THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND AND AGRICULTURAL PROGRESS 1838-1880

'The agricultural history of the period is as stirring... as is the social and political history in the midst of which we have grown up.'

- John Chalmers Morton (1820-1888)
26 December 1881

1981

by

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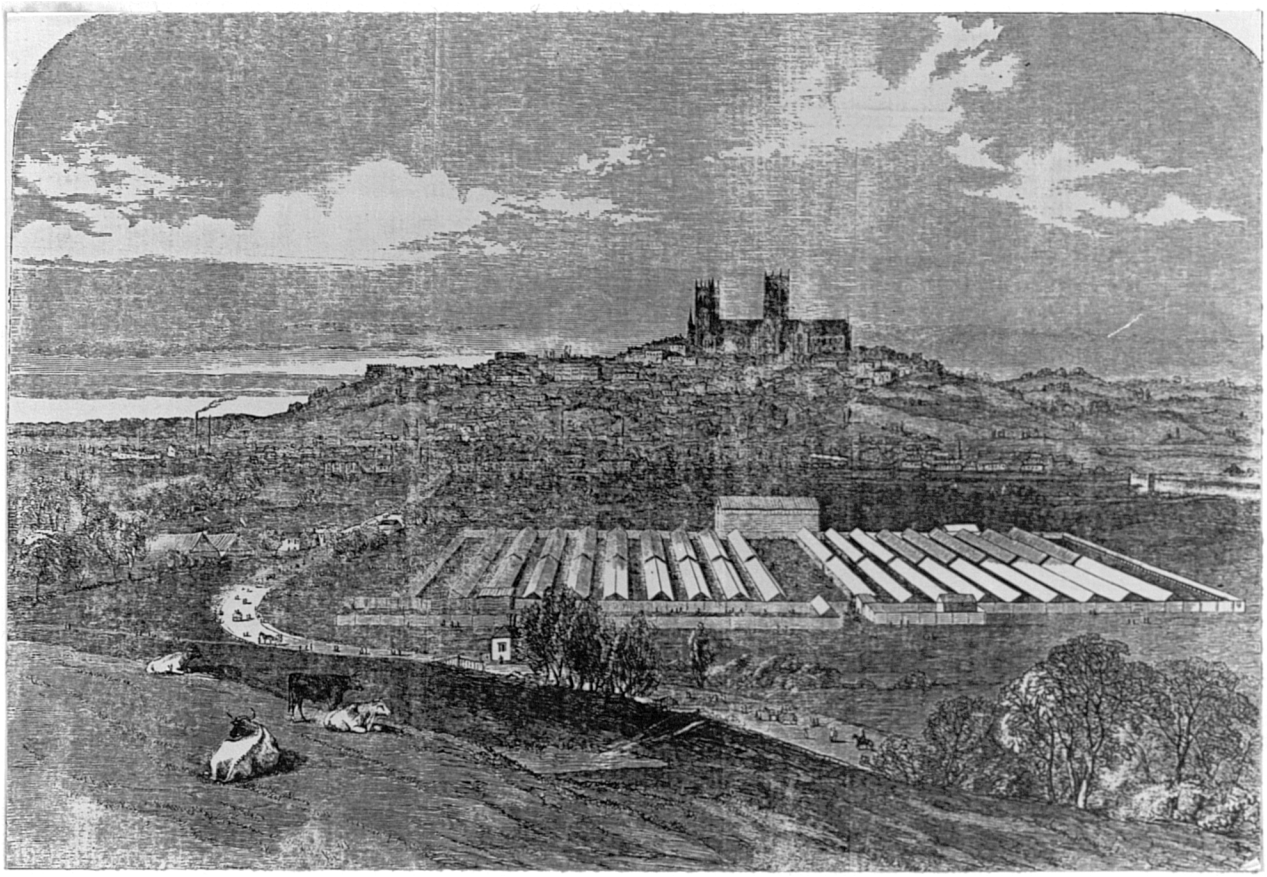
FRONTISPIECE: THE SOCIETY AT LINCOIN 1854.



Source: Illustrated London News.

(22 July 1854, p.60)

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ABSTRACT

The Royal Agricultural Society was founded in 1838 by a group of landowners, agricultural journalists, and 'enthusiasts' who were much impressed with the potential of 'science' for raising the productivity of English agriculture. Although the economic foundations of their programme were uncertain, the adoption of improved agricultural technique was seen by the Society's founders as essential to maintain rural prosperity and to fulfil the agriculturist's obligation to provide the food requirements of an expanding industrial population. The Society was associated with most of the agricultural innovations, and problems, of Victorian 'high-farming'.

The study reviews the development of agricultural information sources such as farming literature and national and local societies up to 1838 and the circumstances which led to the formation of the 'Royal' are outlined. Its membership, links with the agricultural community, and relation to other agricultural information sources and organisations are surveyed. Chapters are devoted to the major areas of the Society's activities - the publication of a Journal, the annual country-meetings, and consultancy and education. A number of controversies and problems such as the question of the Journal editorship, the 'prize-system', fertiliser adulteration, and cattle disease policy are examined. Attention is focussed upon the wider impact and significance of the Society's work and on some of the agricultural personalities of the period. A short concluding chapter suggests that although the advanced methods promoted by the Society did lead to some worthwhile productivity increments the optimism of the 1840s over what 'science' could do for agriculture was not justified and some of the new techniques, such as deep drainage, were seriously flawed. Between 1838 and 1880 the agriculturist had to face a number of problems, such as animal disease and the labour difficulty, and the conclusion suggests that J.C. Morton's assessment of early and mid-Victorian agricultural experience (of which the Royal was an integral part) as a period of 'rough education' for the farmer may be a more apposite description than of a 'golden age'.

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Chickenden Farmhouse,
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Abbreviations

A.G.	:	Gardener's Chronicle and Agricultural Gazette (Gazette published separately after 1873)
B.W.M.	:	Bell's Weekly Messenger
A.H.	:	Agricultural History
A.H.R.	:	Agricultural History Review
B.P.P.	:	British Parliamentary Papers
E.H.R.	:	Economic History Review
F.M.	:	Farmer's Magazine
Journal	:	Journal of the Royal Agricultural Society of England (In Bibliography : J.R.A.S.E.)
M.L.E.	:	Mark Lane Express and Agricultural Journal

Figures in parentheses indicate a series number

CHAPTER I : AGRICULTURAL PROGRESS AND THE QUEST FOR INFORMATION

The Context of the Study

The Royal Agricultural Society of England was founded in 1838 [1] with the aim (as embodied in its motto 'Practice with Science') of encouraging the application of science to agriculture, the stimulation of agricultural progress and development, and the generation and diffusion of agricultural information, especially in its scientific and technical aspects. Its formation was the outcome of the efforts of a small group who attached at least as much importance to the development and 'intensification' of English agriculture as they did to legislative means to achieve rural prosperity. Leading members of the group were William Shaw, first editor of the Mark Lane Express and Agricultural Journal, the most influential of the nineteenth century agricultural newspapers, the third Earl Spencer, Whig politician and agricultural 'enthusiast', and Henry Handley, Member of Parliament for Lincolnshire. The 'Royal' was not the first national institution in England to take an interest in agricultural improvement but the antecedent institutions were either specialised, such as the Smithfield Club, had agriculture as only part of their programme, such as the Society of Arts, or were short-lived, such as the 'old' Board of Agriculture (1793-1822). The activities of these earlier institutions, and local agricultural associations, are reviewed in the sections which follow within the context of the development of 'institutional' means to aid the spread of agricultural information.

A question which immediately arises is why 1838 was deemed a propitious time for the launch of a national agricultural institution. The answer given

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[1] As the 'English Agricultural Society'; it took the 'Royal' prefix in 1840 when it received its Charter and Queen Victoria became its patron.

by Professor J.A. Scott Watson in his centenary survey of the Society's work was that England was too large a unit to be embraced in a single agricultural association before this time. [1] This is not a very convincing explanation because the difficulty of internal communication, by no means overcome in 1838, was not the reason for the failure of the 'old' Board sixteen years previously, and the founders of the Royal took some inspiration from the model of the well-established Central Paris Society and other continental agricultural societies as well as the Highland and Agricultural Society of Scotland, founded in 1784. The rapid extension of the railway system in the 1840s facilitated the holding of a national agricultural show each year by the Royal in a different provincial locality each year instead of in the metropolis, but the reasons for the foundation of the Society may be better understood in the following terms.

In the late eighteenth century there had been considerable enthusiasm for agricultural 'improvement' of all kinds, but more particularly enclosure, new crops, better rotations, and improved stock. Information on these advances were spread, albeit inefficiently, by the agency of individuals, local societies, and an increased output of agricultural literature; the 'old' Board of Agriculture unsuccessfully attempted to give direction to this enthusiasm. There was not a great deal of attention given at this time to the scientific basis of agriculture although there was considerable interest in agricultural experimentation [2] and explorations in agricultural chemistry by a limited number of writers such as Earl Dundonald, William Grisenthwaite, and, most notably, Humphrey Davy. This enthusiasm for

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[1] The History of the Royal Agricultural Society of England 1839-1939, 1939 p.14.

[2] See G.E. Fussell, 'Agricultural Science and Experiment in the Eighteenth Century: an Attempt at a Definition', A.H.R., 24, 1976, pp.44-7.

agricultural improvement noticeably diminished with the fall in agricultural prices on the cessation of the Napoleonic Wars and to an extent it was replaced by clamours for legislative support for agriculture in a high level of protection. After 1819, currency reform was added to the programme of some sections of the 'agricultural interest' and repeal of the Malt Tax held perennial appeal. In the early 1820s it may be, as Mitchison has suggested in accounting for the demise of the 'old' Board, that there was little demand or support for an essentially 'non-political' society devoted to the cause of agricultural improvement. [1]

During the 1820s and 1830s English agriculture was by no means uniformly depressed but there were recurrent outbreaks of agricultural 'distress' into which there were repeated inconclusive parliamentary inquiries. It was a relatively barren period for the development of agricultural science in England:[2] much more was being done on the continent by pioneers such as Von Thäer, Schubler, Berzel ius, Sprengel, and de Candolle. Although their writings probably did not have a very wide circulation in England it seems that they were read by a small group of agricultural enthusiasts - William Shaw, with his close associate Cuthbert Johnson, translated Thäer's work as Principles of Agriculture in 1844.

If agricultural science per se made rather little progress during the early part of the nineteenth century there were, nevertheless, by 1838 a number of accumulated agricultural questions of a technical and scientific nature which the more far-seeing members of the agricultural community thought ripe for answer. A good example was the action of fertilising agents; the use of bones as

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[1] Rosalind Mitchison, 'The Old Board of Agriculture 1793-1822', English Historical Review, LXXIV, 1959, p.65.

[2] Noted by E.J. Russell, A History of Agricultural Science in England, 1966, p.77; G.E. Fussell, Crop Nutrition: Science and Practice before Liebig, 1971, p.185.

fertiliser had increased since the early 1820s, but they had been found to be far from uniform in their efficacy, and the reason why this was so led to consideration of the whole question of the food of plants and indicated a clear convergence of interest between 'science' - in this example, the theoretical understanding of plant nutrition - and 'practice' - the best means of fertilising the land. The inconclusive Select Committee on Agricultural Distress in 1836 drew attention to the divergence in productivity between the heavy clay lands (historically the best wheat-producers) and the lighter soils which had most benefited from the eighteenth century advances in agricultural practice. It also brought publicity to Smith of Deanston's 'thorough' draining as a remedy of great potential to narrow this widening productivity differential. The same year also witnessed experiments in steam ploughing which attracted the attention, among others, of Henry Handley.

Thus at the time of the foundation of the Society there was a conviction in the minds of men such as Shaw and Spencer that there was a great deal of potential for raising the productivity of English agriculture which would only be realised by the application of 'capital' and 'science' although the precise terms in which this was so and what was understood as 'science' was not always very clearly specified. At a presentation of plate to William Shaw in 1843 in recognition of his services to the agricultural community, the Chairman (Francis Pym) maintained that agriculture should now be considered as a science and draw upon the knowledge which had 'raised commerce and industry to such a height as almost to throw agriculture into the shade'.[1] Chemistry was seen as having particular relevance to the practice of agriculture.[2] A quest for

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[1] 'Testimonial to William Shaw Esq.', F.M.(2), VII, 1843, p.54.

[2] 'The Application of Science to Agriculture', Ibid., pp.41-2.

knowledge was in conformity with the spirit of the times. Spencer talked of agriculture as being in its 'infancy' [1] while Grey of Dilston looked to that 'grand disideratum... of basing the practice of agriculture upon scientific principles...' which had made little progress. [2] The immediate background of the formation of the English Agricultural Society was the failure of the Central Agricultural Society in December, 1835. This, though nominally concerned with 'improvement' had been much more interested in 'political' matters, especially the currency question. The founders of the English Agricultural Society were convinced that an institution dedicated to the technical and scientific aspects of farming would only prosper if 'politics' were rigorously excluded and the policy was rigorously adopted from the outset. This contributed to the success of the Society in the 1840s, especially when the debate over the Corn Laws was at its height, but later led to diffculties when the range of agricultural questions which were in some sense 'political' but not 'party-political', such as agricultural statistics and cattle disease policy, increased. These matters became as much part of 'agricultural progress' as fertilisers or drainage, but upon which the Society failed to give a lead because of the restrictions contained in its Charter.

It cannot be said that the Society's founders had anything like a coherent programme mapped out, neither could one be reasonably expected. In 1838 'science' had contributed little to agricultural practice and the means by which agriculture could be raised from its 'infancy' were far from clear. The economic basis of the 'intensification' envisaged by the

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[1] At the Smithfield Club dinner December 1837, reported in F.M., VIII, 1838, pp.47-8.

[2] John Grey, 'A View of the Past and Present State of Agriculture in Northumberland', Journal, II, 1841, p.155. The views of the promoters of the Society are considered in more detail in the later section which deals with the Society's formation.

founders was obscure. William Shaw published many articles in the Mark Lane Express which suggested ways in which agricultural output could be raised yet he held 'over abundant supply' to be at the basis of the agricultural depression between 1833 and 1835. At the same time he considered that it was 'absurd' to expect legislation to keep up agricultural prices which he thought would only give extra advantage to the light soils at the expense of the heavy land, the 'chief supplier of wheat before the new system of husbandry was brought in'. [1]

The factor of increasing population was perceived as an important underpinning of the proposed programme of agricultural development, which Cuthbert Johnson saw as essential to counter the Malthusian prediction of population outstripping food supply [2] while a few years later Chandos Wren Hoskyns, one of the most talented of Victorian agricultural writers and who played a prominent part in the proceedings of the Society for some thirty years, wrote in the Agricultural Gazette of the thousand-a-day increase in population which necessitated 'an indefinitely increasing supply of food to a constantly increasing demand'. [3] As the increase in food production seems to have just kept pace with population growth up to this time, although supplies were often subject to interruption and short-run setbacks due to such factors as adverse weather and distribution problems, [4] it is difficult to maintain that demand was a factor that encouraged the programme of agricultural intensification urged by the founders of the Society. Thus contemporaries appear to have perceived population growth as an 'independent

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1 'Committee of House of Commons on the State of Agriculture - Mr. Shaw Le Fevre's Report', F.M., V, 1836, p.235.

2 F.M., VIII, 1838, p.163.

3 A.G., 3 January 1846.

4 J.D. Chambers and G.E. Mingay, The Agricultural Revolution 1750-1880, 1966, p.127. For a broad view of the post-medieval increase in wheat yield see G. Stanhill, 'Trends and Deviations in the Yield of the English Wheat Crop during the last 750 Years', Agro-Ecosystems, 3, 1976, pp.1-10.

variable' and that the agriculturist had a duty to prepare in advance for the expected demand that an increased population would generate. This touches upon the highly controversial debate as to whether population growth is a cause or consequence of agricultural change. In what has become known as the 'Boserup thesis' it is held that population growth is the prime cause of agricultural intensification which is seen as initially independent of the food supply. [1] While there is no uniformity of opinion as to the relations between agricultural change and population growth in the British Isles (and the Western World generally) it has been maintained that 'it is no longer obvious that the acceleration of population increase in the eighteenth and nineteenth centuries was simply a function of the changes brought about by the industrial and agricultural revolutions' [2]; the perception of the supporters of the Royal Agricultural Society in the late 1830s might be summarised as that agriculture had kept pace with demand up to that period (hence low prices at times) but that population was increasing and it was up to the agriculturist to respond to the challenge.

It was also maintained by some that it was possible for the agriculturist to create a demand by lowering the price of agricultural commodities. This would increase consumption, allow the farmer to sell more and so ensure his prosperity. This argument was most clearly stated by Hoskyns. His message to the readers of the Agricultural Gazette, for which he frequently wrote leaders, was that it was not the price of agricultural commodities that was all important in determining farming profitability. Rather, it was

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[1] Ester Boserup, The Conditions of Agricultural Growth, 1965. For a recent discussion, see David Grigg, 'Ester Boserup's Theory of Agrarian Change: a Critical Review', Progress in Human Geography, III, 1979, pp.64-84.

[2] D.B. Grigg, 'Population Pressure and Agricultural Change', in C. Board et al., ed., Progress in Geography, 8, 1976, p.138.

yield from a given space which was crucial. Increased yield could lead to a decreased price but thereby also an increased demand that would more than compensate the farmer. The ill-fed would then consume more, while the well-fed would demand better quality and thus provide the basis for profitable enterprises such as beef and bacon production. Although Hoskyns was in advance of opinion generally, his inclination to contrast the prosperity of manufacturers (agricultural writers of the time were characteristically oblivious to the recurrent periods of industrial depression) with the relative poverty of many agriculturists found a wider response. Hoskyns attributed the success of manufacturing to the application of capital, invention, and lowering of price by scale economies and queried why a 'truth positive to the loom be negative to the plough'; a correspondent to the Mark Lane Express a decade before Hoskyns was writing had maintained that 'in the midst of this activity of the manufacturing and commercial world, the agricultural stands in stupid apathy'. [1]

The extent to which agricultural protection was viewed as a necessity for a programme of agricultural intensification or, alternatively, 'high-farming' was the 'best substitute' was an area where opinion was anything but unanimous. In the 1830s, as we have seen, Shaw was not inclined to put too much stress on legislative means in order to maintain farming prosperity, although protection was seen as necessary to compensate for the burdens of tithes and the poor-rate. With the foundation of the Anti-Corn Law League late in 1838 [2] his view seems to have hardened and in the 1840s he

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[1] A.G., 7 February, 25 July 1846, 30 June 1849; M.L.E., 4 January 1836.

[2] Norman McCord, The Anti-Corn Law League 1838-1846, 1958.

gave support to movements which argued the case for continued protection, although with some qualification; it was necessary, he thought, 'to retain the protection required by the British farmer as regards any disadvantages under which he may labour as compared with the foreign grower' but protection could not be justified without a programme of agricultural improvement to produce 'the greatest possible quantity at the cheapest rate'. [1] Although Shaw considered that the tenant farmers were let down by the landlords over the issue, and maintained that they had not been sufficiently energetic in stating their case, [2] the principle of protection was not maintained in a narrow unquestioning way: Shaw was quite prepared to publish in 1843 a long article which maintained that protection had acted against the interests of farmers [3] and soon after the passing of the legislation of 1846 posed the question 'Is it not possible that we may have been mistaken in our views?' (in upholding the principle of agricultural protection). [4] When Caird's famous pamphlet was published three years later, [5] however, Shaw maintained that the argument that 'high farming' was the 'best substitute' was not 'proved to our satisfaction' [6] a view in contrast to that of Morton in the Agricultural Gazette who warmly endorsed Caird's arguments. [7]

Shaw's views on protection, especially in relation to agricultural improvement, are instructive, given that the Royal was in a large part his own creation and the journal that he edited was the most important agricultural

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1 M.L.E., 19, 26, February 1844.
2 Ibid., 9 February 1846.
3 'The Corn Laws', F.M.(2), VII, 1843, pp.177-82.
4 M.L.E., 1 June 1846.
5 James Caird, High Farming under Liberal Covenants the Best Substitute for Protection, 1849.
6 M.L.E., 28 May 1849.
7 A.G., 5 May 1849.

publication of the time. In his position as the editor of a paper which professed to support the tenant farmer's interest he could hardly declare in favour of free-trade. As it was, he had to deny that the Express was an advocate of free-trade opinion, [1] and when Hoskyns put forward his argument in the Gazette that it was yield per unit area that was a more important consideration than price there were complaints that such a view was 'diametrically opposed to the feelings and opinions of a great bulk of readers', [2] although he had to admit that it was an 'affection' [3] to ignore, as he and Morton were inclined to do, the debate which aroused such heights of feeling in the rural community. In varying degrees these leaders of agricultural opinion probably perceived the long-term inevitability of the abandonment of protection, and there was a clear link with the interest in more intensive farming. Shaw declared that if the tenant-farmer was to be forced into competition, he must have all the advantages which could be afforded him [4] and Hoskyns thought that given improved methods, the English farmer 'could challenge the world to a ploughing match and beat them on their own ground'. [5] That the majority of the agricultural community were unconvinced by such sentiments is readily understandable for there was little tangible evidence that 'science' could compensate for a lack of protection. The possibility of higher yields also brought with them higher costs - for external inputs such as guano and also drainage work - and probably higher rents, while some of the protagonists of scientific farming looked for an increase in labour inputs into English agriculture. Shaw maintained that it was essential for agriculture to be seen as a source of employment, not merely as a supplier of food

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1 M.L.E., 20 April 1846.
2 A.G., 3 January, 7, 14 February 1846.
3 Ibid., 7 February 1846.
4 M.L.E., 9 March 1846.
5 A.G., 7 February 1846.
6 M.L.E., 27 May 1844.

while the interest in agricultural improvement by such supporters of the Royal as Philip Pusey was given rationale by the programme of rural renovation that was implied by agricultural developments. This would increase rural employment and alleviate distress and poverty. [1]

These range of views indicate the economically uncertain foundations of the programme of agricultural intensification envisaged by the founders of the Society. An increase in output might necessitate the maintenance of protection to uphold a profitable price for the home market for agricultural products, but many of the promoters of the new Society had no great desire to see that principle maintained. If the principle of protection were to be abandoned, either through political pragmatism or economic necessity, then the programme envisaged by the protagonists would still be relevant, but here it would be so more through the adoption of cost-reducing methods and greater efficiency. However, it was not specified how the new methods would be cost-reducing especially as there was, in the wake of the rural incendiarism of the 1830s, often a disinclination to develop potentially labour-saving machinery, and Shaw and Pusey saw the maintenance of rural employment as part of the wider social objectives of the new Society. In the light of these sometimes contradictory economic underpinnings, and the fact that itwas as yet little more than the vague promise of agricultural benefits from 'science' for the future, the launch of the new Society was a great act of faith in the idea of 'progress' and the fact that it could attract over two thousand paid-up members in less than two years is a considerable tribute to the enthusiasm that its leaders were able to

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[1] R.W. Linker, 'Philip Pusey, Esq., Country Gentleman 1809-55', unpub. Ph.D. thesis, Johns Hopkins University, 1962, pp.459-62, 515.

generate and the propaganda machinery at their disposal.

Among these leaders were many who, as Kitson Clark remarked, took a wider view of agriculture and its place in the national economy than that which was presented from the 'parlour of their country-home'. [1] As the Royal Agricultural Society was strictly non-political from the outset it therefore took no 'position' with regard to the arguments over the Corn Laws; but those who suspected that many of its leading figures had no great commitment to the principles of protection were often not incorrect in their view. These suspicions were given strengthened force when Spencer made a speech at Northampton late in 1843 where he declared his position against the Corn Laws, [2] and thus openly joined another founder-member of the Society whose views were already known - Earl Fitzwilliam, who had written a number of pamphlets attacking the Corn Laws during the 1830s. [3]

These two Whig land owners and politicians were by no means alone in their views; Peel was also at the founding meeting of the Society in 1838, and over thirty years later Edward Bouverie Pusey (the Oxford Tractarian) recalled how his brother (Philip) saw 'long before others' that the Corn Laws must be repealed and that the call of 'cheap bread' could not and ought not to be resisted. [4] Pusey did not declare his position openly, but R.W. Linker has shown us the battle that he had to fight in the early 1840s between his conviction (that in the longer term the Corn Laws could not be justified) and his conscience - the obligation to represent the views of his rural constituency in Berkshire. Pusey felt justified in voting against Repeal once,

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[1] G. Kitson Clark, 'The Repeal of the Corn Laws and the Politics of the Forties', E.H.R.(2), IV, 1951, p.9.

[2] M.L.E., 1 December 1843, 15 January 1844.

[3] Earl Fitzwilliam, First, Second and Third Addresses to the Landowners of England on the Corn Laws, 1839. See also David Spring, 'Earl Fitzwilliam and the Corn Laws', American Historical Review, LIX, 1954, pp.287-304.

[4] A.G., Literary Supplement, 21 April, 1879, p.17.

but absented himself on the final division after numerous heart-searching letters to Peel, Acland, Portman and others. [1]

Another early leading member of the Royal who declared himself for free trade was Earl Ducie of Whitworth, Gloucestershire, who created something of a sensation when he appeared on the platform of the Anti-Corn Law League and declared that, under free trade in wheat, not one acre of the Cotswolds would be thrown out of cultivation. [2] Ducie's views were condemned by, among others, H.S. Thompson, [3] who was shortly to play an important role in the affairs of the Society, but Ducie is particularly interesting because of his association with the young John Chalmers Morton, editor of the Agricultural Gazette between 1844 and 1888, the outstanding agricultural commentator of the nineteenth century who figures very prominently in this thesis. Morton's father John (1780-1863) was for forty years Ducie's agent and superintended his Whitfield example farm. With Joshua Trimmer, the agricultural geologist, he wrote in 1844 a pamphlet advocating Repeal from an agricultural point of view on the grounds that the farmer himself would come to be one of the largest consumers of grain and that his business would be thus helped rather than hindered by a cheapening of that commodity. [4] J.C. Morton acknowledged the kindness and encouragement that he had received from Ducie and complained that as an agriculturist the Earl never got the full recognition that he deserved. [5] It is therefore not difficult to identify the influence on Morton's thought; like Shaw he could hardly declare his free-trade position in a newspaper for

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1 Thesis, pp.500-37.

2 M.L.E., 3 June, 22 July 1844.

3 Ibid., 7 October 1844.

4 John Morton and Joshua Trimmer, An Attempt to Estimate the Effects of Protecting Duties on the Profits of Agriculture, 1844. For memoirs of John Morton see Journal of the Society of Arts, XII, 1863, p.616 (obituary notice), and A.G., 4 October 1873.

5 A.G., 4 June, 31 December 1853.

agriculturists, but the Corn Law debate was almost ignored in the pages of the Gazette Morton claiming that he was not interested in what he considered to be essentially an argument between landlords and manufacturers. [1] Instead, he left it to his close friend Chandos Wren Hoskyns to write the sort of leaders that have already been referred to, and which aroused the hostility, at the time, of many of the readers of the Gazette.[2] Morton later recalled Hoskyns as having been instrumental in bringing about the gradual growth of free trade opinion among agriculturists. [3]

There were many more agriculturists who were connected with the Society in its early years, were interested in 'scientific' or 'experimental' farming and who were in favour of free-trade. Edward Holland of Dumbleton - another close associate of Morton's - Hewitt Davis, who wrote a number of letters to The Times in the 1830s claiming that agriculturists would not suffer under a free trade regime, and Thomas Dyke Acland are other prominent figures that readily come to mind in this context. [4] This is not to claim that by any means all of the leading founding members of the Society entertained such views: E.S. Cayley, M.P., Sir William Miles, M.P., the Duke of Richmond and Robert Baker (of Writtle) were also associated with the Royal, were interested in advanced and experimental farming, but led the opposition to the Anti-Corn Law League in 1844. [5] Still more were initially committed supporters of protection but, like Sir James Graham, changed their minds and supported Peel in 1846, believing (in Graham's words in the third Repeal debate) that the measure would save the nation from 'anarchy, misery and ruin'.

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1 Ibid., 14 February 1846.

2 As did John Morton's pamphlet: see, for example, W. Hainworth, Free Trade Fallacies Refuted, 1846.

3 A.G., 7 January 1871.

4 For Morton's memoirs of these individuals (which stress their early free-trade leanings) see A.G., 10 December 1870, 4 February 1871, 8 June 1872.

5 On this, see George L. Mosse, 'The Anti-League and the Corn Law Crisis of 1846', Historical Journal, III, 1960, pp.162-83; Travis L. Crosby, English Farmers and the Politics of Protection, 1977, pp. 131-5.

It was thus a gross exaggeration for Earl Stanhope to declare in 1843 that the Royal Agricultural Society represented the 'final and fatal triumph of free trade', [1] but there was some association between the founding of the Society and the growth of free-trade opinion among agriculturists. At first sight the position of William Shaw might seem to contradict this because of the editorial endorsement that he gave to local protection societies [2] and the Anti-League between 1844 and 1846; Mosse has drawn attention to the 'full support' that the Shaw-edited Farmer's Magazine gave to protectionists at this time. However, the qualified nature of Shaw's support for protection has already been noted and as Shaw aspired to something like leadership of the agricultural community to give anything else than encouragement for protection associations would undermine his credibility, as Fisher has recently pointed out in a review of Shaw's efforts for a better system of Tenant Right. [3] The opinions of Fitzwilliam Ducie, Spencer, Pusey and the other leading figures that have been reviewed were certainly not representative of agricultural opinion generally. Shaw did not view the Corn Laws as being particularly efficacious, but believed that agriculturists were entitled to some compensation for the various burdens that they had to bear, especially as he considered that agriculture was in an early state of development.

Shaw eschewed the more polemical aspects of the debate and his underlying tolerance of free-trade opinion is well demonstrated in his reaction to Earl Spencer's 1843 speech. He commented in the Mark Lane Express to the effect

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1 Linker, thesis, p.508.

2 'Anti-League', p.35. Most of the articles and reports first appeared in the Mark Lane Express.

3 John Fisher, Tenurial Deficiencies in the English Land System: The Mid-Nineteenth Century Debate, Univ. of Newcastle N.S.W., Australia, Department of Economics Research Report or Occasional Paper No. 58, 1980, p.13.

that the speech was 'ill-advised' and 'not stamped with his lordship's usual discretion', in marked contrast to the view taken in the staunchly protectionist Farmers' Journal which roundly condemned the 'anti-agricultural peer' and his 'cottoncratic allies'. [1] The latter paper may not have been so far off the mark in its claim that not a score of ordinary members of the Royal agreed with Spencer on free trade, but Shaw refused to give space to letters on Spencer and the Corn Laws [2] and took satisfaction in the fact that less than one percent of the Society's membership (sixty-one out of some seven thousand) felt compelled to resign over the matter. [3] It is thus incorrect to claim that 'it was not until Spencer's forceful speech... that the farming community realised their leader was a Judas' [4] for, as Shaw stressed, it was essentially the 'repetition of opinions that we all knew or ought to have known'. [5] To Shaw the Corn Laws were not the semi-mystical symbols for the rural community which united labourers, farmers, and landowners in an affirmation of the ascendancy of land, but a necessary (though not very efficacious) expedient which could be disposed of given better farming methods and certain concessions to agriculturists, conditions which had not been fulfilled by 1846. Among the leaders of the Society, the Corn Laws were probably viewed in more symbolic terms by figures such as Miles and Richmond; very many more of the ordinary members were simply convinced that they would not survive in the competitive environment which they thought would result from Repeal. Those landed aristocracy who did view the Corn Laws in more symbolic terms, were not, on the whole, very prominent in the Society. The best example is probably the Marquis of Chandos and Buckingham

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1 M.L.E., and Farmers' Journal, 15 January 1844.

2 M.L.E., 29 January 1844.

3 Ibid., 27 May 1844.

4 E.A. Wasson, 'The Third Earl Spencer and Agriculture 1818-1845', A.H.R., 26, 1978, p.97.

5 M.L.E., 11 December 1843.

who, in the 1830s, tried to lead farmers' movements and set himself up as a 'farmers' friend', but who did not join the Society and who was not, as Professor Spring has pointed out, much interested in agricultural improvement even on his own extensive estates. [1]

Lord Ernle called the Royal Agricultural Society 'the heart and brain of agriculture' [2] in the nineteenth century. Certainly that is the judgement which the founders of the Society would have hoped could be made of their creation. Yet this view is not a full justification of the thesis, because reasons why Ernle's judgement is less than apposite will be explored in the course of the work; nevertheless, the Society was connected with many of the scientific and technical developments in agriculture which underpinned Victorian 'high-farming'.

The involvement has been quite widely recognised and most general texts on nineteenth century agriculture are not without reference to the work of the Society. Typical is part of a paragraph in Orwin and Whetham:

> ...members of the two [Royal and Highland] national societies could claim that they had greatly benefited farming in the last half of the nineteenth century. They had been pioneers in the analysis of feeding-stuffs and fertilisers, by which adulteration had been greatly reduced; their botanists had encouraged the seed trade in providing purer seeds in better condition; they had propelled the Government into more efficient measures for the control of animal diseases; the experiments supervised by their chemists had elucidated many details of manuring and animal nutrition; their regular tests had facilitated the improvement of farm machinery and

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1 David Spring, 'Lord Chandos and the Farmers, 1818-46', Huntingdon Library Quarterly, XXXIII, 1970, pp.278-80.

2 English Farming Past and Present, 6th edn., 1961, pp.362-3.

> implements; their journals, textbooks, annual shows and regular meetings kept their members in touch with products of science and engineering; their examinations and diplomas provided a foundation for a later growth of agricultural education. [1]

Though some of this needs qualification as the Royal was not always at the head of agricultural progress it is essentially correct and the topics mentioned by Orwin and Whetham will form a large part of the content of this thesis. As the activities of the Society were so extensive with some extremely important individual items, it is remarkable that the work of the Royal Agricultural Society should have been given so little specific consideration. It has received recognition in general surveys of improvement associations [2] but the only work devoted exclusively to the activities of the Royal is J.A. Scott Watson's 1939 centenary commemoration. This, as we would expect from so distinguished a scholar, faithfully records the main outlines of the Society's work during the first hundred years of its existence, but the earlier period is dealt with comparatively briefly, some important issues are ignored, and there is little attempt to trace or assess the overall influence of the Society with regard to the wider picture of agricultural development in a detailed way. There is an interesting discussion in the same author's Great Farmers (with M.E. Hobbs, 1937), but here the treatment is brief, as is a later outline note by A. Hobson. [3] Some aspects of the Society's work are considered by Kenneth Hudson in Patriotism with Profit: British Agricultural Societies in the Eighteenth and Nineteenth Centuries (1972) but the approach

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[1] C.S. Orwin and E.H. Whetham, History of British Agriculture 1846-1914, 1964, p.384.

[2] Such as T.H. Middleton, Early Associations for Promoting Agriculture and Improving the Improver', Reports of the British Association for the Advancement of Science, 1912, pp.709-30.

[3] Practice with Science: a Brief History of the Royal Agricultural Society of England, 1953 .

here is limited as it does not go much beyond the descriptive level. More indicative of the value of an analytical approach which places the Society's work in the context of the development of scientific knowledge about agriculture is Lynette J. Peel's short review of the first twenty years of the Society's scientific interest. [1] It is not easy to account for the lack of extended examination of the Society and its work, though the neglect is part of a failure by historians of English agriculture to give adequate consideration to such questions as how information was generated and spread among farmers. Thus neither the Royal, nor the numerous local farming associations, nor the printed media (apart from bibliographic studies) have received anything like the attention that they deserve. It is part of the argument of this thesis that this neglect has led to a considerable lacuna in our understanding of the process of nineteenth century agricultural change, an assertion the next section seeks to justify: here some recent studies which are beginning to fill this gap are reviewed, and the thesis may be seen as a contribution to this developing interest.

The period covered by this study is comparatively short, terminating as it does in 1880, but it was one which was exceptionally rich in agricultural innovations. Towards the end of his long career Morton looked back over the period and recalled what he thought were some of the 'momentous' agricultural events that had taken place:

> The National Agricultural Society... the writing of Liebig... the interest aroused by the Rothamsted studies... agricultural statistics... foreign cattle diseases... artificial manures... developments in butter and cheese making... [2]

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[1] 'Practice with Science: the First Twenty Years', Journal, 137, 1976, pp.1-14.

[2] A.G., 26 December 1881.

and many more items could be added to this list. It has been maintained that in the overall development of English agriculture 'only one short period 1880-1914 was plausibly free from profound technical changes'. [1] While it might be doubted if 1880 really heralds the start of the period which was free from technical innovation - dairy technology, silage-making, the use of basic slag are among developments of the last two decades of the nineteenth century which might justify such doubts - it does seem at least to mark a slowing down of a period of rapid technical change which dated from about the time of the foundation of the Royal Agricultural Society in the late 1830s. The year 1880 is also significant on economic grounds. Though a number of 'turning points' [2] have been postulated for the transition from the ephemeral 'golden age' of Victorian agriculture sandwiched between the short-run agricultural depression following the Repeal of the Corn Laws (ending in 1852) and the harsher economic climate for agriculture of the 1870s, by 1880 many agriculturists, particularly the arable farmers of the south and east were clearly operating under difficulties mostly occasioned by the price-falls brought about by low-cost agricultural imports but exacerbated by exceptionally adverse weather conditions. The dejected appearance of the Society's Kilburn showground in 1879, when the show coincided with a period of torrential rain, seemed to symbolise the 'gloom' that then pervaded 'all things agricultural'. [3]

It is however neither the question of technical innovation nor economic considerations which justify the choice of terminal date of the period covered by this thesis. It is rather a combination of the two, and in the following

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[1] F.M.L. Thompson, 'The Second Agricultural Revolution 1815-1880', E.H.R.(2), XXI, 1968, p.66.

[2] P.J. Perry, British Farming in the Great Depression 1870-1914, 1974, p.1.

[3] F.M.(3), LVI, 1879, p.90.

sense. As a response to low prices and accompanying rural distress in the late 1870s, agriculturists were sometimes urged to further intensify their systems of cultivation. This was the substance of a speech made by Lord Derby in 1879, which received a good deal of attention in the agricultural press. Significantly, it was J.B. Lawes, doyen of nineteenth century agricultural researchers, who pointed out that this was not a realistic solution. He stressed, (in a well-publicised address to the Berwickshire Farmers' Club) that although the adoption of artificial fertilisers during the preceding forty years had been instrumental in raising yields, there was not infinite progress that could be made in this direction under the technical knowledge then available and that Derby's contention that the land could then be made to yield twice as much was fallacious because further fertiliser inputs would give diminishing returns per unit expended. [1] A yield increase would have to await new technical development - as in plant breeding which was essentially an untouched area at that time. Morton, who had taken an exceptional interest in agricultural progress in its technical and scientific aspects over four decades, argued for a changed direction on the part of the Society in 1879. He held that the Society had taken the initiative in a series of improvements and had carried out its 'first programme' in uniting science with practice and stimulating invention in every department of farming. Although the Society's 'mission' was not fulfilled nor its work finished in 1879, Morton maintained that its main preoccupation should be no longer with 'the invention of machinery, and breeding of animals, and chemical manures, and in the careful comparison of novelties in the showyard'. Instead, 'new departures' were needed in the field of agriculture and there were more on the 'political' side of things - to try and attract greater attention and

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[1] A.G., 19 May, 7 July 1879. See also 'High Farming a Remedy (?) for Lower Prices', in Morton's Almanac for Farmers' and Landowners, 1881, p.43.

sympathy for the position of the farmer in a country which, Morton recognised, was coming to depend much less upon the home agriculturists' efforts. [1]

It is thus in the sense of a completion of the 'first programme' of the Society's work that the terminal date of this thesis is justified, and it is also maintained that the period was one of exceptional importance to the technical development of English agriculture, not merely by virtue of the number of innovations but by their very nature. For, despite a note of dissent by E. Kerridge, [2] the significance of what Nigel Harvey has distinguished as the 'technical revolution' as opposed to the earlier 'agrarian revolution' [3] (made so much of by Kerridge) [4] has been quite widely recognised. The 'agrarian revolution' consisted of raising productivity by what may be termed 'natural' means - new crops, improved rotations, better animal breeds, and an increased stocking rate to maintain fertility levels within the improved farm structures made possible by Parliamentary Enclosures. Though there is good reason for thinking that the improvements brought about by these means were not unimpressive, there were limits as to what could be done in this direction in the nineteenth century, and therefore more intensive nineteenth century techniques had to use 'external inputs' to farming systems on an extensive scale. Thus E.L. Jones has stressed the importance of purchased fertilisers in Victorian intensive farming systems, [5] which F.M.L. Thompson has termed breaking the 'close-circuit system' as part of his 'second agricultural revolution' starting in 1815 and the 'force of which was spent' by 1880. [6] Though there has been considerable

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1 Ibid., 23 June and 14 July 1879.

2 'The Agricultural Revolution Reconsidered', A.H., XLIII, 1969, p.465.

3 The Farming Kingdom, 1955, pp.30-52.

4 Principally in his The Agricultural Revolution 1500-1750, 1967.

5 'The Changing Basis of English Agricultural Prosperity, 1853-73', A.H.R., X, 1962, p.104.

6 E.H.R.(2), XXI, 1968, pp.64-5.

- and rather inconclusive - debate about the impact of these new techniques (more particularly on the heavy-land sector of English farming) [1] they excited tremendous interest among Victorian agriculturists. The successful harnessing of science to agriculture - which is what the founders of the Royal Agricultural Society set out to do - has brought about profound changes in the agriculture of developed countries during the twentieth century and has given the Western World its often very intensive high-output agricultural systems which can support a large non-agricultural population. The Victorians were able to utilise some accumulated 'stores' of nutrients (such as guano) as part of their external system-inputs as well as manufactured 'artificial' fertilisers (most notably superphosphates) but in the longer term manufacture, particularly of nitrogenous fertilisers, has become much more important. Unfortunately, the manufacturing processes consume a great deal of energy, as do the modern intensive farming systems upon which we have become so dependent. [2] It is for this reason - as energy has increased in cost in recent years - that there is so much renewed interest in the 'natural' systems which were partially superseded during the Victorian technical revolution in agriculture. An example is in the growing of improved leguminous crops

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[1] R.W. Sturgess, 'The Agricultural Revolution on the English Clays', A.H.R., XIV, 1966, pp.104-21; E.J.T. Collins & E.L. Jones, 'Sectoral Advance in English Agriculture', Ibid., XV, 1967, pp.65-81; R.W. Sturgess, 'The Agriculture Revolution on the English Clays: a Rejoinder', Ibid., pp.82-87; E.H. Whetham, 'Sectoral Advance in English Agriculture: a Summary', Ibid., XVI, 1968, pp.46-8; A.D.M. Phillips, 'Underdraining and the English Claylands, 1850-8 a Review', Ibid., XVII, 1969, pp.44-55.

[2] On this see C.R.W. Spedding, The Biology of Agricultural Systems, 1975 especially pp.9, 74-5; Gerald Leach, Energy and Food Production, 1976; C.R.W. Spedding and J.M. Walsingham, 'The Production and Use of Energy in Agriculture', Journal of Agricultural Economics, 27, 1976, pp.19-29; Lynette J. Peel, 'Science, Energy and Agriculture since 1800', Acta Museorum Agriculturae Pragae, XII, 1977, pp.60-7; I.G. Simmons, 'Ecological Functional Approaches to Agriculture in Geographical Contexts', Geography, 65, 1980, pp.305-16.

for nitrogen fixation.[1] Though the wheel has not yet come 'full circle' it is aspects of part of the outward trip on the path of progress which had such profound repercussions, with which this thesis, in its broader context, is concerned.

In detail the thesis considers the Royal Agricultural Society's work in the generation and spread of information (and mis-information) on the technical and scientific aspects of agriculture during the period of Victorian 'high farming' through its support and encouragement of research, its publications, and its shows. Although there are aspects of the Society's internal history which have their interest and are relevant in understanding the Society's role and impact, the emphasis in this thesis is firmly in examining its broad position within the agricultural community as a whole, for it is only in this wider context, as part of a complex web of information systems, that any worthwhile understanding of the part that it played in the 'agricultural progress' of the period can be arrived at. Not least, too, the thesis is concerned with some of the outstanding agricultural personalities who helped to direct the course of events during the period considered. Several of these figures are quite well known - Pusey, Mechi, and Morton are examples - although even here there are aspects of their impact upon the agricultural scene which have as yet been very imperfectly explored. Others, such as William Shaw the founder of the Society who many contemporaries saw as the most influential agriculturist in the 1840s, Samuel Sidney, the Society's most persistent critic during the 1850s and 1860s, and Henry Corbet, who commented extensively upon the Royal's work as editor of the Mark Lane Express between 1853 and 1875, have been almost entirely ignored by agricultural historians of the period and it is hoped that this thesis will help to restore recognition of their rightful place at the centre of the Victorian agricultural stage.

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[1] Spedding and Walsingham, p.27.

In 1973 the archives of the Royal Agricultural Society were deposited at the Museum of English Rural Life at the University of Reading. These records consist of the Minutes of the Council which met each month (or more frequently if business so necessitated) and made policy decisions. In addition, there are the Minutes of the various committees which were kept with varying degrees of exactitute but are usually brief. [1] The records of the Society are, on the whole, disappointing as a source for they often give little indication of how decisions were arrived at and are extremely concise. Despite the limited utility of the Society's archives the Minutes have been extensively consulted in preparation of this thesis as they have importance in marking the development of the Society's work and showing, to some degree, the contributions of individuals and varieties of opinion. As the Minutes of the Council meetings were published with little revision in the Farmer's Magazine from 1841 onwards and that journal is relatively more accessible, the appropriate Farmer's Magazine reference has usually been given in citation of the Society's Minutes. Of the unpublished material of the Society, Minutes of the initial Committee of Management between 1838 and 1840, and some of the Minutes of the Journal Committee (which are typically sketchy) in the late 1850s have been most valuable in throwing light upon the Society's affairs. There is little surviving correspondence for the period covered by this thesis, apart from one letter-book (1838-44) which deals with mostly routine matters. The Minutes of the Old Board of Agriculture (which have also been consulted) were given to the Royal Agricultural Society by George Webb Hall and are also now located at the Museum of English Rural Life.

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[1] The Society Records have been classified by the Museum of English Rural Life, University of Reading: see A List of the Historial Records of the Royal Agricultural Society of England, 1973.

The most valuable sources for this thesis are the agricultural periodicals, newspapers, and pamphlets of the period (including the Society's own Journal). These are fully discussed during the course of the work but the most important are the Mark Lane Express, Farmer's Magazine,[1] Agricultural Gazette and, to a lesser degree, Bell's Weekly Messenger which, along with other titles, have been very extensively consulted. Apart from their sheer utility, use of the newspapers and periodicals has been vital to the approach and argument that has been adopted; this is essentially that to understand fully the way in which farmers perceived and reacted to new techniques, and how they made their decisions about them, we need to study their comment, discussions, and reactions, and an analysis of the printed media (but particularly the farming newspapers) is the best way of doing this. Other important sources are the various Parliamentary Select Committee Minutes on agricultural subjects, and the personal papers of certain of the leading figures, such as Pusey and Richmond. Full attention to the attitudes to, and perceptions of, technical change, is considered necessary as a counter to the more economic emphasis which, as Perry has pointed out, has tended to characterise much writing on agricultural history.[2] This is not to deny that decisions are often made primarily on an economic basis, but for full understanding we need to take account of the infinitely complex world of perceptions, attitudes, meaning, and experience.

In the following introductory sections, theoretical approaches to the spread

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[1] The seriation of the Farmer's Magazine is as follows: First Series vols. I-VIII, 1834-8; New Series, vols. I-III, 1838-9; Second Series, vols. I-XXIV, 1840-51; Third Series vols. I-LIX (iii), 1852-1881. It should be noted that both volumes of the Third Series, 1860, were numbered 'XVIII' (there is no XVII), Vol. XLVII, 1875, is numbered XLVI on the cover only and this error persists to the end of the series. The British Farmer's Magazine has identical content after 1846.

[2] P.J. Perry, 'Agricultural History: a Geographer's Critique', A.H., XLIV, 1971, pp.259-67.

of agricultural information are briefly considered with reference to recent work which utilises some of these concepts in an historical context. There then follows a survey of the development of 'formal' information sources up to the time of the formation of the Society, the details of which are then outlined along with the early development of the Society's activities, its links with the agricultural community, and alternative information sources up to 1880. This leads to the major sections of the thesis on the Journal, country meetings, and consultancy and education. A concluding chapter attempts to make some overall assessment of the influence of the Society on the course of agricultural progress and a brief 'postcript' outlines the Society's activities between 1880 and 1906, when it was reorganised after a disastrous attempt to establish a permanent showground in West London between 1903 and 1905.

The Acquisition of Agricultural Information, Present and Past

Studies of twentieth century agricultural change and development have given considerable attention to the means by which farmers acquire information about new agricultural techniques and the psychological, cultural, and economic factors that determine their reaction to information, which in turn influences the rate of adoption of agricultural innovations. Workers in this area have at their disposal a formidable body of theory and case studies derived from both the 'rural sociological' and 'diffusionist' schools of approach which have given rise to a number of generalisations about the ways in which agricultural information is obtained and evaluated. [1]

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[1] For convenient summaries of this work see Herbert F. Lionberger, The Adoption of New Ideas and Practices, 1960; G.E. Jones, 'The Adoption and Diffusion of Agricultural Practices', World Economics and Rural Sociology Abstracts, 9, 3, 1967, pp.1-34; L.A. Brown and E.G. Moore, 'Diffusion Research in Geography: a Perspective', in C. Board, et al., Progress in Geography, I, 1969, pp.118-57; Everett M. Rogers and F. Lloyd Shoemaker, Communication of Innovations: a Cross-Cultural Approach, 1971.

Agricultural innovations -widely defined to embrace all new, improved, or modified components of agriculture, including tools, machinery, improved crops or stock, cultivation technique, fertilisers, land improvement, marketing, processing, organisation, and abstract knowledge and ideas [1]- can originate in two basic ways. Firstly, an individual engaged in agriculture can experiment on his own holding and develop a new method or technique, or an improved seed-strain or breed of stock. Alternatively, research may be carried out by specialists not directly involved in agriculture such as the chemist, botanist, or engineer, and their ideas applied to agriculture through a governmental or independent institutional agency, or by a private firm, or individual to fulfil a perceived need. The motive may either be the 'national interest' - the need to raise food-production - or commercial if the innovation is such that it is likely to yield a worthwhile return to its instigators. In either case, if innovations are to become general rather than limited to a few far-seeing individuals or specialists, efficient channels for the flow of information are required.

Two broad categories of communication channel are generally recognised: the inter-personal or 'face-to-face' contact between two or more individuals, and the 'mass media' or impersonal channels. The former include direct contact between farmers and neighbours, advisors from government agencies or research establishments maintained by academic bodies, and representatives from commercial organisations or marketing boards. Mass media include radio, television, newspapers, magazines and journals, commercial or non-commercial leaflets or brochures. [2] Much attention has been given in studies of contemporary agricultural change to the identification of stages in the

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[1] G.E. Jones, p.4.

[2] See Rogers and Shoemaker, pp.252-3; G.E. Jones, pp.16-18; F.E. Emery and O.A. Oeser, Information, Decision and Action : A Study of the Psychological Determinants of Change in Farming Techniques, 1958, especially pp.17-54.

adoption sequence such as 'awareness', 'interest', 'evaluation', 'trial', and 'decision',[1] and the part played by the various media in these stages. Mass media have been held to be of particular importance in the initial stage of stimulating awareness while other farmers, or extension agencies, are believed to be especially significant in the trial phase. As the mass media do not reach all individuals a 'two-step' information flow has been postulated whereby progressive individuals are among the first to adopt an innovation, perhaps from information gained from the mass media; these become 'key communicators' and encourage others to follow in their path.[2] In this way, agricultural improvements pass from 'best to worst, from innovator to imitator', over time and space.[3]

Until recently, agricultural historians have given but little explicit attention to the means by which the pre-twentieth century English farmer acquired and avaluated information about innovations.[4] To the writer of this thesis, studies of agricultural change which disregard the queries posed by Stuart Macdonald:

> How was it that the late eighteenth - and early nineteenth - century farmer came to hear of new agricultural techniques...? How was it that... the farmer became sufficiently convinced of the utility of a new technique to want to try it?[5]

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1 Lionberger, pp.3-5.

2 G.E. Jones, p.20.

3 Perry, 'Agricultural History', p.264.

4 Important recent studies of eighteenth and ineteenth century agricultural change which are welcome exceptions to this generalisation in that they do give explicit attention to information sources include S. Macdonald, 'The Communication of Information and the Development of Agriculture in Northumberland 1750-1850', unpub. Ph.D. thesis, University of Newcastle-upon-Tyne, 1975; J.R. Walton, 'The Development of Oxfordshire Agriculture, 1750-1880', unpub. D. Phil. thesis, University of Oxford, 1976; H.S.A. Fox, 'Local Farmers' Associations and the Circulation of Agricultural Information in Nineteenth Century England', in Idem, and R.A. Butlin, Change in the Countryside: Essays on Rural England 1500-1900, 1978, pp.43-63.

5 Stuart Macdonald, 'The Diffusion of Knowledge among Northumberland Farmers 1780-1815', A.H.R., 27, 1979, p.30.

are unsatisfying in that they leave unanswered questions about the generation, acquisition, and evaluation of agricultural information which are necessary for full understanding of the process of change. This is not to suggest, however, that there is merit in uncritically applying current ideas on the communication of information to past situations. Macdonald has rightly warned against this while pointing to the value of some diffusion theory in aiding our appreciation of the nature of late eighteenth and nineteenth century agricultural change, [1] for although the cultural milieu may vary, there is a certain temporal universality in the adoption processes that have been outlined by Lionberger, Rogers, and others.

To some, of course, these questions may well be irrelevant in as much as improvements are seen to be 'naturally contagious' [2] but this would seem to assume too much and essentially avoid the issue. As far as the spread of information has been given explicit consideration in studies of agricultural change, most attention has been given to the role of the individual as a critical 'change-agent'. Much of this derives from the work of Lord Ernle who, in his own particular view of the English agricultural development, placed the enlightened and progressive landlord in the van of eighteenth century agricultural improvement. Ernle's 'heroic view' [3] of the 'agricultural revolution' has become much modified because later work has shown that important innovations (especially crops such as clover and

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[1] Idem , 'The Role of the Individual in Agricultural Change: The Example of George Culley of Fenton', in Fox and Butlin, pp.1-2.

[2] Loc. cit., referring to E. Kerridge, The Agricultural Revolution, 1967.

[3] Term used by G.E. Mingay, 'The Agricultural Revolution in England: A Reconsideration', A.H., XXXVII, 1963, p.124.

turnip) were known well before the eighteenth century and that the achievements of agricultural leaders such as Thomas Coke were rather more modest than Ernle maintained.[1] This has still left a small handful of progressive landlords in an important role as popularisers rather than innovators per se although it also appears that they were very much the exception and that the average eighteenth century landlord was relatively indifferent to agricultural improvement.[2]

The individual as a critical 'change-agent' has, however, recently been resurrected in the context of late eighteenth and early nineteenth century English farming for it is in this way that Macdonald answers his own questions, already cited. The difference is that now it is the intelligent working farmer whose influence is seen as crucial and Macdonald's hero is George Culley, of Fenton, Northumberland. By utilising the detailed Culley papers, Macdonald is able to show his extensive influence in encouraging farmers to adopt profitable farming practices, and suggests that there is no reason to think that individuals such as Culley were unique to Northumberland.[3] Indeed, Ellman of Glynde[4] and Boys of Kent are others of the Culley mould that readily come to mind as probably fulfilling a similar role in various parts of England in the late eighteenth century. Arthur Young was so impressed with their activities that he wanted to recruit them into a

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[1] For a useful summary of this work, see Donald Woodward, 'Agricultural Revolution in England 1500-1900: A Survey', Local Historian, 9, 1971, pp.324-5; on Coke, see R.A.C. Parker, Coke of Norfolk: a Financial Survey, 1976.

[2] G.E. Mingay, English Landed Society in the Eighteenth Century, 1963, p.166.

[3] Macdonald, 'The Role of the Individual', p.17.

[4] See Sue Farrant, 'John Ellman of Glynde', A.H.R., 26, 1978, pp.77-88 for an assessment.

'Royal Agricultural Academy' to give cohesion to their unco-ordinated efforts. [1]

Exceptional individuals whether landlords or tenants or others who took it upon themselves to exhort farmers to adopt improved practices with missionary fervour, such as Arthur Young and, in the period with which this thesis is particularly concerned, John Joseph Mechi, were clearly one important source of agricultural information. [2] H.S.A. Fox has recently reviewed the other ways in which the farmer might acquire information. These include regular interpersonal contact between farmers at market, fairs and casual meetings, printed media - books, periodicals, and newspapers - and local farmers' associations which Fox considers to be particularly important. To Fox's list we may add the national institutions of which the Royal Agricultural Society of England came to be the leading example. [3]

There can be little doubt that the channels available for information flow to farmers were highly deficient in the late eighteenth and early nineteenth centuries, and it is part of the argument of this thesis that, between about 1840 and 1880, they were transformed so that lack of effective means of communication was much less of a barrier to change. The more perceptive of late eighteenth century and early nineteenth century agriculturists were keenly aware of this deficiency and Young considered a number of agencies to give direction to agricultural improvement; his interest in the

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[1] Claudio Veliz, 'Arthur Young and the English Landed Interest 1784-1813', unpub. Ph.D. thesis, University of London, 1959, p.35.

[2] On Young see Ibid.; J.G. Gazley, The Life of Arthur Young, 1973; G.E. Mingay, Arthur Young and his Times, 1976. For Mechi, Scott Watson and Hobbs, pp.90-101.

[3] Fox, 'Local Farmers' Associations,' pp.45-6.

Society of Arts can be seen in this context [1] as well as his involvement with the Board of Agriculture and his proposed 'Royal Agricultural Academy'. Appreciation of the deficiency of means of communication is best typified by Coke's oft-quoted lament that improvements spread out from Holkham at the rate of less than one mile per year. Individuals such as Culley or Coke could doubtless achieve a certain amount but without formal direction to their efforts the rate of agricultural change was likely to remain painfully slow. In support of this contention we may note Raine Morgan's recent finding that roots occupied only seven per cent of arable land by 1801 but underwent a three-fold expansion during the following seventy years.[2] This is not to deny that the rate of adoption of agricultural innovation may well be closely linked to purely economic factors, but information is an essential pre-requisite for economic adjustment.

The Royal Agricultural Society was formed to fulfil a perceived need to generate agricultural information and make it available to the ordinary working farmer, after several other institutions had been found to be inadequate for the purpose. Before examining its formation as a preliminary to a detailed consideration of its activities, the development of 'formal' information sources up to 1838 will be outlined and assessed. These are the national and local societies and printed media, termed 'formal' sources in contrast to the essentially informal contact between individuals. As Fox stresses, the ways in which information was acquired by these means has gone largely unrecorded [3] apart from chance survivals such as the Culley papers. It will also be argued that the 'formal' information sources became increasingly important as the nineteenth century progressed. The

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[1] John. G. Gazley, 'Arthur Young and the Society of Arts', Journal of Economic History, I, 1941, pp.129-52.

[2] Raine Morgan, 'The Root Crop in English Agriculture, 1650-1870', unpub. Ph.D. thesis, University of Reading, 1978, p.628.

[3] Fox, 'Local Farmers' Associations', p.45.

proceedings of the Royal and the other national and local societies and associations were fully reported in agricultural newspapers and periodicals and which formed, by the mid-nineteenth century, an impressive agricultural information system of which the Royal was an integral part.

The Development of Agricultural Information Sources to 1838

National Societies

Both Scotland and Ireland had national agricultural institutions before England. As early as 1723 a body styled 'The Society of Improvers in the Knowledge of Agriculture in Scotland' was based in Edinburgh. It had a membership of about three hundred and may well have been the earliest agricultural society in Europe. It gave advice on management and improvement to its members, but did not continue after 1745.[1] The Dublin Society, for improving 'Husbandry, Manufactures and other Useful Arts', was founded in 1731 and agriculture held a prominent place in its activities: it attempted to distribute Tull's Horse-Hoeing Husbandry throughout Ireland and the first paper read to the Society was concerned with land-drainage. In 1732 a museum of agricultural implements was established together with an experimental nursery-garden where investigations included the management of 'cyder-trees' and the improvement of hop-growing techniques. Prizes were offered for a variety of topics but agriculture was well represented.[2] A national institution solely devoted to agriculture was not founded in Ireland, however, until 1841. In contrast, Scotland had a permanent agricultural society as early as 1783. The Highland Society, founded in that year,

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[1] Alexander Ramsey, History of the Highland and Agricultural Society of Scotland, 1879, pp.19-27.

[2] Desmond Clarke, Thomas Prior 1681-1751: Founder of the Royal Dublin Society, 1951, pp.26, 29; Terence de Vere White, The Story of the Royal Dublin Society, 1955, pp.16-17.

obtained a Royal Charter in 1787 and expanded rapidly. Sir John Sinclair obtained Government financial assistance for the Society which allocated funds for the award of prizes and grants for discoveries and inventions. By 1821 its membership was well over one thousand in number, it published its own Transactions and held annual shows from 1822 onwards. At first these were in Edinburgh but became peripatetic after 1829 when the Society visited Perth. The founders of the Royal Agricultural Society of England took considerable inspiration from the activities of the Highland Society; the first prize essay topic of the English Society related to the achievements of the Highland. [1]

Although there was no equivalent institution to the Highland in England until the formation of the Royal there were a number of national institutions which took an interest in agriculture, or some branch of it, or whose activities were of relevance. These were, in chronological order, The Royal Society (1660), The Society of Arts (1754), The Smithfield Club (1799), The Horticultural Society (1804), The Society for the Diffusion of Useful Knowledge (1826), and the British Association for the Advancement of Science(1831). Distinct from these groups, in that it was almost exclusively concerned with agricultural matters and received government money, was the Board of Agriculture (1793-1822).

The earliest proposal for a national institution to advance the cause of agricultural progress appears to have been made by Samuel Hartlib in 1651, although the suggestion seems to have been to found a residential agricultural college rather than an institution of the type reviewed here. [2] The Royal Society founded a 'Georgical Committee' in 1664 which determined to compile a 'History of Agriculture and Gardening'. To this end it drew up a list

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[1] Ramsey, pp.104-131; the essay appeared as John Dudgeon, 'Account of the Improvements which have taken place in the Agriculture of Scotland since the Formation of the Highland Society', Journal, I, 1840, pp.59-112.

[2] E. Clarke, 'The Board of Agriculture 1793-1822', Journal (3), IX, 1898, p.2.

of 'enquiries' which were published in the Philosophical Transactions and which were intended to elicit information on the best practice of agriculture in different parts of the country, a concern which was later evinced by the Board of Agriculture and the Royal itself. The early agricultural survey of the Royal Society collected a substantial amount of information and was 'a striking example of that alliance of science and industry which was characteristic of the age'. [1]

After an initial period of activity the Royal Society underwent a decline and towards the end of the seventeenth century suffered from poor administration and shaky finances. [2] After reorganisation it became much more of an academic body and, during the first half of the eighteenth century, there was no national institution in England concerned with agricultural improvement. This was again taken up by the Society of Arts, founded by William Shipley in 1754. This body had as its objective more than the promotion of agriculture alone - its full title was the 'Society for the Encouragement of Arts, Manufactures, and Commerce', but agriculture was one of six sections for which 'Premiums' (awards of money or medals) were offered. The others were chemistry, 'polite arts', manufactures, mechanics, colonies and trade. [3] The first agricultural premiums, announced in 1757, were for 'the best set of experiments with a dissertation on the nature and operation of manures'. Although no entries were received which were considered to be worthy of a premium, these early topics are interesting on account of their advanced character. The concern is with the operation of manures and there is stress on experimental method.

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1 R.V. Lennard, 'English Agriculture under Charles II: The Evidence of the Royal Society's "Enquiries",', E.H.R., IV, 1932, p.23.

2 Sir Henry Lyons, The Royal Society 1660-1940, 1940, p.118.

3 D.G.C. Allan, William Shipley, Founder of the Royal Society of Arts, 1968; D. Hudson and K.W. Luckhurst, The Royal Society of Arts, 1754-1954, 1954, provide an account of its formation. The Society of Arts took its 'Royal' prefix in 1908.

There was also emphasis placed upon the practical utility of science, rather than theory as an end in itself. Detailed instructions as to the conduct of trials were specified after 1761 and awards proposed by the Agriculture Committee covered a wide range of topics including the introduction and cultivation of new crops (the Society of Arts took particular interest in this), husbandry methods, implements, manures and soil analysis, and the treatment of animals. As the premium lists often kept the same topics over a period, the prizes acted as a sort of research subsidy. [1]

For a time, Arthur Young thought that the Society of Arts could prove the right vehicle for giving overall direction to English agriculture. [2] He became a member in 1769 and Chairman of the Agricultural Committee in 1774. He encouragedthe Society to hold a trial of ploughs and a dynamoter was used to test an all-iron plough at Morden, Surrey in 1773. Young received a gold medal for his work on the potato in 1779 but his proposal that the agricultural activities of the Society should be expanded was resisted, as was his suggestion that the Society should undertake a series of agricultural experiments on its own account. [3] In the nineteenth century, the Society of Arts gave less attention to agriculture but continued to generate information by sponsoring lectures from distinguished experts, particularly after mid-century. It is difficult to gauge its impact on agriculture during this earlier period of involvement. While it may be questioned (as contemporaries did) whether the award of premiums ever served to procure an advance that would not otherwise have taken place, the publication

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[1] The early agricultural interests of the Society of Arts are dealt with by Sir Henry Trueman Wood, A History of the Society of Arts, 1913, pp.114-42 and Luckhurst and Hudson, pp.57-85.

[2] See J.G. Gazley, 'Arthur Young and the Society of Arts'.

[3] Hudson and Luckhurst,p.83; Gazley, The Life of Arthur Young, p.130. Details of the plough trial are given in Annals of Agriculture, I, 1786, pp.113-9.

of premium lists and the announcement of the awards may be expected to have excited interest in agricultural innovation. One example of its influence may be in the encouragement of potato-growing for which premiums were regularly offered, at first as feeding-stuff for stock and later for human consumption (with the stimulus of the wheat-shortage of 1795) and Luckhurst and Hudson attribute the spread of potato-growing to the work of the Society.[1]

The Smithfield Club had the specialist interest of stock-raising. The originator of the Club was John Wilkes of Measham, Derbyshire, and it was established at the Woburn Sheep-shearing of 1799 under the patronage of such leading agriculturists as Lord Somerville, Young, and Ellman, with Francis, Duke of Bedford, as President.[2] Although membership was initially limited to fifty this restriction was lifted after 1805. More concerned with the fattening than the breeding of stock its chief objective was to ascertain the breeds of cattle and sheep which would give the best return for auxiliary feeding, and the most paying types of beast. The early years of the Club were precarious. In 1821, it came near to dissolution and John, Duke of Bedford, withdrew from it because he thought that its objectives had been achieved. The presidency was then vacant until the Club was revived by Viscount Althorp (later third Earl Spencer) in 1825[3], after which it slowly grew in stature. The pre-Christmas show was an important London event and was enlarged to include crop specimens and agricultural machinery. Nevertheless, the activities of the Club met with criticisms which were often justified. The emphasis on feeding and fattening and the fashion that

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1 History of Society of Arts, pp.64-5.

2 For the early history of the Smithfield Club see Brandreth T. Gibbs, The Smithfield Club, a Condensed History of its Origins and Progress, 1857, and F.M., VIII, 1807, pp.189-92, for a contemporary account of its formation. See also E. Clarke, 'Agriculture and the House of Russell', Journal (3) II, 1891, pp.128, 135-6.

3 E.A. Wasson, 'The Third Earl Spencer and Agriculture, 1818-1845', A.H.R., 26, 1978, p.93.

it encouraged for large, overfed beasts, gave rise to the jibe that it encouraged the production of animals 'too dear to buy and too fat to eat'.[1]

The Royal Horticultural Society was less directly linked to the agricultural interest but Sir Joseph Banks, who took the chair at its inaugural meeting in 1804 was also a member of the Society of Arts and the Board of Agriculture. The aim of the Society was to encourage all branches of horticulture, both ornamental and practical, by the means of discussion papers and, most importantly, an annual show which, of course, remains an important feature of the London calendar.[2] There was a much closer connection between the Smithfield Club and the Royal Agricultural Society than with the Royal Horticultural Society as there was a greater overlap between the aims and interests of the two institutions: Brandreth Gibbs, Director of the Royal Shows between 1844 and 1875, was also Secretary of the Smithfield Club.

The Society for the Diffusion of Useful Knowledge was founded by Henry Brougham in 1826 to facilitate the diffusion of knowledge considered to be useful in as much as there was emphasis on everyday, practical and utilitarian subjects upon which the Society published elementary, cheap books.[3] Agriculture was included as a topic and the Society's Farmers' Series included volumes on domesticated animals - the Horse, Dog, Sheep, Cattle written by William Youatt.[4] Other important agricultural works sponsored by the Society included the three volume Manual of British Husbandry (1834) a composite volume edited by J. French Burke, and articles on farming

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1 J. French Burke, British Husbandry, 1834, p.23.

2 H.R. Fletcher, A History of the Royal Horticultural Society 1804-1968, 1968.

3 Monica C. Grobel, 'The Society for the Diffusion of Useful Knowledge 1826-1846', unpub. M.A. thesis, University of London, 1933.

4 Ibid., pp.362, 374; Sir Frederick Smith, The Early History of Veterinary Literature, III, pp.137-41.

written by Rev. W. Rham for the Society's Penny Cyclopedia were later published as the Dictionary of the Farm (1844). Spencer was active in the affairs of the Society. He became a life member in 1829 and did much to keep the Society alive in the 1840s; it collapsed soon after his death in 1845. [1]

The British Association for the Advancement of Science, founded in 1831, had the general aim of giving impulse to scientific enquiry and the removal of barriers to progress. [2] Agriculture was not recognised as a distinct section until 1912 but topics of agricultural relevance received attention within the sections for Geology, Zoology and Botany. Liebig visited the Association in 1837 and his very influential Organic Chemistry in its Application to Agriculture and Physiology (1840) was dedicated to the Association. It was a more popular body than the Royal Society and the Royal Agricultural Society took direct inspiration from the British Association in copying the principle of holding an annual 'country meeting' away from London.

We may now turn our attention to the 'old' Board of Agriculture, the most important of the national institutions involved with agriculture before the foundation of the Royal. Although both Young and Marshall claimed to have originated the idea, [3] specific proposals for the institution were contained in an appendix to Lord Kames's The Gentleman Farmer (1776). [4] Whatever the origin of the Board it would not have been established without the determined efforts of Sir John Sinclair, a Scottish landowner and agricultural enthusiast, who was 'given' the Board by Pitt in return for political support during the

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[1] Wasson, p.94, who also points out that the collapse was precipitated by Spencer's rather over-ambitious plans.

[2] O.J.R. Howarth, The British Association 1831-1931: a Retrospect, 1931.

[3] Annals of Agriculture, XXI, 1793, p.198; Arthur Young, On the Advantages which have Resulted from the Establishment of the Board of Agriculture, 1809, p.2; William Marshall, Review and Abstract of the County Reports of the Board of Agriculture, 1808, pp.xvii-xxii.

[4] pp.367-78.

currency crisis of the year.[1]

Sinclair believed that a public society, with government finance, would have more influence than a private institution for the promotion of agriculture. This was not to be the case as the activities of the Board, perceived as a branch of government, gave rise to suspicion in the minds of ordinary farmers, even though Government was at best indifferent to the Board's existence and always parsimonious over finance. A closed corporation, the Board consisted of thirty ordinary members and a President who was elected each year together with five new members drawn from the honorary membership made up of gentry, farmers, writers, and other professional men connected with agriculture. Young, who had doubted whether Sinclair's proposal would come to fruition, was appointed Secretary in which post he remained until 1820. His appointment was responsible for the considerable antipathy between him and William Marshall, who had hoped for some direct involvement with the Board.

Sinclair envisaged that the Board of Agriculture would have the function of providing information on the most advantageous methods of farm management, act as a general magazine of agricultural knowledge, and would give direction to local societies. A series of agricultural surveys would enable the state of agriculture in the country to be ascertained, together with the means for its improvement.[3]

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[1] Sir John Sinclair, Plan for Establishing a Board of Agriculture, 1793; E. Clarke, 'The Board of Agriculture 1793-1822', p.4; Rosalind Mitchison 'The Old Board of Agriculture (1793-1822)', English Historical Review, LXXIV, 1959, p.42. For Sinclair's life and work see Idem, Agricultural Sir John, The Life of Sir John Sinclair, 1754-1835, 1962.

[2] Sir John Sinclair, 'Preliminary Observations on the Origin of the Board of Agriculture', Communications to the Board of Agriculture, I, 1797, p .iii; Marshall, 1808, pp.xxii-xxv. For the Board's Charter see Communications, I, pp.x-xvi.

[3] Sinclair, Plan, pp.5-7.

It was this latter objective with which Sinclair was most concerned and it is the Board's General Views of agriculture, county by county, for which it is most remembered, though not with the credit which Sir John hoped would accrue to the Board and himself by the completion of such a major undertaking. Soon after the Board was established Sinclair proceeded to commission, with injudicious haste, surveyors to carry out the project, under the belief that five or six weeks, in winter, would be adequate for each county survey. Sinclair justified his choice of surveyor by claiming that as he regularly travelled from his Caithness estate to London he was acquainted with a range of people fitted to carry out the task, a justification which did not satisfy Young. [1]

The first surveys were issued in quarto size with wide margins for comment and correction, the intention being that they would be sent back to the Board for editing and re-issue in amended form. This was not an unreasonable plan and the information that the surveyors were asked to gather was potentially very useful. Information categories included the nature of local soils, land-use, land tenure, stock, crop cultivation and rotations, manure, enclosure effects, labour, wages, drainage, prices, roads, improvements, and societies. [2] Unfortunately, the haste with which the surveys were carried out and the variable abilities of the surveyors led to a heterogeneous result. The surveys range in length alone from the cursory twenty-six pages of Messrs Griggs on Essex to Charles Vancouver's two hundred and nineteen pages on Cambridgeshire, which is a systematic parish

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[1] M. Betham Edwards, ed., The Autobiography of Arthur Young, 1898, p.242.

[2] See Communications to the Board of Agriculture, I, 1799, Appendix b, p. xlvii.

by parish study. [1] The circulation of these reports soon brought the Board and its work into disrepute. Although Sinclair at first expressed some satisfaction with the progress of the survey which he claimed in July, 1794 'had surpassed the most sanguine expectations' [2] public opinion soon led to a retraction of this view. It was then stressed that the first surveys were 'merely intended for private circulation and as a foundation for more extensive enquiries' and admitted that they were 'neither useful to the public nor creditable to the Board' in order to redeem the Board's flagging reputation. This was also diminished by the belief current among farmers in the south that the surveys were connected in some way with taxation.[3] Although Young tried to maintain that the early surveys were too severely criticised 'when considered as what the President termed them, printed manuscripts given away for marginal correction and addition', he soon became disgusted with the 'frivolous nature of the Board which seemed to be engaged in nothing that could produce the least credit with the public'. The limited revenue of the Board went 'almost entirely to the printers', spent on reports that were 'so miserably executed that they brought the institution into contempt'. [4]

When it was clear that the first surveys would not do, even in corrected

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1 For catalogues of the various editions of the General Views see Clarke, 'Board of Agriculture', p.16; W.F. Perkins, British and Irish Writers on Agriculture, 2nd edn., 1939, pp.176-8; O.R. Macgregor, 'Introduction' to Ernle, 6th edn., 1961, pp.xcix-c.

2 Sir John Sinclair, Account of the Origin of the Board of Agriculture and its Progress for Three Years after its Establishment, 1796, p.53.

3 Board of Agriculture, Minute Book, 1806, p.83; Letter Book, June 1800, pp.417-8; John, Lord Somerville, The System followed during the last Two Years by the Board of Agriculture, 1800, pp.5, 10.

4 Young, Advantages, p.35; Betham-Edwards, pp.246, 315.

form, re-surveys were commissioned. These suffered from lack of adequate finance. Letters sent out in May 1796 to prominent landowners and agriculturists asking for help stressed that no money was available for the assistance requested and the surveyors were required to work to a tight budget. [1] Few of the original surveyors were also responsible for the second (or third) versions and this was as much due to their dissatisfaction with the terms offered than to the inadequacy of their initial work. There were numerous problems with the manuscripts [2] and lack of money held up the printing. The whole project slowed after 1793 when Lord Somerville, the new President, directed the Board's depleted finances into other projects. They were mostly completed by 1814 after additional sums of money had been allocated to carry the project through. Although the final surveys were supposed to adhere to a more rigorous plan, they show considerable variety of approach. Writers continued to spend much time on their own personal whims and examined the best practices rather than the general level of farming. Superior productions were those carried out by knowledgeable farmers such as George Culley and John Boys. Many were overlong and Marshall's undertaking of a 'concentrated edition' in his Review and Abstract of the General Views was a much-needed exercise.

With due regard for the circumstances surrounding their production, the General Views have proved a valuable historical source, providing a wealth of information on husbandry methods and agricultural practice, and have been utilised to trace the progress of enclosure, to reconstruct the late

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[1] Letter Book, 1796, pp.9-10.

[2] Ibid., 1800, pp.402, 418.

eighteenth century agricultural geography, and to examine the contemporary perception of the agrarian landscape.[1] The usefulness of the surveys to contemporaries in the context of the overall problem of the circulation of agricultural information may, however, be questioned. There were frequent criticisms of the inclusion of irrelevant material by the surveyors and a tendency to wander from the point. Thus the Farmer's Magazine reviewer of Middlesex observed that it had 'much important information, though rather arranged in a desultory manner'. Many had in them facts used as 'clergymen do a text...' while Young's Lincolnshire was 'voluminous but desultory'. Of Bailey and Culley's Northumberland it was only wished that all the reports were executed on the same 'liberal and scientific principles'. Too many contained 'a vast amount of repetition and matter of pure local interest, of no value whatever to the husbandman', mixed up with that which was 'really useful'. In addition, they were 'exceedingly voluminous and very expensive, thus beyond the reach of most farmers'.[2]

The Board engaged in a number of other projects apart from the surveys, particularly after 1798 when Somerville ousted Sinclair as President. It tried to encourage local societies, without much success, and put up premiums for agricultural improvement. Although there was dispute over the utility

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[1] D.B. Grigg, 'The changing Agricultural Geography of England: A Commentary on the Sources Available for the Reconstruction of the Agricultural Geography of England 1700-1850', Transactions of the Institute of British Geographers, 41, 1967, pp.76-78; W.H.R. Curtler, The Enclosure and Redistribution of our Land, 1920, pp.182-226; H.C. Prince, 'England c.1800', in H.C. Darby, ed., A New Historical Geography, 1973, pp.400-33; H.C. Darby, 'Some Early Ideas on the Agricultural Regions of England', A.H.R., II, 1954, pp.34-7; John Barrell, The Idea of Landscape and the Sense of Place 1730-1840; An Approach to the Poetry of John Clare, 1972, pp.72-8.

[2] See Marshall's Review and Abstract, F.M., I, 1800, pp.87, 434 and Ibid., II, 1801, p.77; J. French Burke, British Husbandry, I, 1834, p.36

of these, some were imaginative in conception as, for example, the offer of a premium for irrigation in a district where it had not hitherto been practiced.[1] The Communications of the Board contained essays of high quality[2] and the interest in an experimental farm and the sponsorship of Davy's lectures on agricultural chemistry at a time when the subject was a minority interest demonstrated involvement in progress and innovation even though it may be doubted whether there were any substantive results. Some of the Board's projects suffered ill-luck; the Board evinced considerable concern over the widespread food-shortages of the last years of the eighteenth century and undertook to import Indian rice in 1800, but the cargo was delayed until after the good harvest of 1801. The promotion of a General Enclosure Bill was frustrated by the Lords, partly because it was represented as taking the view that tithes were an obstacle to agricultural improvement and its activities were therefore thought to be inimical to church interests.[3] Successes of the Board were minor. It obtained a tax-exemption on draining tiles and imported American oil-cake, brought weights and measures under the summary jurisdiction of magistrates, produced an account of Elkington's mode of draining, and published a general report on enclosures. Later projects included the 1816 account of the Agricultural State of the Kingdom, replies to a circular letter designed to ascertain the extent of agricultural distress, and it also sponsored a prize essay competition on the farming of Flanders in

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[1] The premium lists were published in the Board's Communications.

[2] For a contemporary review, see Agricultural Magazine (3), II, 1808, p.130.

[3] See Lord Carrington's address to the Board of April, 1803, Minute Book, pp.386-405.

1818, although this was never judged.[1]

By this time the Board had considerably reduced the scope of its activities and the government grant was withdrawn in 1820. This action may have been precipitated by the fact that the Board had sent back part of the money allocated to it for 1819, but George Webb Hall, who succeeded Young as Secretary, was deeply involved in the protection association movement[2] which was gaining widespread support at the time. The last major act of the Board was to sponsor livestock shows in London, in 1821 and 1822, but these were unsuccessful, being ill-organised and poorly attended.[3] Attempts were made to keep the Board in operation after the withdrawal of the grant and remaining sets of the Communications were offered to anyone who would make a life subscription. This proved an insufficient inducement and the final demise of the Board came in July 1822.

The 'old' Board of Agriculture failed to fulfil the high initial expectations of those agriculturists who had, at first, given enthusiastic support. This failure may be attributed to a variety of factors, not least the way in which it antagonised influential elements in church and state. It was an isolated body, remote from the agricultural community and oligarchical and aristocratic in nature. As Young sadly observed, the Board suffered from jealousy, suspicion and misrepresentation: 'those talents

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1 For contemporary public justifications of the Board see Young's 'Advantages' and R. Ackerman, The Microcosm of London, III, 1809, pp.73-85. For an assessment of the Agricultural State of the Kingdom see G.E. Mingay's 'Introduction' to the 1970 edition; on the Flanders Prize Essay, John S. Creasey, 'The English Board of Agriculture and the Husbandry of Flanders: the Prize Essay Competition of 1818-20, Acta Museorum Agriculturae Pragae, 12, 1977, pp.36-50.

2 D. Spring and T.L. Crosby, 'George Webb Hall and the Agricultural Association', Journal of British Studies, 1, 1962, pp.115-31.

3 Reports in Farmers' Journal 16 April 1821 and 29 April 1822.

that blazed at Woburn became extinguished at Sackville Street... as if a Coke lost all his knowledge of turnips and a Somerville all his skill in cattle by entering these doors'. [1] But the Board of Agriculture did Young's own reputation little good for 'placed in his official position, like a city on a hill, his merits and defects were observed with more facility'.[2] To agriculturists the Board was like an 'inn with a staring sign, alluring the traveller in the hope of a good cheer, but without a chop in the larder or a bottle in the bin'. [3]

Although the negative aspects of the 'old' Board are inescapable, it must be viewed in the context of the search for the right medium to give direction to agricultural progress, and to diffuse agricultural information. Sir John Sinclair came round to the view that a private institution would be more appropriate than a quasi-government body [4] for this purpose (in contrast to his initial belief), and the founders of the Royal Agricultural Society, sixteen years later, were able to take account of the experience of the Board, and its shortcomings, in their design of the new institution. Although the Royal, in time, met with some of the same criticism that had been made of the Board, such as lack of openness in the constitution, the insistence of the principle of an annual 'country meeting' can be viewed as a reflection of an initial determination to maintain links with the agricultural community and avoid the charge of remoteness that came about as a result of [4a] centralisation of the Board of Agriculture.

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[1] Young, Advantages, p.10.

[2] F.M., II, 1801, p.77. For Young's involvement with the Board see Betham-Edwards, pp.219-61 and Gazley, Life of Arthur Young, pp.306-59.

[3] Correspondent to the Agricultural Magazine (2), II, 1808, p.287.

[4] Letter, Farmers' Journal, 11 October 1819.

Local Associations

Complementary to the national institutions, though lacking any formal links, were the numerous local farmers' organisations which were founded during the second half of the eighteenth century. Although a local farmers' club existed at Faversham as early as 1727, its character seems to have been largely social, as is suggested by its maintenance of a 'collar-boy' to loosen the collars of members as they subsided under the dinner table. [1] The foundation of the Society of Arts gave stimulus to the formation of local counterparts. The first of these was the Brecknockshire Society founded by William Powell in 1755, who took direct advice from the national Society on its formation. [2] Powell, a Welsh philanthropist, urged the establishment of 'country premium societies' a suggestion enthusiastically endorsed by William Shipley but opposed by Charles Whitworth, a Vice-President of the Society, who thought that such a movement would weaken the national organisation. [3] Therefore, the local associations, although they took inspiration from the Society of Arts, were independent of it. Other Welsh societies quickly followed: local agricultural societies were instituted at Cardigan, Carmarthen, and Pembroke before 1775. [4]

By 1800, local associations numbered about thirty-five to forty. It is impossible to give a precise figure, as some did not appear in the published lists. The movement seems to have grown considerably during the first two decades of the nineteenth century and then remained fairly static until about

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1 Prideaux George Selby, The Faversham Farmers' Club and its Members 1727-1927, 1927; Archives, IV, 1950, p.29.

2 H. Edmunds, 'History of the Brecknockshire Agricultural Society, 1755-1955', Brycheiniog, II, 1956, pp.22-65.

3 Allan, pp.61-7.

4 Wood, p.7.

the time of the formation of the Royal Agricultural Society when there was expansion in the number of local societies of all kinds. [1] Samuel Parkes noted nearly one hundred local associations in 1819 [2] and a similar total was listed in the Agriculturist in 1836 (presented on a map in figure I) although some of these were probably as much concerned with political objectives as with matters of agricultural improvement. The Bath and West Society founded in 1777 is by far the best known of these local societies [3] but this was only the largest of the many local societies of similar type originating during this period.

Following the Society of Arts (many local societies initially took the 'agriculture, manufactures, and commerce' title) the award of premiums occupied a central part of the proceedings of these bodies. These were sometimes offered for innovations, but were more typically for excellence of stock or crops exhibited at their periodic shows. It was also customary to offer premiums to farm workers for skill in farming operations such as ploughing and shepherding and to those who had successfully brought up large families without recourse to charity or poor relief. Great stress was placed upon the society show where there would be exhibitions of stock and machinery, and some early societies held regular discussion meetings and published their proceedings. [4]

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[1] Fox take a figure of thirty-five for 1800, based from analysis of the General Views, as 'approximately correct' ('Local Farmers' Associations', pp.46, 58-9). Claudio Veliz (thesis, pp.288-90) found thirty-nine societies mentioned in the Annals of Agriculture between 1776-1809. Young's list in the Annals (XL, 1803, pp.476-7) totalled only twenty-three. Over fifty are listed in the Letters and Papers of the Bath Society XII, 1810, pp.397-40 (Reproduced by Hudson, Patriotism with Profit pp.130-2.)

[2] A Letter to the Farmers and Graziers of Britain, 2nd edn., 1819, pp.87-8.

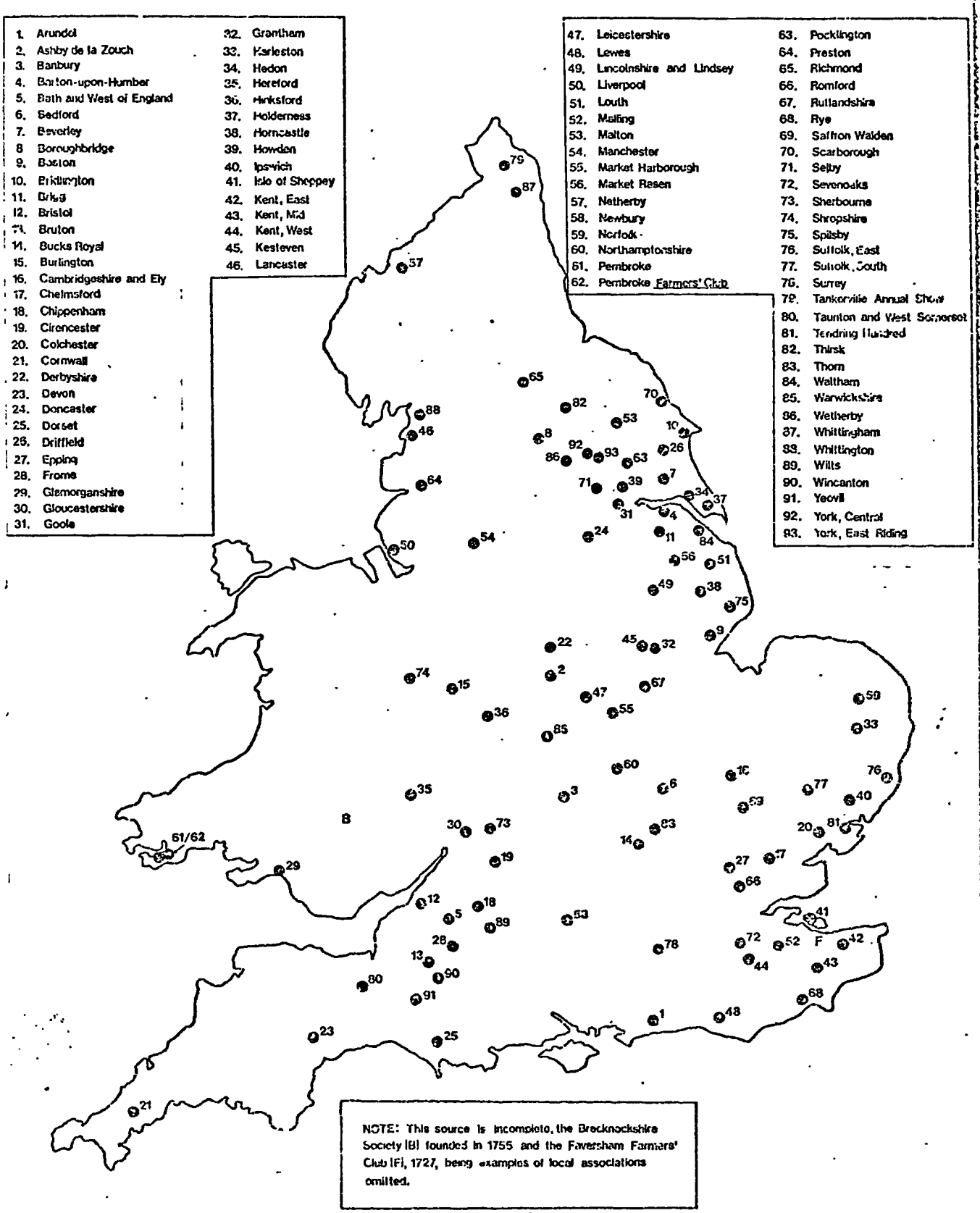
[3] Kenneth Hudson, The Bath and West: a Bicentenary History, 1976.

[4] Details on the activities are given by Hudson, Patriotism with Profit, and Fox, 'Local Farmers' Associations'. Rules and objectives of local associations are to be found in the Annals of Agriculture and some societies - e.g. Hereford (1804), Kent (1804) and Surry (sic) (1808) published them in pamphlet form.

FIGURE I:

Local Agricultural Associations, 1836.

Source: The Agriculturist, 2 January, 1836.



NOTE: This source is incomplete, the Brecknockshire Society [B] founded in 1755 and the Faversham Farmers' Club [F], 1727, being examples of local associations omitted.

The most important late eighteenth and early nineteenth century shows were the 'sheep-shearings' organised by progressive landowners, particularly Coke at Holkham and the Dukes of Bedford at Woburn. At these meetings, which extended over several days, many of the most prominent agriculturists met to exchange views, and premiums were offered for national and local improvements and for the skill of the farm labourers. The Holkham meetings ran for forty-three years, coming to an end in 1821 amid agricultural gloom and depression.

The influence of these early local associations is difficult to gauge and a matter of some controversy. Macdonald, for one, has taken a highly critical view, claiming that Culley avoided contact with his local society at Newcastle because it mostly existed to pander to local landowners. He castigates what he calls the 'servile fawnings' of the writer in the Farmer's Magazine in praise of J.C. Curwen, who held extensive shows at Workington, and he dismisses agricultural societies as significant sources of information in the late eighteenth and early nineteenth centuries.[2] The view of Riches that Coke's sheep-shearings, accounts of which were spread 'far and wide' by the Annals of Agriculture, could 'hardly be overestimated' as a means of spreading agricultural information is considered by Macdonald to be 'nonsense'.[3]

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1 E. Rigby, Holkham, its Agriculture etc. 1817; Richard Noverre Bacon, A Report of the Transactions of the Holkham Sheep-Shearing, 1821; E. Clarke, 'Agriculture and the House of Russell', pp.129-36; for a eulogistic 'Farewell to Holkham' see Farmers' Journal 6 July 1822.

2 Stuart Macdonald, 'The Role of George Culley of Fenton in the Development of Northumberland Agriculture', Archaeologia Aeliana (5), III, 1975, p.139; thesis, pp.472 and 482-95; 'The Diffusion of Knowledge among Northumberland Farmers', pp.32-3.

3 Naomi Riches, The Agricultural Revolution in Norfolk, 1937, pp.33-4; Macdonald, thesis, pp.478-9.

It would be unfortunate if Macdonald's view that these early agricultural associations were 'little more than self-congratulatory organisations uninterested in stimulating new ideas or spreading the best of existing practices' [1] were to gain general currency and that it was accepted that they were of little importance, [2] although we need to be wary of the generally uncritical approach adopted in Hudson's Patriotism with Profit; Fox's more recent work places local associations in a truer perspective, although this valuable survey ignores many of the criticisms that are made so much of by Macdonald.

Certainly such criticisms abound in the contemporary literature. As early as 1780 it was noted that the general establishment of local societies required some improvement and it was observed in the Annals that agricultural societies 'seldom answered the sanguine expectation of those by whom they were suggested'. The value of the premium system was often questioned: it was maintained that the judicious cultivator needed no pecuniary reward to spur him on and that prizes mostly went to those farmers who had the best land or largest capital, so that the smaller man had no chance of competing on equal terms. Premiums as a reward for good conduct, or bringing up large families, were a way in which the aristocracy could display patronage and maintain the status quo. Agricultural Societies 'with their pompous premiums, bounties and encouragements'

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[1] Macdonald, 'Role of George Culley', loc. cit.

[2] G.E. Mingay, The Agricultural Revolution: Changes in Agriculture 1650-1850, 1977, p.13.

were 'mere gew-gaws'.[1]

Many more examples of such criticisms could be cited, but this does not mean that Macdonald's dismissive view is valid. The gathering of farmers at shows and meetings must have encouraged the exchange of information, and the great advantage of the shows was their 'power of imparting a vivid impression'. There was a variety of pattern followed by local societies and while some were clearly dominated by highly conservative landowners intent upon maintaining the status quo, others performed significant work. Agriculturists from all over the country thought it worthwhile to attend the annual meetings of the Workington Agricultural Society under the patronage of J.C. Curwen, and the activities of this association (despite Macdonald's strictures) were said to 'contrast with the general insignificance of such societies', being considered to have transformed the agriculture of Cumberland during the first decade of the nineteenth century. The Holderness Agricultural Society was among the first to have regular discussion meetings on strictly practical agricultural topics and Hunter's Georgical Essays were produced for the York Society. The origins of the Royal Veterinary College can be linked to the Odiham (Hampshire) Society and the same body conducted a questionnaire to try to ascertain the best farming practice in different parts of the kingdom , and organised a rudimentary co-operative for the purchase of seed and machinery. As for the Holkham sheep-shearings, the impression that they made upon contemporaries can be gauged by the 1855 recollection of John Hudson of

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[1] Anon., Strictures upon Agricultural Societies with a Proposal for One on a New Plan, 1780, p.23; Annals of Agriculture, XXXI, 1798, pp.1-3; H. Holland, General View of the Agriculture in Cheshire, 1808, p.340; W. Stevenson, General View of the Agriculture of Dorset, 1815, p.465.; 'Agricola', ed., Letters on the Rules and Regulations of Agricultural Societies, 1842; Correspondent to Agricultural Magazine (3), II, 1808, p. 128.

Castleacre (one of the foremost Victorian 'high-farmers') that Coke gathered around him all the scientific and practical experience that he could obtain at the time: 'I have seen there Sir Humphrey Davy, Sir Joseph Banks, Dr. Rigby, and the only agricultural chemist of the day, Mr. Grisenthwaite... they thought there was "something looming for the future" '. [1]

Hudson's remark is highly significant for the light that it throws on the more progressive of late eighteenth and early nineteenth century local agricultural societies and gatherings. For all those which were conservative and inward-looking, there were others which were genuinely concerned with agricultural progress and the generation and diffusion of agricultural information, and there was a small nucleus of progressive landowners and tenant-farmers who supported local and national societies which they saw as a means of aiding agricultural advance. They comprised a group that Claudio Veliz has identified as the 'farming interest' to distinguish it from the traditional 'landed interest' which was more conservative in outlook. From the membership of agricultural societies (not a wholly safe source, as membership of societies did not necessarily imply a progressive attitude, as we have seen) and the authors of articles in the Annals of Agriculture Veliz estimates the membership of the group as totalling some three thousand and suggests that they were scientifically minded, interested in experiment, articulate, and gregarious. Above all, they looked to the intelligent application of science to increase

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[1] J.C. Hincks, Some Remarks on the Principles which should Regulate Public Encouragement, 1847, p.4; F.M., XIV, 1813, p.332; Hudson, Patriotism with Profit, pp.19-22; 'Rules of the Holderness Society', Agricultural Magazine, XII, 1805, pp.195-203; E.J. Russell, History of Agricultural Science, p.55; W. Bowden, Industrial Society in England towards the End of the Eighteenth Century, 1925, p.47. Hudson's observation was made at a meeting of the Society of Arts, reported in F.M.(3), IX, 1856, p.356.

food production. [1] Veliz concludes that their activities did not materially alter farming practice, but it must also be stressed that science did not have a great deal of potential for the agriculturist at that time. That potential was, as Hudson put it, 'looming for the future' and the linking of science to practical agriculture was a prime concern of the early years of the Royal Agricultural Society at a time when science had progressed to the extent that its potential could begin to be realised.

Printed Media

Although there was a great diversity of English farming literature from the sixteenth century onwards, the number of farming books published rapidly increased during the late eighteenth and early nineteenth century; between about 1780 and 1850 there was a considerable expansion in the number of titles and this growth can be seen as a parallel movement to the growth of interest in the societies and agricultural information sources generally. [2] Agricultural books were highly variable in quality, especially before 1800. Books which proclaimed some great advance in method but which were clearly written by authors with little direct knowledge of their subject cast suspicion upon the whole body of farming literature, so that it became almost obligatory for

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[1] Veliz, thesis, pp.16-38.

[2] Early farming literature is surveyed in G.E. Fussell, The Old English Farming Books from Fitzherbert to Tull, 1523 to 1730, 1950, and More Old English Farming Books: from Tull to the Board of Agriculture 1731-1793, 1950. Useful as bibliographic guides are: Royal Agricultural Society of England, Catalogue of the Library, 1918; W.F. Perkins British and Irish Writers on Agriculture 2nd edn., 1939; M.S. Aslin, Library Catalogue of Printed Books on Agriculture 1471-1900, 2nd edn., 1940; A. Alexander, Catalogue of the Walter Frank Perkins Agricultural Library, 1961; Wye College, Catalogue of Agricultural and Horticultural Books 1543-1918, in Wye College Library, 1977. For information on the authors see J. Donaldson, Agricultural Biography, 1854, and D. McDonald, Agricultural Writers 1200-1900, 1908.

authors to proclaim that they were 'practical farmers'. The more important agricultural books between about 1750 and 1838 can be allocated to four broad categories according to their subject matter and approach. Firstly, there were those books which set out to give practical guidance and advice on routine farm operations and information on specific techniques or farm animals. Secondly, there were farming tours and descriptions of farm practice in different parts of the country. Then there were attempts to bring the whole corpus of farming knowledge under one cover and finally, a few works which, before 1838, examined the scientific basis of farming.

As far as there was a demand for farming books in the late eighteenth and early nineteenth centuries it seems it was the first category of books that were the most popular. Probably the most widely read farming author in the middle of the eighteenth century was William Ellis whose The Practical Farmer: or the Hertfordshire Husbandman first published in 1732 reached a fifth edition in 1759, the whole of his directions on farming being brought together by an anonymous editor in 1772 as Ellis's Husbandry Abridged and Methodised. Ellis's The Modern Husbandman or Practice of Farming first published in 1731 and which also went through a number of editions gave directions according to the months of the year and this was the scheme followed by what may well have been Arthur Young's most successful book, The Farmer's Kalendar, first published in 1770 and which had gone through ten editions by the time of the author's death in 1820. Young was surprised by its continued popularity, one thousand two hundred of the fifth edition printed in 1804 being sold within a month. [1] Other writers adopted this plan, an example

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[1] Gazely, The Life of Arthur Young, p.471. For a bibliography of Young's work see G.D. Amery, 'The Writings of Arthur Young', Journal, 85, 1924, pp. 189-205 and Fussell, More Old English Farming Books, pp.154-65. G.E. Mingay, Arthur Young and his Times, gives a selection of extracts from his works.

being John Lawrence's New Farmer's Calendar, 1800, which seems to have enjoyed a degree of popularity, probably because it related to the ordinary farmer's everyday experience. Other examples of work of this type before 1838 include the Society for the Diffusion of Useful Knowledge's Manual of British Husbandry which dealt with such subjects as leasing and stocking farms, buildings and manures, cultivation, crops and stocks. The associated Farmer's Series, with books on farm animals by Youatt became standard. Another example in this category was David Low's Elements of Practical Agriculture (1834).

The need to transmit information about farming practice in different parts of the country was a concern of many authors. Many of the works of Young and Marshall can been seen in this context. Young's series of Tours began with his Six Weeks' Tour through the Southern Counties of England, 1768, followed by A Six Months' Tour through the North of England, 1770 and The Farmer's Tour through the East of England, 1771, and Marshall's Rural Economy series began with Norfolk, 1787, followed by Yorkshire, 1788, Gloucester, 1789, Midland Counties, 1790, West of England, 1796, and the Southern Counties, 1798. By this time the Board of Agriculture's General Views were being produced, but Sir John Sinclair's ambition to produce an overall view of the farming of England on the basis of the county surveys was never realised. Chronicles of farming practice continued during the nineteenth century: the third volume of British Husbandry partly consisted of 'Reports of Select Farms' and the Royal's series of county surveys of agriculture was, of course, a continuation of the concern to elicit information about the best farming practice in different parts of the country.

As the body of agricultural knowledge increased, there were a number of attempts to compile volumes that brought the best advice together under one cover and the farming dictionary and encyclopaedia became popular. The preface of the Compleat Body of Husbandry, 1756, sometimes attributed to Sir

John Hill and which claimed to draw upon the papers of 'Thomas Hale' and others, spoke of the large amount written on farming and of the need to 'pick the few grains of corn from the loads of chaff and present them clean to the reader', an oft-repeated sentiment. [1] John Mills's New and Compleat System of Practical Husbandry, 1763-5, was a compilation of the works of various earlier authors, as were two volumes produced by a 'Society of Gentlemen, Members of the Society for the Encouragement of Arts, Manufactures, and Commerce', drawing upon the works of Ellis, Miller, Hale, Lisle, Mills, Young, Marshall and others. In the early nineteenth century, R. Forsyth's Principles and Practice of Agriculture Systematically Explained, 1804, was based upon agricultural information in the Encyclopaedia Britannica and was followed by Thomas Potts's The British Farmer's Cyclopaedia two years later. Sir John Sinclair's Code of Agriculture, 1817, was comprehensive in nature and drew heavily on the reports to the Board of Agriculture, a fact which did little to commend it to the reviewer in the Farmer's Magazine who considered that it abounded 'so greatly in truism and frivolities that it will not bear the close inspection of the fastidious reader'. [2] Despite this, the Code was translated into several languages and went through many editions. Young's own project, Elements of Agriculture, was never published. Setting new standards was J.C. Loudon's Encyclopaedia of Agriculture, 1825, which in authority and thoroughness could justly claim to be the 'most complete body of agriculture hitherto submitted to the public'. [3] Much of the information

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[1] On the Authorship of the Compleat Body of Husbandry see Fussell, More Old English Farming Books, pp.37-8.

[2] F.M., XIX, 1818, pp.80-1.

[3] p.iii.

contained in this work was not directly concerned with practical farming; of more value to the ordinary farmer was possibly Baxter's Library of Agricultural and Horticultural Knowledge, first published in 1832.

Much of the early farming literature was essentially empirical in character and, before 1838, there are relatively few books in the fourth category, concerned with the scientific foundations of farming. One of the earliest works of this type was Francis Home's Principles of Agriculture and Vegetation, 1757, which dealt with such topics as manures, the food of plants, and the relation of chemistry to agriculture. A short treatise on the latter topic was produced by Earl Dundonald in 1795, although the lack of general interest in this work (not altogether surprising) is shown by the fact that the author offered to give the unsold copies of his book to the Board of Agriculture in 1799.[1] It has already been noted that this body encouraged the work of Humphrey Davy. His lectures to the Board in 1803 were published as Elements of Agricultural Chemistry, 1813. Although Davy did not contribute much of a substantive nature, he did generate a degree of interest in the subject. More significant, but less well-known, was William Grisenthwaite's New Theory of Agriculture, 1819, a long series of letters outlining his views having appeared in the Farmers' Journal in 1818 and 1819.[2] The importance of this work was that it anticipated some of the principles enunciated by Justus von Liebig's Organic Chemistry in its Application to Agriculture and Physiology, 1840.

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[1] G.E. Fussell, 'A Scottish Forerunner of Humphrey Davy. Archibald Cochrane, Earl of Dundonald, 1749-1831', Scottish Farmer, 57, 1949, p.625; Board of Agriculture, Minute Book, 1799, p.22.

[2] For discussion of Davy's and Grisenthwaite's work see E.J. Russell, A History of Agricultural Science in Great Britain, 1965, pp.67-80, and G.E. Fussell, Crop Nutrition: Science and Practice before Liebig, 1971, pp.159, 184-5 and 194-6.

The impact of these books is difficult to assess and it seems likely that they were not read by ordinary farmers. There are many indications that even those books deemed to be generally useful were restricted in their circulation and confined to those limited sections of the agricultural community who had the ability, means, inclination, and leisure to purchase and read them. Lord Somerville, President of the Board of Agriculture between 1798 and 1800, and himself a writer on farming topics [1] considered that the majority of farmers were 'not a reading class of people' and that the weekly journal of the county was 'the probable extent of their literary pursuits'. Arthur Young came to the conclusion that 'not one pamphlet in a hundred is read by farmers', and another correspondent to the Farmers' Journal expressed the view that there was little value in giving information to the public in large and expensive volumes as 'a great proportion of those connected with farming concerns will not buy them'. The writer of the introduction to Baxter's Library noted that a 'great prejudice... of which is considered theory and book-learning is frequently found among farmers', while Earl Spencer, who was most concerned to aid the diffusion of written information to farmers, lamented that the Farmer's Series was little taken by the ordinary farmers for whom it was intended. [2]

The ponderous style of many agricultural books must have inhibited their readership, even aside from the question of their cost. This is well illustrated by the experience of Clarke Hillyard, a well-known Northamptonshire farmer in the early nineteenth century, a frequent correspondent to the Farmers' Journal, President of the Northamptonshire Farming and Grazing Society and prominent in the early activities of the Royal Agricultural Society.

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[1] Ernest Clarke, 'John, Fifteenth Lord Somerville', Journal (3), VIII, 1897, pp.1-20.

[2] Lord Somerville, The System followed during the last Two Years by the Board of Agriculture, 1800, p.16; Arthur Young, Letter on the Cultivation of Potatoes, Farmers' Journal, 30 March 1812; Ibid., 29 April 1811; Baxter's Library, p.3; Grobel, thesis, p.368; Wasson p.98.

In the preface to his Practical Farming and Grazing, first published in 1836, he recalled that when he began farming he tried to obtain information from those works on agriculture that were in highest repute but found them 'so verbose and so theoretical that I soon laid them aside' preferring to take every opportunity to visit well-cultivated farms and study good farming at first hand. [1] His own work originated as a summary of practical farming written for his son in 1814, one hundred and fifty copies of which were privately printed and given away. The demand for these copies encouraged Hillyard to produce his book which was soon enlarged and went through four editions in eight years.

Given the leisure and resources needed to make use of many of the farming books before 1838, the periodical and newspaper offered a solution to the problem of giving information to the farming community in an acceptable form. After Houghton's Collections 1681-3 and 1692-1703 there were no agricultural periodicals during the first half of the eighteenth century. [2] Hale's Complete Body of Husbandry, 1756, was first issued in weekly parts. Other early periodicals included the short-lived Museum Rusticum et Commerciale, 1769, which Young, in consideration of the requirements of an agricultural periodical in 1770 characterised as a mere 'bookseller's job' [3], and the De Re Rustica, 1769-70. These two publications carried a good deal of material pertaining to the Society of Arts although they had no official

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[1] G.E. Fussell, 'A famous Northamptonshire Farmer - Clarke Hillyard Esq., of Thorpelands, Northampton', Journal of the Land Agents' Society, 50, 1951, pp.162-4.

[2] Eighteenth century agricultural periodicals are reviewed by Idem., 'Early Farming Journals', E.H.R., III, 1931, pp.417-22.

[3] Arthur Young, Rural Economy: or Essays on the Practical Parts of Husbandry, 1770, pp.56-7.

connection with that body. A more formal arrangement for the publication of the Society's proceedings, which at this time had agriculture as one of its prime concerns, came about when Robert Dossie, an active member of the Society, arranged to publish selected communications from the Society in his Memoirs of Agriculture and other Oeconomical Arts which ran from 1768 until Dossie's death in 1782, when the Society began a regular series of Transactions which continued until 1848; the Journal of the Society of Arts was begun in 1852. [1] Another journal which had a large agricultural content during the latter part of the eighteenth century was the Bath and West Society's Letters and Papers which ran from 1780 until 1816. Young's Annals of Agriculture was the most significant of agricultural journals during the latter part of the eighteenth century. It commenced in 1786 and continued until 1808 when Young's failing eyesight caused him to curtail some of his extensive activities. The Annals were joined by four more agricultural periodicals around the turn of the century: the Board of Agriculture's Communications (1797), Anderson's Recreations in Agriculture, Natural History, Arts, and Miscellaneous Literature (1799), the Agricultural Magazine (1799) and the Farmer's Magazine (1800).

The Annals contain a vast store of information on agriculture in the form of articles, reports and enquiries but lack form and cohesion. Anderson's Recreations stressed the need to give information in small doses to hold public attention, but the emphasis in this periodical was very much upon the 'miscellaneous' section and there were complaints that too little space was devoted to agriculture. [2] The Communications contained

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[1] Wood, pp.329-34.

[2] James Anderson, ed., Recreations in Agriculture..., I, 1799, pp.3,287.

long essays of considerable quality; the Agricultural Magazine and Farmer's Magazine (between which there was considerable rivalry) [1] were far more structured than the Annals, with separate sections for original communications, reviews of publications, and agricultural reports, they established the style that was to be followed during the first half of the nineteenth century.

Published in Edinburgh - as were so many of the agricultural works of the time - the Farmer's Magazine had some bias toward Scottish affairs but contained extensive reports from England and may be fairly considered to have been a national magazine. It ceased in 1825 when the publishers failed. This gave the opportunity for a new journal to be launched, the British Farmer's Magazine founded by H. Fleming in 1826. It was edited until 1836 by the Rev. Henry Berry who combined an interest in Shorthorns with ministry of a large Liverpool parish. [2] Another Farmer's Magazine was begun in 1832 as a complementary publication to the weekly Mark Lane Express and Agricultural Journal. This combined a mixture of short articles and comment, correspondence, reports of all types of local and national agricultural gatherings, and market information, with a strenuous advocacy of the interests of the tenant-farmer. Although hardly 'popular' in style, most of the information that it contained was of direct relevance to the ordinary farmer, which was not always the case with some of the other agricultural periodicals. Even allowing for the rivalry which existed, there was truth in the claim made in the Mark Lane Express that much of the material published in the Quarterly

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[1] See, for example, the attack on the Farmer's Magazine in Agricultural Magazine, XII, 1805, pp.57-8.

[2] British Farmer's Magazine, X, 1836, p.380.

Journal of Agriculture (begun in Edinburgh in 1828) was devoted to 'subjects uninteresting and almost valueless to the British Farmer', illustrating this contention with reference to an issue which contained articles on the natural history of the herring, the discovery of the tea plant in India, and a section on the agriculture in Hindustan. [1]

The early development of agricultural nespapers suffered from the difficulties common to the newspaper industry as a whole: printing problems, poor communications, post office restrictions, the hostile attitude of government, and heavy taxation. [2] Although Bell's Weekly Messenger (1796) is sometimes taken as the oldest English agricultural newspaper, that title more properly belongs to Evans and Ruffy's Farmers' Journal begun in 1807. It was edited, until 1825, by Benjamin Holditch, himself a practising farmer and attender of meetings and shows so that the paper was very close to the agricultural community. Though the contents were not exclusively agricultural, a substantial portion was taken up with communications on agricultural subjects, reports, price information and, after 1815, extensive coverage of local protection associations for which it came to be the most important mouthpiece. In its early years Hillyard judged it to be 'so well conducted, and contained so many original letters on agricultural subjects as to make it a very interesting paper to those engaged in agricultural pursuits'. [3] Later its reputation flagged and its demise was attributed to the fact that one of

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[1] M.L.E., 3 June 1839.

[2] A. Aspinall, 'The Circulation of Newspapers in the early Nineteenth Century', Review of English Studies, XXII, 1946, p.29.

[3] Practical Farming and Grazing, p.57.

the proprietors, William Ruffy, had financial difficulties.[1] In 1832, it was merged with Bell's Weekly Messenger and it is thus from this year that Bell's may be properly considered as an agricultural newspaper. Before 1832 the space given to specifically agricultural topics was small and its early reputation as a rural affairs paper chiefly derives from the Monday edition,[2] begun in 1799, which was sent out to reach country readers with market information, including agricultural prices. After 1832 it was the Monday edition which had a column headed 'Farmers' Journal'. The shortlived British Farmer's Chronicle (1826-9) - a continuation of Fleming's Weekly Express (1823-6) - had little on agriculture apart from price information while another ephemeral publication was the Agriculturist (1836-7), the organ of the Central Agricultural Association which agitated particularly on the currency question. As there was a great deal of internal dissension on editorial policy the Agriculturist underwent a number of changes and on 15 May 1837 was merged with the recently launched New Farmers' Journal, which was in turn absorbed by the Gardener's Gazette - devoted to amateur horticultural topics - the following year.

The earlier failure of Evans and Ruffy's Farmers' Journal provided the opportunity for the launch of what was to become the most important of the nineteenth century agricultural newspapers and one which is of particular significance for the present study. This was the Mark Lane Express and Agricultural Journal which had five joint proprietors. These were John and Joseph Rogerson, Cuthbert W. Johnson, William Shaw, and Dr. J. Blackstone. The Rogersons originated from Sotby, Lincolnshire. After leaving their

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[1] New Farmers' Journal and Agriculturist, 30 October 1837.

[2] S.Morison, John Bell 1745-1831, 1930, p.54; Idem, The English Newspaper, 1932, p.237.

family farm at an early age - possibly because they had failed in farming though the published memoirs [1] are not very explicit on this point - they became involved in the London printing industry. Cuthbert Johnson was a prolific writer on fertilisers [2] and his close friend, William Shaw, had farmed in Wiltshire for a time in the 1820s but later qualified as a barrister. [3] Shaw edited both the Express and the associated Farmer's Magazine and his great influence in English agricultural affairs during the 1830s and 1840s will be made clear in the course of this thesis. The fifth proprietor, Dr. J. Blackstone, was later to be a medical officer for the same group's Royal Farmer's Insurance Institution.

One of the first concerns of the Express was market information for John Rogerson had worked for a time on the Mercantile Journal and been impressed with the imperfect way in which the corn markets were reported. [4] Extensive market coverage was a prime feature of the paper throughout the nineteenth century. [5] It was sent out on Monday afternoons with an account of the state of trade in Mark Lane together with specially written reports of the Smithfield and Newgate meat and cattle markets. Shaw gave much more extensive coverage than the other papers to reviews of improved farming methods and 'scientific' agriculture and it was his advocacy, from 1834, of a central, non-political agricultural institution devoted to the cause of agricultural progress that paved the way for the formation of the English Agricultural Society four years later.

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1 F.M.(2), XXIV, 1851, pp.1-3, (Joseph Rogerson) and Ibid.(3), XVI, 1859, pp.87-8, (John Rogerson).

2 See G.E. Fussell, 'Cuthbert William Johnson 1799-1878: A Protagonist of Salt as a Manure', Fertiliser and Feeding Stuffs and Farm Supplies Journal, 26, 1950, pp.577-80.

3 There is a brief memoir of Shaw by Sir Ernest Clarke in the Dictionary of National Biography, XVII, pp.1386-7.

4 F.M.(3), XVI, 1859, pp.87-8.

5 For the history of the Mark Lane Express see issue of 31 March 1902 ('70th Birthday Supplement').

The periodicals and newspapers that have been reviewed were part of the attempts in the late eighteenth and early nineteenth centuries to improve the communication of agricultural information and before proceeding to the formation of the Royal Agricultural Society a brief assessment of the impact of the printed media will be made. The overwhelming impression from contemporary comment is that, as has already been noted, ordinary farmers were extremely reluctant to read on agricultural topics and were not very likely to buy the agricultural books that were available. At the same time, the fact that some of the books went through a number of editions suggests that there were at least some agriculturists for whom they were of value. While it seems probable that the Board of Agriculture's General Views had little direct impact on farming practice and it was recognised that these and the Board's Communications had very limited circulation, [1] the early newspapers acted as a forum for the exchange of views among the progressive minority of farmers. Evans and Ruffy's Farmers' Journal had a lively correspondence column while Bell's Weekly Messenger outsold The Times in the 1830s. [2] However, it must be stressed that the agricultural content of Bell's was small at this time and that the Monday (country) edition accounted for less than a third of total sales. [3] Stamp returns indicate that the Mark Lane Express achieved a weekly sale of about 3,750 copies in the late 1830s. [4]

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[1] F.M., XV, 1814, p.478; Communications to the Board of Agriculture (N.S.), I, 1819, p.iii.

[2] For a comparison of the circulation of Bell's with other newspapers see A.P. Wadsworth, 'Newspaper Circulations 1800-1954', Manchester Statistical Society 9 March 1955, p.13.

[3] In the issue of 4 August 1811 there was a claim for an average of 9,100 sales for the Sunday edition and 4,200 for the Monday edition. I am most grateful to Dr. L. Adrian for this reference.

[4] This estimate is from the Government stamp returns, B.P.P., 1852, xxviii, pp.498-516. The question of the circulation and readership of the papers is treated in more detail in Chapter III of this thesis.

These circulations are small and doubt has been expressed as to whether the farming literature of the late eighteenth and early nineteenth century had much impact upon the agricultural community. Attention has been directed to the pseudo-scientific and unpractical and inconsistent advice often given in works of the time,[1] and Macdonald is as dismissive of the agricultural books and periodicals of this period as he is of local societies as means for the promotion of agricultural change. Agricultural textbooks of the time, Macdonald claims, contained information from 'the useless to the harmful, from the contradictory to the impossible', while local newspapers, according to Macdonald, often propagated worthless advice.[2] Yet the last part of the eighteenth century saw, as we have seen, the launch of a number of farming periodicals and it may be questioned as to whether these were intended only for the amateur agriculturist or leisured spectator of the rural scene; Macdonald's dismissive view fails to put the late eighteenth century interest in farming literature into its full context.

This is suggested by the 'farming interest' group of Claudio Veliz. He claims that one of the outstanding features of this collection of scientifically-minded progressive agriculturists was their literary pretensions,[3] and that Young's Annals came to be the most important outlet for their writing. At first sight this may seem a surprising claim because the small sale of the Annals and the large amount of material contributed by Young himself has often been noted. According to Young, the circulation of the Annals was only three hundred and fifty per issue in 1791 and Veliz suggests a circulation peak of five hundred. However, he also notes that many of the

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1 Lord Ernle, 'The Wisdom and Follies of Ancient Book-Farmers', Journal of the Ministry of Agriculture, XXIX, 1922, p.203; G.E. Fussell, 'The Farming Writers of Eighteenth-Century England', A.H., 21, 1947, p.1.

2 Macdonald, thesis, p.482; 'Role of George Culley', p.138; 'Diffusion of Knowledge Among Northumberland Farmers', pp.31-2.

3 Veliz, thesis, p.21.

local agricultural societies were among subscribers to the Annals, and taking their nominal membership as seventy-five, it seems quite likely that the three thousand of Veliz's 'farming interest' group came into contact with the Annals. [1] This contention is further supported by his detailed analysis of the authorship of articles contained in them. Veliz finds that over six hundred different authors had articles in the Annals and that there was a 'hardcore' of fifty-three who contributed more than five each. The majority of these contributors were practising agriculturists, not amateurs, and agricultural experimentation (twenty percent of all Annals articles between 1784 and 1809) was an abiding concern, second only in importance to general farm management as an Annals topic. [2]

To this small but highly significant group the printed media do seem to have been of importance as a means of generating and communicating agricultural information. It was noted in the Encyclopaedia Britannica that lack of information was an obstacle to agricultural improvement and that publications could combat the difficulty that farmers were often isolated from each other. [3] The majority of 'ordinary farmers' were probably oblivious to the 'farming interest' group and their articles, and the books and periodicals together with societies, had little direct influence on the general level of the late eighteenth century farming practice. But this is to miss the point; the societies and the associated interest in literature were the start of an expanding agricultural information system which was to come to maturity during the nineteenth century the promise of which, in 1800, was (like 'science'), to the perceptive minority 'looming for the future'. This is the context in which early societies - national and local - and the literature need to be taken, and to dismiss them as being of little importance at this time is to take a restricted view of the process of English agricultural change.

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[1] Ibid., pp.22, 25-6; Annals of Agriculture, XV, 1791, pp.170-1.

[2] Thesis, pp.19, 21, 27, 279-87.

[3] Enclyclopaedia Britannica, I, 1810, p.327.

CHAPTER II : THE FORMATION AND EARLY DEVELOPMENT OF THE SOCIETY

The Formation of the Society

In the introductory section to chapter I the reasons for the formation of the Society in 1838 were briefly outlined. It was suggested that those who were most instrumental in its foundation - William Shaw, the third Earl Spencer, and Henry Handley - believed that agricultural practice was open to much development and improvement by means of the employment of 'science' and in making information about advanced practice readily available. In the sections which followed, the attempts to improve agricultural information channels in the late eighteenth and early nineteenth centuries were reviewed. We may now return to the circumstances which led to the establishment of the Royal Agricultural Society and the details of its formation, and we need to start at the beginning of the nineteenth century.

During the war years between 1793 and 1815 there was a sharp upturn in agricultural prices, though this was marked by violent fluctuations. Chambers and Mingay point out that the high prices were due to a succession of poor harvests and the inflationary effects of war finance as well as the continental blockades, and that there were high imports during some of these years.[1] The agricultural response to these profitable farming conditions was partly the interest in improved methods that has been briefly reviewed, but more particularly a considerable extension of the cultivated area. The annual number of enclosure bills reached a new peak during the war years,[2] and

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[1] The Agricultural Revolution 1750-1880, pp.114-5.

[2] Ibid., p.83.

involved over three million acres during the first two decades of the nineteenth century. Much of this was inferior land which had not been wanted when lower prices obtained before 1793. [1]

The price of wheat fell markedly between 1813 and 1815. Prices were higher in 1817 and 1818 but then sank from 86s 3d. to 44s 7d. per quarter in 1822 as substantial imports brought in during 1818 - when the price was above the 80s. level fixed by the Corn Law of 1815 - augmented the large produce from the abundant harvests of 1821 and 1822. [2]

With this sharp fall in prices there was much talk of 'depression' and 'distress' in the agricultural community which, in some districts at least, was real enough as rents had often been raised in line with wartime profits but had not been reduced to take account of the changed post-war conditions. The predominant reaction among agriculturists to this new situation, including the scientifically-minded 'farming interst group', was to call for even more protection than that afforded by the 1815 legislation. [3] Mitchison has remarked that what was wanted at this time was not the 'research, enthusiasm, and information' that we have reviewed but persistent pressure on Government which was 'refusing to conduct its economic policy exclusively in the interests of farmers or proprietors'. [4] Agitation was led by George Webb Hall through his Agricultural Association, a national body which had numerous local branches. For a time this movement was articulated through the pages of the Farmers' Journal - the first of many farmers' movements of the nineteenth century.

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1 Chandos Wren Hoskyns, 'The Progress of English Agriculture During the Last Fifteen Years', Journal of the Society of Arts, IV, 1856, p.272.

2 Chambers and Mingay, pp.124-5.

3 Veliz, thesis, p.40.

4 'Old Board', p.62.

Topical issues of the Farmers' Journal were sent gratis to farmers' market inns to ensure wide coverage of the Association's views, [1] and between 1820 and 1822 four hundred and seventy five petitions relating to agricultural distress were presented to Parliament. [2]

Webb Hall's movement soon lost support; his rather uncompromising and ill-thought out views were discredited when he failed to make much impression in his appearance before the Select Committee on Agricultural Distress in 1821 where he was questioned by David Ricardo. [3] In addition, another group emerged who believed that low agricultural prices were essentially attributable to the Currency Act of 1819 which had a deflationary effect by returning the country to the gold standard. Many agriculturists did not appreciate the monetary arguments but felt the effects of the Act by the restriction of credit by country banks, although this was also a reflection of an increasing tendency to view the tenant farmer as a poor risk with regard to lending in contrast to the position that had obtained before 1815. [4]

The agricultural agitation died away as prices recovered, not to wartime levels, but to figures which were above those which were usual in the 1770s and 1780s. On a decennial view, however, wheat prices declined. The following figures are given by Fairlie [5] for the first four decades of the nineteenth century:

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1 Spring and Crosby, p.121; Travis L. Crosby, English Farmers and the Politics of Protection 1815-1852, 1977, p.36.

2 B.P.P., 1822, V, p.67.

3 Crosby, pp.42-3.

4 L.S. Pressnell, Country Banking in the Industrial Revolution, 1956, pp.348-9.

5 S. Fairlie, 'The Corn Laws and British Wheat Production 1829-1876', E.H.R. (2), XXII, 1969, p.105. On the accuracy of the Corn Averages on which Fairlie's statistics are based see Wray Vamplew, 'A Grain of Truth: The Nineteenth Century Corn Averages', A.H.R., 28, 1980, pp.1-17.

Table: I Decennial Wheat Prices, 1800 - 1840

Period	Price per quarter
1801-10	83s 9d
1811-20	87s 5d
1821-30	59s 5d
1831-40	57s 10d

This demonstrates the lower price levels of the 1820s and the 1830s compared with the first two decades, although they also show a degree of stability around the lower level. The 1830s figures would not have been so low but for exceptionally depressed prices between 1833 and 1835. The explanation of the phenomenon of falling, or flat, prices at a time of rising population and demand is a matter of some controversy. A general view has been that this was a reflection of rising productivity and output brought about by new methods [1] though this has been questioned by Fairlie. [2] The nature of post-Napoleonic arable adjustments has been given more recent - and still inconclusive - consideration by A.R. Wilkes. [3] The problems cannot be fully examined here, but features of the period between 1815 and 1837 do need consideration inasmuch as they relate to the reasons why Shaw, Spencer, and others called for what amounted to a programme of agricultural intensification which led to the formation of the Royal Agricultural Society.

It is not disputed that during the war peiod much land was brought into arable production and, with the costs of reclamation, those responsible may

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[1] G.E. Fussell and M. Compton, 'Agricultural Adjustments after the Napoleonic Wars', Economic History, IV, 1939, pp. 184-204; Betty Kemp, 'Reflections on the Repeal of the Corn Laws', Victorian Studies, V, 1962, pp.184-204; Chambers and Mingay, p.127.

[2] S. Fairlie, 'The Corn Laws and British Wheat Production 1829-76',

[3] A.R. Wilkes, 'Depression and Recovery in English Agriculture after the Napoleonic Wars', unpub. Ph.D. thesis, University of Reading, 1975, and 'Adjustments in Arable Farming after the Napoleonic Wars', A.H.R., 28, 1980, pp.90-103.

have been reluctant to give it up immediately on the return to peacetime conditions. Additional enclosures fell away sharply after 1815, and contemporaries thought that the increased arable area was quite adequate to supply the needs of the increasing population during the 1820s. [1]

At the lower price levels obtaining, it would still be possible for individual agriculturists to maintain or improve their position by increasing output per unit area. That there were attempts to do this is shown by the substantial increase in the consumption of fertilisers and manufactured feeding-stuffs after 1815. Professor Thompson's statistics show a 'take-off' in the importation of bones and manufactured oilseed cake during the 1820s, [2] and although the unit productivity increments from these inputs is problematical (a question which will be given further consideration later in this thesis) they may reasonably be assumed to have led to an increase in output. Wilkes has recently pointed to an increase in wheat acreage on the 'claylands' during the 1820s and 1830s as also contributing to gain in output during the period. [3] The view that agricultural output kept broadly in line with, or slightly exceeded demand in the 1820s and 1830s does not, therefore, seem unreasonable, and that oversupply was the reason for the plummet in price in the years of very good harvest. Between 1833 and 1835, there was much renewed talk of 'depression' and 'distress' but this was a far from universal feature of the agriculturist's position in the 1820s and 1830s.

The line of thought which looks to rising productivity during the 1820s and 1830s also suggests that this was a most marked feature of the lighter

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1 Hoskyns, 'The Progress of English Agriculture', p.272.

2 'Second Agricultural Revolution', pp.73-5: average annual importation of bones, according to these figures, rose from 4,400 tons 1821-4 to 16,100 tons 1825-31 and of oilseed cake 10,643 tons to 24,035 over the same period.

3 Wilkes, 'Adjustments in Arable Farming'.

soils and that there was a widening productivity differential between these and cold, wet soils, where turnips could not be grown [1] or where farmers or landowners were unwilling or unable to make the necessary investment in improvements. The view which emphasises this widening differential in the competitive position of different classes of soils - more particularly the lightland/clayland dichotomy - is by no means invalidated by Wilkes's recent claim that there was an expanded wheat acreage on the claylands and, in any case, this is hardly a very novel finding. David Grigg, for example, has discussed the apparent paradox of an increasing acreage of wheat on inferior clays even though it might have been expected that pasture would offer greater returns in the face of more buoyant prices for livestock products. In south Lincolnshire, he attributed this reaction to the expectation among farmers that wheat prices would recover, high losses from sheep rot in 1827, the slowness of newly-sown grassland to come into production, and the fact that recently ploughed clays can give good yields for an initial period before their nutrient store is seriously depleted. [2] The fact that farmers in other regions may also have been making this response so increasing total output and leading to price stability emphatically does not mean that the clays were a dynamic sector of the agrarian economy, as claimed by Wilkes. Grigg also attributes the process of increasing output in south Lincolnshire during this period to the more general adoption of the methods of the 'agrarian revolution' - turnip growing and greater stocking densities - and clearly recognises low prices as a stimulus to improvement at this time. [3] The extension of the arable acreage, though not

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[1] Chambers and Mingay, p.127; E.L. Jones, The Development of English Agriculture 1815-1873, 1968, pp.14-15.

[2] D.B. Grigg, The Agricultural Revolution in South Lincolnshire, 1966, p.128.

[3] Ibid., pp.158-9.

on very marginal land, with intensification on suitable soils has also been noted as a feature of Northumberland agriculture during the first half of the nineteenth century. [1]

The loss of the competitive position of the claylands, perceived as the traditional 'granaries of England', was often noted by commentators during the 1830s, including William Shaw. There are frequent indications in the 1836 Select Committee on Agricultural Distress evidence that there were piecemeal attempts to rectify this situation, as in draining with turf or stones. Indeed, it was the attention that this committee focussed on the potential of Smith of Deanston's draining methods - that were hoped to make great improvements to the clays if more generally known - that provided one of the motives for the formation of the Society. For those who looked for improved methods to further raise productivity there was the apparent contradiction, referred to at the cutset of this chapter, of oversupply leading to low prices and depression in good harvest years. But there was also the perception of the feature of the rising population and changed demand - as stated by Hoskyns - to underpin the programme of agricultural intensification envisaged by the founders of the Royal Agricultural Society, and the prospect of some amelioration of the position of the agriculturist on the less favourable soils.

Given the rather intangible prospect of improved methods and the possible economic contradictions of agricultural intensification, it is fairly readily understandable that for many landowners and agriculturists - particularly those on the less favoured soils or who lacked capital - clamours for legislative support as by relief of financial burdens, currency reform, and the maintenance of protection had greater appeal. Thus there was at least some degree of

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[1] Stuart Macdonald, 'Agricultural Responses to a Changing Market during the Napoleonic Wars', E.H.R.(2), XXXIII, 1980, pp.70-1.

polarisation between what Linker has seen as the 'Party of Memory' who looked back to wartime high prices which might be revived by government support and the 'Party of Progress' who looked to improved technique and sustain rural prosperity.[1] These categories must not be drawn too sharply for many leading agriculturists were, for example, interested in experiments with bone dust at the same time as they called for repeal of the Malt Tax. Similarly, it was not an unreasonable point of view to argue that protection was necessary to support improved methods, rather than the opinion of Hoskyns that scientific agriculture would render protection unnecessary. However, the 'Party of Memory' were those who followed the Marquis of Chandos and at the dinner of the Royal Buckingham Agricultural Association in 1834 applauded the sentiment that

> New fangled *nonsense ain't the thing*
> To gull the British farmer,[2]

while the 'Party of Progress' promoted a non-political, national agricultural institution dedicated to advanced farming and the spread of best practice.

Most accounts of the foundation of the Royal Agricultural Society stress the part played by the third Earl Spencer who formally proposed it at the annual dinner of the Smithfield Club held on 11 December 1837.[3] While Spencer's involvement was crucial, it is William Shaw, editor of the Mark Lane Express and Farmer's Magazine, who may most properly be considered the founder of the Society. The launch of the Express in 1832 coincided with the sharp downturn in the price of wheat. In the face of renewed 'distress' Shaw

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1 Linker, thesis, p.446.

2 F.M., II, 1835, cited by D.C. Moore, 'The Corn Laws and High Farming', E.H.R.(2), XVIII, 1965, p.549 and The Politics of Deference, 1976, p.342.

3 For example, E. Clarke, 'The Foundation of the Royal Agricultural Society', Journal (3), I, 1890, pp.2-3; Scott Watson, p.15; Wasson, 'Third Earl Spencer', p.95. The dinner was reported in F.M., VIII, 1838, pp.47-8; See also C. David Edgar, 'Honest Jack Althorp - Founder of the Royal', Journal, 141, 1980, pp.10-22.

advocated a radical programme which included a call for a fifty per cent rent reduction, a tax on incomes of over three hundred pounds as a substitute for tithes and local taxes, and a limitation on the size of farms to three hundred acres in rich districts and five hundred in poorer areas.[1] From 1834 onwards Shaw persistently called for some form of central agricultural society, and produced a plan for a body that was to be styled the 'Royal Agricultural Society'. This was to protect the interests of agriculture but with the significant rider: 'in so far as it may be consistent with the prosperity of the other branches of industry'. Shaw placed stress on the model of the Highland Society and the Paris Central Society and looked to his Society to act as a centre of communications with local and overseas societies, maintain a museum and library, sponsor reports and lectures, and hold an annual meeting in the country.[2]

Shaw's proposal was taken up, but not in the way that he had hoped. Deputations from various agricultural associations whose chief interest was in legislative action met at Aylesbury on 12 Noverber 1835 under the auspices of the Duke of Buckingham and his son , the Marquis of Chandos. The outcome of this meeting was the formation of a Central Agricultural Society during the Smithfield Show week of 1835.[3]

The official title of this group was the 'Central Society for the Protection and Encouragement of Agriculture'. 'Encouragement' was taken to mean the application of science to agriculture but from the start, the 'Protection' part was very much to the fore.[4] The Secretary of the

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1 Shaw's arguments are reviewed in M.L.E., 31 March 1902 ('70th Birthday Supplement').

2 'Royal Agricultural Society', F.M., III, 1835, pp.443-9. Shaw reviewed his efforts to create the Society in 1840: F.M.(2), II, pp.73-4.

3 'Meeting of the Agricultural Deputations at Aylesbury', F.M., III,1835, pp.492-8; 'Central Agricultural Society', F.M., IV, 1836, pp.8-16.

4 It is for this reason that the 'Central' was not considered in the review of national improvement societies antecedent to the Royal.

'Central' was Robert Montgomery Martin[1], a writer and statistician, who had returned to England in 1830 after extensive travel in the colonies and who had been impressed, on his return, with the widespread manifestations of rural distress, incendiarism, and depression in manufacturing. Martin's remedy was currency reform. In this, he aligned himself to those agriculturists who believed that low prices were essentially attributable to the deflationary effects of Peel's Currency Act of 1819. At the inaugural meeting of the Central Society there was 'great cheering' when Earl Stanhope referred to the distress caused by that 'Edict of Confiscation, Peel's Bill',[2] while it was argued, rather illogically, that 'every shilling taken from circulation was a shilling taken from the value of that sold on the market'.[3]

But the currency issue was divisive; Chandos refused the presidency of the Central for this reason, and warned against agitation on currency which he thought would be abortive, and would lead to a failure of the agricultural interest to exert full pressure on government. Chandos was more interested in protection and the Malt Tax, and the motive for his courting of the Buckinghamshire farmers was to mould them into an electoral power-base by bringing them into the ranks of the Conservative Party, which, in his own area, he did with some success.[4]

Thus the 'Central Society' of 1835 incorporated from the start an ill-assorted collection of interests: the ultra-high Tory landed aristocrat; the political economists; country bankers (William Medley, a failed country banker, was the treasurer[5]); and assorted tenant farmers. Their affinity of

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1 Here I am indebted to Prof. F.H.H. King for information from his biography of Martin currently in preparation.

2 Crosby, pp.57-8.

3 'Central Agricultural Society', F.M., IV, 1836, p.9: 'Meeting of the Agricultural Deputations at Aylesbury', Ibid., III, p.493.

4 Crosby, pp.88-93.

5 Medley was a friend of Martin's father. Martin resided with Medley during the formation of the Central Association.

interest is found in Martin's speech to the inaugural dinner of the Association: 'God forbid that the prayer of the false political economist should ever be realised, and that England should become the manufacturing workshop of the world'. [1] The Central declared that the 'Agriculture of the Kingdom was the foundation of national prosperity in every other matter by which that prosperity is produced', [2] sentiments which represent those of a 'Party of Memory' which sought to uphold the dominance of the agricultural and landed interest. Rural prosperity would be secured by high prices maintained by a benevolent legislature rather than by 'scientific' farming which would need substantial inputs of capital, changes in the relationship between landlord and tenant, and the traditional basis of rural society.

When it became clear that the main preoccupation of the Central Society was to be the currency question, Shaw criticised the course taken and became more persistent in his calls for a non-political 'scientific' Society. In contrasting the economic advantage of manufacturers with agriculturists Shaw claimed that their success and prosperity derived not from the 'liberality of a free trade Parliament' but solely from their own 'exertions, capital and machinery' which allowed them to beat competitors. Shaw then went on to report on experiments with steam ploughs which had received the attention of Henry Handley. [3] He published a 'political companion' to the Farmer's Magazine which gave the view of other newspapers on the Central's prosecution of the currency question, most of which were unfavourable; [4] and he gave

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[1] Agriculturist, 2 January 1836. I am grateful to Prof. King for drawing this to my attention.

[2] 'Meeting of the Agricultural Deputations at Aylesbury', pp.497-8.

[3] F.M., IV, 1836, pp.2-3.

[4] Ibid., pp.82-9.

prominence to a letter from A.G. Spiers, M.P. for Paisley, to Montgomery Martin in which he stated that he could not accept an invitation to join the Central because its objects were not those of the Highland Society - science and the encouragement of agriculture. The true friend of agriculture was a more scientific system of tillage not the Marquis of Chandos, a 'nobleman violently conservative in his politics, hostile to the liberal ministry, advocate of the Corn Laws, and of restrictions and monopolies'. [1]

The Central propagated their views through their own newspaper, the Agriculturist. It tried to affiliate local associations, which it did with partial success, though many local groups evinced a reluctance to become involved. Support for the Society soon began to fall away, particularly with the revival of prices during 1836. Martin was essentially an interloper on the scene and internal dissension is apparent when a leader in Bell's Weekly Messenger announced that the paper was to be the medium of communication to agriculturists at large [2] in place of the Martin-edited Agriculturist. The new version of this, the New Farmers' Journal and Agriculturist, claimed that the Central's original organ had failed because the columns were all taken up with one important question. [3] Increased concern with some aspects of agricultural improvement is apparent at this time, and Bell's carried reports of the Central's experiments with grass seed, rye grass, wheat, and manures. [4]

Shaw at the Mark Lane Express continued to allege that the Central, that 'political abortion, the offspring of a confederacy of bankrupt landowners,

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1 F.M., IV, 1836, pp.115-6.

2 B.W.M., 5 June 1837. I am grateful to Miss Sarah Joynes for this and subsequent Bell's references during this period.

3 New Farmers' Journal, 15 May 1837, referring to the Central's preoccupation with the currency issue.

4 For example, B.W.M., 24 July, 28 August, 11 and 18 September and 25 December 1837.

mercenary speculators, and merciless currency-mongers', [1] had given insufficient attention to matters on agricultural improvement. He gave prominence in 1836 to letters calling for more agricultural chemistry. [2] Attention was focussed on the Select Committee on Agricultural Distress (which had been moved by the Marquis of Chandos in 1835) and its failure to report. [3] Shaw Lefevre's Remarks on the Present State of Agriculture, which was the only tangible result of his Committee's deliberations, was published in full. [4] This stressed the perceived advantage of the lighter lands over the clay lands and, in particular, looked to draining after Smith of Deanston's principles to help redress the balance; Smith's sub-soil plough would be 'as important to the heavy lands as turnip husbandry was to the light lands'. [5] There were calls published for the re-appointment of a Board of Agriculture and references to the 'new discoveries astonishing the world by their results'. Agriculture presented a wide field for improvement and discovery, but suffered from a 'want of communication which characterises the manufacturing part of the community'. [6]

This, then, is the context of the formation of the English Agricultural Society. Shaw had done the preparatory work through persistent attacks on the Central and calls for a 'scientific' non-political national institution after the model of the Highland or Paris Central Society. Spencer was an appropriate person to formally propose the new Society. His concern for the

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1 M.L.E., 22 January 1838 (from Bedford Beacon).
2 'On Agricultural Chemistry', F.M., V, 1836, pp.27-33, 77-81, 157-60.
3 Ibid., pp.235-6.
4 Ibid., pp.248-56.
5 Ibid., pp.250-1.
6 Ibid., VII, 1837, pp.511-2.

efficient communication of information has already been noted. He was known to the agricultural community, and in August 1837 founded the Yorkshire Agricultural Society which for some years was to sponsor a premium list larger than that of the Royal. It was Shaw, however, who induced Spencer to make his proposal at the Smithfield Club dinner. Spencer met with Shaw at the headquarters of the Club on 8 December 1837 together with Brandreth Gibbs, Secretary to the Club. Spencer agreed with Shaw's suggestions that he should launch the proposed institution, on the condition that he could obtain the support of the Duke of Richmond to give political balance.[1] Thus it was no accident that when Spencer made the proposal he had before him 'one of the largest meetings of agriculturists ever assembled at the club'. They were gathered there as a result of much preparatory work, the bulk of which had been carried out by William Shaw.

In his speech to the Smithfield Club dinner, Spencer suggested that efforts for agricultural improvement should not be devoted to stock alone, as was the concern of the Club. This, being in the metropolis, was 'totally useless for the promotion of the general purposes of agriculture'. Farming, Spencer maintained, was in its infancy, and there was little application of science to agricultural practice; but with successful experiments, explained and made practicable, he had no doubt that 'an improvement would soon take place that few had now any conception of'. The Duke of Richmond extolled the benefits of the Highland Society in diffusing agricultural information and he could not see 'why the farmers of England should fail to

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[1] B.H.T. Gibbs, The Smithfield Club. A Short History of its Origin and Progress, 1857, p.14.

imitate so excellent an example'. [1] In commenting upon the proceedings Shaw reviewed the failure of the Central and the problems that had faced agriculturists since he had 'commenced the dedication of our labours to the service of the British Agriculturists' (1832). He urged the importance of cultivating the science of agriculture, and of enquiring into the application of chemistry to agriculture as a remedy, and emphasised the point insisted upon by Spencer that there would be few important results unless 'politics and all matters which might become subjects of legislative enactment' were scrupulously avoided at the meetings of the proposed institution. [2]

During the early part of 1838 the new Society was promoted in a number of ways. Henry Handley, [3] M.P. for Lincolnshire, made efforts to obtain influential support from members of Parliament. In a letter to Richmond, Spencer stressed the need to obtain at least twenty subscribers of fifty pounds each to get the new institution under way and looked to Handley to achieve this, hoping that he would get the names of some 'outrageous Tories and Corn Law people'. [4]

Handley also published an influential 'open letter' to Spencer. Here he alluded to the failure of the Board of Agriculture and maintained that the very time when it failed was the time when it was most needed, a reference to the agricultural distress of 1822. Parliamentary interference was not the answer to lower prices; rather, the lowering of costs and the utilisation of the discoveries of science would put farming on the road to prosperity..

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1 'Smithfield Club Dinner', F.M., VIII, 1838, pp.47-8.

2 'National Agricultural Institution', Ibid., pp.1-3.

3 Handley was the son of a Lincolnshire solicitor and an 'independent man of the people'. Apart from his interest in scientific agriculture he also campaigned against the Malt Tax. For a memoir, see F.M., (2), XI, 1845, pp.1-4.

4 West Sussex Record Office, Goodwood MSS, 1597, Spencer to Richmond 10 January and 14 February 1838.

Agriculture, according to Handley, was too much dominated by the 'old school' who regarded innovation with suspicion, had no time for 'book-learning', confined their lives to their own immediate neighbourhoods, and had minds unwilling to seek or appreciate new information. Thus such improvements as had been discovered were slow to travel. In contrast, Handley claimed that there was also a new class of men who were prepared to strive after knowledge and utilise the new facilities of internal communication. Science - chemistry, botany, entomology, mechanics - was to be the 'pilot' that would steer them into 'hitherto imperfectly explored regions'. Topics in the minds of thinking farmers were such questions as what was the food of plants? How were soils formed? How could manure best be prepared? What was the role of minerals - lime, gypsum, salt? Why had bones acted so well in parts of the Midlands but failed elsewhere? These were the questions that Handley thought that the new Society should consider, and it would additionally help to spread such advances as improved seeds of Col. Le Couteur and the machinery developed by Ransomes. But all this could only be achieved if politics were rigorously excluded. [1]

While Handley was eliciting support for the proposed institution, Shaw concentrated on making the provincial press aware of the project. In his first communication to Richmond on the subject, he enclosed a list of some of the most important subscribers who had been recruited and stated that there had been favourable comment in more than fifty local newspapers, [2] and he gave full coverage to this local support in the Mark Lane Express. [3] The general merits of the proposal were widely debated and correspondents to the Express and Farmer's Magazine echoed the points that had been made by

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[1] Henry Handley, M.P., A Letter to Earl Spencer on the Formation of a National Agricultural Institution, 1838. See also F.M., VIII, 1838, pp.191-98.

[2] Goodwood MSS, 1458, Shaw to Richmond 21 February 1838.

[3] See, for example, issues of 1 and 15 January 1838.

the principals, Shaw, Spencer, and Handley. To Cuthbert Johnson, the new institution would have 'no Polar Star except the increased prosperity of agriculture' and science would enable agriculture to meet the Malthusian prediction of excessive population growth. Carleton Smythies stressed the difficulty of the communication of information on agricultural experiment and the inadequacy of rural education, and called for more experimental farms. Others looked to the potential of new improved communication in spreading techniques from one district to another and quoted the motto of the Society for the Diffusion of Useful Knowledge, 'Knowledge is Power'. [1]

Not all communications were favourable. There were those which still supported the Central Society which Shaw maintained 'existed only in name' and had done little for agricultural improvement. [2] Others questioned how much the Highland had actually achieved and misgivings were expressed on the potential of science, for which so much was claimed. For 'Rusticus' the history of agriculture did not furnish one single instance of any assistance from science: 'our best chemists cannot farm, and our best farmers are no chemists'. The shortcomings of agriculture were essentially due to mismanagement. The practitioners of agriculture were not educated for the business as they were in other professions: 'I know of a nobleman in England who lately employed a disbanded seaman to manage his farm... When do we hear of a manufacturer employing a seaman or a publican to superintend his manufactory?'. [3]

Late in February 1838, Spencer informed Richmond of his intention of

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[1] Ibid., and F.M., VIII, 1838, pp.162-3.
[2] 'Fair Play', letter, M.L.E., 5 January 1838.
[3] F.M., VIII, 1838, pp.164-5.

putting an advertisement for the proposed society in the Express and Bell's, though he had some doubt as to whether the latter would publish it.[1] These advertisements duly appeared and it was with 'no ordinary feelings of satisfaction' that, in March, Shaw was able to announce the 'first decisive step toward the formation of an English Agricultural Society'.[2] The advertisement alluded to a proposed meeting for 9 May at the Freemasons' Tavern. In April Shaw was able to publish the addition of the names of Sir Robert Peel, the Marquis of Exeter, and the Duke of Wellington to the growing list of supporters. Shaw stated that Conservatives were welcome, so that the new Society would be seen to be non-political. It was also important to stress the uniformity of opinion on the necessity of promoting improvement in agriculture.[3] Immediately preceding the meeting convened to form the English Agricultural Society Shaw published a long-leader which enunciated farseeing principles for the new Society:

> The Society about to be formed will not seek to promote or maintain erroneous principles or to uphold one class in the state of injury to the rest nor to advocate politically the importance of one branch of national industry to another. The great axiom and object of its exertions will be directed to the advancement of such improvements in every department of agriculture, and to their speedy and general diffusion amongst the whole agricultural community, as may enable them to profitably convert our barren wastes to a fertile soil and to render our cultivated lands still more fruitful.

The rationale for this, Shaw claimed, was the increasing population which made such improvements imperative.[4]

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1 Goodwood MSS, 1275, Spencer to Richmond 22 February 1838.
2 M.L.E., 19 March 1838.
3 Ibid., 9 April 1838.
4 Ibid., 30 April 1838.

At the meeting of 9 May, [1] Spencer took the chair and re-iterated the points that have already been reviewed; the importance of the exclusion of politics, the example of the Highland, and the need to diffuse information in a cheap form. He was then followed by Richmond and Handley. At this point there was considerable disruption when a group of dissidents attempted to put a motion to the effect that the proposed society was 'delusive in principle'. This group had had a meeting the previous night when it was claimed that the proposed English Agricultural Society disavowed the principle of protection. A representative of the Cambridgeshire Association claimed that the superiority of Scotch farming was due to freedom from tithes and a low poor rate as well as the 'privilege of the circulation of one pound notes'. Handley and Shaw Lefevre had abandoned their commitment to farmers, it was claimed. There was support for this from J.S. Allnat from Berkshire who claimed that the proposed society would destroy the agricultural interest and reduce it to 'penury and beggary'. After some more disturbance the dissidents left the meeting. They were representatives of the Central Society, but it must be noted that by this time many of the leading supporters of the Central had withdrawn, and some, such as E.S. Cayley, M.P., joined the English Society. The Central went into dissolution at the time of the foundation of the new Society, [2] while some of the remaining diehards - who tried to disrupt the Freemasons' Tavern meeting - went on to form the

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[1] This was very widely reported. The account used here is from F.M., VIII, 1838, pp.440-448.

[2] B.W.M., 14 May 1838.

insignificant Farmers' Central Agricultural Society. [1]

The resumed meeting was then addressed by Peel, who interestingly made reference to the importance of agricultural improvement, the application of capital and science to agriculture, and the danger of political discussion which was inimical to general improvement. After further addresses the meeting separated. The following is a summary of the most importance resolutions that had been made:

> A Society be established for the Improvement of Agriculture in England and Wales; and that it be called the 'English Agricultural Society'.
>
> Prop: Richmond, Sec: Handley.
>
> That it be a fundamental law of this Society, that no question be discussed at any of its meetings of a political tendency, or which shall refer to any matter to be brought forward or pending in either of the Houses of Parliament.
>
> Prop: Peel, Sec: Shaw Lefevre.
>
> That the Society shall consist of two classes of subscribers. The one to be called Governors, subscribing annually Five Pounds; the other, members, subscribing annually One Pound; either the one or the other to be permitted to become Governors or members for their lives by the payment in one sum of the amount of ten annual subscriptions.
>
> Prop: Fitzwilliam, Sec: Pusey.

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[1] See circular in Ibid.,21 May 1838. As for Martin, essentially the founder of the Central, in March 1838 he proposed a revival of the Board of Agriculture (B.W.M., 26 March 1838), a project that had interested him for some time. In 1835 he had obtained an interview with Thomas Spring Rice on the subject, but to no avail. Martin, having seen the failure of the Central to mobilise opinion on the currency question, had little further dealings with agriculture, but in 1842 he proposed an agricultural department of the Board of Trade to collect agricultural statistics, and he communicated with Milner Gibson on the point in July 1846. But apart from the brief career with the Central, Martin was not a significant figure in English Agriculture. He was made Treasurer of Hong Kong in 1844. (Information supplied by Prof. King).

Additional resolutions included the appointment of a committee to frame rules and appoint officers, and to report to a General Meeting to be held 27 June. (Chichester and Cayley)

Only a few comments are needed on these resolutions. The 'non-political' element was at once incorporated as a fundamental rule, with important consequences which will be examined in a later section. There was some opposition to the division between classes of members, as bringing a wedge between landlord and tenant. This was denied, the motive being financial - it was thought better to raise funds by a higher set class of subscription, than to rely on large donations which might give excessive influence to individuals. plan to hold meetings in different parts of the country was a response to the need to take improvements to backward parts of the country and to forge links with the local agricultural community. Fitzwilliam was actively involved in the affairs of the British Association. Cayley's name among the list of proposers and seconders of the various motions is significant because he had been one of the leading figures in the Central Society. He made the point that the foundation of the English Agricultural Society did not mean that farmers could not agitate political questions elsewhere. [1] With the election of a large Committee to carry on the business of forming rules and to choose officers the following day, the English Agricultural Society had come into being.

The Early Development of the Society

The Committee of Management appointed at the Freemasons' Tavern meeting

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[1] See his vigorous defence of the Corn Laws written December 1845 Letter from E.S. Cayley, Esq., M.P. to Lord John Russell on the Corn Laws reported in F.M. (2), XXIV, 1846, pp.23-6 and 46-53. For a memoir of Cayley see F.M. (2), X, 1844, and obituary Ibid. (3), XXI, 1862, pp.354-6.

convened the following day when resolutions were passed with regard to the constitution of the Society. It was to consist of a President, Twelve Vice-Presidents, Governors and Members. The Society was to be run by a Committee of Management consisting of the President, Vice-Presidents, and fifty subscribers, to be elected at the annual meetings, twenty-five to go out annually by rotation, but eligible for re-election. All Governors were to have power of attending meetings of the Committee, but without voting power unless forming part of the Committee. The President was to be elected annually and not be eligible for re-election in less than three years. Subscriptions were to be paid in advance, due on the first day of January each year.

The meeting elected Spencer as the first President and William Shaw as Secretary. Spencer's election was, of course, entirely predictable though he had expressed concern to Richmond that the matter should not be decided in advance of the meeting of 9 May. Spencer had also given considerable thought to the question of the secretaryship. He was aware that Shaw wanted the position and although Spencer came to the conclusion that Shaw would 'do better than anyone', he had expressed the view in correspondence to Richmond that Shaw's position as editor of an agricultural newspaper was something of a disqualification; William Youatt and Cuthbert Johnson were among other names that Spencer considered during the early part of 1838. [1] Shaw continued as Secretary until 1840 when James Hudson, [2] (who had earlier been an assistant librarian

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[1] Goodwood MSS. Spencer to Richmond 14, 22 February, 27 March 1838.

[2] Not to be confused with John Hudson, of Castleacre, the tenant farmer who played a prominent part in the Society's proceedings as a Council member for many years. This error seems to be made by Paolo E. Coletta in describing James Hudson (along with Mechi, Pusey, Fisher Hobbs, and Lawes) as one of the 'foremost agriculturists of the day' (A.H., XVIII, 1944, p.90). James Hudson's duties were almost entirely administrative, and he did not write in the Journal. For a memoir of John Hudson see F.M.,(2), IX, 1844, pp.1-4.

of the Royal Society) succeeded him. Hudson remained in the post until 1859 when he left amid considerable controversy; Shaw continued to play a very active part in the Society's affairs until his sudden departure from England in 1852.

At a further meeting held 12 May, the Committee of Management formulated the following objects for the Society:

I To embody such information contained in Agricultural publications, and in other scientific works as has been proved by practical experience to be useful to the cultivators of the soil.

II To correspond with Agricultural, Horticultural, and other Scientific Societies, both at home and abroad, and to select from such correspondence all information, which according to the opinion of the Society is likely to lead to practical benefit in the cultivation of the soil.

III To repay to any occupier of land, who shall undertake at the request of the Society to try any experiments how f r such information leads to useful results in practice, any loss that he may incur by so doing.

IV By the distribution of Prizes, and any other mode of expending a part of the Resources of the Society, to encourage men of science to exert themselves in the improvement of Agricultural Implements, the improved and economical construction of Farm Buildings and cottages, in the application of Chemical Knowledge to the Food of Plants, and in the suggestion of means of destruction of insects and animals injurious to vegetables, and for the eradication of weeds.

V By the same means to promote the discovery of new varieties of Grain, and other vegetables useful to Man, or for the food of Domestic Animals.

VI To pay attention to any suggestions, which may be made for the proper Management of Woods, Plantations, and of Fences; and apply every other mode, which may appear advisable to improve the general Resources of the Country in its rural concerns.

VII To take such measures as may be deemed advisable to improve the Education of those who may intend to make the Cultivation of the Soil their means of livelihood.

VIII To take measures for improving the Veterinary Art, as applied to Cattle, Sheep and Pigs.

IX At the Meetings of the Society, which shall take place in different parts of the country, by the distribution of Prizes, and by other means, to encourage the best and most advantageous mode in which farms may be cultivated in the neighbouring districts, and to give Prizes to the Owners of Live Stock, which are best calculated to produce profit in their respective localities.

X At the same Meetings, by the same means to encourage Labourers in the improved management of their Gardens, and in general, to promote their Comfort and Welfare. [1]

The Minutes of the Society [2] do not record whether any other objects were discussed or how the ten published were arrived at. One or two comments need to be made about the stated objects and the degree to which they were followed up. Firstly, there was an overall emphasis on the practical value of knowledge and a desire for experimentation. The Society did not, however, involve itself with farm trials and experiments until the establishment of its experimental farm at Woburn in 1875, although Augustus Voelcker (Consulting-Chemist 1857-1883) carried out experiments for the Society at Cirencester and elsewhere. The inclusion of veterinary science has been attributed to the influence of William Youatt, a close friend of William Shaw, [3] who was at that time conducting a campaign for reform of the Royal Veterinary College through

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[1] F.M., VIII, 1838, pp.446-7.

[2] Minutes of Committee of Management, 12 May 1838, pp.7-8.

[3] Sir Frederick Smith, The Early History of Veterinary Literature, III, 1930, p.141

the pages of the Veterinarian, which he edited. An attempt to link the Society with the College was one of the first actions of the Committee of Management, but proved to be one of the least successful of its enterprises. In August, 1838, Spencer made arrangements for the foreign correspondence of the Society to go through the Foreign Office. [1] Shaw had been impressed by the potential of a national agricultural institution by the example of the Central Agricultural Society of Paris, and by the time of the first General Meeting it could be reported that links had been established with the Paris Society and others at Lyons, Geneva, and at Lille. [2] Reports of overseas research and translations of foreign papers sometimes appeared in the Journal but the links with overseas societies did not become very well established. The emphasis on prizes for giving necessary stimulus for the development of knowledge, invention, and excellence followed the pattern established by the Society of Arts and soon generated considerable controversy.

During its early years the Society became involved with a number of projects in connection with its stated objectives, but very few of them had any tangible results. Wheat Trials, to improve the strains available to the farmer, were set up in 1839 but the samples exhibited at the Cambridge Show the following year became inadvertently mixed up so that there was little gained. Another early development was the establishment of a Geological Committee, at the insistence of Sir James Graham. This was to conduct soil surveys in conjunction with the Geological Survey (the Director H. de la Beche was made an Honorary Member of the Society), but enthusiasm soon waned and the Geological Committee was dissolved by the end of 1842. A Committee to promote

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[1] Goodwood MS, Spencer to Richmond 18 August 1838.

[2] F.M.,(N.S.), II, 1839, p.66.

the Comfort and Welfare of the agricultural labourer in 1844 was similarly ineffectual, and when the 'labourers' question' came to the forefront of agricultural discussion in the early 1870s the restrictive interpretation of the Society's Charter precluded the Society from making any intervention.

In calling for the Society to take up the question of agricultural education in 1864, J.C. Morton pointed out that the Society had mostly been concerned with the fourth, eighth, and ninth of its national objects up to that time.[1] Although the Society lacked initiative with regard to many important issues, it was not surprising that the actual activities of the Society came to be rather different than envisaged at the time of its foundation. The annual country meeting was the event which brought it most publicity, and the Society's Journal became one of the leading original agricultural periodicals of the day. But agricultural consultancy, particularly in the chemical department, was an area of work not clearly anticipated at the time of the Society's foundation. Although the importance of the improvement of veterinary science was recognised at the outset, the full impact of cattle diseases and the developments of measures of a legislative nature to combat them was something for the future, although the arrival of foot-and-mouth disease in 1839 soon brought the problem into focus.

In outline, the Society's activities during the period from the time of its foundation until 1880 were as follows. There were three General Meetings for members - in December, May, and July, the latter held during the week of the show at the country location, the others at the Society headquarters at 5 Hanover Square, which was acquired in 1841. General business was conducted

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[1] A.G., 7 May 1864.

by the Council at monthly meetings held on the first Wednesday of the month with a summer recess. Here general issues were discussed and the reports of numerous committees which dealt with more detailed aspects of the Society's work - veterinary, chemical, journal, country-meetings, etc. - were presented. Other Wednesdays at Hanover Square were devoted to open meetings for members to present specimens of plants, crops, etc., ask questions, or send communications on some agricultural topic. Sometimes a formal lecture was given by an outside expert or one of the Society's consultants. These Wednesday meetings were intended as a sort of open forum, a function which they had in some degree in the early 1840s but which they failed to sustain. Agricultural consultancy assumed great significance with the rapid rise in the fertiliser trade in the 1840s and its attendant opportunity for fraud, and the prevalence of cattle disease, particularly from 1865, gave continued importance to the veterinary department. If the show was of most immediate 'popular' appeal- and to some loomed far too large in the Society's proceedings - the Journal, although not always approved of, had a more pervasive influence in the longer term. W.H. Wakefield, in his report of the Birmingham Show of 1876, remarked that if the shows were halted, for financial or other reasons, that action would be more acceptable than ceasing publication of the Journal.[1] The Journal, Country Meetings, and Consultancy and Education were the three broad departments of the Society's work during the period covered by this study, and they are considered in that order in the later chapters. The Society's motto 'Practice with Science' was adopted on the choice of Spencer in 1839 after several others had been submitted to him.[2]

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[1] Journal (2), XII, 1876, pp.547-8.

[2] Including 'In Manibus Terrae', 'Arva Bovemque','Ye generous Britons venerate the Plough' and 'Speed the Plough'; Minutes of the Committee of Management 13, 20 March 1839.

The Society resolved to seek a Charter of Incorporation during February 1840, [1] and this was granted on 1 April through the good offices of Richmond. It is from this date that the Society took its 'Royal' prefix.

Membership: The Society and the Agricultural Community

The Society was able to attract some two thousand members by 1840 and membership continued to increase until a plateau of around seven thousand members was reached in the mid 1840s. Thereafter, membership slipped back to a figure that hovered around the five thousand mark until it began to increase again during the 1870s. The higher levels of the 1840s overstate the membership because under the rules of the Society it was necessary to write a formal letter of resignation in order for a name to be taken off the membership list; non-payment of subscription was not in itself deemed sufficient. Thus names often remained, even though the individuals no longer desired a connection with the Society and steps were often taken to recover 'arrears' of subscription.

The fluctuations in membership, shown on figure II may be interpreted as follows: (i) An initial wave of interest in the early 1840s, when the Society was dominated by enthusiasts such as Pusey and Spencer and there was intense interest in the embryonic techniques of 'high farming' such as underdrainage and artificial fertilisers; (ii) The fall in membership in the late 1840s, which may be related to the short-run depression in agricultural prices at that time, linked, perhaps, to a more critical view of the potentialities of 'science' for agriculture; (iii) The lower level of membership during the 1850s and 1860s is a trend that is

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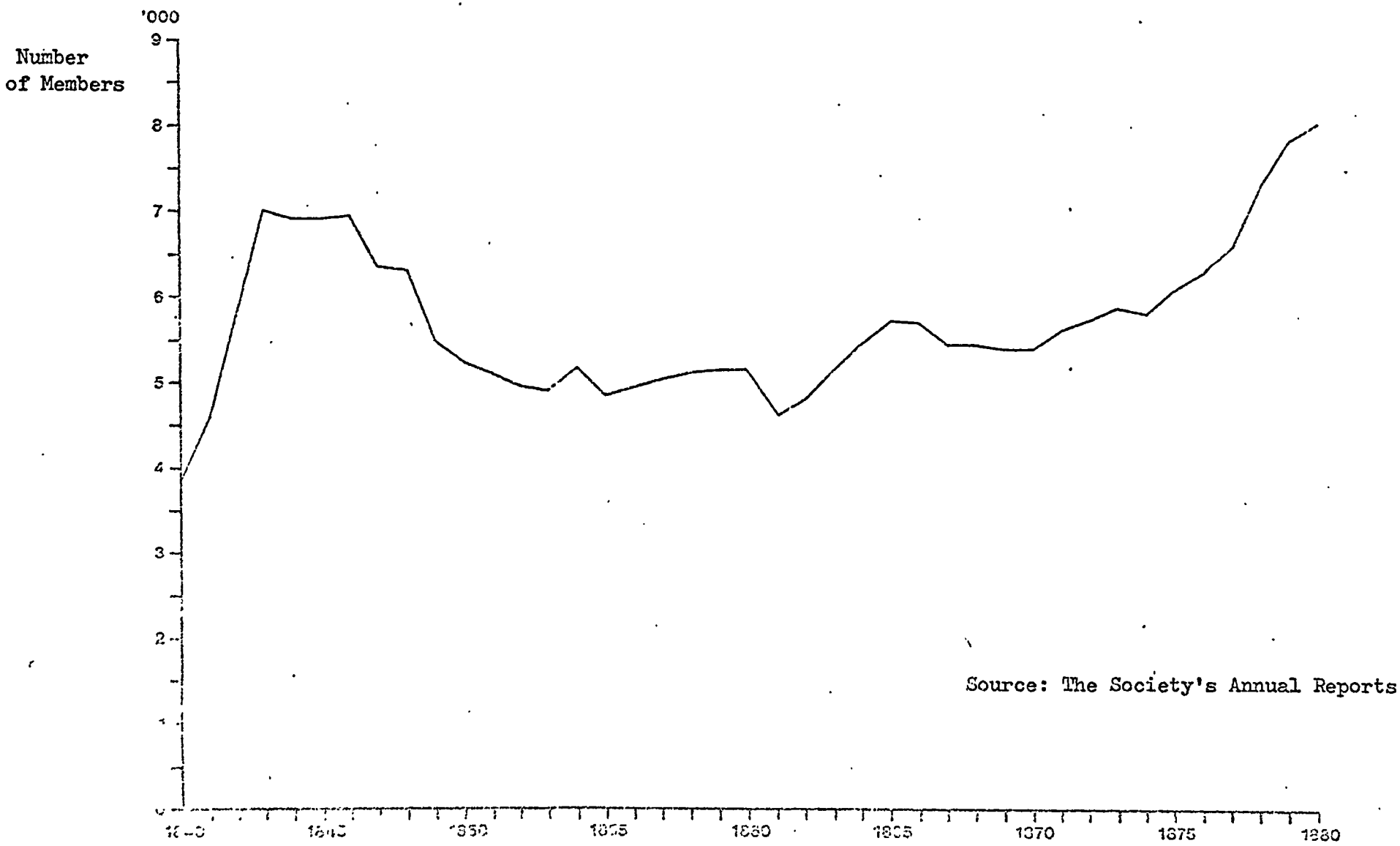
[1] Ibid., 5 February 1840.

FIGURE II:

Membership of Royal Agricultural Society of England 1840 - 1880



Source: The Society's Annual Reports

not readily accountable, but during this period the Society lost much of the confidence of the agricultural community and there was continual criticism of the way in which its affairs were conducted. It must also be added, however, that a variety of sources note a falling-off of interest in agricultural associations and clubs of all types during this period. This may be tentatively attributed as a reaction to the great proliferation of these organisations during the 1840s which had increased to a level which was probably difficult to sustain over the longer term, but it may also be that the period of favourable prices and relative prosperity served to lessen interest in 'improvement' and the 'pioneering spirit' of the 1840s; (iv) The increase in the membership in the 1870s may be related to the onset of less prosperous times for the agriculturist, and the increased appreciation of the work or the Society in such matters as the condemnation of sub-standard fertilisers and feeding-stuffs as well as the energetic and popular Secretaryship of H.M. Jenkins.. Additionally, a members' club was a popular innovation at the Birmingham Show of 1876 and was a specific membership incentive, and the rise toward the end of the decade may be related to this and the publicity surrounding the preparation for the great Kilburn Show of 1879.

With a total of ordinary subscribers which fluctuated between five thousand and seven thousand during this pericd membership by a member of the agricultural community was very much the exception rather than the rule. Speakers at the general meeting would often complain about the low level of membership and call for 'popularisation' that would bring about a ten-fold increase in members, but the Society did very little to 'sell' itself to the agricultural community and it is one of the valid criticisms of the Royal's management that it could have done much more for agricultural research if it had been able to generate a higher subscription income. High levels of membership were

not really to be expected, however, for there was little incentive for the smaller tenant-farmer to join. The main privilege of membership was the receipt of the twice-yearly issue of the Journal, but with its increasing emphasis on lengthy technical articles and extensive reports, there was little of immediate interest for the working farmer whose leisure was more likely to be given over to less demanding reading matter, such as the local newspaper. If he did wish to consult the Journal he did not need to pay his annual pound to the Society for the privilege, for it would be available at his local society or club. There was no members' right of entry to the annual show until 1862, but in any case entry on one of the 'shilling-days' was a cheaper mode of admission than subscribing to the Society. Members also had a number of 'privileges', such as veterinary consultation and chemical analysis. There is little evidence that many veterinary consultations were carried out, and fertiliser analysis, although a very important part of the Society's work (especially in the 1870s), was also widely available at a local level. Non-members could exhibit stock at the shows, but the ordinary tenant-farmer had little chance in competition against the 'crack' stock-rearers such as Turner, Booth, Towneley, Lady Pigott, and the rest. As George Turner pointed out in 1874, for the smaller man a subscription was most usefully given to his county or local association where he could compete at local shows on more equal terms and where there was a better chance of gaining a prize.[1] Many tenant-farmers would have welcomed a 'political' element in the proceedings but this was not possible under the Society's constitution, and it was not the Royal's function to lobby on behalf of the 'agricultural

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[1] At Monthly Council, 9 December 1874, F.M.(3), XLVII, 1875, p.51

interest'. Therefore, although most tenant-farmers of any substance probably belonged to an organisation of some sort, it was exceptional for the Society to be their first choice. They were more likely to join a county association or perhaps a local chamber (in the 1870s) if they farmed on an extensive scale, while farmers' clubs catered (though not exclusively) for the 'grass roots' of the agricultural community.

E.A. Wasson has queried how far the influence of the Society reached down to the lower echelons of the agricultural community [1] and it is certainly not to be seen through direct membership. Even if this was made up exclusively of farmers and landowners (which it was clearly not), membership levels only comprised of about two per cent of the total of agriculturists. It is part of the argument of this thesis that the Society's influence extended far beyond the relatively restricted ranks of the nominal membership and it is in these terms that its work should be viewed. Some individual members, whether landowners or prominent tenant-farmers were clearly 'opinion leaders' or 'key communicators' at the local level, but many 'progressive' farmers did not join the Society. Thus J.R. Walton found that most of the early adopters of cake-crushers in Oxfordshire in the 1840s were not members of the Royal. [2] The Society's influence was through the extension of the totality of agricultural knowledge upon which all members of the agricultural community could draw, if so minded. A small number of the more prominent of Victorian tenant-farmers took an active interest in the Society's affairs; others followed them through the constant reports in the agricultural press. Information generated by the Society could be gleaned from the specifically

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[1] 'Third Earl Spencer', p.99.

[2] Thesis, p.432.

agricultural papers or sometimes the local press and working farmers attended lectures at a local farmers' club where research findings were presented. They could also visit the country meetings (which were given national publicity) and these exercised some influence on the character of implements available for purchase. But although the ordinary farmer benefited from this work, and the Society will be demonstrated to have influenced the course of Victorian agricultural change, there was, for the reasons outlined, very little incentive for the individual agriculturist to contribute an annual subscription to the Society.

There is much contemporary comment deprecating the reluctance of farmers to join the Royal, and this poses a question as to the composition of the membership. There is some indication that many of the regional and local Victorian agricultural societies recruited their members from outside of the agricultural community. Thus Walton has shown that local farmers were not disposed to join the prominent Oxfordshire Association among whom membership was atypical, [1] while Hudson has drawn attention to the small number of farmers who joined the Bath and West Society. [2] The Highland and Agricultural increased the number of tenant-farmers in its ranks in the 1830s [3] though according to J.H. Maxwell only 239 of 2,700 members of this Society - nine per cent - were tenant-farmers in 1850. In calling for a popularisation of the Royal, he claimed that a special reduced subscription had increased the tenant-farmer membership to 1,784 out of a total of 4,033 - forty-four per cent - by 1870, the inference being that the tenant-farmer representation in the

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[1] Thesis, p.232.

[2] 'The Membership of the Bath and West Society during the last 200 years', Acta Museorum Agriculturae Pragae, XII, 1977, pp.50-6.

[3] See Janice Taylor Milne, 'The Royal Highland and Agricultural Society of Scotland: a Study in Membership Diffusion', unpub. B.A. dissertation, University of Cambridge (Geography), 1974.

Royal was below this level. [1]

The precise nature of the background of the membership of the Royal Agricultural Society is difficult to determine from the published lists, but some elucidation of the question of what proportion were practising farmers is possible by examining which of a sample of members were listed as 'farmers' in the Post Office County Directories, the first of which was that for the Six Counties (Essex, Herts, Kent, Middlesex, Surrey, and Sussex) published in 1846. [2] A sample of members living in those counties was made up of those whose surname began with one of the first four letters of the alphabet. This sample totalled 278 out of a total ordinary membership of 5,177 [3] (circa five per cent) of which 33 were identified as 'farmers' in the Six Counties trade list of 1846, which implies a 'farming' membership at that time of twelve per cent - very similar to that claimed for the Highland. A further 84 of the 278 were listed in the 'Court' section and obviously many of these were landowners with farming interests. This leaves the largest proportion of the sample as being in neither the 'Farming' nor 'Court' categories which is indicative of a range of interests and occupations represented in the Society and also a wide general public concern for agriculture in the 1840s.

A little more extensive analysis of the membership was attempted for the early 1870s, when the whole of the Royal's membership in the counties of Kent, Essex, Hertfordshire, Surrey and Sussex in 1873 [4] was related to the Six Counties Directory of 1870. The findings are summarised as follows:

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[1] Comments made at the Annual Meeting, December 1871, F.M.(3), XLI, 1872, p.66.

[2] For a brief discussion of the directories see J.L. Oliver, 'Directories and their uses in Geographical Inquiry', Geography, XLIX, 1964, pp.400-9.

[3] The 1853 list was utilised here: see Journal, XV, 1854, pp.xv-lvi.

[4] Ibid.(2), IX, 1873, pp.iii-lii.

Table: II 'Farming' Membership of the Society in Kent, Essex, Hertfordshire, Surrey and Sussex in 1873.

County	No. of Members	No. listed as 'Farmers' in 1870 Six Counties Directory	Percentage
Kent	249	76	31
Surrey	136	14	10
Sussex	132	38	29
Essex	121	49	40
Hertfordshire	99	22	22
		Mean:	26

We must be wary of placing too much confidence in the figures presented here for there are a number of sources of error inherent in the method followed, such as the accuracy of the lists and the fact that the Directories and membership lists utilised are not in strict temporal conformity. Nevertheless, the percentage of members indicated as being 'farmers' in 1870 in these five counties does accord with what might reasonably be expected, the figure of twenty-six per cent being by no means insignificant, but less than the forty-four per cent claimed for the Highland in 1870. As far as the variations between the five counties are concerned, the low percentage for Surrey is probably a reflection of the larger urban and suburban population of the county (for that reason Middlesex was excluded from consideration) while it is interesting to speculate whether the local influence of that most powerful of Victorian agricultural 'enthusiasts', J.J. Mechi, encouraged an above average number of Essex farmers to join.

It is to be expected that there would be regional variations in the level of farming membership, related to such factors as awareness, availability of alternative institutions, and farming prosperity. To test for this, the

farming membership of the Northern Counties of Northumberland, Westmorland, and Cumberland was examined, the Post Office Directory for these counties being published in 1873. Of 282 members residing in those three counties in that year, 50 were identified as 'farmers', a lower but not dissimilar figure to that found for the five Home Counties (eighteen per cent compared with twenty-six per cent). Somerset was also examined, and here the farming proportion was seventeen per cent (19 out of 114 members). The membership of these nine counties totalled 1,133, a nineteen per cent sample of the 5,945 members in 1873. The farming proportion would seem to have increased (though not spectacularly) over the twenty year period, but it seems likely that the farming membership was higher during the early 1840s *peak (before* Directories are available) and that many left because of the short-run depression in agriculture (which also seems to have led to a decline in subscriptions to farming papers) and probably some disillusionment with 'science' after the heady euphoria of the Society's first years. The figures support the point that it was very much the exception for farmers to join; the low percentage of farming members from Somerset is very probably related to the influence of the Bath and West.

It is likely that a substantial proportion of the remaining members had a direct agricultural interest through landholding, and it also seems probable that very many of the members joined because they were interested in rural affairs, had a 'patriotic' concern for agricultural progress, or had some professional connection with agriculture as through engineering, veterinary practice, writing, land agency, or the food trades. It was no accident that clergy always figured prominently in the lists between 1840 and 1880 for ministry of a rural parish often led to a concern for farm progress and, by

extension, rural prosperity. This concern encouraged many rural incumbents to directly engage in agricultural experimentation, writing or trials of cultivation practice and they were a not insignificant group in Victorian agricultural research; some - such as Huxtable, Rham, Wilkins, Moule, and Smith (of Lois Weedon) - reached national prominence.

The table overleaf shows the county distribution of membership for 1853 and 1873. The variations clearly relate to a variety of factors such as population density, the structure of landholding, and the type of farming. Although there is a wide range of change, with some counties having more than doubled their membership over the twenty year period, many demonstrate little change, and others show substantial falls. The most important single factor to account for these changes may be the length of time that had elapsed since the holding of the annual meeting at a locality in, or adjacent to, the respective counties. Thus Cumberland and Westmorland (+119 per cent and +112 per cent) had not had a show within range until Carlisle (1855) which then probably raised awareness of the Society and its work in this remote location, and this was maintained by the Manchester Show of 1869. Above average increases in Monmouth, Warwickshire, Worcestershire and Staffordshire may relate to the Wolverhampton (1871) and Cardiff (1872) Shows. Falls in the south-western counties of Cornwall, Devon, Somerset, and Dorset almost certainly reflect the revival of the Bath and West Society in the 1850s, which was itself inspired by the Royal's Exeter meeting of 1850. To test the hypothesis that membership change was related to the length of time that had elapsed since the holding of a country meeting in the county (or in a town that was immediately adjacent to the county) a Spearman Rank Correlation Coefficient (R) was calculated which

Table III County Membership of the Society 1853 and 1873

County	1853	1873	Change 1853-1873 (%)
Bedford	48	48	-
Berks	117	130	+ 11
Buckingham	66	62	- 6
Cambs	58	62	+ 7
Cheshire	56	150	+171
Cornwall	61	42	- 31
Cumberland	43	94	+119
Derby	93	75	- 19
Devon	208	100	- 52
Dorset	109	65	- 40
Durham	96	87	- 9
Essex	142	121	- 15
Gloucester	134	188	+ 40
Hants	164	136	- 17
Hereford	100	100	-
Herts	114	99	- 13
Hunts	36	37	+ 3
Kent	183	249	+ 37
Lancs	156	222	+ 42
Leics	71	126	+ 77
Lincs	174	200	+ 15
Middlesex	266	273	+ 3
Monmouth	27	64	+137
Norfolk	256	162	- 37
N'hants	100	96	- 4
Northumberland	138	135	≅ 2
Notts	101	131	+ 30
Oxon	112	146	+ 30
Rutland	7	15	+114
Salop	176	306	+ 74
Somerset	187	114	- 39
Staffs	137	258	+ 89
Suffolk	126	157	+ 25
Surrey	135	136	+ 1
Sussex	186	132	- 29
Warwick	76	155	+106
Westmorland	25	53	+112
Wilts	97	98	+ 1
Worcs	66	139	+111
Yorks	229	271	+ 18
Wales	256	277	+ 8
Scotland	69	68	- 11
Ireland	44	82	+ 86
C.I.	15	12	- 20
Overseas	29	74	+155

Source: Journal, XIV, 1853, p.xxiv and (2), IX; 1873, pp.xiv-xv

yielded a significant value of +0.78. [1]

We may now turn to the relations between the Council and administration of the Society and its members. During the first decade of its existence the proceedings of the Society were generally harmonious and it enjoyed a high level of support from the agricultural press and the agricultural community generally. Internal dissensions were relatively minor and the Society's management of its affairs was uncontroversial. A change from this is first apparent in the early 1850s. Lewes (1852) and Gloucester (1853) were less than usually successful country meetings. Philip Pusey became less active in the Society's affairs in 1853. He took his rejection by the electors of Berkshire the previous year with great sadness and the increasing ill-health of his wife, Lady Emily, meant that he was unable to give so much attention to the Journal as previously. [2] Pusey died in 1855, and William Shaw fled to Australia late in 1852. It was about this time that a feeling began to be expressed that the management of the Society was becoming somewhat distant from the general body of members. Morton remarked in the Agricultural

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[1] This was calculated by ranking the counties in terms of membership change from the largest positive figures (Cheshire +168% and Monmouth +137%) to the largest negative figure (Devon -52%) and by the time that had elapsed since the holding of a show nearby: Monmouth, 1 year (Cardiff 1872) to Somerset 31 years (Bristol 1842). For locations of the shows see Chapter IV, p.313. The Spearman Rank Correlation Coefficient R examines the correlation between the rankings. $R = 1 - \frac{6\Sigma d^2}{n^3 - n}$ where d is the difference between each pair of rankings and n = total of occurrences in the columns, which in this case was 40 (40 counties). R values can range between +1 (an absolute correlation) to -1 (an inverse correlation). The R value obtained is statistically significant at the 0.1% level (from students t distribution). For a discussion of the method, see S. Gregory, Statistical Methods and the Geographer, 1963, pp.181-3.

[2] Linker, thesis, p.586.

Gazette that although the report for 1853 had been received at the General Meeting without criticism, did not represent the 'feeling of the membership generally'. [1] Morton criticised the Society for inactivity and inaction; the General Meeting of 1855 was 'barely more than a meeting proforma held and conducted simply because it was "down in the Charter" that it was to be so held and conducted'. [2] Behind these criticisms was a feeling that the Society was failing to move with the times. In particular there was a dislike of the rigid adherence of the Society to the Charter with its prohibition on the entertainment of 'political' issues. This provision had been generally approved of in the 1840s and such a limitation was then essential if the Society was not to be rent with internal dissensions over protection. But when protection became a 'dead-issue' in the 1850s new 'political' questions arose which were considered perfectly proper by commentators such as Henry Corbet (Shaw's successor at the Mark Lane Express) and Morton for the Royal to take up.

It was not until 1857 that forceful and open criticism was expressed over the direction that the Society was taking. This was first articulated by Samuel Sidney, then hunting correspondent of the Illustrated London News [3]

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[1] A.G., 31 December 1853.

[2] Ibid., 15 December 1855.

[3] Samuel Sidney, 1813-1883 (non-de-plume of Samuel Solomans) is an interesting and neglected figure in mid-Victorian agriculture. In the 1840s he wrote on the gauge question and the colonies and edited Sidney's Emigrants' Journal (with his brother) between 1848 and 1850. He attended agricultural shows for the Illustrated London News and in the 1850s and 1860s was a frequent attender of agricultural discussions, especially at the Society of Arts and the London Farmers' Club, where he was never slow to express his forthright views. He re-edited Youatt's Book of the Pig in 1860 and completed his most popular and widely read work, The Book of the Horse, in 1873. He was an Assistant Secretary to the Crystal Palace for some years, and was appointed first Secretary to the Islington Agricultural Hall Company in 1860 where, from 1864 until the time of his death, he organised the annual horse shows, notorious for their 'leaping' exhibitions.

at the conclusion of the Salisbury meeting of that year and repeated by him at the General Meeting in December. Sidney's criticisms were wide-ranging. They included the small number of members (then standing at about five thousand), the fact that the Society did little more than hold an annual show, that there was too much encouragement, by way of prizes, for implements which were standard in design and efficiency, that the open Wednesday afternoon meetings were given insufficient publicity and were 'little more than a farce', that the Council had 'too many gentlemen and too few working men', and that there was too much delay in the publication of important reports and papers given to the Society. [1] Although such complaints had been made in the Express and elsewhere for some time, Sidney did not at first find much support for his lengthy strictures. He was viewed as an interloper, and Corbet quoted with approval Dyke Acland's comment that the Society 'should be careful to notice whence complaints really emanated. They were too often with some people but the excuse to make for themselves a little petty importance, or to indulge in the opportunity of delivering a fine speech!. [2] As the Salisbury meeting, in a particularly good situation and with an impressive array of steam-engines as its chief feature, had been a highly successful occasion Sidney's choice of moment for his attack was less than opportune.

Over the next few years, however, a number of circumstances combined to give momentum to his campaign. There was general dissatisfaction with the editorial arrangements for the Journal, run, after the death of Pusey, by a triumvirate consisting of Hoskyns, Acland, and Thompson and when the almost unknown P.H. Frere was appointed to the editorship in 1860, instead of

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[1] Reports of the General Meetings July and December 1857 F.M.(3), XII, 1857, pp.162-3 and XIII, 1858, pp.70-1.

[2] Ibid., XII, pp.156, 163.

the universally respected Morton - the first choice of the agricultural community - a great deal of bitterness was engendered. In 1859 James Hudson (Secretary since 1840) was dismissed for the embezzlement of the Society's funds which led to the resignation of the Finance Committee. Understandably, this gave added force to general criticisms of the Society's administration. [1] For these reasons, increased attention was given to Sidney's points of criticism and he was soon no longer the 'accuser-general' and it was impossible to resist the 'rush of general opinion so forcibly expressed' in 1861. [2]

The criticisms related to the full range of the Society's affairs. Detailed examination was given to the composition of the Council, and there was support for Sidney's view that over the first twenty years of the Society's existence there had been a change that had been detrimental to progress. Initially, the Council had consisted of nearly one-half 'practical farmers' or men of the middle-class. Sidney looked back to the 1840s when those who ran the Society's affairs were 'united by the strongest ties of sympathy to the agricultural and farming class', including here figures such as Spencer, Ellman, Handley, Pusey and Youatt. In contrast, by 1860 the Council of the Society was becoming

> an agreeable club, the members of which could meet together for a conversazione and amuse themselves as a body of amateurs: it had ceased to represent the agricultural community at large [cheers]. It reminded him [Sidney] of All Souls' College, where the qualification was 'to be well born, well dressed, and with a little knowledge of music'.

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[1] Special Council Meetings 27 May and 22 June 1859, F.M.(3), XVI, 1859, pp.79-82; 'The Administrative of the Royal Agricultural Society', Ibid., pp.15-16. Brandreth Gibbs acted as Secretary pro tem. for the rest of the year.

[2] Ibid., XIX, 1861, pp.429-30.

Sidney calculated that there were only thirteen members of the Council directly involved with practical agriculture or engaged in cultivation for profit. Sidney's case was overstated, for it was by no means easy to agree on a definition of a 'practical farmer' but his contention that the administration of the Society was unrepresentative with 'twenty one peers, twenty nine sons of peers, baronets, or country members, twelve squires, five lawyers - not yet arrived at the dignity of squires though they might possibly do so - four engineers or implement makers, one hon. director [Brandreth Gibbs], twelve breeders and stockholders, and two mayors' fell on sympathetic ears, especially when popular members of the London Farmers' Club such as Pawlett, Rigden, and Owen Wallis (as well as James Caird) were refused Council seats despite being nominated. [1]

The composition of the Council was one important area where the critics looked for reform, but more particularly it was urged that the Society should give more publicity to its proceedings and that better use be made of the Wednesday afternoon open meetings, the original purpose of which was to provide a forum for members to make communications on agricultural subjects or where occasional lectures could be given. If the following anonymous report from the Farmer's Magazine is to be believed these occasions had sunk to a very low level:

> nine out of ten of these Wednesday meetings closely resemble the Protestant Church in Ireland where Dean Swift began the service with 'Dearly Beloved Roger' and of which Sydney Smith told the story beginning with 'Please your reverence she's sick' - members of the Council ...

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[1] Sidney at General Meeting 15 July 1859 and Half-Yearly Meeting 23 May 1860, F.M.(3), XVI, pp.145-6, XVIII, 1860, pp.479-80. Comment in A.G. 23 July 1859, 12, 19, 26 May, 21 July 1860. Sidney's figures would seem to include the trustees and vice-Presidents who could attend Council Meetings but did not vote.

> depart in haste and trepidation: for there was a rumour that Mr. Edwin Chadwick was waiting ... when he might report for the hundredth time ... the value of sewage. The Journal Committee ... were the first to vanish Sir Watkin W. Wynn mounted his weight-carrier with the grim satisfaction of a man who has 'escaped'. [1]

There were calls for much more to be made of these open forums and for discussions to be modelled after those regularly held by the London Farmers' Club [2] but these were generally resisted on the grounds that it would not be desirable for the Royal to become a 'mere debating society'. Apart from continual complaints about the unrepresentative nature of the Council [3] the malaise which gripped the Society during this period was more a failure to take a lead in agricultural affairs: dissatisfaction was due to 'shortcomings rather than offences', a reluctance to take 'bold and popular measures calculated to inspire public enthusiasm and attract an ever-growing body of supports'. [4]

The persistent and widespread criticisms did bring some changes and improvement was noted in 1861. Better facilities were extended to the press, the composition of the various committees was made known, a new membership list produced, and there was more immediate circulation of papers delivered to the Society. Even Sidney acknowledged a change for the better and by the end of 1861 there was 'abundant evidence of the activity and prosperity of the Society'. [5]

Grievances continued however, there was dissatisfaction with Frere's editorship of the Journal and continual animosity between the Society and the implement manufacturers over the operation of the implement trials and

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1 'A Wednesday Afternoon at the Society's Rooms', F.M.(3), XIX, 1861, p.495.
2 For example A.G., 12 January 1861.
3 Ibid., 2 February 1861.
4 'Old English Farmer', letter, Ibid., 19 January 1861.
5 Ibid., 14 December 1861.

the 'prize system'. The 'Wednesday Afternoons' do not seem to have met with any increased success: there was a 'lukewarmness about the whole business' whereby the Council members thought it rather 'infra dig' to attend, which they did with a 'quaint air of martyrdom'. [1] In general, the early 1860s was a rather dull period for the Society and gone was the enthusiasm that had been so much to the fore in Pusey's day. It was, however, the advent of the cattle plague in 1865 which brought the greatest crisis in the relationship between the Society and agricultural community during the period covered by this thesis.

In 1857 the Society's Veterinary Inspector (J.B. Simonds) had produced a report which concluded that there was little likelihood that cattle plague (rinderpest) would be introduced into the British Isles. The contrary warnings of Professor Gamgee were almost entirely disregarded by the 'establishment'. [2] One exception was Edward Holland M.P., a Council member and close friend of J. C. Morton. In 1863 he unsuccessfully tried to introduce legislation on animal diseases on his own initiative, and the following year argued that it was a proper and urgent matter for the Society to take up the question of the best means of preventing the possible introduction of cattle plague into the country. This was resisted because of the prohibition in the Society's Charter as to the consideration of any 'political' matter or subjects which might lead to legislation enactment, because the only means of preventing the importation of cattle plague (and the possibility of this was not generally recognised or admitted) was to control the importation of live animals. Holland called for changes in the Charter to assist in 'warding off a national evil' and to prevent the Society from 'being debarred ... from

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[1] M.L.E., 4 May 1863.

[2] This is dealt with in the later section on 'The Veterinary Problem'.

steadily advancing the interest of agriculture' as, Holland thought, was frequently the case.

Because of the attitude of the Council, and here one can identify some of the older Council members such as Raymond Barker, Col. Challoner and H.S. Thompson as taking an extremely conservative view of the terms of the Charter, the Society was slow to take a lead when the cattle plague arrived in 1865, to the great dissatisfaction of the agricultural community. It took a local association, the Wakefield Farmers' Club, to organise agricultural opinion (see pp. 411-13) and the Society's initial inactivity on the matter of cattle disease was bitterly resented. It was 'absurd' that the Society could not interfere with anything that was to be brought before Parliament because the Society had been formed in the 'old protectionist times'. [1] The height of criticism of the Society's attitude came at the end of 1866, a year when the 'leading agricultural events' included the cattle plague and the attendant restrictions on cattle importation and home cattle traffic, the high price of meat, and miserable harvest weather, but the report of the Society gave more prominence to its relatively insignificant efforts on agricultural education than on such topics. Morton, usually temperate in his comment, was exceptionally scathing about the fact that more was said about five pound prizes won by a lot of schoolboys than was written about the cattle plague; the report was more than half taken up with 'important' announcements such as that:

> 'F. Chubb', 'E. King', and 'W. Mortimer', had won four pounds at a recent examination in pure mathematics. [2]

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[1] 'The Charter of the Royal Agricultural Society' and report of half-yearly meeting F.M.(3), XXIX, 1866, pp.420, 453-4.

[2] A.G., 15 December 1866. See also 'Forbidden topics at the Royal Agricultural Society', F.M.(3), XXXI, 1867, pp.79-80.

The failure of the Society to give a decisive lead in the matter of cattle disease legislation led to the formation of a new organisation, the Central Chamber of Agriculture. This was proposed by Charles Clay, a Wakefield implement manufacturer in a letter to Bell's Weekly Messenger in December 1865. Clay maintained that since the Royal was precluded by its Charter from dealing with politico-economical subjects a new 'Farmers' League or Association' would not intrude upon its function which was essentially connected with the improvement of stock and machinery. The special object of the new institution would be to represent the agriculturist with regard to Government measures as they affected agriculture and to press for the appointment of a Minister or Board of Agriculture. [1]

The first meeting to constitute the new organisation was held on 6 February 1866 immediately after a large anti-Malt Tax meeting. These moves prompted the Royal to form a committee to look into the question as to whether the Charter might be changed to allow it to embrace such 'forbidden' topics it had hitherto eschewed. [2] This Committee, which included Cathcart, Acland, Dent, Holland (who had moved for change), Hoskyns, Thompson and Torr of Aylesbury, did not come to any conclusion until the day before the annual meeting at the end of the year. At this meeting (at which the President, H.S. Thompson, read a paper justifying the Society's position) Albert Pell, who had been one of the most active supporters of the embryonic Central Chamber, put a direct question as to whether any change in the Charter was contemplated. Thompson said in reply that the Charter Committee had been interested only in the consideration as to whether there were agricultural

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[1] Charles Clay's letters are reproduced in A.H.H. Matthews, Fifty Years of Agricultural Politics, 1915, pp.392-4.

[2] Monthly Council 2 May 1866, F.M.(3), XXX, 1866, p.496.

questions before the legislature which were not 'party political' and which could properly be taken up by the Society. The intention was not to admit the broad range of 'political' questions. Edward Holland, for the Charter Committee, stated that it had been decided not to recommend any change as that, in practice, the Society had been acting up to any amendment that could reasonably be made. Deputations had been made to the Privy Council on the cattle plague question and, although opposed to a strict interpretation of the wording of the Charter, it was felt that the Society was not likely to be called to account over the matter as the proceedings had been sanctioned by the very body - the Privy Council - which had originally granted the Charter. [1]

This then left the way clear for the Central Chamber to take up the 'dangerous' questions, and Pell immediately left Hanover Square for the first General Meeting of the new organisation which was held on the same day. There, from the chair, he was able to announce that the older Society did not contemplate any change in the Charter or revision of its role, and during the last three decades of the nineteenth century the Central Chamber and its local branches (with which the links were sometimes rather tenuous) embraced a wide range of 'political' issues which were connected with agriculture or rural land-ownership. [2]

Though there was a further crisis of confidence in the Society during 1868 over the decision to merge the posts of Editor and Secretary into one position and appoint the almost unknown H.M. Jenkins to the combined post, the start of the new decade saw a substantial advance in the Society's

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[1] F.M.(3), XXXI, 1867, pp.54-7.

[2] Reviewed by A.H.H. Matthews, Fifty Years of Agricultural Politics, 1915.

prestige and influence. This was in no small part due to Jenkins himself, who soon proved to be so outstandingly able and energetic that the agricultural community put aside their initial misgivings about his suitability. Sympathy was generated by the Society's involvement in such matters as the French Peasant's Seed Fund [1] and condemnation of sub-standard animal feed mixtures and adulterated fertilisers. Some grievances continued, however, and these mostly concerned what were considered to be the alleged defects in the Charter, as regards the sort of issue that the Society could entertain and an alleged lack of openness in the constitution. Morton, in posing an open question as to the objects of the Royal in 1870, pointed out that it had to thank 'outsiders' for directing it toward some of the most useful aspects of its career and looked for new ways in which it could extend its usefulness such as the 'sewage question'.[2] Similarly, the Farmer's Magazine detailed a number of topics that the Society had eschewed. These included such matters as the operation and powers of land improvement companies, river basin drainage and irrigation, and security for agricultural capital, and in the early 1870s there were repeated calls for the Society to become involved in the Game Laws and agricultural labourers' questions.[3]

The matter of the unrepresentative nature of the Council and the alleged deficiencies of the method by which it was elected, which had been a matter of some discontent since the late 1850s, gained a new prominence when C.S. Read strongly criticised the Royal at a meeting of the Central Chamber

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1 Sadie B. Ward, 'The French Peasant's Seed Fund: a 19th Century Example of Disaster Relief', Journal, 138, 1977, pp.60-70.

2 A.G., 11 June 1870, 29 April 1871.

3 'The Present Position of the Royal Agricultural Society', F.M.(3), XXXIII, 1868, p.471. Crisp at General Meeting 1871, Ibid., XXXIX, 1871, p.463; 'The Royal Charter', Ibid., pp.530-1; Crisp at Annual Meeting 1873, Ibid., XLV, 1874, p.478.

during the Leicester show week in 1868. Read's criticism was that the Council (to which he had recently been elected) acted as a 'Pocket Borough' and that some members of that Council had voted against the interests of the agriculturists in Parliament. This referred to J. Dent Dent's support of the Malt Tax, which he maintained was easily and cheaply collected. These sentiments were anathema to many members of the agricultural community - Henry Corbet was for many years Secretary to the 'Total abolition Malt Tax Society' - and Read's comments attracted a good deal of attention, coming as they did from a figure who commanded almost universal respect in the agricultural community. Read's remarks were brought to the attention of the Council at a 'stormy and detrimental' General Meeting of members as part of the Leicester show proceedings. In comment about the alleged support of the Malt Tax by Dent Dent and others Corbet maintained that 'never had graver charges been brought' against the Society. [1]

The point about the 'Pocket Borough' was that although the nomination and election of new members to the Council was technically in the hands of members at the annual meeting, the procedure adopted was to place a 'house-list' in the hands of the few - often less than twenty - members attending in a way that made for straightforward election with little chance for alternative nomination from the floor. [2] The only principle adopted was to try and maintain a degree of regional representation, in that Council members were supposed to support the regional interests of ordinary members, though in practice this did not amount to very much. Twenty-five members of the Council had to retire each year, but as they were eligible for re-election the Council

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[1] E.M.(3), XXXIV, 1868, p.67, 167. On Read, see J.R. Fisher, Clare Sewell Read 1826-1903: a Farmer's Spokesman of the Late Nineteenth Century, 1975.

[2] A.G., 5 September 1868.

tended to be self-perpetuating. It was a fairly general criticism that the 'practical element' was kept down and that there was an overbearing aristocratic element in control of the Society's affairs. [1] Read instanced his own case in that he had been a member for some twenty-five years, had contributed to the Journal and worked hard as a judge at the Country Meetings, but that it was not until he had become a sort of 'agricultural notoriety' [as tenant farmer M.P. for Norfolk] that he was asked to sit on the Council. It was, according to Read, as 'true to say that the Queen makes acts of Parliament that the Council is elected by the members', and that if they refused to pass the house-list 'there would be as great a commotion in Hanover Square as there would be in St. Stephen's if the Queen refused to give consent to Bills of Parliament'. [2]

It was continual criticisms of this sort during the early 1870s, despite the Society's increased popularity, which led to moves to give further reconsideration to the question of changing the Charter. [3] This was brought up at the December Council of 1874 when a 'Special Charter Committee' was formed to examine the possibilities, but there was a restriction that this was essentially to give ordinary members a greater and more direct interest in the proceedings of the Council, and there was a fairly general uniformity of opinion to the effect that it was not desirable to alter the clause that prohibited discussion of any matter of a political tendency. By this time it was felt that the political matters were best left to the alternative bodies - such as the Chambers - and that, on the whole, the clause restricting 'political' discussion had worked well. Thus Charles Randell's motion

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[1] Ibid., 29 August, 26 December 1868.

[2] Ibid., 19 September 1868.

[3] 'The Opening of the Winter Session in London', F.M.(3), XLVII, 1875, pp.1-2.

restricting the terms of reference of the Committee was carried by twenty-six votes to six. During 1875 the Society took the opinion of Counsel on the Bye-Laws and by the end of the year a new set was issued with the intention of making the Society relatively more 'democratic' in the matter of election to the Council. [1] This was only partially successful, for many had wanted a voting paper to be sent to all members, and Morton held that the Council continued to be unrepresentative and attributed the very slow membership growth to this reason. [2]

It may therefore be seen that Mitchisons's contention that the relative success of the Royal compared with the earlier Board of Agriculture is partly attributable to the Society's more open constitution, [3] is not really valid given that there were continual complaints over this matter. The Royal was successful, but it might have been more so, in attracting members, even though the hopes of Morton and Mechi of a membership of twenty or even fifty thousand were unrealistic. Yet it will be appreciated that the Society was always in something of an anomalous position. It was not really a great learned society - although undoubtedly some Council members would have liked it to assume that role - but neither did it have very close links with the grass-roots of the agricultural community, only a small minority of whom were members. It did not lobby vigorously for the 'agricultural interest' which, again, agriculturists saw as the most proper purpose of farmers' organisations. Few issues brought so much popularity to the Society as its prosecution of the manufacturers of sub-standard animal feed substances in the 1870s, but the number of issues of that sort which the Society was able to

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[1] Monthly Council 8 December 1875. Ibid., XLIX, 1876, p.53.
[2] A.G., 27 December 1875 & 29 May 1876.
[3] 'Old Board', p.66.

take up under the terms of its Charter, or it evinced much enthusiasm for, were relatively few. It is not surprising that only a minority of Council members who served on the various committees that oversaw the Society's work were practical farmers, for such work required frequent attendance at the Royal's London headquarters. The reasons why there was rather little incentive for farmers to become ordinary members have also been detailed. If the direction of the Society's affairs was often in the hands of leisured - sometimes gifted - 'amateurs', the Society's professional consultants were given considerable freedom and the Annual Show did preserve an essential link with the broad base of the agricultural community.

The Society and Parallel Information Sources, 1838-1880

This raises the more general question of the position of the Society as an information source in relation to alternative media during the period covered by this study. The development of these, in terms of the categories already reviewed for the period up to the formation of the Society, will now be considered before proceeding to the detailed analysis of its main activities.

Of the other national societies with an interest in agriculture in 1838, the Smithfield Club steadily grew in stature under the secretaryship of Brandreth Gibbs and its pre-Christmas show was considerably expanded to include exhibitions not only of fatstock but also a variety of agricultural implements. The show was held in the Islington Agricultural Hall from 1862 onwards. Although the interest of the Society of Arts in agriculture was less during the nineteenth century than it had been in the late eighteenth, important discussions on agricultural topics were held at its regular meetings, particularly during the 1850s and 1860s. These were generally on topics with

more than just agricultural appeal, such as sewage-farming, the 'prize-system', broad questions of food supply, or reviews of agricultural progress, and these were published in the Society's Journal and abstracted by other agricultural publications. There were two important additional national agricultural organisations founded during our period. The first was the London Farmer's Club (sometimes termed the Central Farmer's Club) founded by William Shaw in 1842. [1] This provided a focal point for the interests of tenant farmers and there were monthly discussion meetings instituted by Robert Baker in 1844. Henry Corbet was the Secretary from 1846 until 1875, and as he succeeded William Shaw as Editor of the Mark Lane Express and Farmer's Magazine, those two publications gave extensive coverage to the Club's affairs. The final national institution was the Central Chamber founded, as we have seen, in 1866 in response to the Royal's failure to take up 'political' matters, in particular the matter of cattle disease policy. It may be noted that this body did not act as a political lobby for the agricultural community as a whole and was perceived to be 'landlord dominated'. It was soon criticised for being far too concerned with such matters of local taxation at the expense of issues such as the Game Laws, Tenant-Right, and the repeal of the Malt Tax. This criticism was begun by Henry Corbet and soon followed by more neutral commentators such as Morton. [2] Toward the end of the century relationships between the London Farmer's Club and the Central Chamber became quite cordial (a joint dinner was held after 1894) but at the fiftieth anniversary of the Club (1892),

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[1] For an outline history of the Club see K. Fitzgerald, Ahead of their Time: A Short History of the London Farmers' Club, 1967.

[2] On this see for example M.L.E., 18 January, 19 April, 15 November 1869; W.W. Good, Where are we Now? A Politico-Agricultural Letter to the Chairman of the Central Chamber of Agriculture, Clare Sewell Read Esq.,M.P., 1869; M.L.E., 29 November 1869 (praise of Good's pamphlet); 'The Central Chamber and its Organ', F.M.(3), XLV, 1874, p.15; J.R. Fisher, 'Public Opinion and Agriculture 1875-1900', unpub. Ph.D. thesis, University of Hull, 1972, p.181.

Charles Clay, the Wakefield implement manufacturer who was the prime mover of the Central Chamber, recalled Corbet's antipathy which he held as being a great hindrance to the Chamber's early progress.[1] It was to give greater voice to the interests of tenant farmers that the Farmers' Alliance[2] was formed in 1879, and this was given active encouragement by Corbet's successor at the Express, W.E. Bear.

There were thus a number of national organisations which took an interest in agriculture in the nineteenth century, but the Royal was by far the most important of those concerned with matters of scientific or technical improvement. They provided a focus whereby the more active agriculturists could meet and compare notes, and the fortnight before Christmas when the Smithfield Show, the Annual Meeting of the Royal, and the Annual Dinner of the Farmer's Club coincided was particularly important; thus Corbet often published comment on the proceedings of the various bodies under headings such as 'The Opening of the Winter Session in London' or 'The Smithfield Club Show Week'.

Perhaps the most remarkable development in farmers' organisations was the extraordinary growth in various local associations of all kinds which took place in the early 1840s. Although figures must be taken as indicative rather than absolute, it seems that from the base of about one hundred local associations in existence in the mid 1830s, there was a sevenfold increase over the next ten years; J. Plowman, Secretary of the Oxford Club, put their number at seven hundred in 1845,[3] a figure that has been broadly confirmed by

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1 See Clay's remarks at the discussion of S.B.L. Druce's 'History of the Farmer's Club', Journal of the Farmer's Club, 1892-6, pp.18-19.

2 J.R. Fisher, 'The Farmers' Alliance: An Agricultural Protest Movement of the 1880s', A.H.R., 26, 1978, pp.15-25.

3 J. Plowman, 'Oxford Farmers' Club Prize Essay', F.M.(3), VII, 1855, p.380. In 1845 J.C. Morton listed six hundred and twenty eight, A.G., 13 December 1845.

analysis of lists published in Johnson and Shaw's Farmer's Almanac during the 1840s, which probably contains the most complete lists of these sometimes rather ephemeral organisations. A number of sources note a decline in the number of these local organisations during the 1850s [1] but they continued to be of great importance throughout the nineteenth century.

Plowman estimated that about one hundred and fifty of his total styled themselves as 'farmers' clubs', a form of association which became popular in the late 1830s - the earliest seems to have been formed at Ashbocking [2] (E. Suffolk) in 1837 and others quickly followed in that vicinity where J. Allen Ransome, the Ipswich implement manufacturer, encouraged their formation.[3] In a preliminary short local study in 1974 I distinguished between these newer local associations and the well-established local societies that have already been reviewed, on the grounds that the smaller clubs catered particularly for the needs of the tenant-farmer, and placed a great emphasis on the holding of discussion meetings on practical agricultural topics. [4] Subsequent research has strengthened my opinion that the distinction is important despite Fox's view based on a detailed but partial examination of the contemporary literature that there was in essence no difference between them, even though he recognises a distinct 'farmers' club movement' in early Victorian England. [5]

Most contemporaries recognised the distinction, and clubs were often

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[1] For example J.C. Nesbit (the agricultural chemist) F.M., V, 1854, p.28 and J.C. Morton 'Agricultural Progress; Its Helps and Hindrances' Journal of the Society of Arts, XII, 1863, p.62.

[2] For the first notice of the Ashbocking Club see F.M., VII, 1837, p.428.

[3] Ibid.,(3), XI, 1857, pp.1-2.

[4] 'Kentish Farmers' Club in the Mid-Nineteenth Century', Cantium, VI, 1974, p.80.

[5] 'Local Farmers' Associations', p.46 and personal communications; 'The Early Years of the Farmers' Club Movement 1837-70', Annals of Science, (forthcoming). (I am grateful to Dr. Fox for allowing me to read a draft of this unpublished paper.).

considered as 'another class of institution'; [1] as Charles Poppy, Chairman of the Ashbocking Club in 1837 and 'the father of Suffolk agriculture' (he had been a contemporary and correspondent of Young and Sinclair) noted, societies were established by the aristocracy for cattle shows, ploughing matches and for premiums to servants' and clubs could spread information to a 'tenfold degree' compared with such activities. [2] While there was a considerable overlap between the activities of the clubs and the societies, the latter were much more likely to be dominated by the aristocracy or large landed proprietors and become a means of maintaining the status quo - as, for example, the distribution of premiums to farm servants - and those whose chief concern was agricultural progress often evinced impatience with lengthy dinners and attendant speaches where 'noble lords occupied valuable time lauding each other'. [3] This is not to deny that many local associations were a vital source of agricultural information in Victorian England through the means recently outlined by Dr. Fox - shows, agricultural libraries, and discussion meetings - but the leaders of the agricultural community in the 1840s were particularly impressed with the potential of the clubs for reaching the less substantial farmers. William Shaw did everything in his power to encourage their spread and development by devoting considerable space in the publications that he edited to reports of their proceedings. Typical of his numerous commendations are the following:

> Having always been zealous advocate for the establishment of Farmers' clubs as being the most ready and efficient means of promoting improvements in agriculture and extending the knowledge of these

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1 M.L.E., 11 February 1839; Morton, 'Helps and Hindrances', pp.62-3.

2 F.M.,VIII, 1838, p.333; Ibid.,(3), XIII, 1858, for Memoir of Poppy.

3 See my 'Agricultural Societies', in G.E. Mingay ed., 'The Victorian Countryside', (In press 1981).

> improvements, but also of elevating the agricultural class in the scale of intellectual accomplishments it has been our endeavour to assist these institutions by every means in our power and it affords us great satisfaction in seeing the progressive increase in their numbers. [1]

and

> We have ever been zealous advocates for the establishment of agricultural societies, not only on account of the stimulus given to exertion by the distribution of prizes but also from such meetings affording an opportunity for an interchange of opinion and for the communication of information on matters connected with agricultural pursuits. There is however, another class of institution which we are happy to see increasing in number, the benefits of which in diffusing information and elevating the intellectual character of the British farmer are by no means inferior to agricultural societies ... we mean 'Farmers' Clubs'.[2]

These two statements illustrate very clearly the potential that Shaw saw for the farmers' clubs movement: as 'another class of institution in 'elevating the intellectual character', and 'diffusing information'. The clubs were sometimes seen as the rural equivalent of the urban mechanics' institutes and were a remarkable manifestation of a desire for self-improvement in a time of increasing, and often perplexing, agricultural change. [3] In the latter part of 1838 Shaw noted that the meetings of local societies were so numerous that it was impossible to cover anything more than a small proportion of their proceedings [4] and in the following year he published an appendix to the Farmer's Magazine devoted entirely to reports of farmers' club meetings. He also proposed to encourage the movement in a more tangible way, as he announced that he intended to devote ten per cent of the profits

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[1] M.L.E., 17 February 1840.
[2] Ibid., 11 February 1839.
[3] Ibid., 15 February 1841; Maidstone Gazette, 2 February 1841.
[4] Ibid., 29 October 1838.

of his newly founded 'Farmers' Fire and Life Insurance Institution to Farmers' club funds.[1] Morton also saw great potential in the clubs as 'a new, additional, and most important means of diffusing practical and useful knowledge among cultivators of the soil' and circulated a list of one hundred and fifty topics on practical subjects which could be used for discussion meetings.[2]

The decline in the number of clubs in the 1850s may be attributed to a natrual reaction to the over-proliferation during the previous decade, for it became difficult to sustain monthly discussions after the favourite topics had been dealt with, and at the same time there were complaints about the long-winded nature of some of the proceedings of the larger societies. Of those which survived, many responded to the calls to embrace 'political' topics - exclusion of politics was a fundamental rule of most of these local organisations in the 1840s and they are not to be confused with the numerous 'protection' societies of that time - while the societies concentrated on their shows, sometimes held on a peripatetic basis. The initial distinction between the clubs and societies certainly became blurred during the second half of the century, but it continued to be observed,[3] as was a perceived division of function between the clubs and the local chambers, which were often seen by commentators to be essentially landlord-dominated and less concerned with agricultural progress than with 'political' issues of a type which were not of immediate interest to tenant farmers.

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1 F.M.(2), II, 1840, Appendix p.9.

2 A.G., 6 July 1844, 13 December 1845.

3 For example, by Thomas F. Plowman in his paper 'Agricultural Societies and their Uses', (read to the London Farmer's Club 7 December 1885), Journal of the Bath and West Society (3), 17, 1885-6, pp.168-88.

One of the most important functions of clubs and societies was to maintain agricultural libraries and certainly there was no shortage of agricultural books available for consultation as well as numerous shorter pamphlets. Of the four categories already outlined, there was considerable increase in those which dealt with theory (especially in the 1840s) and the extensive encyclopaedic works such as Stephens's Book of the Farm (1844) and, most notably, Morton's Cyclopaedia of Agriculture, completed in 1855. What was lacking were simple straightforward textbooks written in a concise manner to convey the best of the farm practice and theory of the times. This had to wait for enterprises such as Morton's Book of the Farm series inaugurated with Robert Warington's Chemistry of the Farm in 1879. A number of observers saw the periodicals and newspapers as being far more useful than books for educating farmers as they could dip into their varied contents week after week and pick up some new fact or idea, whereas a volume containing the same amount of information would never be opened; in 1857 it was maintained that the 'influence of all the books on agriculture ever written is but a feather on the scale compared with the agricultural newspaper', [1] and the newspapers brought 'greater changes than could have been produced by all the essays upon agriculture ever published'. [2] Although the successful agricultural periodical titles were comparatively few in number, they do seem to have been very influential in the agricultural community, and in helping to spread technical information on agricultural topics. They are considered in some detail in the chapter that follows.

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[1] William Day, Mechanical Science and the Prize System in Relation to Agriculture, 1857, pp.14-15.

[2] 'A Manufacturer', The Manufacture of Agricultural Machinery considered as a Branch of National Industry, 1857, p.7. See also discussion at London Farmers' Club on the 'Progress of Agriculture', F.M.(3), XVI, 1859, p.391.

Victorian England did not lack individuals who preached the message of agricultural improvement with zeal but it is noticeable that they did this through the agency of the associations and agricultural publications rather than independently. In this context, the agricultural editors were highly important and two names particularly stand out - John Chalmers Morton, editor of the Gazette between 1844 and 1888, and Henry Corbet, editor of the Mark Lane Express between 1853 and 1875. As their two titles were by far the most important, and because they were both forceful and committed figures who had long tenure of their posts, they had a most pervasive influence on the course of change. There is one other editor who was possibly the most influential of all, and that is that almost entirely neglected figure, William Shaw. Some of his numerous activities have already been referred to. He was co-founder and first Editor of the Mark Lane Express and Farmer's Magazine; essentially the founder of the Royal itself, and of the London Farmers' Club; an influential supporter of the local farmers' clubs; a pioneer of farmers' insurance, and responsible for directing Pusey's attention to the tenant-right issue, with which the London Farmers' Club was always particularly concerned. In 1847 he was nearly elected as tenant-farmer M.P. for the Northern division of Hampshire. His influence among tenant-farmers reached its apogee in 1850 when, at a presentation of plate subscribed to by tenant-farmers in recognition of his services, he was acclaimed as the 'Cobden of Agriculture'.[1] The answer to the question as to why the 'Cobden of Agriculture' has gone almost unrecorded in the histories of nineteenth century agriculture is probably to be found in the nature of his departure from the scene late in 1852. At

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[1] F.M.(2), XXI, 1850, p.407.

that time he was forced through financial ruin, possibly occasioned by the failure of his new cattle insurance project, or railway speculation, to flee to Australia. He died there the following May, in remote gold-diggings in the outback. Thus the tenant farmers' champion of the 1840s, the 'Cobden of Agriculture' was, in the words of the Gentleman's Magazine, 'sent to die beyond the billows of the Pacific with only three halfpence in his pocket'. [1]

Individuals who were publicists for agricultural techniques but not directly connected with a publication in an editorial capacity are too numerous to mention individually, but one additional figure does deserve comment. This was J.J. Mechi, the son of an Italian immigrant who made a fortune out of his 'magic razor strop' and turned himself to high-farming when he bought Tiptree Hall Farm in 1841. He was constantly before the attention of the agricultural community throughout the period covered by this thesis (he died on Boxing Day, 1880); there is scarcely one issue of the Gazette over thirty five years which does not contain some correspondence from him. He shared with Morton a terrific optimism about what could be achieved in farming by means of capital, science, and education, and gave close attention to such issues of the day as steam cultivation and sewage utilisation. [2] Though always controversial, Mechi was listened to by farmers at various local meetings and he frequently introduced papers at the London Farmers' Club. It is therefore misplaced to view him as 'arrogant' and giving offence to the agricultural community by the source and abundance of his wealth, as D.C. Moore has done. [3] To be sure, the 'Cockney Agriculturist' was bitterly attacked by some [4] and

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[1] Gentleman's Magazine (N.S.), 40, 1853, p.422. Information on Shaw from Dictionary of National Biography and miscellaneous sources.

[2] I deal with this in 'Nineteenth Century Recycling: The Victorians and the Agricultural Utilisation of Sewage', History Today, 31, June 1981, pp.32-6.

[3] Politics of Deference , p.342.

[4] See for example W.W. Good's The Theorist Confuted or the Practical Farmers Vindicated, 1851, and Political, Agricultural, and Commercial Fallacies, 1866; 'R.R.' (R. Rolton), Tiptree Hall Farming, 1853 for a more balanced critique.

he did not have much of a hearing in the Royal Agricultural Society, but the Tiptree Hall Visitors' Book [1] shows upwards of five hundred visitors a year to his Essex farm, including many of the leading figures of the day, his various pamphlets enjoyed a wide circulation by the standards of the times, and when his affairs were put into liquidation shortly before his death, the agricultural community freely entered into a subscription got up by Morton to support his widow and children, as they had done at the time of his Unity Bank failure in 1867. [2] Many of his ideas were mistaken and were viewed with healthy scepticism, but Mechi's influence as a publicist should not be underestimated.

This, then, was the 'information environment' of which the Royal was a part - a complex array of national and local institutions whose proceedings were given constant attention by the small but energetic agricultural press and which was used as a forum by various 'opinion leaders'. There were never any formal links between the Royal and the local associations, although these were sometimes suggested; the nature of the local movements was too varied and independent for that, and there was undoubtedly a desire on the part of some Council members to adopt a somewhat aloof position. Information generated by the Society filtered down to the agricultural community by reports in the newspapers and periodicals of research findings and events such as the shows which were visited by many agriculturists, and lectures and discussion meetings where popular speakers outlined the research findings. Analysis of some of the complex linkages is attempted in the section that follows.

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[1] British Museum, add.m.s. 30015.

[2] A.G., 3 January 1881.

CHAPTER III: THE JOURNAL, 1840-1880

Publication Arrangements

The publication of the proceedings of the English Agricultural Society received a good deal of attention from the Committee of Management during the latter half of 1838. Advice was sought from William Shaw on printing costs and he conveyed an offer from the proprietors of the Farmer's Magazine to provide free space in that periodical each month to record the transactions of the new Society, after the pattern followed by the Highland Society whose Prize Essays and Transactions were published in conjunction with the Quarterly Journal of Agriculture. The Minutes of the Committee of Management record that there was considerable discussion over this proposal, but the feeling was that the Society should publish its own Journal, and that this should be issued free to all members.[1] Given Spencer's enthusiasm for the work of the Society for the Diffusion of Useful Knowledge, it was fitting that he should announce this decision to the first General Meeting, held on 18 December of the same year. Here, he indicated that the projected Journal was to contain the prize essays and matter connected with the institution and agriculture generally, and stressed the importance that was attached to the free issue to members to assist the spread of information on agricultural topics as widely as possible. To non-subscribers, the Journal was to be sold at a 'reasonable cost'.[2]

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[1] English Agricultural Society Minutes of Committee of Management, 6 June 1838, pp.16-7.

[2] F.M.(N.S.), II, 1839, p.65.

Initially, it was proposed that the new Journal should be a quarterly [1] but only the first volume (for 1840) was issued in four parts and publication was formally changed to two parts each year in 1843 on Pusey's instigation in order to cut costs, although the Journal was to contain the same amount of content as before. [2] The optimum publication arrangements for the Journal with regard to its object of facilitating the spread of agricultural information was a topic of perennial debate. Infrequent issue was held by some to produce bulky volumes that were not to the taste of those modest tenant farmers that it was especially intended to reach. An open letter to Spencer, published in the Farmer's Magazine in 1839 warned that a volume of the Prize Essays and Transactions of the Highland Society, upon which the new publication was to be in part modelled, was 'so voluminous, so expensive, so diffuse in its articles that comparatively few can afford to purchase it, fewer have time to peruse it ...' [3] Free issue would circumvent the problem of cost, if tenant farmers subscribed to the Society in sufficient numbers, but the question of the best format of the Journal was more difficult. It was often maintained that frequent small doses of information were to be preferred to less frequent, more substantial volumes, the sheer size of which was likely to prove intimidating. It was also held that the twice-yearly issue led to the content becoming out-of-date by the time it was received by the reader, a criticism which was especially pertinent with regard to show reports as they often appeared in the Journal as much as six months or more after the country meeting had taken place, so that topicality

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[1] Minutes of Committee of Management, 22 January 1840, p.314.

[2] Monthly Council 5 April 1843, F.M.(2), VII, 1843, p.359.

[3] F.A. Mackenzie, Letter, Ibid.(N.S.), III, 1839, p.86.

and interest was lost. However, another line of thought was expressed by H.H. Dixon who maintained that the Society would be best occupied by the production of a single annual volume, a sort of agricultural yearbook to be issued during the late autumn which would contain, as well as the show reports and technical articles, matter pertaining to agricultural personalities, sales, lettings, and agricultural news to be perused at leisure during the winter evenings. [1] A basic division of opinion, which was difficult to reconcile, existed between those who saw the Journal as a forum for the exchange of views, as against a more encyclopaedic permanent record of the progress of scientific agriculture. H.M. Jenkins, who edited the Journal during one of its most successful phases, was probably correct when he maintained that it was the interest and relevance of the content rather than the frequency of issue that determined its degree of success and influence on the agricultural community. [2]

At the outset, the distribution of the Journal posed something of a problem, as few of the subscribers were able to collect each part in London. Pusey negotiated to post it on a 2d stamp [3] but by the end of 1839 complaints had been received about non-delivery and mis-direction of the first issue. [4] In answer to these complaints at the General Meeting, Richmond proposed the establishment of a network of booksellers and agents in country towns where the Journal could be collected by subscribers. [5] These agents are listed in the appendices of the early volumes, but this mode of distribution gave way to a postal arrangement and in 1851 it was claimed that of some

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[1] H.H. Dixon, 'The Royal Agricultural Society', Gentleman's Magazine (N.S.), III, 1869, p.304.

[2] J.C. Morton, 'The late Mr. H.M. Jenkins, F.G.S., A Memoir', Journal (2), XXIII, 1887, p.193.

[3] Minutes of Committee of Management, 24 April, 1839, pp.155-6.

[4] Ibid., 14 December 1839, p.307.

[5] F.M.(2), I, 1840, pp.11, 14.

thirty thousand journals that had been posted direct to subscribers, only one had gone astray.[1] To non-members, the cost of the Journal was 6/= per volume until it was raised to 10/= in 1848, being reduced back to 6/= in 1863. Sales to non-members were generally of a very low order, a point that will be reconsidered in a later section.

The Editorship of the Journal

A Journal Committee was established early in 1839 and consisted of Henry Handley, C. Shaw Lefevre, Rev. W.L. Rham, J. French Burke, J.W. Childers, Philip Pusey, and William Youatt.[2] With four members of Parliament (Handley, Lefevre, Childers, and Pusey) and excellent experience of agricultural writing - French Burke edited British Husbandry, Rham was agricultural correspondent to the Penny Cyclopaedia, and Youatt editor of the Veterinarian - this was a strong committee. In April 1839 it was *resolved to advertise* for an Editor, and Pusey, Childers, and Lefevre were delegated to draw up a suitable advertisement.[3] The advertisement decided upon was for a combined Secretary/Editor and it was to that post that James Hudson was appointed in July, at an annual salary of four hundred pounds.[4] Power of editorial control was vested in the Journal Committee, however, and the Secretary/Editor was to work under its direction, it being envisaged that he would write reports, translate foreign papers, and edit articles for publication.[5] In fact, Hudson wrote very little for the Journal. He supervised printing and administrative matters connected with its production but Philip Pusey, as

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1 Ibid., XIX, 1851, p.57.
2 Minutes of Committee of Management, 6 February 1838, pp.114-5.
3 Ibid., 24 April 1839, pp.160, 164.
4 Ibid., 24 July 1839, p.260.
5 Minutes of the Council, 1840-4, p.18.

Chairman of the Journal Committee, was the de facto Editor. Before 1838, Pusey had written for the Morning Post and Quarterly Review but had not been particularly concerned with agricultural matters. It is not known what caused him to work so wholeheartedly for the Society and its Journal during the final phase of his life, but Linker suggests that he was prompted by the national question of population increase and the local problem of rural distress in his Berkshire constituency which prompted him to strive for a comprehensive programme of rural development. [1] The first fifteen volumes of the Journal, through the work that he did in editing contributed material, judging of prize essays, and his own articles, bear abundant testimony to his close involvement.

This was an arrangement which worked very well. Throughout the 1840s, Pusey's position as, in Sir James Caird's retrospective assessment, 'the leading agricultural writer of the day' was unchallenged, [2] his 'readable and practical essays' being the 'embodiment of the Society's motto "Practice with Science" '; he directed the Journal with 'zealous ability'. [3] But after Pusey's death in 1855 the editorship and the editorial arrangements became one of the most controversial topics in the Society's proceedings, and until 1869, when H.M. Jenkins was appointed to the editorship, the Journal suffered from a period of often uncertain direction.

In the face of Pusey's indisposition (he was confined by illness at Christ Church with his brother from the time of the death of his wife, Lady Emily, in November 1854, until his own death in the July of the following year) H.S. Thompson was appointed Chairman of the Journal Committee early

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[1] Linker, thesis, p.449. Apart from this work, for important studies on Pusey see Ernest Clarke, 'Philip Pusey', Journal(3), XI, 1900, pp.1-17 and Paolo E. Coletta, 'Philip Pusey, English Country Squire', A.H., 18, 1944, pp.83-91.

[2] Sir James Caird, 'Agriculture' in The Reign of Queen Victoria, II, ed. T.H. Ward, 1887, p.130.

[3] 'Philip Pusey', F.M.(2), X, 1844, p.3.

PLATE I: PHILIP ~~PUSEY~~.

Source: Farmer's Magazine.

(2nd Series, X, July, 1844)

in 1855, with Chandos Wren Hoskyns and Sir Thomas Dyke Acland as Vice-Chairman, and this triumvirate shared the editorial responsibilities.

Thompson was the dominant figure in the partnership. Born in 1809, he had studied entomology for a time at Cambridge, having gone up to Trinity in 1829 after private tuition in London. He had been one of the chief promoters of the Yorkshire Agricultural Society in 1837 and a staunch supporter of the Royal from the time of its foundation. He contributed a number of significant papers to the Journal under Pusey's editorship, among the most important being a communication on the potato disease and a report of his own experiments which laid the foundations of soil absorption research, Thompson being among the first to demonstrate the power of soils to assimilate ammonia. These contributions are considered in a later section; some of the best of Thompson's early writings were his reports of implements exhibited at the country meetings, which he wrote for York (1848), Norwich (1849), and Lewes (1852). In 1849, his attention was directed towards railway management. He became Chairman of the North-Midland Railway Company, and the North-Eastern in 1854, and entered Parliament as liberal member for Whitby in 1859. He continued as Chairman of the Journal Committee until increasing ill-health caused his retirement from active involvement in the Society's affairs in 1873; he died the following year. [1]

Chandos Wren Hoskyns was perhaps the most talented writer of the three. Best remembered for that most charming of Victorian agricultural works Talpa: or the Chronicles of a Clay Farm he was one of the closest associates of J.C. Morton and worked with him on the Agricultural Gazette. Indeed, Talpa

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[1] For obituary, see M.L.E., 25 May 1874; also Earl Cathcart 'Sir Henry Stephen Meysey Thompson, Bart: a Biographical Sketch', Journal (2), X, 1874, pp.519-41; for a later assessment G.E. Fussell, 'Sir Harry Stephen Meysey Thompson', Journal of the Land Agents' Society, 49, 1950, pp.540-2.

first appeared as a series of articles in the Gazette in 1847. Others followed and he frequently wrote leaders for Morton. Forceful in his writing, but always witty and entertaining, he championed such issues as agricultural education, steam ploughing by rotary action, and agricultural statistics. The second son of Sir Hungerford Hoskyns, an early member of the Council of the Royal, of Harewood Hall, Herefordshire, he entered Parliament as member for Hereford in 1869. Morton clearly thought very highly of him and chose him to write the introduction to his Cyclopaedia of Agriculture as well as the sections on 'Education' and 'Landlord and Tenant' in that work. Morton gave Hoskyns much of the credit for the success of the Gazette in its early years: he was 'active, energetic, and brilliant', a leader in progressive agricultural opinion. [1]

Thomas Dyke Acland came from one of the largest landowning families in Devon, with estates extending to fifteen thousand acres. After a distinguished university career - he gained a double first in classics at Oxford and became a fellow of All Souls' - he had entered Parliament but lost his eat after voting for repeal. Thereafter, he determined to learn *chemistry* (entering King's College London) to demonstrate to the west of England farmers that scientific farming could prove a better way forward than continued hankering after protection. He travelled widely gathering information for his prize essay 'On the Farming of Somerset' which was published in 1851, and taking inspiration from the Exeter meeting of the Royal in 1850, he undertook to revive the moribund Bath & West Society, editing the first

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[1] See Morton's sketch in his 'Noteworthy Agriculturist' series: A.G., 7 January 1871, and 9 April 1877. Hoskyns's views on steam ploughing have been given attention by G.E. Fussell, 'Charles [sic] Wren Hoskyns', Notes and Queries, 153,1927,pp.42-4.

seven volumes (1853-60) of its resurrected Letters and Papers. [1]

The joint editorship of Thompson, Hoskyns and Acland seems to have been an uneasy arrangement and it may be that they were not very suited on personality grounds to work together as an editorial team. Thompson was a practical man of business and science, Hoskyns talented but sometimes rather whimsical in approach; Acland, apart from his academic and farming work had interests in the Army and Church. Earl Cathcart's memoir of Thompson, for the most part eulogistic, mentions that contemporaries often found his rather withdrawn manner distant, aloof, and unapproachable, [2] while Acland, according to a letter of his mother's in H.D. Acland's collected Letters and Memoirs (1902) of his father, could be dilatory and indecisive. [3] Criticisms soon came from outside- at the annual general meeting of 1857 Samuel Sidney observed that he had 'never yet known the office of editor conducted as it ought to be, when put into commission like the Chancellor's seal'. [4] Early in 1858 attention began to be given to the question of the appointment of a paid editor, [5] and the Journal Committee even went so far as to suggest that the editorship be offered to Hoskyns and Morton, to be conducted on a joint basis. [6] This suggestion was not followed up and there was a great deal of resistance to the concept of a salaried editor among the ordinary Council, whose support was necessary before it was possible to proceed with an appointment.

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1 Kenneth Hudson, The Four Great Men of the Bath & West, 1973, pp.11-16. Acland's revival of the Bath & West is considered in same author's The Bath & West: a Bicentenary History, 1977, pp.88-116.

2 Cathcart, 'Thompson', p.519.

3 Quoted in Hudson, 'Four Great Men', p.16.

4 F.M.(3), XIII, 1858, p.71.

5 Minutes of Journal Committee, 3 February 1858.

6 Ibid., 3 March 1858.

As Pusey had carried out the editorial responsibilities entirely without remuneration, payment for the Editor was seen as an unwelcome increase in expenditure and the proposal was held up by Samuel Jonas and William Torr who were, significantly, two prominent tenant farmer members of the Council. A compromise was reached in May 1858 whereby the triumvirate expressed a willingness to continue, provisionally, as joint-editors until some other arrangement could be made, so long as they were granted a sum not exceeding three hundred pounds per annum for such assistance as they required. [1] This did not solve the problem of editorship, but as was observed in the Farmer's Magazine: 'tested by the position, tastes and habits of Mr. Pusey, it may be some time before the right man turns up'. [2]

In the autumn of 1858 Hoskyns and Acland withdrew from the arrangement claiming pressure of other commitments. [3] It was probable, however, that there was also disagreement over matters of editorial policy, especially over the admission of 'political' topics to the Journal. Hoskyns was enthusiastic over the question of agricultural statistics, an example of a subject area which Thompson felt ought to be excluded under the terms of the Society's Charter. This left Thompson as the sole editor, though still with the three hundred pounds that had been granted for editorial assistance. He continued as Editor for a year, but it is clear that he received a great deal of assistance during this time from Morton. [4] In November 1859 Thompson

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[1] Monthly Councils, 3 February, 3 March, 25 May 1858; F.M.(3), XIII, 1858, pp.262,277,519.

[2] 'Royal Agricultural Society - Proceedings in Council', Ibid., p.495.

[3] Minutes of Journal Committee 3 November 1858; Monthly Council 3 November 1858, F.M.(3), XIV, 1858, p.488.

[4] See 'An Investigator ', Letter, A.G.,16 June 1860, and Morton's obituary Ibid., 14 May 1888.

asked for a committee to be appointed to consider the future of the editorship.[1] This was the year that he entered Parliament although his decision to relinquish the editorship must also be seen against a background of criticism of the editorial arrangements in the agricultural press and at the Society's General Meetings; it is not clear however whether this was a factor in his resignation. Given Thompson's single-minded character and his later attitude to critics, it is probable that he was not concerned with criticisms at this juncture. By December, the Council accepted a recommendation that a 'literary and scientific editor' of the Society's Journal be appointed at a salary of five hundred pounds per annum, the whole time of the Editor to be at the disposal of the Society.[2] Advertisements were placed in the agricultural press and in March 1860 the Editorship Committee, which consisted of Sir John Shelly, Sir William Miles, Sir John Johnstone, C.S. Lefevre as well as Thompson, Hoskyns, and Acland, reported that of twenty-five applicants who had complied with the terms of the advertisement, they unanimously recommended the appointment of P.H. Frere and this was duly confirmed by the Council.[3]

Frere was Bursar of Downing College, Cambridge, son of a former Master. He had joined the Society in 1840, at the time of the Cambridge Meeting, but apart from occasional communications on minor matters he had not played an active part in the Society's proceedings during the intervening period. He had some knowledge of agriculture from the management of family and college estates but, as he was practically unknown to agriculturists generally, his appointment was extremely ill-received by the agricultural

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[1] Monthly Council, 3 November 1859, F.M.(3), XVI, 1859, p.495.
[2] Ibid., 7 December 1859, F.M.(3), XVIII, 1860, p.49.
[3] Editorship Committee, 9 March 1860.

community, especially as it had been confidently expected that John Chalmers Morton would be given the editorship.

Morton's connection with the Agricultural Gazette has already been noted. He is a key figure in any examination of agricultural progress in Victorian England and he played a large, though mostly indirect, part in the affairs of the Royal. Educated in Edinburgh at the Merchiston Castle School he had attended some of Low's classes on agriculture at the University before coming to join his father on Earl Ducie's Whitfield Example Farm in Gloucestershire. While at school he had carried out, in 1836, his first piece of agricultural reporting, on Smith of Deanston's subsoil drainage and deep cultivation.[1] Appointed to the editorship of the new-founded Gazette at the age of twenty-three in 1844, he continued in that post until his death in 1888. His obituary recalls how he brought out 1,300 successive issues of the paper without interruption and it was Morton's boast that he had attended every Royal Show except those of 1840, 1842, 1848 and 1854.[2] His Cyclopaedia of Agriculture, completed in 1855, was 'still the most complete work of the kind extant' at the time of his death.[3] As a constant commentator on the development of agriculture and a promoter of technical and scientific advance in farming, Morton's observations provide a fascinating insight into the nature of nineteenth century agricultural progress. In addition to writing for the Gazette he contributed to the Journal of the Royal and other periodicals as well as editing his own Farmer's Almanac and Book of the Farm series, which contained one of the most successful of farm textbooks in the last quarter of the century. He was also an Inspector for the Land Commissioners and a member

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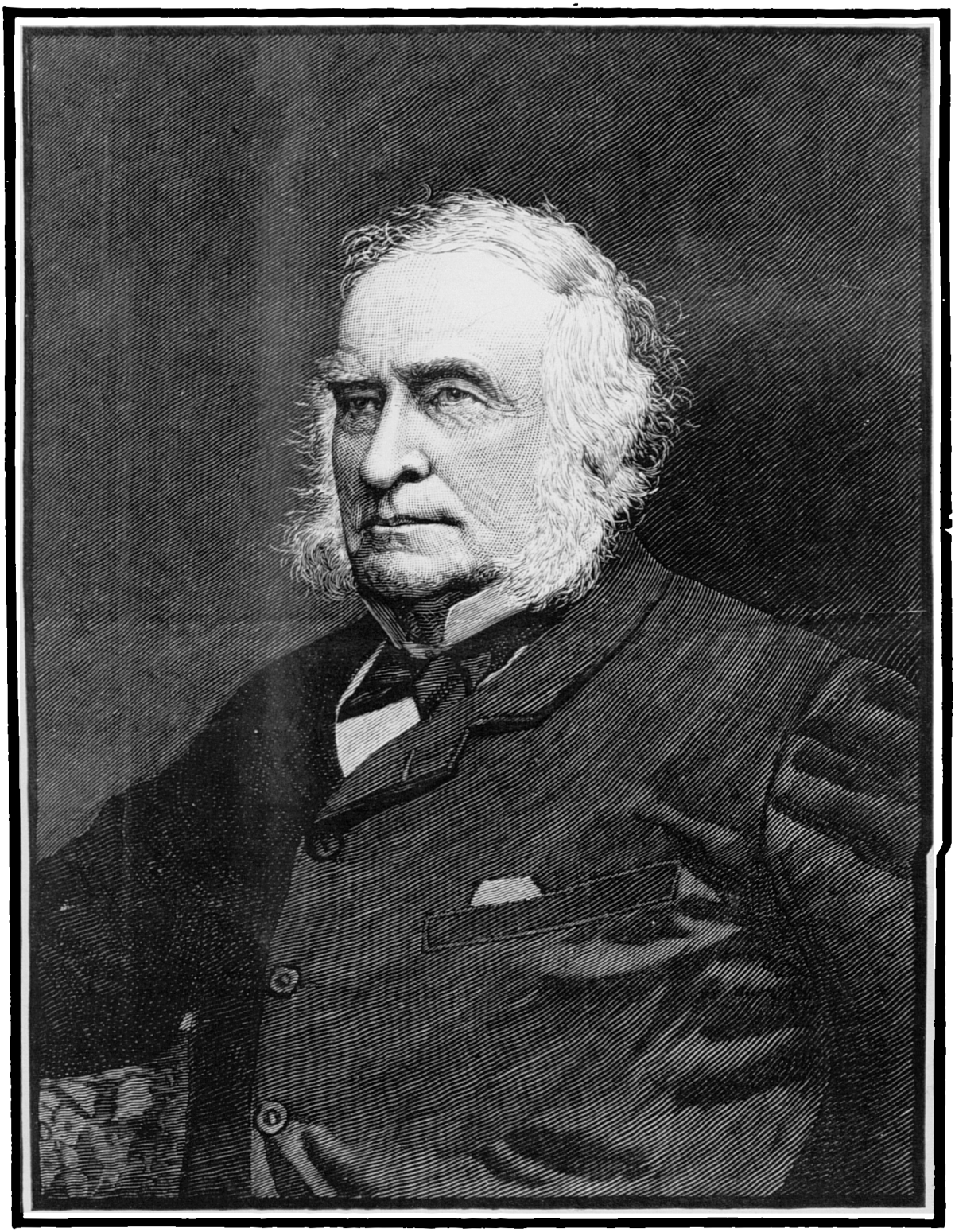
1 'Mr. Morton's Schooldays', A.G., 21 May 1888.

2 Ibid., 7, 14 May 1888; Scott Watson and Hobbs, Great Farmers, p.287.

3 E. Clarke, 'John Chalmers Morton', Journal (2), XXIV, 1888, pp.691-6.

PLATE II: JOHN CHALMERS MORTON.



JOHN CHALMERS MORTON,

Source: Agricultural Gazette.
(14 May, 1888)

of the Royal Commission on the Pollution of Rivers between 1868 and 1874. One of his most abiding interests was in agricultural education; he conducted classes in agriculture in Edinburgh in 1855 and was largely responsible for directing the attention of the Royal to the subject.

By 1860 Morton may be considered to be one of the most influential and respected of agricultural writers and his literary talent, energy, impartiality, closeness to the agricultural community, together with his experience of editing an agricultural journal would appear to have given him impeccable credentials as the Royal Agricultural Society's Editor. As he had directly assisted Thompson, the fact that he was passed over and the position given to an 'unknown' is not immediately explicable. There is no direct evidence that Thompson and Morton had anything but a good working relationship and it is noticeable that Morton always paid tribute to Thompson's work on the Society's behalf , even when Thompson was under criticism from the agricultural community. [1] Thompson and Hoskyns did not vote on the decision of the Editorship Committee. Given that they were both closely associated with Morton it would clearly have been improper for them to take any other course. Yet as critics of the decision were quick to point out, it was extraordinary that the rest of the Selection Committee did not heed their advice, assuming that they were in favour of Morton's selection. [2] Morton, had, after all, been recommended for the post, with Hoskyns, two years earlier. In the absence of any specific evidence suggestions as to the

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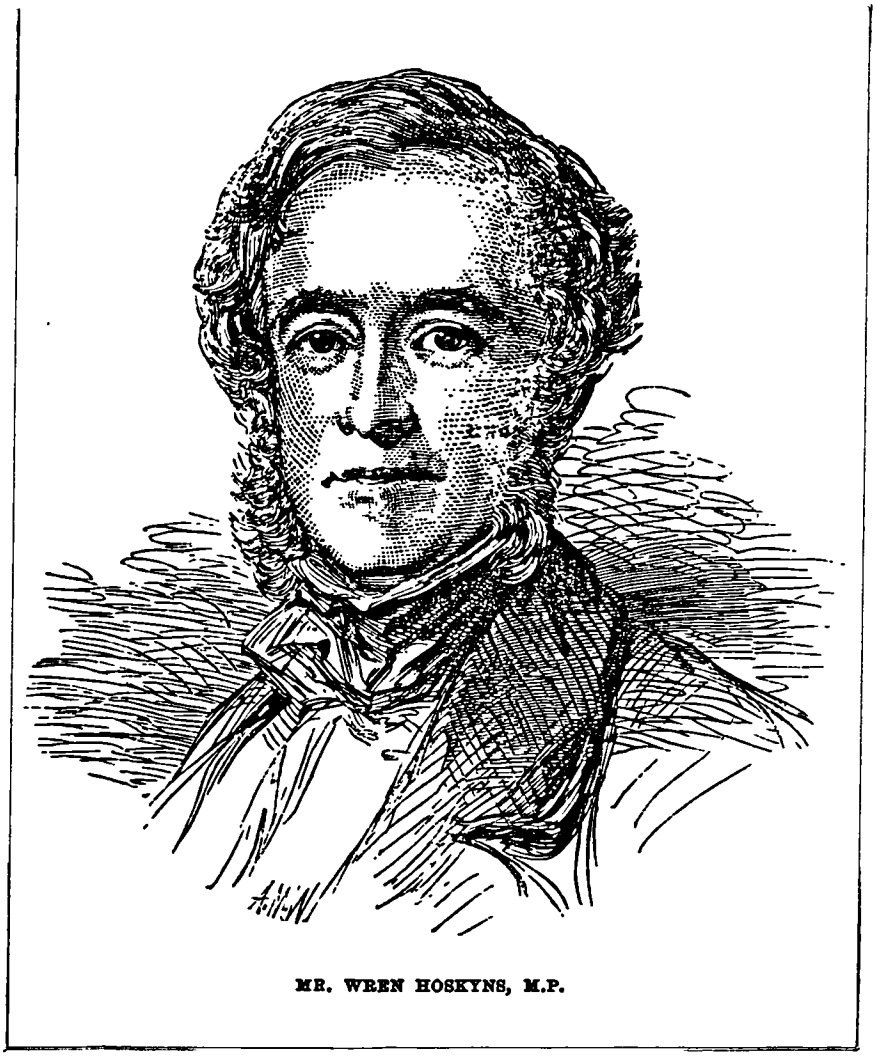
[1] That Morton was grieved over his non-selection for the editorship is clear from the tone of some of his leaders in the Gazette at the time, though because of the circumstances he was restrained in the expression of his views (see particularly A.G., 10 March 1860). Yet he was able to pay tribute to Thompson in his 'laborious office'; see, for example, Ibid., 25 February 1861.

[2] 'An Investigator', letter, Ibid., 16 June 1860, Ibid., 9 June 1860.

PLATE III: CHANDOS WREN HOSKINS.



MR. WREN HOSKYNS, M.P.

Source: Agricultural Gazette.
(7 January, 1871)

reason for Morton's non-appointment can only be speculative. There may have been a desire on the part of the Selection Committee not to appoint a professional journalist on the grounds that this might have encouraged the 'popularisation' of the Journal, a change which was called for by many, including Morton, rather than continuing its character as a substantial work of reference. In justifying Frere's appointment, much was made of his literary and academic qualifications. Another possibility is that Thompson had come to the conclusion that it would be difficult for the Journal Committee to maintain control if Morton, who would certainly have wished to preserve a high degree of independence, was to be the Editor. Thompson who continued as Chairman of the Journal Committee until 1873 gave close direction to the Editor during the 1860s; it is, however, interesting to speculate upon the direction that the Society would have taken with Morton's active participation in its affairs as Editor.

The full list of candidates for the editorship does not survive in the records of the Society, but Samuel Sidney was among the other applicants. As Sidney was the most persistent critic of the Society at this time it is hardly surprising that his application was not viewed favourably, but he maintained that he had been disqualified on the same grounds as Morton: 'we had both been professional writers connected with newspapers, not amateurs and had not graduated from an English University'. Morton, he added, would have been far more competent than the Journal Committee and would so much have improved the Journal as to reduce the importance of the preceding volumes.[1] With characteristic vigour Sidney denounced Frere's appointment at the half-yearly meeting in May 1860:

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[1] Sidney, Letter, A.G., 16 June 1860.

> the gentleman selected was a highly-educated man and a perfect gentleman he readily admitted; but considering that there was amongst the other candidates several men who had devoted themselves for years to the subject of agriculture and agricultural information, who had learnt by experience both how to write and how to edit on agriculture which were two utterly different things - as different indeed as painting and statuary - and who had the confidence ... of the agricultural community, who were on intimate terms with all the best farmers in England, it was with surprise that people saw the Council electing a gentleman totally unknown tothe agricultural world - a gentleman of middle age, without experience, without literary reputation, although doubtless connnected with influential families - who commenced his editorial apprenticeship for the first time when he entered his duties as editor of the Journal. [1]

According to John Girdwood, a writer for the Highland Society and involved as a land agent with agricultural improvement, [2] there was an immense amount of dissatisfaction with the appointment: 'when the committee made its selection, it had before it in the list of candidates the name of John Morton ... a feeling of the greatest astonishment was created among the agriculturists of England when such a man was passed by '. [3]

The protests about the appointment continued throughout the agricultural press; there was something 'strange and inexplicable' about the affair; the non-selection of Morton was an 'unwarrantable blow to the cause of scientific agriculture'. [4]

Frere continued in the editorship until his death in May 1868. Arrangements were made for the second issue of the Journal for that year to be brought out

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1 F.M.(3), XVIII, 1860, p.480.
2 A.G., 28 September 1861.
3 F.M.(3), XVIII, 1860, p.482-3.
4 A.G., 26 May and 9 June 1860; F.M.(3), XVIII, 1860, p.484.

by Josiah Goodwin, editor of the Journal of the Bath & West Society. Frere's death initiated a debate on the future management of the Journal and after prolonged discussion in the Council meetings of June and July it was agreed that the office of Secretary and Editor be combined after 1 January 1869. [1] Henry Hall Dare, the Secretary, applied for the new combined post but his application was rejected by the Editorship Committee and the Council after considerable debate. At first, the recommendation that Dare be dismissed and a joint Secretary/Editor appointed at an annual salary of six hundred pounds was narrowly defeated on the Council (13-14) but after further discussion, when a number of alternative options were considered, it was decided to dimiss Dare, give him six hundred pounds by way of compensation and advertise the combined post at an annual salary of four hundred pounds. [2] This was, of course, an extremely insensitive way in which to treat Dare, who had supervised the administration of the Society's affairs in an entirely satisfactory manner after the Hudson débâcle. [3] That he was extremely pained by the decision is clear from his statement to the General Meeting of 1868:

> On first assuming the office he felt extremely diffident of his powers ... Having resolved to devote all his energies to the business of the Society he at once set to work in the collection of subscriptions in arrear amounting to nearly £5,000 ... At that time the capital of the Society was only £10,000; but by dint of hard work, in the course of four years and a half he raised it to £21,000 ... The severance of his connection with the Society was a source of regret to him, particularly in the present year, when he had hoped, under the presidency of H.R.H. the Prince of Wales, to have been able to carry out the Manchester Show with success:

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[1] Monthly Council, 3 June 1868, F.M.(3), XXXIV, 1868, p.39.

[2] Ibid., 1 July 1868, F.M., pp.137-8.

[3] His dismissal in 1859.

however there was no help for it but to bow to the financial requirements of the Council, and to take his leave of the Society. [1]

The ostensible motive for the combination of offices was to economise on expenditure, but the savings to be made were relatively small. The policy was moved by the more 'practical' elements of the Council, William Torr and Charles Randell (in as much as they were working tenant-farmers) who had opposed the creation of a salaried editorship in 1859, and an inference to be drawn is that they did not attach a great deal of importance to the Journal in the totality of the Society's work. This was in contrast to the view of observers such as Morton who deplored the decision on the grounds that the editor, whose salary it was desired to save, ought to have been 'the very eye and nerve power of the body seeing and feeling everything in English agriculture everywhere', and that the two offices were incompatible because the secretarial duties were largely of an administrative nature, to be carried out from Hanover Square, while the editor needed to be 'portable' not 'fixed'. Instead of having the freedom to go out and obtain material for reports and articles the combined Editor/Secretary was to be 'cooped up in a wooden office' looking after mundane general matter which could be left to Dare who had 'many years good service as a most efficient secretary'. [2]

As in 1860, considerable interest was expressed in the appointment. According to Bailey Denton [3] the outstanding men for the position at that time were Morton, J.A. Clarke (who became Editor of the Chamber of Agriculture Journal the following year), and Howard Reed. Reed had contributed influential papers on the cattle plague and steam ploughing to the Society's Journal and had recently left England to edit the Transactions of the New South Wales

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[1] F.M.(3), XXXV, 1869, p.56.
[2] A.G., 6 June and 4 July 1868.
[3] J. Bailey Denton, letter, Ibid., 15 August 1869.

Agricultural Society, a publication that was praised by Morton as being a model of what a successful journal of an agricultural society should be - popular in style with an emphasis on practical topics. [1]

Although many potential candidates, including Morton and Clarke, were dissuaded from applying by the terms of the appointment [2] forty-six applications were received. The Selection Committee, which comprised Lord Chesham, John Dent Dent, Chandos Wren Hoskyns, William Torr and Charles Randell under the Chairmanship of Thompson, unanimously recommended the appointment of H.M. Jenkins, and this was accepted without question by the Council.

The controversy generated by this decision exceeded that which had been occasioned by Frere's selection nine years earlier. Aged twenty-nine, Jenkins had left school at fourteen and after short periods of work with a seed and corn merchant in Bristol and a manufacturing chemist had entered into a minor position as a clerk at the Geological Society in London. There his aptitude and efficiency quickly brought him to the attention of the senior officers of the Society such as Murchison and Huxley, and he eventually succeeded Rupert Jones as Secretary and Editor, having acquired sufficient geological knowledge by private study as to be able to contribute scholarly articles to geological periodicals. According to Morton, the members of the Selection Committee had unanimously agreed that the testimonials provided by Murchison and others suggested that Jenkins was the outstanding of the candidates. [3] It was also considered that his geological knowledge would prove a useful asset to his new work.

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[1] Ibid., 17 October 1868.

[2] A.G., 22 August 1868.

[3] J.C. Morton, 'The Late Mr. H.M. Jenkins F.G.S. A Memoir', Journal (2), XXIII, 1887, p.174.

The testimonials and the geological experience did not impress the agricultural community. Morton led the attack upon the appointment and was less restrained than he had been on the occasion of Frere's appointment as he was now not directly involved. The whole affair, according to Morton, was an 'heroic disregard of common-sense'. The best man might have been chosen, but this he maintained was only a reflection of the misguided nature of the combined post; however good his career at the Geological Society may have been, Jenkins knew nothing of agriculture. Torr, Randell, and others were more concerned with obtaining a Secretary than an Editor, as they never read the Journal, Morton alleged. The appointment was 'so ludicrously absurd'; it was a farce to elect an 'entire outsider' as 'teacher and leader' within a special department of instruction. It was 'altogether indefensible', a 'wrong thing' had been done. Thompson was criticised for not wanting an editor, but a sub-editor 'the real editorship will be conducted as it has all along already been, by the Chairman of the Journal Committee'.[1]

At the December General Meeting Morton was supported in his criticism, by Sidney, C.S. Read, and others, who repeated the arguments that had been so widely voiced against the appointment during the preceding month - it was necessary to have a knowledge of agriculture in order to properly discharge the editorial duties, great injustice had been done to Dare, the Selection Committee had acted in a close and secretive manner.[2] It was this latter point that gave rise to most criticism and Henry Corbet who objected to the way in which the names of potential editors had been discussed in the Gazette[3] came to the conclusion that 'a good man had been got in a bad way'.[4] Thompson

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[1] A.G., 7, 14, 21 November, 12 December 1868.
[2] F.M.(3), XXXV, 1869, pp.49-56.
[3] M.L.E., 7 September 1868.
[4] Ibid., 9 November 1868.

made a vigorous defence of the appointment, with regard to both the mode of selection and the man that had been chosen:

> You advertised to the whole country; you appointed a Committee; no one disputed the competency of the Committee - and in saying this he spoke not of himself as Chairman, but of the Committee generally. The Committee was unanimous in its recommendation. Every member of the Council had the testimonials in his hand; and he ventured to assent that no gentleman competing for office ever had better, more consistent, more hearty, more unanimous testimonials ... He should like to know therefore, in what other way the Committee and the Council could have proceeded, if they had wished to act business-like and openly. [1]

There was much to be said for this justification: the post had been widely advertised and in Hoskyns, Dent, and others, the Selection Committee contained some of the most active and progressive elements of the Council. Thompson went on to dismiss the complaints that the Editor needed direct agricultural experience by reviewing the work that was involved. He firstly identified the practical part - printing arrangements, production of illustrations, and settlement of printer's bills which could be done by any business-like person whether acquainted with agriculture or not. As for the matter that the Journal was to contain, reports of implements and stock at the shows were furnished by experienced reporters who undertook the task. Prize essays were adjudicated by the Journal Committee and there was the more strictly scientific matter written by authorities such as Voelcker, Lawes and Gilbert which was self-generating. A final class of paper was that whereby the editor extracted communications from the farming community, but since Pusey's time this had been a small proportion of the whole contents. In this case agricultural knowledge was necessary, but there

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[1] Ibid., pp.53-5.

was no reason why the new Editor should not acquire it: 'Mr. Sidney had not received an agricultural education but he had nevertheless achieved success in editing a work on - Pigs! (loud laughter) ... He would be very much surprised if in the course of two years or so Jenkins had not proved himself a fit man for office'. [1]

In the event, Thompson's views and judgement were entirely vindicated and within the year there were abundant tributes to the energy and efficiency with which Jenkins carried out his office. In the 1870s he wrote extensively for the Journal and lectured widely to agricultural clubs and societies. Perhaps the most outstanding tribute to his success was the wholly eulogistic obituary memoir of Jenkins written by Morton in 1887. Given that Morton had led in condemning his appointment it is especially poignant:

> I had opposed his original appointment to the offices which he has held with such signal advantage and ability ... I know that for years he imagined that scant justice was dealt out to him in the weekly journal that I edited ... the members of the great Society of which our late friend was Secretary may, however, be assured that no one could bring to the duty which has been confided to me a keener sense of the great loss we have all sustained, a more earnest desire to do justice to the example of his career, or a warmer loyalty to his memory. [2]

Thompson continued as Chairman of the Journal Committee until he was forced to resign through ill-health in December 1873; he had become an increasingly infrequent attender at Hanover Square since 1870. [3] He was

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[1] Ibid., The reference was to Sidney's revision of Youatt's Book of the Pig, which he claimed to have done largely by questionnaire.

[2] Morton, 'Jenkins', p.169.

[3] Minutes of the Journal Committee, 9 December 1873.

PLATE IV: H.M. JENKINS.

MR. HENRY MICHAEL JENKINS, F.G.S.

Source: Agricultural Gazette.

(9 July, 1877)

succeeded by John Dent Dent, of Ribston Hall, Wetherby. Dent had been elected to the Council in 1865 and was a Member of Parliament for Scarborough. He was particularly interested in the scientific work of the Royal (he also served as Chairman of the Chemical Committee) and played a prominent part in the proceedings of the Society in the 1870s and 1880s. He was President in 1882. [1] His articles for the Journal had been well received and with editorial duties shared between him and Jenkins a most successful partnership emerged, under which the Journal steadily grew in stature during the 1870s.

The Character and Content of the Journal 1840-80

In his review of the development of the Royal Agricultural Society in 1878, Jenkins identified three main phases of the early history of the Journal. There was an initial period when it teemed with short practical articles written by enthusiastic landowners and farmers who had been among the founders of the Society. This was followed by a greater reliance upon prize essays which in turn gave way to specially commissioned articles and official reports written by recognised specialists. [2]

This identification was not strictly accurate as prize essays had been a feature of the Journal from the outset, but the tendency towards a smaller number of more substantial articles is clear from an analysis of the contents. In the first forty volumes of the Journal (1840-1879) there are 1,149 substantive articles, communications, and reports. In addition there are 164 short notes, and reports of lectures and discussions held at Hanover Square at the initiative of the Council. The average number of

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[1] A.G., 24 March 1873 (noteworthy agriculturists); Ibid., Derby Supplement, 14 July 1881, p.V; The Times, Obituary, 24 December 1894. Dent, like Thompson, also served as Chairman of the North Eastern Railway from 1880 until his death.

[2] H.M. Jenkins, 'The Royal Agricultural Society of England', Journal (2), XIV, 1878, pp.889-90.

articles per volume for five-year periods, 1840 - 79, is as follows:

Table IV: Average Number of Articles in the Journal, 1840-79

Volumes		Average number of Articles per volume*	Average length (pages)
I - V	1840-5 **	38	13
VI - X	1845-9	35	17
XI - XV	1850-5	28	22
XVI- XX	1856-9	26	22
XXI- XXV	1860-4	25	21
I - V	(second series) 1865-9	27	19
VI - X	1870-4	26	25
XI - XV	1875-9	26	28

* to nearest whole number excluding miscellaneous notes and communications.

** No volumes for 1844 or 1854, two for 1845 and 1856

The larger number of short articles during the 1840s is in part a reflection of the enthusiasm that Pusey engendered among farmers for communication on matters of agricultural practice and the care and interest that he took in rendering them fit for publication. There is interesting confirmation of this in a letter from E.B. Pusey to the Agricultural Gazette Literary Supplement in 1879. Recalling days spent away from Oxford at the family home in Berkshire he remembered how his brother would begin his day at 6 a.m. rewriting letters received with little attention given to orthography or grammar in order to pick out that which was valuable while keeping to the facts; he was 'all along much interested in his plans, because they involved self-denying labour for the good of others'. [1] The decline in the number of short communications was in part a reflection of the expansion of the agricultural newspaper which gave opportunity for greater speed of publication

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[1] E.B. Pusey, letter, A.G. Literary Supplement, 21 April, 1879, p.17.

and topicality, but the tendency was deprecated by many. Charles Lawrence wrote to Pusey in 1854 asking for agricultural experiments to be carried out by farmers and recorded in the Journal, the pages of which would thereby 'be enriched by a variety of matter highly instructive and useful'. [1] In 1861 Lawrence complained about the policy of relying on the promulgation of strictly scientific topics and prize essays 'so that intelligent or observant farmers hesitate from communicating results as they thought they might not be valued or be worthy of notice' [2] comments that were quoted with approval in the Agricultural Gazette. [3]

In the 1840s the prize essay was still a standard and uncontroversial mode of eliciting information followed by many learned societies. The Society generally announced ten topics each year, with premiums typically ranging between £10 and £50 for each essay. Topics were chosen by the Journal Committee, who would consult with other members of the Council. To begin with, the essay topics were seen as falling into discrete groups, such as 'Experiments', 'Manures and Soils', 'Agricultural Operations' and 'Implements' but this classification was not later adhered to. All essayists had to abide by a set of rules which was printed in the Journal along with the essay topics. The most important of these rules was that information contained in the essays was to be founded on experience or observation, rather than compiled from secondary sources. Essays sent in for competition were to be inscribed with a motto and accompanied by a sealed envelope bearing the motto and containing the name of the essayist. In this way anonymity was preserved. When the essay

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1 Lawrence to Pusey, 'On diminishing the Quantity of Roots in fattening Cattle', 10 August 1854, p.8. Berkshire Record Office D/EBp. F8/2.

2 C. Lawrence, 'On the Management of Clover Layers ...', Journal, XXII, 1861, pp.447-8.

3 A.G., 15 March 1862.

topics were published quite detailed guidelines were generally laid down as to the information that was wanted and essayists had to provide information under specified headings. Essays were adjudicated by the Journal Committee.

A problem that was encountered from the outset was that the Society had difficulty in obtaining essays of sufficient merit to award premiums, although unsuccessful essays were frequently published. Competitors often submitted material that was derived from their own experience or observations, as was required, but based upon a restricted outlook with little knowledge of the broad compass of the subject that they had understaken. The shortcomings were expressed by J.S. Henslow who had read some of the unsuccessful submissions on 'Diseases of Wheat' in 1840:

> I have ... seen these essays, and it was evident to me that the authors were ignorant of many facts long known to scientific enquiries, respecting the nature of these diseases, and the causes producing them. However valuable some of the remarks may have been, as the results of the personal and practical experience of their authors, these essays fell far short of what the Society really wanted. [1]

By the 1860s the prize essay system was the subject of considerable criticism on the grounds that it was anachronistic. Instead, it was maintained that a more appropriate method of obtaining sound material was to commission acknowledged experts in their respective fields to write on defined topics. The topics announced for prize essays had also been scrutinised and found to be wanting in as much as they did not always reflect what were perceived to be the relevant and important issues of the day. A review, for example, of the list for 1862, which included such items as

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[1] J.S. Henslow, 'Report on the Diseases of Wheat', Journal, II, 1841, p.1.

'The Agriculture of Staffordshire', 'Hay-making', 'Land-valuing', 'Management of the Home Farm', and 'Any Agricultural Subject', made an unsatisfactory comparison with those which had been prepared by Pusey. Morton held that topicality and relevance had declined and that in 1862 more appropriate subjects would include reaping by machinery, cultivation by steam power, and the relative merits of different breeds of sheep. The meagre list presented by the Society was a 'confession of inability and failure' on the part of the Journal Committee. [1] Consideration of the lists of topics between 1840 and 1869 shows that in the early years there was a greater emphasis on subjects that related to the practical experience of farmers - modes of root storage, rotations followed, results of fertiliser application. Increasingly, the topics of the day,- utilisation of town sewage, theories of plant nutrition or the nature of cattle diseases - were subjects which needed the attention of the expert and were inappropriate for public competition as they demanded greater technical experise and specialist knowledge.

Another source of dissatisfaction with the system was the anonymity of the adjudicators; and when the authors of unsuccessful essays had them published on their own initiative the competency of the judges was sometimes questioned when, as was often the case, public opinion did not coincide with the official view of the relative merits of the different essays. A good example was over the important subject of steam cultivation in 1863; Frere, whose ability was under question, was scathingly referred to as 'walking about with a bundle of essays in his pocket asking for someone to read them' [2] and such comment, justified or not, undermined confidence in the

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[1] A.G., 3 August 1861.

[2] 'The Public Judge', F.M., (3), XXIV, 1863, p.257.

system. Sidney considered continued adherence to the procedure indefensible:

> What did the Council do in this matter of prize essays? They induced a number of men to write on a particular topic; the essays went before a committee existing of nobody knew who; and after a cut-and-dry arrangement an unsatisfactory sketch was placed before the world. [1]

Little good, Sidney maintained, would come of continuing to offer prize essays: 'He had written a prize essay himself and knew how such things were got up'. [2] By the late 1860s the system was clearly outmoded. It took a great deal of time to read the essays which was wasted when, as Thompson was forced to admit, submissions were often badly written or 'mere twaddle'. [3] Although there was no specific resolution to discontinue the series the Minutes of the Journal Committee show an increasing tendency to approach known authorities for papers for which payment was given. The Committee also considered unsolicited material which was submitted by various authors from time to time. The last premium offered by the Journal Committee (in 1869), was twenty-five pounds for 'Any Agricultural Subject', awarded, rather curiously, to a paper on the Jersey potato. [4] Although it was held that the Journal Committee continued the system after it ought to have been abandoned, there was no uniformity of opinion that the system had a deleterious influence on the Journal content. While there were those who agreed with H.H. Dixon (himself a prize essayist) that 'prize essays and country reports have not done much for this journal so far' (1869), [5] in 1873 it could be maintained that 'many of the best papers in the Journal were provoked by the premiums'. [6]

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1 F.M.(3), XXXV, 1869, p.51

2 Ibid.(3), XXXIII, 1868, p.39.

3 Ibid.(3), XXXV, 1869, p.54.

4 C.P. Le Cornu, 'The Potato in Jersey', Journal (2), VI, 1870, pp.127-44.

5 H.H. Dixon, 'The Royal Agricultural Society', p.304.

6 'The Prize System Again', F.M.(3), XLIII, 1873, p.483.

The one hundred pounds for an essay on potato disease put up by Earl Cathcart in that year brought ninety-two entries, but as the prize was not awarded this only served to underline the inefficiency of the system.

In summary, the following were the main sources of content of the Journal between 1840 and 1880:

(i) UNSOLICITED COMMUNICATIONS: Particularly important during the early phase of Pusey's editorship. These were often very short notes, revised by Pusey, and either placed in the main body of the Journal or in space devoted to shorter notes and communications. Pusey actively encouraged communications of this kind and in the early years the Society also organised experiments, such as on the productivity of improved wheat strains and fertiliser application. More substantial communications were also received, and Lawes and Gilbert, in particular, used the Journal as a medium of publication, although their experiments were conducted independently of the Society.

(ii) PRIZE ESSAYS: Up to twelve topics per annum were designated between 1840 and 1869, chosen by the Journal Committee in consultation with the Council. Prizes were also sometimes offered by individuals. A wide variety of topics was produced, the most important sub-set of which were the series of county reports (generally three a year between 1844-1856). Many of the premiums were not awarded but some of the unsuccessful essays were published.

(iii) COMMISSIONED ARTICLES: Topics were chosen by the Journal Committee, and these articles were particularly important in the late 1860s and in the 1870s.

(iv) LECTURES DELIVERED TO THE SOCIETY: These were either at the country meetings or at the Society's headquarters. Important papers were given in the main body of contents, and sometimes placed, along with discussion, in a separate end-section, though this was not a continuous feature.

(v) REPORTS: Accounts of implements and stock at the country meetings were a regular feature, undertaken by stewards at the shows. There were also accounts of other domestic and overseas exhibitions with an agricultural content. The Society's consultants produced reports on specific subjects of investigation and laboratory analyses. Veterinary, chemical, and botanial reports were a very prominent feature of the contents during the 1870s.

(vi) MATERIAL ABSTRACTED: Papers were sometimes reproduced from such sources as the Journal of the Society of Arts and Royal Commissions, and there were also translations from overseas publications and books.

Appendices to the Journal contained matter relating directly to the Society - reports of meetings, [1] premiums, rules, and regulations. A statistical section, with reports of prices, meteorological records etc., was a feature from 1855 onwards, being an innovation of Thompson's when he first assumed the Chairmanship of the Journal Committee.

Between 1840 and 1879 there were 445 individual contributors to the Journal. However, a sub-set of leading contributors may be identified: 44 authors, 10 per cent of the total during the period under consideration, with 4 or more articles, contributed nearly one half of the content (482 out of 1,149 articles).

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[1] The formal reports of the half-yearly meetings of the Society do not carry any of the discussion which took place. For this - which is particularly informative - recourse has to be made to the agricultural periodicals and newspapers.

Table V : Leading contributors to the Journal 1840-79

(qualification: 4 or more articles)

Author	No.of Articles	Author	No.of Articles	Author	No.of Articles
x+ A. Voelcker	83	J.Hannam	8	+ F. Dun	5
x+ J.B. Lawes	30	x J.Parkes	8	x Ld. Portman	5
x P. Pusey	27	+ J. Buckman	7	x+ W. Duguid	5
x+ J.T. Way	22	J.A. Clarke	8	R. Vallentine	5
+ J.H. Gilbert	19	H. Dixon	7	Col. Le Couteur	4
R. Herbert	19	x J. Dent Dent	7	J.B. Denton	4
x P.H. Frere	17	G. Murray	7	J. Grey	4
x+ J.B. Simmonds	17	T. Rowlandson	7	x R.M. Milward	4
x H.M. Jenkins	14	+ W. Tanner	7	C. Cadle	4
J.C. Morton	14	+ C. Daubeny	6	J.C. Clutterbuck	4
+ J. Curtis	14	x J.E. Denison	6	C.S. Read	4
+ J. Coleman	11	C.T. Lawrence	6	W.L. Rham	4
x+ W. Carruthers	11	+ J. Wilson	6	x W. Sanday	4
x H.S. Thompson	11	+ J.F.W. Johnston	6	x C. Whitehead	4
H. Evershed	10			+ J. Wright	4

x Official position with the Society, + 'Scientist'. [1]

Several features of this list require comment. Overall, the outstanding characteristic is the degree to which the leading contributors were either directly connected with the Society as consultants, or on the Council, or were practising men of science. Of those not designated within these categories some were well-known professional writers - Morton, Evershed (later agricultural correspondent of The Field) Clarke, Dixon, and Rham - and many were land-agents or connected with land improvement in various ways - Hannam, Murray, Rowlandson, Vallentine, Denton, Cadle. The land-agents were also well

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[1] 'Official Position': Consultants, Council membership or Editor. 'Scientist': a professional connection with science in teaching or research.

represented among the more minor contributors (those with less than four articles) together with many practising farmers. Of course, categories of occupations were by no means mutually exclusive and classification can only be approximate, especially as occupation often changed during an individual's lifetime. The 'professionalism' of the contributors stands out, and absent are the leisured spectators of the rural scene who were such prolific contributors to the agricultural newspapers and other periodicals. It might seem that, compared with Veliz's analysis of the authorship of articles in the Annals of Agriculture (see p. 70) the diversity of practising agricultural writers had fallen over the first half of the nineteenth century. In fact, the two analyses are not comparable because the Annals were conducted as a topical forum, while the Journal specialised in more substantive, academic articles, although the Journal of the 1840s, as we have noted, carried more short articles than later volumes. What this demonstrates is that writing on agriculture became increasingly the province of the specialist in Victorian times - itself an aspect and reflection of 'agricultural progress'. By the 1840s and 1850s there were of course, a larger number of alternative 'outlets' for communications on agriculture, and those who might have written to Young, or Pusey, were increasingly inclined to write to the agricultural newspapers rather than use the Journal as a topical forum. Yet it is also interesting that there was a substantial number of agricultural writers who did not contribute much to the Journal - Caird, Mechi, Corbet, C.W. Johnson, and Sidney are names which readily come to mind, [1] and this must be taken account of in assessing the ideas that were propagated by the Journal.

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[1] Although all of these had one or more articles in the Journal between 1840 and 1879.

From this general survey of the editorial arrangements, origins of the material contained in the Journal, and the contributors, we may proceed to closer examination of its content over the period considered in the present study as a first step towards an assessment of the role of the Journal in promoting agricultural progress. It has of course, been widely recognised as a significant medium for the communication of information on agriculture, but most surveys of the period are restricted to general statements about its importance. Typical of such statements are :

> the Journal was an important vehicle for the dissemination of new knowledge and practice [1]

or: its Journal, under the great editorships of Philip Pusey and H.M. Jenkins, maintained the highest standards set by the best periodicals of the period [2]

or: If good farming could be learnt from books, there should have been no medieval farming in the British agriculture of 1850. Under Philip Pusey as editor, the bi-annual Journal of the Royal Agricultural Society provided full reports of the Society's shows and of the scientific lectures given to general meetings ... [3]

or: Progressive farmers could now learn of the best approved practices in the Royal Agricultural Society's Journal [4]

These statements, uncontroversial as they are, nevertheless excite a number of questions which have been given little attention by historians of English agriculture. Such questions include the place of the Journal in its relation to other agricultural periodicals of the time, readership and

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1 G.P. Jones, and A.G. Pool, A Hundred Years of Economic Development in Great Britain, 1940, p.71.

2 McGregor, 'Introduction' to English Farming Past and Present, 6th edn., 1961, p.ci.

3 Orwin and Whetham, History of British Agriculture, pp.33-4.

4 Chambers and Mingay, 'The Agricultural Revolution 1750-1880, p.170.

degree of notice that farmers took of the contents, the way in which information was generated and passed down to farmers, the view of progress presented to them, and whether the Journal was a 'leader' or 'follower' with respect to the development of new knowledge on the scientific and technical aspects of agriculture. To put this another way: did the Society, through its Journal, initiate topics that were then expanded or followed up in alternative media? Or did it take up issues which were raised independently, whether, for example, as a query from a practising farmer or a piece of scientific research reported elsewhere? Many of these queries are difficult to answer with precision, but a detailed analysis of the content of the Journal together with an assessment of its links with other periodicals, does provide a means of elucidation of such questions.

Content analysis is a technique which has created a fair degree of interest in the social sciences. Originally developed as a formal method to throw light on such matters as disputed authorship, its use has been extended to describe the characteristics of information flows and to draw inferences about their impact, often employing sophisticated procedures, including the use of computer techniques.[1] The method followed here is relatively simple, and involves the following stages:

(1) Allocation of the 1,149 articles contained in the first forty volumes (1840-79) of the Journal to discrete subject categories.

(2) Review of the content within the subject categories with particular regard to the 'messages' passed down to the readership.

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[1] For an introduction to the wide-ranging and complex field of content-analysis see particularly G. Gerbner etal., The Analysis of Communication Content, 1970; O.R. Holsti, Content Analysis for the Social Sciences and Humanities, 1969; T.F. Carney, 'Content Analysis: A Review Essay', Historical Methods Newsletter, II, 1970, pp.52-61.

(3) Assessment of the influence of the 'messages' by

(a) A review of the relation of the Journal to alternative printed media, 1840-86.

(b) A survey of contemporary criticisms and reviews of the Journal.

(c) Analysis of the 'information linkages' between the Journal and other media.

A preliminary survey of the articles in the early volumes of the Journal presents a bewildering array of topics, but study of individual articles has suggested allocation into the following subject categories:

Agricultural Science: theoretical papers on scientific topics such as plant nutrition, soil science, and agricultural climatology.

Manures and Fertilisers: all aspects of artificial and natural *fertilising* agents, including types, action, value, and mode of application; feeding stuffs.

Surveys and descriptions of farm practice: information and reports on farming in specific localities, at home and overseas, prize essays on various counties, reports of prize farms.

Drainage and Irrigation: underdrainage techniques, arterial drainage, and irrigation projects.

Pests and diseases: crops - potato disease, 'finger and toe' etc. - and animal diseases such as pleuro-pneumonia and cattle plague, including reports on animal health.

Crops and cultivation: discussion on various crops-grain, roots etc., their mode of cultivation, and land reclamation.

Implements and Machinery: description of specific implements (including farm-transport), surveys of progress in steam ploughing, reports of the implement department at the shows.

Livestock: methods of animal husbandry, breeds of livestock, show reports.

Food Manufacture, Markets and Supply: topics such as butter and cider manufacture, statistics of consumption.

Farm Building: farmsteads and ancillary buildings, roadways and fences.

Welfare: health and comfort of labourers, cottage gardening, allotments.

Miscellaneous: topics which cannot be readily assigned to the foregoing categories, and the reports of committees, consultants etc.

These are fairly broad categories - they would be open to further subdivision, but the value of so doing would be limited. A balance has been drawn here between the need to isolate discrete groups of subject-matter but at the same time limit the total number of subject categories to a comprehensible number. To extend the subject categories beyond the twelve outlined would have been unhelpful in this respect. In one sense, the allocation is arbitrary as the area of interest in individual articles frequently overlaps subject categories. This is particularly so in the important categories of 'agricultural science' and 'manures and fertilisers' as articles in the first ('science') group relate to the action of fertilisers and articles in the second group sometimes seek to establish general scientific principles. In this case the allocation-criterion has been to allocate to the first category those articles which are predominantly theoretical in their area of interest, and to the second those which are more practical in their bias. Thus Lawes's important article 'On Agricultural Chemistry' (1847), which deals with general principles, is allocated to the 'science' group but 'Agricultural Chemistry - Pig Feeding' (1854) which deals with the fattening potential of various feeding stuffs but particularly their manurial values is allocated to the 'manures and fertilisers' category as its emphasis is more

Table VI : Content of Journal, 1840-79, by Subject Categories

Subject - Category	Representation 1840-79		Representation per 5-year period, 1840-79							
	* Percentage	No. of Articles	1840-4**	1844-9	1850-4	1855-9	1860-4	1865-9	1870-4	1875-9
Crops and Cultivation	17.8	(205)	26.7(50)	21.0(37)	13.0(18)	16.5(20)	17.6(23)	21.8(29)	13.3(17)	8.2(11)
Miscellaneous Topices	12.3	(142)	5.8(10)	6.8(12)	2.9(4)	6.6(8)	11.6(15)	17.3(23)	23.4(30)	30.3(40)
Manures and Fertilisers	11.4	(136)	13.4(25)	15.3(27)	14.5(20)	20.7(25)	16.0(21)	3.8(5)	5.5(7)	4.5(6)
Surveys and Descriptions of Farm Practice	9.9	(114)	11.8(22)	9.7(17)	8.7(12)	7.4(9)	9.2(12)	8.3(11)	12.5(16)	11.2(15)
Livestock	9.9	(114)	6.0(13)	6.3(11)	11.6(16)	9.1(11)	14.5(19)	16.4(22)	6.2(8)	10.4(14)
Pest and Diseases	8.8	(101)	9.1(17)	10.3(18)	8.7(12)	4.9(6)	2.3(3)	5.3(7)	15.6(20)	13.4(18)
Agricultural Implements and Machinery	8.4	(97)	10.2(19)	6.3(11)	5.0(7)	9.1(11)	9.9(13)	6.0(8)	10.9(14)	10.4(14)
Agricultural Science	6.4	(74)	4.8(9)	9.1(16)	10.9(15)	15.7(19)	3.0(4)	6.0(8)	1.56(2)	0.7(1)
Food Manufacture, Markets & Supply	5.1	(59)	0.5(1)	0.6(1)	2.6(3)	6.6(6)	13.7(18)	11.2(15)	6.2(8)	5.2(7)
Drainage & Irrigation	5.0	(58)	10.2(19)	10.3(18)	12.3(17)	0.8(1)	0.8(1)	0.8(1)	- -	0.7(1)
Farm Buildings	2.8	(32)	0.5(1)	2.3(4)	10.1(14)	3.3(4)	0.8(1)	3.0(4)	2.3(3)	0.7(1)
Welfare	1.5	(17)	0.5(1)	2.3(4)	- -	0.8(1)	0.8(1)	0.8(1)	2.3(3)	4.5(6)
Total:		1149	187	176	138	121	131	134	128	134

* to nearest significant figure

** Percentage of total for each five year period followed (in parentheses) by the number of articles.

toward the practical value of the scientific principles employed in the discussion. A category has only been recognised where it is continuously represented throughout the period under consideration even though (as in the case of 'welfare' and 'building') there are only a small number of articles of intermittent occurrence. Thus 'education', though an important topic, is assigned to the 'miscellaneous' category because it is only represented after 1864.

The articles assigned to the categories, and category representation for the entire period reviewed here, and in five-year periods between 1840-79, is shown on table VI . From this change in the relative balance of categories over time may be seen.

Certain general features of the overall category-representation and their relative temporal change are worthy of note and comment. 'Crops and Cultivation' constitute the largest category at 17.84% of the total although along with 'Manures and Fertilisers' (11.38%), 'Agricultural Science' (6.44%) and 'Drainage and Irrigation' (5.04%) are more important in the earlier period. Articles on drainage are mostly confined to the years before 1855 (112 out of 116). 'Welfare', 'Building', and 'Manufactures...' are thinly represented throughout. The increase in the latter during the 1860s was due to R. Herbert's regular review of the statistical pattern of meat consumption in the metropolis, though other aspects of manufacture (such as butter-factories) began to be given consideration in the 1870s. In place of declining categories, 'Pest and Diseases' (8.79%) and 'Miscellaneous Topics' (12.35%) assumed greater significance after 1870. The attention given to the first of these is readily explicable because of the prevalence of rinderpest, foot-and-mouth and other diseases and especially the resolve of the Society

to make some concerted effort with regard to these problems at that time. The increase in the 'miscellaneous' category (to 30.30% 1875-9) might be taken as an indication of increasing diversity of content (inasmuch as it could reflect an increasing number of articles which do not fall into any specific category) but the converse is in fact the case. While it is true that new topics in the Journal did become established over the period (such as agricultural education and, after 1874, occasional biographical sketches), the increase in the 'miscellaneous' category was largely attributable to the volume of reports written by the Society's consultants. Augustus Voelcker was extremely prolific (as the table of principal contributors demonstrates) and his reports, the reports of the Chemical Committee, and Carruthers's botanical reports formed the largest single group of contents in the 1870s. As these ranged over a number of topics (unlike the veterinary reports) they have been assigned to the 'miscellaneous' category. Their increased significance reflected the developing role of the Society as a professional body able to provide consultancy services: this very important aspect of the Society's role in agricultural progress is considered in a later chapter.

A significant area of interest which was not represented in the Journal is matter pertaining to what may be broadly termed 'political issues'. This, of course, derived from the provisions of the Charter which excluded political topics or those subject to parliamentary consideration from the Society's affairs. As we have seen, however appropriate this prohibition may have been in the 1840s, it seriously undermined the standing of the Society in the 1860s. Exclusion of a wide range of 'political' issues from the Journal gave rise to

extensive criticism. Some of these issues - Tenant Right and Game Laws are prime examples - would certainly have caused dissension within the Society if given free expression, but in the case of others, such as agricultural statistics, there was a need for discussion to explore various viewpoints. There is no doubt that Thompson, who maintained rigorous control over the Journal between 1855 and 1870, interpreted the provisions of the Charter as they related to the Journal extremely conservatively. He made his position clear in his Presidential Address to the Society in 1867:

> ...as Chairman of the Journal Committee, I have been frequently urged to take steps to procure articles on such questions as leases, Tenant Right, preservation of game etc ... not the objects for which the Society was founded ...

maintaining that the Society was established for the promotion of the two great branches of agriculture - crop and stock farming. Other subjects, however important they might be were 'forbidden topics' as far as the constitution of the Society was concerned. [1]

This view was vehemently attacked in the Mark Lane Express and Farmer's Magazine where it was complained that Thompson's attitude was 'obstructive' and that it was absurd to maintain that tenure of land was a 'forbidden topic' in a community of agriculturists. [2]

> When Mr. Pusey took up land-tenure as part of its business, the Royal Agricultural Society flourished; and when Mr. Thompson denounced land tenure as a "forbidden topic" the Royal Agricultural Society failed ... [3]

In point of fact this view was far from correct because Pusey had observed the 'non-political' rule quite strictly and his work for tenant-

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1 'Address of the President to the General Meeting...', Journal (2), III, 1867, p.428.

2 '"Forbidden Topics" at the Royal Agricultural Society', F.M.(3), XXXI, 1867, pp.79-80.

3 'The Present Position of the Royal Agricultural Society', Ibid.(3), XXXIV, 1868, p.471.

right had not been under the auspices of the Society. The subject was given brief representation in the sixth and seventh[1] volumes when there were statements or memoranda printed that could be appended to existing leases or agreements to improve the tenant-right position, but these were not accompanied by comment. Pusey has a footnote to Baraugh Almack's Norfolk report (paradoxically an article that was published in place of Bacon's essay which was too 'political') to the effect that the 'subject of unexhausted improvements seems to me to be the most important of all agricultural subjects for the landlord at present and improvements to our agreements in this respect to be a condition sine qua non of any steady or general improvement of the soil or its cultivation', but tenant-right could on no account be reckoned as a subject that had much exposure in the Journal in the 1840s.

The interpretation of the Charter was first seriously questioned over the issue of agricultural statistics. This received a good deal of attention in the early 1850s and Hoskyns, an enthusiast for the cause, wrote an eloquent article on the topic which was published in the Journal in 1856. This concluded by looking forward to the development of the subject in the Journal [2] and was well received, approvingly referred to in the Farmer's Magazine as the 'right article in the right place at the right time' [3] but it was disapproved of in the Council - Miles raised the question - and no further articles on the topic appeared. Yet as outsiders were not slow to point out, all fundamental questions of improvement were to a degree 'political' and it was maintained that the Highland Society had taken up the question of

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1 Journal, VII, 1846, pp.234-7.

2 C. Wren Hoskyns, 'On Agricultural Statistics', Journal, XVI, 1856, p.606.

3 F.M.(3), IX, 1856, p.270.

agricultural statistics with perfect propriety - the restrictive provisions it was held were only to save time being wasted in fruitless party political dicussion, not on subjects of legitimate agricultural interest.[1] Thompson's view prevailed, admittedly with plenty of support from other members of the Council. Interest outside of the Society shifted towards the 'political' issues and the standing of the Journal (and, as we have seen, the Society as a whole) suffered as a result during the 1860s. In the 1870s, as new classes of topic - reports on laboratory analysis being an example - became popular, they provided the Journal with a well-defined niche while such new organs as the Chamber of Agriculture Journal carried the subject-areas excluded from the Society's affairs which were also dealt with by other more 'popular' publications.

Journal Content: A Review of Subject Categories

We may now proceed to a review of the Journal content within the specified sub-categories. Our concern in this section is the identification of the information that was presented in the Journal as a preliminary step to an evaluation of the Journal within its overall context with regard to information flows.

The majority of subject categories that have been identified contained extremely important original articles, but three of the twelve areas of discussion have been selected for extended consideration because of their particular importance in connection with agricultural progress during the period. The first of these is 'agricultural science' because it was here that there was investigation of the fundamental principles that governed the practice of farming, the elucidation of which was part of the basic rationale of the Society's existence. Closely related is the information on 'manures and fertilisers' and this was of significance because it probably had the greatest

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1 'The Charter of the Royal Agricultural Society versus Agricultural Statistics', Ibid., p.271.

impact on farm output. 'Drainage' has also been selected for extended consideration because of the great interest in the various techniques in the 1840s and the deeply-held belief among the founders of the Society that drainage held the key to agricultural progress on the heavy lands and that it could narrow the perceived productivity differential between the 'light' and 'heavy' land sectors of English agriculture. Before turning to these three areas the other subject categories will be briefly reviewed.

CROPS AND CULTIVATION: As the largest single subject category represented in the Journal between 1840 and 1880 many of the articles related directly to the practical experience of the ordinary agriculturist. There was a great deal of interest in cultivation practice and tillage operations such as subsoiling, marling, drill husbandry, the optimum condition of land for seedling growth, and the best rotations, particularly for heavy land, [1] while the cultivation of nearly

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[1] Examples include Charles Shaw Lefevre, 'An Account of the Application of the Subsoil-Plough to a Dry Soil at Heckfield, Hants', Journal, I, 1840, p.38; W.L. Rham 'Experiments on the Improvement of Poor Lands by Subsoil-Ploughing, both with and without Under Draining', Ibid., pp.257-62; H.S. Thompson, 'On Sub Soil-Ploughing', Ibid., II, 1841, pp.26-37; William Linton, 'An Account of the Transposition and Admixture of Soils, as in the Application of a Clay dressing to a Light Sand; stating the Result of Actual Experiments', Ibid., II, 1841, pp.67-72 (Prize Essay); Charles Burnett, 'On the Marling of a Light Sandy Soil on the Duke of Bedford's Farm at Woburn', Ibid., III, 1842, pp.233-4; F.W. Overman, 'On Claying or Marling Land', Ibid., pp.234-6; Philip Pusey, 'On Horse-Hoeing Flat-drilled Turnips', Ibid., IV, 1843, pp.76-80; Barlaugh Almack, 'On the Drill-Husbandry of Turnips', Ibid., pp.49-75 (Prize Essay); Professor Tanner, 'The Mechanical Condition of the Soil favourable for the Growth of Seed', Ibid., XXI, 1860, pp.46-72; John Towers, 'Considerations on the Rotation of Crops', Ibid., I, 1840, pp.283-93; J.S. Nowlan, 'Statement of a New and Successful Rotation of Crops for Heavy Clays', Ibid., IV, 1843, pp.409-10; P.D. Tuckett 'On the Modification of the Four-Course Rotation which Modern Improvements have rendered Advisable', Ibid., XXI, 1860, pp.258-66.

every farm crop was discussed at some time over the forty year period considered here. The early volumes of the Journal contain a good number of articles on the potentialities of different strains of wheat and the reports of the Society's own inconclusive wheat trials. [1] A clear indication of the influence of economic considerations on cultivation questions is seen in the change from the interest in breaking up pasture land in the 1840s [2] to the inexorable increase in concern as how to best convert arable to pasture as arable farming became less profitable in the 1860s and 1870s [3] and a further reflection of the 'changing basis of agricultural prosperity' is seen in the increased attention given in the Journal to 'non-standard' crops which held out the possibility of specialisation and diversification. Examples are in the discussions on market-gardening, hop,

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[1] Patrick Shirreff. 'On the Hopetoun Wheat, and on Comparative Trials of Wheat', Ibid., II, 1841, pp.344-6; C. Hillyard, 'On Wheat', Ibid., III, 1842, pp.297-305; Edward Roberts, 'On the Management of Wheat', Ibid., VIII, 1847, pp.60-77. See also reports on Cambridge prize wheat by Handley, Kimberley, and Miles in the second volume.

[2] John Bravender, 'On the Advantages or Disadvantages of Breaking up Grass Lands', Ibid., VII, 1846, pp.161-200; John Clarke, 'On the Advantages and Disadvantages of Breaking up Grass Lands', Ibid., pp.500-20; John Morton, 'On the Maintenance of Fertility of new Arable Land', Ibid., pp.283-94; Philip Pusey, 'Account of Breaking up Grass-Land by Paring and Burning at Longworth, Berks', Ibid., IX, 1848, pp.422-24.

[3] H.S. Thompson, 'On Laying-Down Land to Grass, and its subsequent Management', Ibid., XIX, 1858, pp.250-64; M.H. Sutton, 'Laying Down Land to Permanent Pasture', Ibid., XXII, 1861, pp.416-21; Clement Cadle, 'The Improvement of Grass-Lands', Ibid.(2), V, 1869, pp.317-36 (Prize Essay); H.S. Thompson, 'On the Management of Grass Land, with especial Reference to the Production of Meat', Ibid., VIII, 1872, pp.152-79; Augustus Voelcker, 'Field-Experiments on Permanent Pasture', Ibid., X, 1874, pp.429-43; Morgan Evans and T. Bowstead, 'Report on Laying down Land to Permanent Pasture', Ibid., XI, 1875, pp.442-509; W.T. Carrington, 'The Advantage of Converting Cold Arable Clay Land into Permanent Pasture, and the best Method of doing it', Ibid. XV, 1879, pp.487-97.

and fruit growing in the 1870s. [1]

Two particular controversies stand out in this section: the debate over thick-and-thin sowing and continuous corn-growing. In 1845 David Barclay presented some results which he held to demonstrate that thick seeding, with broadcast sowing, gave much better yields, 2½ bushels to the acre producing a yield of 40 bushels at 65 lbs on his Surrey farm as opposed to 25 bushels at 62½ lbs from 1 bushel/acre drilled, [2] but this was strongly disputed the following year. In a report on his Spring Park Farm (Croydon) cultivation (originally published in the Maidstone Gazette) Hewitt Davis stressed the adverse consequences of thick sowing, in impeding maturity and in the encouragement of disease, [3] while Sir William Heathcote reported on experiments which showed advantage to thin-sowing [4] and J.J. Mechi, in one of his rare Journal contributions stressed the diminishing returns of excessive seeding densities. [5]

The chief protagonist of continuous corn-growing as a practical mode of husbandry was the Rev. S. Smith who first published an acoount of his methods at Lois-Weedon (Northants) in his book A Word in Season (1849), which enjoyed considerable popularity. Smith reported on his Lois-Weedon husbandry for the Journal in 1851. His system involved planting wheat in triple rows with one-foot spacing between each individual row and three-foot spacing between each triple row, as in the illustration. Under this method, Smith claimed continuous yields of 34 to 40 bushels per acre, without the application of manures. [6] This was

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1 H. Evershed, 'Market-Gardening', Ibid., VII, 1871, pp.420-36; Charles Whitehead, 'On Recent Improvements in the Cultivation and Management of Hops', Ibid., VI, 1870, pp.336-66; Idem, 'The Cultivation of Hops, Fruit and Vegetables', Ibid., XIV, 1878, pp.719-60.

2 'On the Advantage of Thick Sowing', Ibid., VI, 1845, pp.192-3.

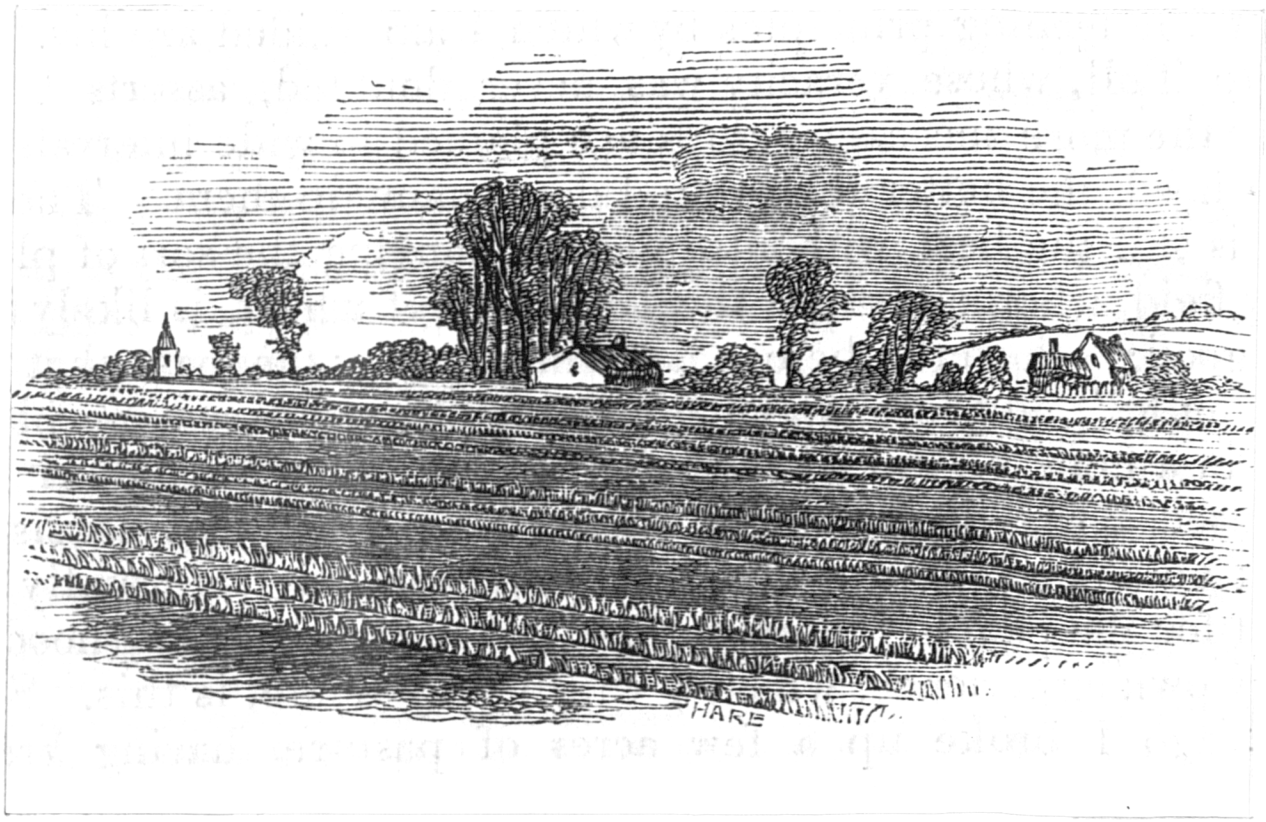
3 Hewitt Davis, 'Some Account of Spring Park Farm', Ibid., VII, 1846, p.529.

4 'On Thick and Thin Sowing', Ibid., pp.535-6.

5 'Experiments in Thin Sowing', Ibid., pp.537- 9.

6 Rev. S. Smith, 'Experiment and Experience in the Growth of Wheat, Year after Year, on the same Acre of Land', Ibid., XII, 1851, pp.133-9.

PLATE V: LOIS WEEDON HUSBANDRY.



Source: Journal Of The Royal Agricultural Society Of England.
(XII, 1851, p.133)

the reason that the method excited a considerable degree of interest in the 1850s, for at that time agriculturists were experiencing considerable difficulties over the supply, quality, and cost of guano, the most efficacious 'artificial' nitrogenous fertiliser then available, and which had been adopted with enthusiasm in the 1840s. Smith's methods were less successful away from Lois-Weedon, and Lawes and Gilbert produced a detailed report for the Journal in 1856, based upon trials that they had carried out at Rothamsted since 1851, and which had not produced yields anything like as good as those obtained by Smith. They concluded that the Lois-Weedon soils had a higher nitrogen content and retained more water and ammonia than those at Rothamsted.[1] This provoked a vigorous response from the Rev. Mr. Smith, who claimed that Lawes had not followed the details of the Lois-Weedon plan, so that failure was inevitable.[2] Continuous corn-growing again received attention in the 1870s when the Council of the Society commissioned a report on the systems followed by John Prout of Sawbridgeworth, Herts., and Edward Middlewitch of Blunsdon, Wiltshire, which had received a good deal of publicity,[3] although the system depended upon the heavy application of artificial manures.[4] The famous reports of Lawes and Gilbert on their field trials at Rothamsted demonstrated that where crops of wheat or barley were not manured, there was a fall-off in yield during the early years of continuous growth followed by stability around the lower levels.[5]

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1 J.B. Lawes and J.H. Gilbert, 'On the Growth of Wheat by the Lois Weedon System, on the Rothamsted Soil.', Journal, XVII, 1856, pp.607, 610.

2 Rev. S. Smith, 'Lois Weedon Husbandry', Ibid., XVIII, 1857, pp.30-36.

3 See, for example, 'Mr. Prout and his System', F.M.(3), XLV, 1874, pp.197-8.

4 Finlay Dun, 'Report on Messrs. Prout and Middlewitch's Continuous Corn Growing', Journal(2), XI, 1875, pp.38-67.

5 J.B. Lawes and J.H. Gilbert, 'Report of Experiments on the Growth of Wheat for 20 years in succession on the same Land', Ibid., XXV, 1864, pp.93-185 & 441-501; 'Report of Experiments on the Growth of Barley for Twenty Years in succession on the same Land', Ibid., (2), IX, 1873, pp.89-162 & 275-374.

MISCELLANEOUS TOPICS: Under this classification is a variety of Journal topics which do not fall neatly into the other specified subject-categories. In the early years, these included articles on such items as forestry [1] - about which comparatively little was written in the farming literature of the period - hedge removal,[2] horse-shoeing, [3] farm accounts, [4] seed-adulteration, [5] (which became a very important issue and is discussed in the section on the Society's Consulting-Botanist), 'agricultural maxima', [6] land - valuation[7], and the use to the farmer of a microscope [8]. Agricultural information in the Census of 1861 and 1871 received attention from J. Dent Dent and there was also a review of the agricultural returns of 1866 and 1867. [9] The general issue of

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1 Charles Falkner, 'On the Planting and Management of Forest-Trees', Journal, III, 1842, pp.263-97 and J. Spencer Stanhope, 'Aboriculture', Ibid., VII, 1846, pp.679-80; Sir James Stuart Menteath, 'A Few Notes on Scotch Fir and Larch as to the Soil on which they grow best, and the Preservation of the former, when used for Building purposes', Ibid., IX, 1848, pp.372-6; J.E. Denison, 'On the System of Planting and the Management of Plantations at Welbeck', Ibid., pp.365-71.

2 William Cambridge, 'On the Advantage of Reducing the Size and Number of Hedges', Ibid., VI, 1845, pp.333-42 and J.H. Turner, 'On the Necessity for Reducing the Size and Number of Hedges', Ibid., pp.479-88.

3 William Miles, 'On Horseshoeing', Ibid., XVIII, 1858, pp.270-99.

4 John Coleman, 'Farm Accounts', Ibid., XIX, 1858, pp.122-43.

5 William and Hugh Raynbird, 'Adulteration of Seeds', Ibid., XXII, 1862, pp.14-29.

6 J.C. Morton, 'Agricultural Maxima', Ibid., XX, 1859, pp.442-53.

7 Phillip D. Tuckett, 'On Land Valuing', Ibid., XIV, 1853, pp.1-7 (Prize Essay).

8 W. Kencely Bridgman, 'The Use, to the Farmer, of a Magnifying-glass or simple Microscope', Ibid.,(2), III, 1867, pp.1-30 (Prize Essay).

9 J.D. Dent, 'Agricultural Notes on the Census of 1861', and 'Agricultural Jottings from the General Report of the Census of England and Wales for the Year 1871', Ibid., XXV, 1864, pp.318-27 and (2),X, 1874, pp.390-401; James Lewis, 'Agricultural Returns of 1866 and 1867', Ibid.,(2), IV, 1868, pp.214-47.

agricultural statistics was not represented (apart from the 1856 survey by Hoskyns) because of the restrictions contained in the Society's Charter. Similarly, the tenant right issue received scant attention, although there was a prize essay, on the 'Farming Customs and Covenants of England' by Clement Cadle in 1868 [1] and the provisions of the Agricultural Holdings Act of 1875 were reviewed. [2]

Important sub-groups within the 'miscellaneous' category include a number of articles on agricultural education in 1864 and 1866, after J.C. Morton had urged the Society to take up the issue in 1863. These are referred to in chapter V of this thesis. Also notable are a number of reviews of agricultural progress [3] and, during the 1870s, a number of memorial assessments

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[1] Ibid.,(2). IV, pp.144-75.

[2] J.B. Lawes, 'On the Valuation of Unexhausted Manures', Ibid.,(2), XI, 1875, pp.1-38; T. Dyke Acland, 'Note on the Interpretation of Clause 6 of the Agricultural Holdings (England) Act, 1875', Ibid., XII, 1876, pp.196-8; Frederick Clifford, 'The Agricultural Holdings (England) Act, 1875', Ibid., pp.129-95; C. Randell, 'Farm Agreements in reference to the Agricultural Holdings Act', Ibid., pp.198-202.

[3] Philip Pusey, 'On the Present State of the Science of Agriculture in England'; 'On the Progress of Agricultural Knowledge during the last Four Years', 'On the Progress of Agricultural Knowledge during the last Eight Years', Ibid., I, 1840, pp.1-21; III, 1842, pp.169-217; XI, 1850, pp.381-442. John Dudgeon,'Account of the Improvements which have taken place in the Agriculture of Scotland since the Formation of the Highland Society.', Ibid., I, 1840, pp.59-112; H.S. Thompson, 'Agricultural Progress and the Royal Agricultural Society', Ibid., XXV, 1864, pp.1-52; H.M. Jenkins, 'The Royal Agricultural Society of England', Ibid.(2), XIV, 1878, pp.855-93.

of Dilston (Northumberland) while Spencer and Pusey respectively reported on improvements in West Norfolk and Lincolnshire, the latter visiting the county on the invitation of Henry Handley, and where he was much impressed with what he saw; 'a cultivated exuberance such as I had never seen before'. [1]

Prizes for accounts of farming in specific counties were first offered in 1843. No formal decision to instigate the series appears in the Council Minutes, but it seems to have been a project promoted by Handley. [2] The offer of premiums for the surveys has been interpreted as a reaction to an over-emphasis on theory and scientific subjects perceived by some members of the Council, [3] but such a project was entirely in conformity with the philosophy and aims of the Society. As Pusey observed in his survey of agricultural progress in 1842, agricultural advance could come about either by the discovery of some entirely new piece of knowledge, or the discovery of some practice restricted to a specific locality and which could be beneficially adopted elsewhere. [4] Surveys of farming could be expected to help with the

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1 Captain Stanley Carr, 'On Rural Economy Abroad', and 'Rural Economy of Schleswig, Holstein, and Laurenburg', Journal, I, 1840, pp.124-34 and 371-87; W.L. Rham, 'Agriculture of the Netherlands', (part I), Ibid., II,1841, pp.43-63, (part II), Ibid., III, 1842, pp.240-63; J.F.W. Johnston, 'Agricultural Tour in Denmark, Sweden, and Russia', Ibid., pp.409-21; Earl Spencer 'On the Improvements that have taken place in West Norfolk', Ibid., pp.1-9; Philip Pusey, 'On the Agricultural Improvements of Lincolnshire', Ibid., IV, 1843, pp.287-316.

2 In the Lincolnshire survey (p.288) Pusey remarks that it was 'the wish of our President that in each English county an inquiry should be made into the present state of farming compared with reports made to the Board of Agriculture'; Handley was President for 1843.

3 Peel, 'Practice with Science', p.12.

4 Philip Pusey, 'On the Progress of Agricultural Knowledge during the last Four Years', Journal, III, 1842, p.169.

latter aspect. At the General Meeting of May 1843, Handley explained that if it were found that some counties had made improvements since the Board of Agriculture surveys while others had not, 'the latter would be ashamed of their want of energy and enterprise and be induced to make exertion to rival the improvements of their brother farmers'. If reports were made on the state of agriculture in every county he did not see that 'anything was better calculated to improve agriculture than the publication of such reports'. [1]

The first counties specified for the submission of prize reports were Norfolk, Cheshire, Essex, and Wiltshire. It was understandable that Norfolk, widely perceived to be the most advanced agricultural area, should head the list, but thereafter there is little apparent logic in the succession of counties chosen other than sometimes being related to the location of the annual meeting. It is well-known that the Norfolk prize was awarded to Richard Noverre Bacon but that it was not published in the Journal on account of its length. [2] There was, however, another reason. Bacon's essay dealt with such matters as long leases and tenant right to which he attributed the superiority of Norfolk agriculture, but allusion to such topics impinged upon the 'forbidden' area of 'political' topics. Bacon objected to certain passages being expunged, but gained permission to publish the essay independently in 1844. [3] The book runs to over four hundred pages; according to C.S. Read, it was in its 'length, correctness of detail and valuable statistical information never equalled in any similar essay furnished to the Society, but its circulation was restricted to a few hundred copies and never extended far beyond the county of Norfolk'. [4] By comparison, the essay that was printed in its place, by Baraugh Almack, a

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1 F.M.(2), XVIII, 1843, p.444.

2 O.R. Macgregor, 'Introduction', to Ernle, 6th edn., 1961, p.ci.

3 M.L.E. 7 October 1844; R.N. Bacon, Report on the Agriculture of Norfolk, 1844.

4 C.S. Read, 'Recent Improvements in Norfolk Farming', Journal XIX, 1858, p.265.

land surveyor with no direct knowledge of the county, was a very brief affair, lacking a geological or topographical map.

Apart from Bacon's essay, the early reports set the style for those which were to follow. The authorship of these surveys differs interestingly from that of the overall run of articles in the Journal inasmuch as they were written almost entirely by those who had some knowledge or direct connection with the land and farming either as farmers, or land agents and surveyors. A number of prominent tenant farmers were encouraged to turn their hand to writing, and although they would characteristically open their reports with a statement of diffidence expressing their supposed shortcomings, reports written by men such as Robert Baker ('Essex' 1844) and Samuel Jonas ('Cambridgeshire' 1847) were often perceptive and comprehensive; Pusey cited Jonas's essay as a model of what such a report should be.[1] Writing a prize report was the means by which the names of C.S. Read ('South Wales 1850, 'Oxfordshire' 1855, 'Buckinghamshire' 1856) and J.A. Clarke ('Fens' 1847, 'Lincolnshire' 1852) came to the attention of the agricultural public.

Although the prize essays show a fairly uniform pattern in their approach, one particularly interesting feature is the way in which the perception and definition of farming areas by the authors shows development over time, with the extension of knowledge of geology and soils. Professor Darby has drawn attention to the changing conception of discrete farming regions demonstrated by the essayists.[2] The first to employ a geological map was Thomas Rowlandson, in his 'North Wales' (1850), although Jonas had two geological cross-sections. Colbeck on 'Northumberland' (1848) classified land according to general

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[1] F.M.(3), XXXVI, 1870, p.80.

[2] H.C. Darby, 'Some Early Ideas on Agricultural Regions', A.H.R., II, 1954, pp.41-6.

qualities - 'poor clay soils' or 'very high open land' with values superimposed, while Hugh Raynbird ('Suffolk' 1848) employed a soil map essentially based on that which had been produced by Arthur Young. By 1856 it could be said (in a review of Read's 'Oxfordshire') that all such essays should have a geological map, [1] although Read himself was at pains to stress the shortcomings of an assessment of agricultural potential based on solid geology alone. [2]

The reports (including those which were not prize essays) provided abundant information on such topics as crops, rotations, stock, employment of manures, progress of drainage, and the condition of the farm labourer. They have, of course, been widely utilised as a preliminary source in many studies of Victorian agriculture. There is evidence that other of the essayists apart from Bacon felt constrained by the Society's rules on admissable topics, although there is comment on such matters as restrictive leases which were held to explain the continued prevalence of the four-course rotation in Norfolk, [3] and on the evils of the Laws of Settlement with regard to the farm labourer in Oxfordshire [4] (to give but two examples). Acland's 'Somerset' (1851) was published in extended form, together with the essay of the runner-up, W. Sturge, and had a good deal to say about 'forbidden topics', stressing that improvements were to be achieved by giving encouragement and security to capital; in the original prize essay, it was necessary 'to restrict comments on security, of capital and tenant right by the rules of the Royal'. [5]

Although initially a popular feature of the Journal, by the early 1860s the relevance of continued prize reports was questioned, especially when it came to the offers of premiums for reports on counties which were not

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1 F.M.(3), IX, 1856, p.270.

2 C.S. Read, 'On the Farming of Oxfordshire', Journal, XV , 1855, p.200.

3 Almack, 'Norfolk', pp.320-1.

4 Read, 'Oxfordshire', p.265.

5 T.D. Acland and W. Sturge, The Farming of Somerset, 1851, pp.109, 111-3. Raynbird's 'Suffolk' was also published in extended form as a book in 1849.

considered to be in the forefront of agricultural progress. Of the prize for Staffordshire in 1861 it was said:

> We do not suppose that a report of Staffordshire however fully written will affect the farm practice of one man in one thousand who may read it. We are quite certain that an account of reaping by machinery and ploughing by steam-power will be immediately influential on farm-practice over large districts. [1]

Yet a premium for Staffordshire remained on the list for several successive years in the absence of any contributions that were considered sufficiently worthy for the award. In the end, Evershed was commissioned to write a report which was published in the Journal for 1868.

One of the difficulties with the county reports was the length of the period over which they extended. The problems and potentialities of English farming were, after all, greatly different in 1868 compared with 1844 when the series commenced. It was difficult to compare practice in adjacent counties, or between different parts of the country, as had been the intention when the series was initiated, given the temporal discordance of the reports upon which such a comparison would be based. Given that they extended over nearly a quarter of a century doubts were expressed over their continuing utility: Sidney called for the Society to undertake an agricultural survey of the country, citing Sir John Sinclair's Statistical Survey of Scotland as a model, which he thought could be accomplished partly by means of a questionnaire. Another suggestion was a survey of agricultural progress since 1839. [2] A committee was appointed to investigate the feasibility of this latter suggestion but it was rejected as being too costly for the benefit that would accrue from it. It was also

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[1] A.G., 3 April 1861.

[2] At Annual Meeting 1870, F.M.(3), XXXIX, 1871, p.58.

maintained that information of the type Sidney had called for was provided in the Journal by such articles as the survey reports from representative farms in different parts of the country written in 1869, and the report of the Oxford farm prize competition of 1870. [1]

This was the start of a new pattern. One of the first undertakings of the new Editor was a report on the agriculture of Belgium, which Jenkins undertook with Voelcker after a visit with him to the country in the summer of 1869, [2] and thereafter he regularly contributed surveys of agriculture, both within the British Isles and on the Continent of Europe. The annual farm prize competition was also a permanent feature of the 1870s and the reports on the prize farm appeared each year. In a sense, these provided continuity inasmuch as reports on specific farms had always been a popular feature of communicating information on improvement - the Journal of the 1840s abounded with such accounts. While it is difficult to assess the impact of the reports, and doubtful if it is realistic to give credence to Earl Cathcart's optimistic assessment of the influence of the county reports 'in securing happily prevailing uniformity', [3] the prize farm competition did create a good deal of interest, even if entries were often small in number because of the fear of tenants that they might suffer an increase of rent if they were successful. Perhaps most influential were some of the overseas reports: in particular, the surveys carried out by H.M. Jenkins brought continental techniques to the attention of English agriculturists. A good example was dairy practice where Danish methods were in advance of those generally followed in England in the

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[1] H.H. Dixon and H.M. Jenkins, 'Farm Reports', Journal (2), V, 1869, pp.385-508; Monthly Council 7 June 1871, F.M.(3), XL, 1871, pp.6-7.

[2] Augustus Voelcker and H.M. Jenkins, 'Report on the Agriculture of Belgium: the Result of a Journey made at the request of the Council by Dr. Augustus Voelcker and H.M. Jenkins, F.G.S. (Reporter)', Journal (2), VI, 1870, pp.1-80.

[3] Cathcart, 'Thompson', p.527.

1870s.[1]

LIVESTOCK: The Journal contained a number of important essays on the management of the animals of the farm. Earl Spencer contributed an article in the first volume on gestation in cows[2] and William Youatt on the detection of pregnancy.[3] J.W. Childers outlined the advantages of shed-fattening, where there was less movement with associated economy in the use of food, and greater warmth for the animals.[4] There was interest in the physiology of rearing and fattening, and the importance of protein-rich animal food was stressed by Lyon Playfair.[5] Emphasis was placed upon the need to obtain animals with good qualities to begin with, if quick fattening was required with economy of food.[6] It was the concern for early maturity that led to the interest in Shorthorns, noted in 1846 as 'fast spreading into all parts of the kingdom'.[7]

The potential of different breeds, economy of feeding, and the best methods of housing were the most important themes running through the articles on farm livestock. The Society's prize essay on 'The Management of Sheep' had a section on a number of feeding-experiments which stressed that warmth was an important factor in sheep husbandry[8] and there was discussion as to whether small or large breeds of sheep consumed the same amount of food in

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1 See, for example, H.M. Jenkins, 'Report on the Agriculture of Sweden and Norway', 'Report on the Agriculture of the Kingdom of Denmark, with a note on the Farming of the Duchies of Schleswig and Holstein', 'Report on the Dairy-Farming of the North-West of France', Journal (2), XI, 1875, pp.162-261, XII, 1876, pp.309-81, XV, 1879, pp.278-322.

2 Earl Spencer, 'On the Gestation of Cows', Ibid., I, 1840, pp.165-8.

3 William Youatt, 'The Detection of Pregnancy in the Mare and the Cow', Ibid., pp.170-2.

4 John Walbanke Childers, 'On Shed-Feeding', Ibid., p.169.

5 Lyon Playfair, 'Lecture on the Applications of Physiology to the Rearing and Feeding of Cattle', Ibid., IV, 1843, pp.215-66.

6 George Dobito, 'On Fattening Cattle', Ibid., VI, 1845, pp.74-8 (Prize Essay).

7 John Wright, 'On Short-horn Cattle', Ibid., VII, 1846, p.201.

8 Robert Smith, 'On the Management of Sheep', Ibid., VIII, 1847, pp.30, 32.

proportion to their size.[1] Hall Keary's prize essay on the 'Management of Cattle' gave precedence to the Shorthorn and gave detailed attention to the comparative merits of stall-feeding and box-feeding, the latter system having become popular for the production of manure.[2] The merits of shed-feeding sheep were argued by Dudley Pelham in 1850[3], while in a particularly thoughtful article 'On increasing Our Supplies of Animal Food',[4] J.C. Morton suggested that grass was generally more nourishing per ton than turnips and posed such questions as 'what sort of animal will most economically convert vegetable produce into meat?', 'what breed is best to adopt?', 'what kinds of food are to be given?', questions with which the agriculturist often had to be content with 'a loose average sort of judgement which memory enables an unrecorded experience to pronounce'.[5]

J.B. Lawes gave a good deal of attention to the fattening qualities of different animal foods and different breeds. He also gave particular attention to the quality of the manure produced, information which was very useful in connection with the adoption of mixed farming-systems. On sheep, he found that Hampshires gave a greater increase in weight for food consumed than Southdowns, but this was compensated in the latter by a greater quantity of wool.[6] In a comparison with Cotswolds, Lawes found that these were rapid fatteners, but the quality of meat was inferior, so that it was difficult to make a firm judgement on profitability to the farmer,[7] and he stressed

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1 George Shackel, 'Comparison of the Consumption of Food by Large and Small animals', Ibid., pp.487-9.

2 Hall W. Keary, 'Management of Cattle', Ibid., IX, 1848, pp.424-52.

3 Dudley Pelham, 'On Winter Feeding of Sheep', Ibid., XI, 1850, pp.88-92.

4 Ibid., X, 1849, pp.341-79.

5 Ibid., pp.357-62.

6 J.B. Lawes, 'Report of Experiments on the Comparative Fattening Qualities of different Breeds of Sheep', Ibid., XII, 1851, pp.443.

7 Idem, 'Comparative Fattening Qualities of Sheep', Ibid., XIII, 1852, p.1oz. See also Samuel Druce, 'On the Comparative Profit realised with different breeds of Sheep', Ibid., XIV, 1853, pp.211-13.

the danger of reliance upon money calculations in assessing the relative merit of different sheep breeds, in an extension of the experiments to include Leicesters.[1] A separate issue was the degree to which different breeds were adapted to their respective localities: Thomas Rowlandson stressed the need for compromise, and suggested the new Leicester for rich pastures, the Southdown for dry exposed downs, the Herdwicks for mountainsides.[2] In his consideration of the implications of different feeding regimes, Lawes presented detailed results from experiments with sheep[3] and pigs.[4] Although it is difficult to see that the findings were of much practical value, they constituted important early steps towards the elucidation of the scientific principles underlying commercial animal nutrition. Lawes viewed animals 'objectively' as 'meat and manure' machines and gave particular consideration to their chemical composition;[5] the approach was well illustrated in his report of experiments carried out at Woburn to ascertain the relations of both the meat and manure produced by oxen to the food consumed to produce them.[6]

The optimum modes of feeding, rearing, and breeding stock are basic and continuous themes in the early Journal livestock articles, but the interest of many Victorian agriculturists in the animals of the farm was less prosaic. The development of the famous breeds of sheep and cattle, and the individuals connected with them made a considerable impression and in the 1860s there was

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1 J.B. Lawes, 'Experiments on the Comparative Fattening Qualities of different Breeds of Sheep', Ibid., XVI, 1856, p.59.

2 T. Rowlandson, 'On the Breeds of Sheep best adapted to different Localities', Ibid., X, 1849, pp.452-3.

3 J.B. Lawes, 'Agricultural Chemistry - Sheep Feeding and Manure., Part I', Ibid., X, 1849, pp.276-339.

4 Idem, 'Agricultural Chemistry - Pig Feeding', Ibid., XIV, 1853, pp.459-540.

5 Idem and J.H. Gilbert, 'On the Composition of Oxen, Sheep and Pigs, and of their Increase whilst Fattening', Ibid., XXI, 1860, pp.433-88.

6 Idem, 'Report of Experiments on the Fattening of Oxen, at Woburn Park Farm', Ibid., XXII, 1861, pp.200-18.

a series of prize essays on the 'Rise and Progress...' of various sheep and cattle breeds, some being contributed by that most inimitable of Victorian agricultural writers, Henry Hall Dixon, 'The Druid'. [1] An essay on Longhorns in 1876 was a reflection of a renewal of interest in this breed as had been demonstrated at shows held in the Midland counties during the 1870s. [2] Reports of the livestock exhibited at the shows assumed a greater importance during this decade and the volume for 1879 contains seven stock reports - for Bristol (1878) and Kilburn (1879), where there had been a representative collection of the various British and foreign stock.

The increased economic significance of stock to the farmer caused the Council of the Society to commission a thorough analysis of the relative profits to the agriculturist of Horses, Cattle, and Sheep Breeding, Rearing and Feeding. This was written by W. Macdonald, Editor of the North British Agriculturist who concluded, in 1876, that hunters and carriage-horses could not be reared by 'ordinary rent-paying farmers' for profit, but that there was some scope for draught-horse breeding. On cattle, he held that farmers could profitably breed more on their own holdings as opposed to the prevalent practice of buying-in stores and that there was a need for better cattle-housing, more food and shelter in winter, a better bull-service, a generous and progressive system of feeding, and for a more humane means of transit, especially from Ireland. Macdonald confirmed the position of sheep as being the best-paying kind of

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[1] H.H. Dixon, 'Rise and Progress of Shorthorns', Journal (2), I, 1865, pp.317-29; 'History of the Rise and Progress of Hereford Cattle', Ibid.(2), IV, 1868, pp.277-90; 'Rise and Progress of the Leicester Breed of Sheep', Ibid., pp.340-58. See also J. Tanner Davey, 'A Short History of the Rise and Progress of the Devon Breed of Cattle', Ibid., V, 1869, pp.107-30.

[2] J. Nevill Fitt, 'Longhorn Cattle: their History and Peculiarities', Ibid., XII, 1876, pp.459-87.

stock in Britain (though not in Ireland) and argued, that, wherever possible, farms should have mixed stock holdings.[1]

PESTS AND DISEASES OF CROPS AND LIVESTOCK: The Victorian agriculturist had to contend with a number of perplexing and damaging farm pests and diseases of crops and livestock. Failure of clover and turnips in the standard four-course rotations that had been adopted so enthusiastically in the late eighteenth and early nineteenth centuries was one of the problems that Pusey addressed himself to in his introductory survey on the state of agriculture in 1840. He commented that red clover could not be repeated more than once in four years and suggesting that the widespread failure of the turnip in Norfolk, where it had been longest cultivated in England, was due to its too-frequent repetition. [2] The Journal thus carried a number of articles on 'clover-sickness' [3] and 'anbury' or 'finger and toe' [4] (known today as 'club-root'), but little could be done and the soundest advice was not to repeat the crops too often on the same ground. Club-root in brassicas remains a serious difficulty for the amateur gardener, and is a bacterial infection; Buckman, writing in the Journal in 1855 thought it was not a disease, but a symptom of degeneration from the cultivated to the wild state of the plant. [5]

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1 W. Macdonald, 'On the relative Profits to the Farmer from Horse, Cattle, and Sheep Breeding, Rearing and Feeding, in the United Kingdom', Ibid., p.108.

2 Pusey, 'Some Introductory Remarks...', p.13.

3 Rev. W. Thorp, 'On the Failure of Red Clover', Ibid., III, 1842, pp.326-36; W. Carruthers, 'On a New Clover Disease. By P. Mouillefort. Translated from the Journal d'Agriculture Pratique', Ibid.(2), X, 1874, pp.515-519.

4 James Buckman, 'On Finger and Toe in Root Crops', Ibid., XV, 1855, pp.125-35; Augustus Voelcker, 'Anbury; and the Analysis of Diseased Turnips', Ibid., XX, 1859, pp.101-5.

5 Buckman, 'On Finger-and-Toe', p.135.

By far the most devastating plant disease was the potato blight of 1845; volumes VI and VII of the Journal reflect the concern over the tragedy of the potato failure, particularly in Ireland, [1] in that they have nine articles on this topic. H.S. Thompson incorrectly advanced the view that curl and dry-rot were part of the same disease and caused by planting sets that were over-ripe. [2] Lyon Playfair (then the Society's Consulting-Chemist) rejected the view that the potato disease was caused by a fungus. [3] Henry Cox, in the Society's prize essay on the topic, attributed the rapid spread of the disease to the damp and sunless weather of July and August, 1845, and offered a number of ineffectual suggestions for the prevention of decay [4] while George Phillips advanced the commonly-held view that fungi were the effect and not the cause of the disease. [5] F.J. Graham thought that the potato disease was a canker, similar to that which attacked apple trees. [6] This variety of ideas on the cause of potato blight reflected the perplexing nature of the disease. The chief protagonist of the correct fungal theory was initially Rev. M.J. Berkeley of Wood Newton and Apethorpe, Northamptonshire, who published, in 1846, his findings in the Journal of the Horticultural Society. These were generally rejected, not least by Dr. Lindley, Editor of the Gardeners' Chronicle (published in conjunction with the J.C. Morton-edited Agricultural Gazette and thus probably read by many agriculturists). It took

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1 Graphically described by Cecil Woodham-Smith, The Great Hunger, Ireland 1845-9, 1962.

2 H.S. Thompson, 'On the Prevention of Curl and Dry-Rot in Potatoes', Journal, VI, 1845, pp.161-74.

3 Lyon Playfair, 'On the Nature and Causes of the Decay in Potatoes', Ibid., pp.531-48.

4 H. Cox, 'On the Potato Disease', Ibid., VII, 1846, pp.486-98.

5 George Phillips, 'On the Nature and Cause of the Potato Disease', Ibid., p.363.

6 F.J. Graham, 'On the Potato Disease', Ibid., p.367.

another fifteen years for research at the Glasnevin Agricultural College to identify Phytophthora Infestans as the cause of the potato blight. [1] The task was then to understand how the fungus survived the winter (being susceptible to cold conditions) and in the 1870s the Society published a number of papers in connection with its collaboration with continental research in this area. [2] It was not until the mid 1880s that any treatment was possible; in 1885 Bordeaux mixture (copper sulphate and quicklime) was first used [3] (originally developed against Peronospora vine fungus in France). [4]

Apart from these very damaging fungal and bacterial diseases, farm pests and parasitical plants were of great concern. Volumes II (1841) to XVIII (1857) of the Journal had a series of articles on farm pests by John Curtis. With the standard title of 'Observations on the Natural History and Economy of various Insects affecting... ' they were notable for their detail and fine illustration. Despite Ordish's interpretation of Curtis as a pioneer of pest control [5] it is difficult to see that his recommendations had much practical utility. Hand-picking and ducks were the methods advised by Curtis to combat the black caterpillar [6] - an early example of 'biological control' according to Ordish- [7] while one of his remedies for the very damaging turnip flea beetle

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1 Woodham-Smith, pp.94-102. See also Redcliffe Salaman, The History and Social Influence of the Potato, 1949, pp.290-1.

2 William Carruthers, 'The Potato Disease', Journal (2), IX, 1873, pp.248-53; Idem, 'Note on Mr. W.G. Smith's Discovery of the Rest-Spores of the Potato-Fungus', Ibid., X, 1874, pp.396-98; A. de Bary, 'Researches into the Nature of the Potato-Fungus - Phytophthora Infestans', Ibid., XII, 1876, pp.239-69.

3 Woodham-Smith, p.95.

4 See George Ordish, The Great Vine Blight, 1972.

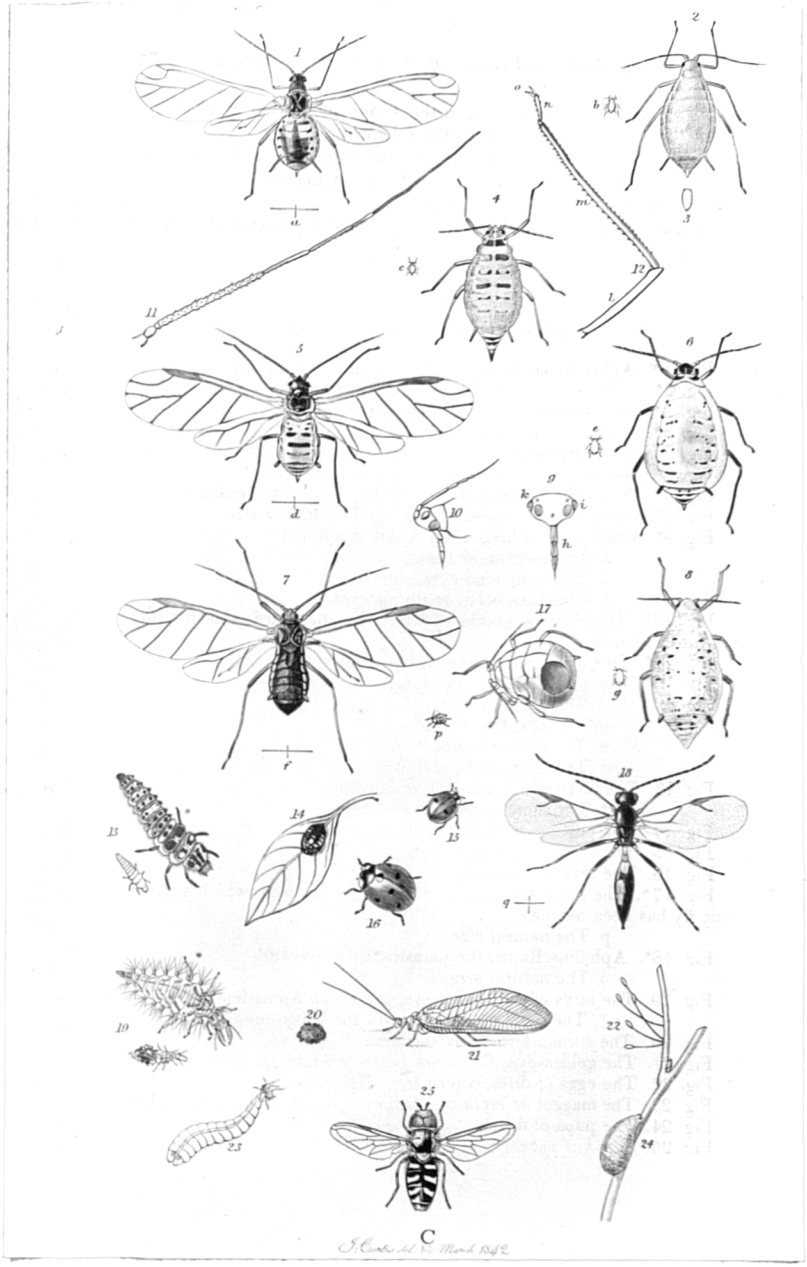
5 Idem, John Curtis and the Pioneering of Pest Control, 1974.

6 John Curtis, 'Observations on the Natural History and Economy of the Turnip Saw-Fly, and its Black Caterpillar, called the Black Palmer, Black Canker, Black Jack, Black Slug, and Nigger, or Negro', Journal, II, 1841, pp.384.

7 'John Curtis', pp.86-7.

PLATE VI: ILLUSTRATIONS OF INJURIOUS FARM INSECTS,

by JOHN CURTIS.



Source:. Journal Of The Royal Agricultural Society Of England.

(III, 1842, between
pp.76-7)

was to draw sticky boards (painted with tar) over the fields so that the bettles would leap against it and become stuck, or to draw elder boughs across which was said to 'annoy' them.[1] Curtis's work and engravings were important in inspiring Eleanor Ormerod[2] whose work on 'injurious insects' attracted favourable notice in 1879[3] and whose appointment as the Society's first Consulting-Entomologist in 1881 opened a very useful phase of the Society's work. Apart from the time-consuming methods of the type advocated by Curtis, very little could be done to combat crop pests and diseases before 1880. Benzene Hexachloride (B.H.C.) was discovered by Michael Faraday in 1825 but not used as an insecticide until 1940,[4] while D.D.T. was synthesised in 1874 but not used until the second world war.[5] Whatever the ecological worries about the employment of chemical insecticides and pesticides, the agriculturist has obtained real benefits from their use during the twentieth century and the Victorian farmer waged a one-sided battle against the constant hazard of pests and diseases of farm crops. Parasitical plants were a separate problem - dodder, a convulvulus-like parasite of flax and clover was a particular difficulty, and attributed to infested seed imported from Odessa.[6] Agricultural weeds were given attention by James Buckman who defined them, as 'every plant growing with the crop to its hindrance'; according to Buckman they were sown with the seed for the crop, spread over the land with manures, perpetuated by being allowed to run to seed, and disseminated from road-sides, waste-land, and badly managed farms.[7]

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1 John Curtis, 'Observations on the Natural History and Economy of the different Insects affecting the Turnip Crop', Journal, II, 1841, pp.208-9.

2 Ordish, John Curtis, p.102.

3 'Entomology and Agriculture', F.M.(3), LVI, 1879, pp.321-3.

4 George Ordish, The Constant Pest, 1976, pp.131-2.

5 W.W. Fletcher, The Pest War, 1974, pp.47-8.

6 Charles Cardaie Babington, 'On the Flax-Dodder', Journal, II, 1841, pp.63-4. See also William Carruthers, 'On Dodder', Ibid.(2), IX, 1873, pp.253-8.

7 James Buckman, 'On Agricultural Weeds', Ibid., XVI, 1856, p.376.

Serious as these crop pests and diseases were, the various animal diseases with which the Victorian agriculturist had to contend could be ruinous to the individual and were of national concern. Foot-and-mouth disease was reported from Stratford (London) in 1839, bovine pleuro-pneumonia occurred in pedigree cattle in the Cork area in 1840 and was prevalent in the London cowsheds in 1842. Sheep-pox was diagnosed by James Beart Simonds in 1847 and the great cattle plague (rinderpest) occurred in 1865. The early volumes of the Journal do not carry many articles on animal disease, but the diagnosis of sheep-pox, conveyed to England by importations of sheep from Hamburg, stimulated an article from Stanley Carr on continental experience of the disease.[1] The Society offered a prize essay on pleuro-pneumonia, awarded to George Waters, in 1848. He gave a detailed description of the symptoms of the disease, and was of the opinion that the congregation of cattle at markets or fairs favoured 'if not the production, yet in a most remarkable manner the dissemination of the disease'.[2] The first disease bacillus to be positively identified was that of anthrax in 1855 but the 'germ theory' of epidemic disease was slow to be generally accepted and at the time of the rinderpest outbreak in 1865 Simonds, the Society's Veterinary-Consultant, was extremely vague as to his view of the cause of animal diseases. The widely believed 'pythogenic theory' which held that the diseases were the result of non-living organic toxic agents known as miasmas, derived from decaying matter, excluded the possibility of one animal being the source of infection in another, while the view that rinderpest was a 'divine punishment' or appeared spontaneously, was quite widely maintained.[3]

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[1] J. Stanley Carr, ' The Sheep-Pox; its Causes, Symptoms, Prevention, and Cure: in a letter to the President and Council of the Royal Agricultural Society of England', Journal, VIII, 1847, pp.489-94.

[2] George Waters, 'Pleuro-Pneumonia among Cattle', Ibid., IX, 1848, p.359.

[3] H.M.S.O., Animal Health, A Centenary Survey, 1966, pp.127, 151.

In the 1850s Simonds carried out a number of investigations for the Society The first of these was on the potential of inoculation as a remedy for pleuro-pneumonia, on which a certain amount of work had been done in Belgium and which was brought to the attention of the Council by Prince Albert. His reports on the continental experience, and also upon experiments carried out in Nottinghamshire, were generally inconclusive. [1] Inoculation against the disease can be successful but it was fortunate that the experiments were not more conclusive for the eradication of the disease would then have been an 'ideal beyond attainment'. [2] Simond's next task for the Society - 'the most important mission in his life'[3]- was to report on rinderpest for the Journal. This came about as a result of an initiative taken jointly by the Society, the Royal Agricultural Society of Ireland, and the Highland and Agricultural Society of Scotland[4]- one of the very few instances of the three national societies acting in unison. The background to Simond's investigations had been persistent reports about a fatal cattle disease extending westwards across Europe and he attributed the diffusion of the malady to Russian troop movements. [5] His lengthy report concluded with the observations that 'no fear need be entertained that this destructive pest will reach our shores' - because of the distances involved and the fact that there was then no direct trade with infected countries - so that 'all alarm... may cease with reference to its importation into the British Isles'. [6]

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[1] James Beart Simonds, 'Report on Inoculation for Pleuro-Pneumonia among Cattle', and 'Second Report...', Journal, XIII, 1852, pp.373-85 and XIV, 1853, pp.244-73.

[2] Animal Health, p.158.

[3] Sir Frederick Smith, The Early History of Veterinary Literature and Its British Development, IV, 1930, p.86.

[4] James Beart Simonds, 'Report on Steppe Murrain or Rinderpest', Journal, XVIII, 1857, pp.204-5.

[5] Ibid., p.227.

[6] Ibid., p.270.

The attitude of Simonds when rinderpest did arrive eight years later, and the attitude of the Society to cattle disease policy will be given further consideration in the section on 'The Veterinary Problem' in chapter V; in the 1870s the Journal contained a number of reports on animal health, [1] the Contagious Diseases (Animals) Act of 1869[2], the animal trades and their influence on the spread of animal diseases, [3] and upon experiments at the Brown Institution (a veterinary research department of the University of London) on the nature of the various animal diseases and their communication.[4] This was a reflection of the active role that the Society took over the questions of animal health after its initial hesitant response in the late 1860s; the eradication of rinderpest - there were no further outbreaks after that of 1877[5]- and pleuro-pneumonia was a major achievement for which the Society

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1 James Beart Simonds, 'Report on Health of Animals of the Farm', Journal (2), IX, 1873, pp.374-8; X, 1874, pp.269-76, 552-63; XI, 1875, pp.353-7, 510-17; XII, 1876, pp.269-93; W. Duguid, 'Report... 1876', XIII, 1877, pp.207-11; XIV, 1878, pp.233-38.

2 G.T. Brown, 'Report on the Contagious and Infectious Diseases of Animals referred to in the Contagious Diseases (Animals) Act, 1869, especially with respect to their degree of prevalence in 1872', Ibid., IX, 1873, pp.482-502; X, 1874, pp.232-46.

3 H.M. Jenkins, 'Report on the Trade in Animals, and its Influence on the spread of Foot-and-Mouth and Other Contagious or Infectious Diseases which affect the Live Stock of the Farm', Ibid., IX, 1873, pp.187-245.

4 Dr. Burdon-Sanderson, 'Report on the Progress of the Investigations into the Nature of Pleuro-Pneumonia and Foot-and-Mouth Disease now being conducted at the Brown Institution', Ibid., XIII, 1877, pp.204-7 and 'Concluding Report', Ibid., XV, 1879, pp.157-73; W. Duguid, 'Further notes of Experiments at the Brown Institution on the Communication of the Foot-and-Mouth Disease from Diseased to Healthy Animals', Ibid., XIII, 1877, pp. 460-2.

5 See 'The Outbreak of Cattle-Plague', Ibid.(2), XIII, 1877, pp.211-41.

could take a substantial, though not exclusive, measure of credit.

There were numerous other animal diseases which received attention, such as sheep-pox and anthrax, and parasitical complaints were also thoroughly investigated. It was in this latter area that Simonds made his greatest contribution, and in his paper on the 'Rot in Sheep', occasioned by losses in 1860, he outlined the fact that rot was due to the presence of flukes in the biliary ducts of the liver [1] a reversal of his earlier view (put forward in 1850) that the flukes were a result rather than a cause of the disease. [2] Not all of the complaints of farm animals were the result of diseases caught by chance, and W. Karkeek, a Cornish veterinarian, drew attention to the 'Diseases of Cattle and Sheep occasioned by Mismanagement', including insufficient food at critical periods of growth, exposure and lack of shelter, inattention to the early symptoms of disease, and poor drainage. [3]

AGRICULTURAL IMPLEMENTS AND MACHINERY: The early issues of the Journal carried a number of short articles which reported on the experience of the use of agricultural implements such as scarifiers, [4] sub-soil ploughs, [5] and dibbling machines [6] which had come to prominence at the Society's annual shows. A continuous concern was with the efficiency of traditional agricultural appliances,

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1 James Beart Simonds, 'The Rot in Sheep: its Nature, Causes, and Treatment', Ibid., XXIII, 1862, pp.64-159.

2 Animal Health, p.93.

3 Journal, XI, 1850, pp.541-57 (Prize Essay).

4 Henry Case, 'Practical Experience in the Use of Biddell's Scarifier', Journal, I, 1840, pp.357-8.

5 Philip Pusey, 'Account of the Chadbury Subsoil-Plough', Ibid., pp.433-5. Sir Edward Stracey, 'Account of the Operation of the Rackheath Subsoil-Plough...' and 'On the Rackheath Sub-turf Plough', Ibid., pp.253-7 and II, pp.37-40.

6 J.H. Langston, et. al., 'Report on Mr. Newberry's Dibbling-Machine', Ibid., IV, 1843, pp.316-18.

particularly with regard to the use of horse-power. Thus the draught of ploughs and farm carts and waggons came under particular scrutiny. [1] Morton's prize essay on agricultural mechanics in 1842 (his first major piece of agricultural writing) described a variety of ploughs, harrows, cultivators, and drainage implements. [2]

After this initial interest, the annual reports of the implements exhibited at the country-meetings constituted the most important set of articles in this category. In the 1860s there were a number of articles on cultivation by steam and on farm steam-engines, [3] the most important of which were the surveys

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[1] Thomas John Lloyd Baker, 'On the Draught of Single Cart-Horses', Ibid., I, 1840, pp.429-33; Philip Pusey, 'Experimental Inquiry on Draught in Ploughing', Ibid., pp.219-44; Henry J. Hannam, 'On the Reduction of Horse-Labour by Single Carts, detailing some Years' experience of their Economy', Ibid., II, 1841 pp.73-91; Trelawny Freeman, 'Trials on the Draught of Ploughs', Ibid., pp. 104-6.

[2] John Morton, 'On the Present State of Agricultural Mechanics, and on the Improvement of which the various Implements now in use may be susceptible', Ibid., III, 1842, pp.100-25 (Prize Essay). Henry J. Hannam, 'On the Advantage of Testing the Draught of Ploughs', Ibid., III, 1842, pp.9-18; E. Bowley, 'An Essay on One-Horse Carts', Ibid., VI, 1845, pp.156-61 (Prize Essay); Jesse French, 'On the Advantage of One-Horse Carts', Ibid., pp.375-9; E. Loomes, 'On the Advantages derived from the Use of One-Horse Carts', Ibid., pp. 398-400; P. Love, 'On the Advantages of One-Horse Carts over Waggons', Ibid., VII, 1846, pp.223-33.

[3] Messrs. Ransome and Sims, 'Directiors for Working Portable Steam-Engines and Keeping them in Proper Order', Ibid., XIX, 1858, pp.430-7; P.H. Frere, 'On the Moveable Steam-Engine', and 'The Present Aspect of Steam Culture', Ibid.,XXI, 1860, pp.201-6, 401-33; Henry Evershed, 'Wear and Tear of Agricultural Steam-Engines and Thrashing Machines, whether Fixed or Portable', Ibid., XXIII, 1862, pp.328-38; R. Valentine, 'The Comparative Advantages of Fixed and Moveable Steam Power, and of Single or Double Dressing Thrashing Machines', Ibid., pp.160-69 (Prize Essay); W.T.Moscrop, 'Results of Steam Cultivation', Ibid., XIV, 1863, pp.320-36.

of the progress of steam cultivation sponsored by the Society.[1] The small increase in machinery articles in the 1870s relates to the extra reports associated with the trials of particular implements at the shows, particularly of reaping machines. These are considered in chapter IV.

FOOD MANUFACTURE, MARKETS AND SUPPLY: Before 1860 there is only a handful of articles which deal with the topics in this category. These include essays on cider manufacture, corn-trade statistics, and prize reports on butter and cheese making.[2]

Robert Herbert's regular reports on the statistics pertaining to livestock and dead meat for consumption in the metropolis boosted the representation of this category between 1858 and 1868 (when Herbert died). A further feature of the early 1860s was the reports of Augustus Voelcker's investigations into the chemistry of dairy produce[3] (in which he took a particular interest) and

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[1] John Algernon Clarke, 'Account of the Application of Steam Power to the Cultivation of the Land', 'Five Years' Progress of Steam Cultivation', Howard Reed et. al., 'Reports of Committees appointed to investigate the present state of Steam Cultivation', Ibid., XX, 1859, pp.174-221; XIV, 1863, pp.362-419; (2), III,1867, pp.397-427.

[2] Frederick Falkner, 'On the Cultivation of Orchards and the Making of Cider and Perry', Ibid., IV, 1843, pp.380-407; Henry S. Bright, 'Statistics of the Corn Trade, 1828-1855', Ibid., XVII, 1856, pp.2-32; Thomas Rowlandson, 'On the Production of Butter', Ibid., XIII, 1852, pp.23-43, (Prize Essay); Louis H. Ruegg, 'On the Production of Butter', Ibid.,XIV, 1853, pp.68-78; Henry White, 'A detailed Account of the Making of Cheshire Cheese', Ibid., VI, 1846, pp.102-25 (Prize Essay).

[3] Augustus Voelcker, 'On the Composition of Cheese, and on Practical Mistakes in Cheese-making', 'Cheese Experiments', 'On Poisonous Cheese', 'Milk', Ibid., XXII, 1861, pp.29-69; XXIII, 1862, pp.170- 91 and 346-50; XIV, 1863, pp.286-320.

an indication of its increasing importance was a prize essay on the comparative profits of butter or cheese making, selling milk, or grazing, although the great variety of site and situation of farms made firm conclusions impossible.[1]

An increased concern with the general question of food supply is evident in the late 1860s. Thus Harry Chester's report on the 'Food of the People', originally commissioned by the Society of Arts, was reproduced in the Journal.[2] This surveyed such developments as meat preservation - particularly with regard to importation - the question of food markets (particularly in the metropolis), the unsatisfactory nature of milk transportation arrangements, and the 'factory-system' for butter and cheese making, especially as practised in North America. In another paper originally given to the Society of Arts, J.C. Morton looked to the extension of the supply of London's milk from country districts, the cattle plague of 1865-6 having given rise to a very considerable change in the management of milk supplies.[3] In the same issue Lawes and Gilbert surveyed the 'Home Produce, Imports, and Consumption of Wheat', which examined, in some detail, yields of wheat and demand,[4] a paper which had first been given to the Statistical Society.

The increasing demand for dairy products and the difficulties associated with the organisation of the trade led to a good deal of interest in factory methods of production of butter and cheese (as reported by Harry Chester) and it was the direct initiative of Lord Vernon - at the July Council, 1868 - which produced a report, written by H.M. Jenkins, on the adaptibility of the American cheese-factory system to the English dairy districts. The cattle plague, which

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1 W.H. Heywood, 'The Comparative Profit from Making Cheese or Butter, Selling Milk, or Grazing', Ibid., (2), I, 1865, pp.348-54.

2 (2) IV, 1868, pp.109-23.

3 J.C. Morton, 'Town Milk', Journal (2), IV, 1868, pp.96-8.

4 Ibid., pp.359-96.

rendered English cheese supplies uncertain and expensive, focussed attention on American factory cheese which was found to be often cheaper and superior to the traditional English product. [1] This was followed by a number of other reports on butter-manufacture and milk-condensing, while Gilbert Murray reported on the early experience of factory-cheese making in Derbyshire, where the system had been pioneered through the initiative of the Derbyshire Agricultural Society and Lord Vernon. [2] Later in the 1870s American competition in the meat market became a prime concern of many agriculturists, and the Journal carried a number of reports on this. [3]

Despite this group of articles on dairy manufactures, the small representation of material on marketing and supply at a time of rapid growth and change in consumer demand is worthy of notice. Over a century later it is, of course, a commonplace criticism that farmers give attention to matters of production at the expense of marketing to their detriment, but it is surprising that there

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[1] H.M. Jenkins, 'Report on the Cheese-Factory System and its Adaptability to English Dairy Districts', Ibid., VI, 1870, p.174.

[2] M. Juhlin-Dannfelt, 'On the Dairy-Factories of Sweden', Ibid., VI, 1870, pp.323-33; X.A. Willard, 'The American Butter Factories and Butter Manufacture' Ibid., VII, 1871, pp.1-42; Idem, 'The American Milk-Condensing Factories and Condensed Milk Manufacture', Ibid., VIII, 1872, pp.103-52; Gilbert Murray, ' The Origin and Progress of the Factory System of Cheese-Making in Derbyshire', Ibid., VII, 1871, pp.42-60.

[3] H.E. Alvord, 'The American Cattle Trade', Ibid., XIII, 1877, pp.356-74; J.P. Sheldon, 'Report on the American and Canadian Meat Trade', Ibid., pp.295-355; J.D. Dent, 'Notes on a Report of Victor Drummond, Esquire, on the Foreign Commerce of the United States for the fiscal year ended 30th June, 1878', Ibid., XV, 1879, pp.343-55.

are no articles on such subjects as the influence of transport improvements on the location of agricultural activities in the early volumes of the Journal.' J.H. von Thünen published his ideas on agricultural location - which stressed the importance of transport as a determining factor - in Germany in 1826 [1] but his work seems to have made very little impression, in contrast to the interest in the continental authors on agricultural science.

FARM BUILDINGS: It may also be a matter of some surprise that there were so few articles on farm buildings in the first forty volumes of the Journal. The early issues carried some articles on labourers' cottages which usually presented plans for 'model' habitations at high cost. [2] The offer of a premium for an essay on the construction of farm buildings led to seven articles appearing on that topic in 1850, an example of the way in which the prize essay system could elicit information. Farm roads, covered cattle-yards, and the use of different materials such as iron, wood, and concrete (in 1874) in construction[3]

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[1] See P.G. Hall, ed., Von Thunen's Isolated State, 1966.

[2] See, for example, Rev. Copinger Hill,'On the Construction of Cottages', Journal, IV, 1843, pp.356-69; Henry Goddard, 'On the Construction of a Pair of Cottages for Agricultural Labourers'; J. Young Macvicar, 'On the Construction of Labourers' Cottages'; Duke of Bedford, 'On Labourers' Cottages', Ibid., X, 1849, pp.~~186-95~~, 230-46, 400-20. 85-7.

[3] W. Fisher Hobbs, 'On Covered Homestalls', Ibid., XIV, 1853, pp.325-35; Lord Kinnaird, 'On Covered Farm Standings', Ibid., pp.336-43; W.J. Moscrop, 'Covered Cattle Yards', Ibid.,(2), I, 1865, pp.88-99; J. Bailey Denton, 'Farm Roads on Strong Soils', Ibid., XVIII, 1857, pp.82-98; W.G. Cavendish, 'On Road Mending', Ibid., pp.451-2; Arthur Bailey Denton (jun.), 'On the Comparative Cheapness and Advantages of Iron and Wood in the Construction of Roofs for Farm Buildings', Ibid.,(2), II, 1866, pp.116-39 (Prize Essay); Philip D. Tuckett, 'On the Comparative Cheapness and Advantages of Iron and Wood in the Construction of Roofs for Farm Buildings', Ibid., pp.140-8; George Hunt, 'On Concrete as a Building Material for Farm Buildings and Cottages', Ibid., X, 1874, pp.211-32.

were other articles in this relatively unimportant Journal category.

WELFARE: Although a concern for the welfare of the labourer was incorporated as one of the original objects of the Society, the analysis of the *Journal* content shows that this topic, at only 1½ per cent of all the articles in the first forty volumes, was virtually ignored. Cottage-gardening, the allotment-system, 'dress for drainers', and farm safety received occasional attention. [1] Probably the view taken by the majority of the members would be that general agricultural prosperity, secured by the application of science and best practice, would best provide for the labourers' welfare.

The Society put up a prize for an essay on the condition of the labourer in 1845. This was awarded to George Nicholls who suggested that the condition of the labourer, admitted as being less than satisfactory, could be improved by enlarging the field of labour, extending education and providing comfortable cottages and adequate cottage-gardens, while being opposed to interference in wages. [2] When John Dent Dent returned to the subject a quarter-of-a-century later, he saw the labourers' position as having advanced through the need to progress in skill and ability to handle the various items of agricultural machinery which had become more widely employed over the intervening period. [3]

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[1] Examples include James Main, 'Cottage Gardening', Journal, II, 1841, pp.322-43; J. French Burke, 'On Cottage Economy and Cookery', Ibid., III, 1842, pp. 83-100; Sir Henry E. Bunbury, 'On the Allotment System', Ibid., V, 1845, pp.391- 4; J.C. Morton, 'The Allotment System', Ibid., XX, 1859, pp.92-101; J.B. Lawes, 'The Rothamsted Allotment Club', Ibid.,(2), VIII, 1872, pp.387-93; Frederick Arthur Paget, 'Accidents through Farm-Machinery', Ibid., XXV, 1864, pp.352-8; Marquis of Westminster, 'On a Dress for Drainers', Ibid.,X, 1849, pp.51-3.

[2] George Nicholls, 'On the Condition of the Agricultural Labourer; with Suggestions for its Improvement', Ibid., VII, 1846, pp.1-30.

[3] J.D. Dent, 'The Present Condition of the English Agricultural Labourer', Ibid., ,(2), VII, 1871, pp.343-65.

In the early 1870s, when the 'labourers' question' was one of the outstanding agricultural issues of the day, the arguments were ignored as being one of the 'forbidden topics' outside of the Society's province by virtue of its Charter, although there was very occasional discussion of poor-relief. [1]

Journal Content: Extended Consideration of Select Subject Categories

From this outline review of the Journal content, we may now proceed to the subject areas that have, by virtue of their importance, been selected for extended consideration: agricultural science, manures and fertilisers, and drainage.

Agricultural Science

Although each issue of the Journal was inscribed by a quotation from Von Thaer (whose work had been translated into English as Principles of Agriculture by Johnson and Shaw in 1844):

> These experiments, it is true, are not easy; still they are in the power of every thinking husbandman. He who accomplishes but one, of however limited application, and takes care to report it faithfully, advances the science, and, consequently, the practise of agriculture, and acquires thereby a right to the gratitude of his fellows, and of those who come after. To make many such is beyond the power of most individuals, and cannot be expected. The first care of all societies formed for the improvement of our science should be to prepare the forms of such experiments, and to distribute the execution of these among their members,

Pusey introduced articles on pure science into the Journal somewhat hesitatingly, conscious that many subscribers were rather more interested in the 'practice'

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[1] J.Y. Stratton, 'Farm Labourers, their Friendly Societies, and the Poor Law' and 'Method of Improving the Labouring Classes by altering the Condition of Poor Relief, and providing them with a system of Insurance through the Post Office', Ibid.,(2), VI, 1870, pp.87-119; VIII, 1872, pp.76-103.

rather than the 'science' of agriculture. He prefaced Professor Schübler's article on soils, in the first volume, with a note that it belonged to 'the theory, not the practice, of husbandry' and stressed that 'theory must not pretend to teach the occupier of land how he is to manage his farm' while recognising that a knowledge of theory was necessary and useful. A paper on manures in the same volume was headed with a short note: 'This paper belongs to the Theory of Agriculture'. [1] Of the seventy-four papers on branches of agricultural science in the Journal between 1840-1879 four main areas of interest can be identified: (i) discussion of theories of plant and animal nutrition, (ii) agricultural geology and soil science (iii) agricultural climatology. These three groupings were of greatest importance, but there were in addition, papers regularly given to the Society by consultants and others which gave (iv) up-to-date information on current botanical and physiological knowledge, generally of an uncontroversial nature: ideas on plant and animal diseases have been considered in the category assigned specifically to these topics.

The discussion in Sir John Russell's survey of agricultural science provides the most detailed consideration that we have of the papers on the subject that appeared in the Journal and the essence of the debate between Lawes and Liebig is well known. [2] However, as Margaret Rossiter has noted, Liebig's relations with the British agriculturists have not been very fully examined, [3] and although a full discussion of this problem is beyond the bounds of the present study, the rise and fall of Liebig's influence within

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[1] Professor Schübler, 'On the Physical Properties of Soils', Journal, I, 1840, p.177, and Charles Sprengel, 'On Animal Manures', Ibid., p.455, also quoted by Peel, 'Practice with Science', p.10.

[2] For this, and the details of the early years of the Rothamsted experiments see Sir. E.J. Russell, History of Agricultural Science, especially pp.88-175. See also Richard P. Aulie, 'The Mineral Theory', A.H., XLVIII, 1974, pp. 369-82; Margaret W. Rossiter, The Emergence of Agricultural Science, 1975.

[3] P.212, note 35.

the Society, and the way in which the issues were presented to readers of the Journal, constitutes an important and fascinating topic in the 1840s and 1850s.

Early papers of a strictly scientific nature were at pains to stress the need for scientific directing principles in agricultural improvement and pleaded for the employment of precise terminology. Charles Daubeny (Sibthorpian Professor of Rural Economy at Oxford) stressed this theme in a lecture given to the Society in December, 1841, complaining (for example) of the use of the term 'marl' to describe soils of widely differing type.[1] A question of great interest was exactly how manures were beneficial. Daubeny identified three categories: agents such as quicklime, which improved soil characteristics, animal dung, which had a direct influence on plant growth, and 'mineral' substances such as nitrates of soda, bone earth, and gypsum. It was not known whether these substances acted as the 'food' of plants or as 'stimulants' to their growth.[2] Daubeny repeated his call for a scientific programme of agricultural experiment in a later paper in the same volume. It was not enough to find that some substance or other benefited plant growth on certain soils - precise analysis of the active ingredients was required, not least so that substitutes could be investigated.[3] Calls for the replacement of the random empiricism that characterised the investigation of fertilising agents did not go unheeded and the more perceptive members of the Society, such as Pusey, echoed Grey of Dilston's view that 'the most important branch of our national industry' should no longer be left for its advancement to the 'chance-directed discoveries of the unlettered rustic'.[4]

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1 Charles Daubeny, 'Lecture on the Application of Science to Agriculture', Journal, III, 1842, pp.139-40.

2 Ibid., pp.143-4.

3 Idem, 'On the Public Institutions for the Advancement of Agricultural Science...' Ibid., pp.383-4.

4 John Grey, 'A View of the past and present state of Agriculture in Northumberland', Ibid., II, 1841, p.155.

In 1841 the Society offered a prize for an essay 'On the Food of Plants' specifying that competitors were required to demonstrate the sources from which plants derived the elements of which they were composed, and the mode in which farm-yard dung and other manures acted upon crops - a somewhat optimistic specification. The prize was awarded to George Fownes, then a prominent London lecturer on chemistry. The approach that Fownes took was to review the history, origin, and chemical nature of soils, examine the structure and composition of plants, the nature of materials furnished to them as food by the earth and the atmosphere, and the modification of the supply by man. In a long discourse he reviewed what was known about plant physiology and addressed himself to the question as to whether plant food was derived from the earth, air, or both. Attention was drawn to the part that nitrogen played in plant growth; it was thought by Fownes that gaseous nitrogen could not be fixed directly by plants. Food required was carbonic acid, water, ammonia, perhaps nitric acid: 'These, together with saline matter derived from the soil, are the only substances we know of required for the sustenance of plants...'.[1] On the agricultural applications, Fownes discussed the decline in fertility experienced by the continuous growth of the same crop, which could be remedied by the long-established practice of fallowing, or crop rotation. What was not fully known was whether the fertility decline was occasioned by the extrusion of poisonous material by the roots of specific plants which could in turn be employed by a different species. Fownes rejected this theory (derived from Macaire) and also the idea that manures were in some sense 'stimulants'.[2] The paper must have brought home to the members

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[1] Dr. Fownes, 'On the Food of Plants', Journal, IV, 1843, p.535.

[2] Ibid., pp.536-540.

of the Society how little science was, at that stage, able to answer the questions that thinking agriculturists asked of it.

Both Fownes and Daubeny drew extensively on Liebig, whose book, Organic Chemistry in its Application to Agriculture and Physiology had created such an impression upon the scientific community when published in 1840. Its contents were in two parts: the chemical processes in the nutrition of vegetables, and the chemical processes of fermentation, decay, and putrefaction. As 'probably one of the most important scientific books ever published' [1] it was a new synthesis of agricultural chemistry which seemed to impose order on the scattered and contradictory knowledge of plant nutrition which existed at that time, and suggested lines of future research. The interest of Liebig's book for the agriculturist was in the hope that it gave to reducing manuring to a precise science and to raising yields by the identification of nutrients absent in soils but which could be supplied from outside if their nature was understood. Particular stress was laid upon the inorganic constituents of plants, which Liebig thought could be identified from an analysis of their ash. In the first edition, however, he also admitted the importance of nitrogen and emphasised that the nitrogen requirements of agricultural crops could not be wholly satisfied from natural sources. This was a view that he moved away from between 1840 and 1843 and which formed the basis of protracted controversy between him and J.B. Lawes. Between the first and third editions of Organic Chemistry... Liebig's position shifted from the standpoint that to maintain fertility the agriculturist had to replenish both the 'mineral' (inorganic) constituents and nitrogen (in the form of ammonia) to a view that plants could obtain all their nitrogen from the atmosphere and

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[1] Rossiter, Agricultural Science, p.25.

that additional inputs of nitrogen in the form of ammonia were not only superfluous, but actually harmful. In the first edition he stated that:

> Cultivated plants receive the same quantity of nitrogen from the atmosphere as trees, shrubs and other wild plants; and this is not sufficient for the purposes of agriculture. [1]

in the third edition:

> Cultivated plants receive the same quantity of nitrogen from the atmosphere as trees, shrubs, and other wild plants; and this is quite sufficient for the purposes of agriculture. [2]

Thus in this way Liebig switched attention toward the 'mineral' constituents of the manurial agents employed by farmers and went so far as to state that:

> The crops on a field diminish or increase in exact proportion to the dimunition or increase of the mineral substances conveyed to it in manure. [3]

It was necessary to restore to the land constituents of the soil removed from it in cropping if its fertility was not to decrease, but this, Liebig now maintained, was quite independent of the ammonia conveyed to the soil, and the source of nitrogen could only be the atmosphere. [4]

The interest in Liebig's theory among agriculturists is readily explicable. It was a logical, easily understood theory which satisfactorily accounted for the action of such substances as farmyard manure and bones. What the farmer removed from the soil in terms of the mineral constituents of his crops had to be returned in natural or artificial manures if fertility was to

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[1] Justus von Liebig, Organic Chemistry in its Application to Agriculture and Physiology, ed. Lyon Playfair, 1st edn., 1840, p.85.

[2] Ibid., 3 edn., 1843, p.54. Also quoted by J.B. Lawes and J.H. Gilbert, 'On some Points connected with Agricultural Chemistry, Journal, XVI, 1856, p.417; Aulie, 'The Mineral Theory', p.372; Rossiter, Emergence of Agricultural Science, p.42. (Rossiter's first quotation is taken from the 2nd edn., 1842, p.84).

[3] Liebig, Organic Chemistry, 3rd edn., p.211.

[4] Ibid., pp.203-6.

be maintained, and if the exact balance of mineral constituents in different crops could be determined by analysis of their ash, the promise was held out of artificial fertilisers precisely calculated to provide the differing mineral requirements of specific crops.

Liebig's influence in England was at its height between 1843 and 1847 and manifested itself in the Society's affairs in two principal ways. In 1843 Lyon Playfair, one of Liebig's pupils at Geissen and translator and editor of Organic Chemistry... was appointed Consulting Chemist to the Society and in the following year the British Association for the Advancement of Science approached the Society with a proposal for a programme of ash analysis. In February 1845 the Council voted three-hundred and fifty pounds towards this project, which was carried out at Cirencester by J.T. Way (then Professor of Chemistry at the College, and who succeeded Playfair as Consulting Chemist in 1847) and his assistant, G.H. Ogston. The results of their ash analysis appeared in the Journal as a series of four articles between 1847 and 1851, [1] but they created little interest and Way doubted the value of the work long before it was completed. In the meantime, patent manures for various crops on Liebig's mineral principles were manufactured by J. Muspratt of Liverpool [2] and given a seal of approval by Liebig who wrote a pamphlet in conjunction with Muspratt's explaining the principles and application of the manures. In this pamphlet Liebig maintained that without phosphates, and other mineral elements of the food of plants, ammonia could exercise no influence whatever on vegetable life; it was an error to regard the nitrogen of manures

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[1] J. Thomas Way and G.H. Ogston, 'Report on the Analysis of the Ashes of Plants', Journal, VII, 1846, pp.593-678; 'Second Report', Ibid., VIII, 1847, pp.134-208; 'Third Report', Ibid., IX, 1848, pp.136-74; 'Fourth Report', Ibid., XI, 1850, pp.497-541.

[2] Michael O. Stephens and Gordon W. Roderick, 'The Muspratts of Liverpool', Annals of Science, 29, 1972, p. 295.

as the principal source of their efficiency, as nitrogen was always accompanied by other mineral elements. [1]

In 1847 Lawes published his first substantive scientific paper - and he chose the Journal to introduce the agricultural and scientific communities to the programme of field experiments that he had embarked upon at Rothamsted. [2] It was a forthright attack on the 'mineral theory' of Liebig although Lawes paid tribute to the latter's contribution to the development of agricultural science. Lawes regretted Liebig's change of view between 1840 and 1843 and attributed many of the 'errors into which Liebig has fallen' as due to a misunderstanding of the nature of agriculture itself. According to Lawes, practical agriculture consisted of:

> the artificial accumulation of certain constituents to be employed either as food for man or other animals, upon a space of ground incapable of supporting them in its natural state. [3]

In terms that would be employed today, Lawes was stressing that 'agriculture' involved the utilisation of man-modified ecosystems and that English farming was essentially intensive in its nature as opposed to the much more extensive systems practiced in other parts of the world. [4]

It was a specious argument, Lawes maintained, to suggest as Liebig did that because plants in their natural state could obtain sufficient nitrogen, nitrogenous manure was not necessary for agriculture, which was a manipulated system attempting to gain more useful material, such as corn, beyond the natural production, the excess to be removed from the system. The 'mineral

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1 Justus von Liebig, An Address to the Agriculturalists of Great Britain, Explaining the Principles and Use of his Artificial Manures, 1845, p.19.

2 John Bennet Lawes, 'On Agricultural Chemistry', Journal, VIII, 1847, pp. 226-60.

3 Ibid., pp.226-7.

4 For a recent discussion on the nature of agriculture see C.R. Spedding, The Biology of Agricultural Systems, 1976.

theory' was 'calculated so seriously to mislead the agriculturist that it is highly important its failures should be generally known'. [1] The evidence that Lawes could produce was derived from his field experiments, and the conclusion that he was able to draw from his results of wheat growing in various plots with different manures was that attempts to gain annual crops of corn with mineral fertilisers alone 'must for ever be abandoned'. [2]

Liebig was also attacked by other authorities in the Journal. J.F.W. Johnston reviewed the relations between agriculture, chemistry, and geology at the York Meeting of the Society the following year (1848). He drew upon the work that had been done by the Highland Society and his own Agricultural Chemistry Society both of which, during the 1840s, had done a very great deal to encourage experiments among farmers. They were more active than the Royal in this respect, although Liebig had been given little notice before 1845. [3] Johnston was a champion of careful experimentation and he was at pains to stress the need for this in his York lecture. On the Liebig theory, he stated that the idea that plants obtained all the nitrogen that they required from the ammonia of the atmosphere was 'contrary to the oldest and most common experience of practical men' and he looked to the 'speedy removal of the notion from the public mind'. He also stated that the idea that crops required only mineral matter from the soil had received its 'death-blow'. [4] Indicating future lines of research, Johnston asked for inquiry into the states in which mineral and organic constituents existed in living plants, the ways in which they entered the roots of plants, the role of nitrogen in plant growth, and the most economical mode of application of fertilising substances

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[1] Lawes, 'Agricultural Chemistry', p.245.

[2] Ibid., p.258.

[3] See Russell, pp.128-33.

[4] J.F.W. Johnston, 'The Present State of Agriculture in its Relations to Chemistry and Geology', Journal, IX, 1848, pp. 200 – 236

to the soil. [1]

To understand how the Lawes/Liebig controversy developed, it is necessary to consider Philip Pusey's view of the issues. In his 1850 survey of the progress of agricultural knowledge, Pusey re-iterated Johnston's 'death-blow' view of the 'mineral theory' - 'hastily adopted by Liebig' - which had, he thought, broken down in the light of the Rothamsted experiments conducted by Lawes 'our best authority'. [2] This support for the 'Rothamsted line' drew a speedy retort from Liebig. In the third edition of his Familiar Letters on Chemistry..., published the following year, he included a strongly worded attack on Pusey's qualifications to discuss the subject on the grounds that he was not a chemist by profession and, in any case, misunderstood chemistry. Pusey's article would he maintained be read 'with astonishment' in France and Germany. Further, Lawes's experiments were 'entirely devoid of value as the foundation for general conclusions' and in his own mineral theory lay 'the whole future of agriculture'. [3]

This brought forth a more detailed critique of Liebig's ideas from Lawes and Gilbert. Giving a considerable degree of detail on the arrangement and results of their experiments to that time, they maintained that the demands made upon the mineral stores of native soils by the annual removal of corn and meat was insignificant. Further,analysis of ash was no direct guide to the optimum composition of manures. Minerals were necessary, and could be exhausted if excess ammonia was added to the soil, but extra nitrogen was extremely important, as it could not be obtained directly from the atmosphere

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[1] Ibid., pp.229-34.

[2] Philip Pusey, 'On the Progress of Agricultural Knowledge during the last Eight Years', Journal, XI, 1850, pp.383, 392.

[3] Justus von Liebig, 'Familiar Letters on Chemistry...', 3rd edn., 1851, pp.479-83.

as Liebig maintained.[1] Pusey appended a note to this article to the effect that it established 'the entire failure of the Mineral Theory as a guide to the use of manures in practical farming', and that having visited Rothamsted he considered it 'the principal source of trustworthy scientific information on Agricultural Chemistry'.[2]

Lawes and Gilbert developed their viewpoint still further in 1855, this time stimulated by another attack on their work by Liebig, his Principles of Agricultural Chemistry, with Special Reference to the late Researches made in England, published in the spring of 1855 and widely circulated in Germany, France, America, as well as England. Much of this book was an attack on the Rothamsted experiments and Lawes was concerned that Liebig's criticisms were endorsed, in his preface, by Professor Gregory, the English editor of the work and were also being given attention in a number of periodicals.

In particular Lawes and Gilbert considered that their views were misrepresented inasmuch as some of their critics used passages from the first (1840) edition of Organic Chemistry... whereas Lawes had proceeded from the third (1843) edition. Much of the paper (which, although condensed, still occupied eighty-eight pages of the Journal for 1856) consisted of quotations from various articles and books to establish the development of the opposing viewpoints. They ended by stating certain of their conclusions:

> 1 That the manure indicated by the resultant requirements of British agriculture has no direct connection with the composition of the mineral substances collectively found in the ashes of the products grown on, or exported from the farm; and that the direct manures which are required

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[1] J.B. Lawes and J.H. Gilbert, 'On Agricultural Chemistry - especially in relation to the Mineral Theory of Baron Liebig', Journal, XII, 1851, p. 38.

[2] Ibid., p. 40, also quoted by Russell, p.118 (although here Pusey's note is incorrectly said to have been appended to Lawes's first (1847) paper).

are not advantageously applied for the direct reproduction of the exported corn, but should be used for the green or fallow crops - one of whose offices it is to collect from the atmosphere or conserve on the farm, available nitrogen for the increased growth of cereal grains.

2 That the nitrogen required to be provided within the soil for this purpose, is far greater than that contained in the increase of product obtained by it.

3 That the chemical effects of fallow in increasing growth of the cereal grains are not measurable by the amount of additional mineral food of plants liberated thereby, these being, under ordinary cultivations in excess of the assimilable nitrogen existing in, or condensed within the soil in the same period of time. The amount of the latter therefore - (i.e.) the available nitrogen - is the measure of the increased production of grain that will be obtained.

4 That the beneficial effects of rotation in increasing the production of saleable produce (so far as they are chemical) are not explained by the fact of one plant taking from the soil more of the different mineral constituents than another, but depend on the property of the so-called green crops or fallow crops of bringing or conserving upon the farm, more substances rich in nitrogen than is yielded to them in manure; whilst the crops to which they are subservient, are both largely exported from the farm, and yield in their increase considerably less nitrogen than is given to them in manure.

Finally, that in the existing condition of British agriculture, a full production of the saleable cereal grains with other exportable produce, is only obtainable, whether by manure, fallow or rotation, provided there be an accumulation of available nitrogen within the soil itself. [1]

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[1] J.B. Lawes and J.H. Gilbert, 'On some Points connected with Agricultural Chemistry', Journal, XVI, 1856, pp.497-8 (authors' emphasis)

Of course, the debate as presented in this review of agricultural science as it was represented in the Journal is very much simplified, and there was a host of other questions which arose out of the controversy connected with associated aspects of plant nutrition that were also being given active consideration, but certain basic points of the Lawes/Gilbert argument must be stressed: (i) ash analysis was no key to manurial requirements of crops; (ii) agricultural crops, especially corn, needed additional nitrogen inputs for high yields; (iii) fertilisers based on 'minerals' alone would not be successful for producing high corn yields.

Liebig published a reply to the Lawes/Gilbert 1856 article. Among various claims, he maintained that his view had been misrepresented:

> After the third edition of my book had appeared, in 1843, no man in Europe ever imagined, up to 1847, that I had taught/ the produce of soils is proportioned to the mineral constituents supplied in the manure alone or that I have advised farmers to give no ammonia in the manure applied to grain crops.

adding that the 'theory which teaches that nitrogen is the turning point of agriculture distrubs the judgement and confuses the understanding of really intelligent men'. [1]

The 'Lawes line' had certainly received very full currency in the Journal. It had been, as we have seen, enthusiastically taken up by Pusey. What is not altogether clear is whether Pusey refused articles by Liebig. This is hinted at when Liebig, in 1856, stated: 'I feel deeply indebted to the Editors for the opportunity given me of expressing my opinions on these questions which I was not able hitherto to do in the Journal'. [2] By 1856 the Journal was

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[1] Justus von Liebig, 'On some points in Agricultural Chemistry', Journal, XVII, 1856, p.318 (author's emphasis).

[2] Ibid., p.325, my emphasis. 1847 was, of course, the date of Lawes's first statement.

under the joint editorship of Thompson, Acland and Hoskyns. To deny space to a protagonist in a controversy would have been against Pusey's character, though he would have done so if he considered that Liebig's criticisms were pitched on too personal a level. The matter of Liebig's exclusion was not missed by some outside observers, it being noted in the Farmer's Herald, for example, that the change in management and the 'impartiality and candour of the new conductors' allowed Liebig a right of reply to the 'severest criticisms' that he had been exposed to in the Journal. [1]

In 1852, Pusey, who certainly took a somewhat simplistic view of the issues, maintained that 'nitrogen is the element mainly required as manure on ordinary soils by our corn crops'. He considered that this was the 'only fundamental truth that we possess in agricultural chemistry' and compared it in its importance to the discovery of the laws of gravitation in astronomy or the circulation of the blood in medicine. [2] Thompson appended a note to the Lawes/Gilbert 1856 statement explaining the background to the controversy and noting that:

> The facts and arguments contained in the accounts of Mr. Lawes's experiments were considered so conclusive by practical agriculturists that for some years past his recommendations have been very generally acted upon, and such excellent results obtained as to produce a deep conviction of the soundness of the views on which they were founded. [3]

However it was not necessarily through reading the arguments that the readers of the Journal would reject the 'mineral theory'. There were the visible results of guano on corn crops, which had been shown to have a high ammonia content,

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[1] Farmer's Herald (Chester), December 1856.

[2] Philip Pusey, 'On the Source and Supply of Cubic Saltpetre, Salitre, or Nitrate of Soda, and its Use in small quantities as a Restorative to Corn Crops', Journal, XIII, 1852, p.358.

[3] Ibid., XVI, 1856, pp.501-2.

whilst the Liebig/Muspratt patent manures had failed. Lawes had tested these and found when used alone, that they produced only a slight increase in yield, (about three bushels per acre)which he attributed to the very small amount of ammoniacal matter that they contained. Other experiments confirmed their inutility, such as those carried out by Sir John Johnstone at Hackness in Yorkshire. [1] Liebig readily admitted that the manures sold under his name had failed, not because the theory was wrong but because they had been misapplied; they had also been made, in processing, too insoluble to enter plants. [2]

This episode probably did more to turn English agriculturists away from Liebig than persuasive writing would do - nearly thirty years later C.S. Read recalled his 'disastrous' results when he had used manures based on the Liebig principle [3] - but the fact that Lawes was engaged in practical agriculture and his experiments were open to inspection, whereas Liebig was perceived to be only a laboratory (and hence theoretical) investigator, did much to commend the Rothamsted view. Also, Lawes was modest in his claims for agricultural chemistry: 'the contempt which the practical farmer feels for the science of agricultural chemistry arises from the errors which have been committed by its professors' he wrote in the Journal. [4] By 1856 the dispute between Lawes and Liebig was 'too well known to deserve notice' in a review of the Journal for that year. [5] Although one can readily appreciate that many readers were probably less than enthralled by, as one review of the Journal in the 1860s put it, 'dreary dissertations on excess of non-

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[1] Gardeners' and Farmers' Journal, 11 March 1848.

[2] Liebig 'On some points ...', p.315; Rossiter, p.44.

[3] See Journal of the Farmer's Club, December 1875, p.62.

[4] Lawes, 'Agricultural Chemistry...', 1847, p.246, also quoted by Peel, p.13.

[5] F.M.,(3), IX, 1856, p.270.

nitrogenous constituents', [1] we can also appreciate the distinct view that Journal readers had of the controversy, so that by 1863 Liebig bemoaned the fact that what 'Lawes found to be true on a very small piece of land at Rothamsted has become axioms for all England'. [2]

There were few papers on pure theory after 1860, as the table of content by categories shows. Lawes and Gilbert continued to be regular contributors but their articles, although adding to the development of theory, were generally less abstract; they regularly gave results of their experiments with continuous corn growing under different fertiliser regimes and analysed the manurial implications of varying stock-feeding patterns that had undergone trial. Voelcker's writing was also usually practically orientated although his laboratory analyses often contributed much to the general body of knowledge on agricultural science. One particularly interesting paper of Voelcker's in the 1860s was his consideration of the value of clover as a preparatory crop for wheat. This he rightly attributed to the 'enormous quantity' (two tons six hundred-weights per acre, he estimated) of nitrogen fixed by the roots of clover. There was, he found, three times as much nitrogen in a crop of clover than in wheat, and the clover caused a large accumulation of nitrogenous matter in the soil which was of particular benefit to a following wheat crop. [3] How this accumulation of nitrates by the clover came about was not known: Way had demonstrated their formation in soil, but it was not until the work of Schloesing and Müntz in France (1877) that micro-organisms were shown to be the cause of nitrate formation in sewage, which then opened up the whole new

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[1] A.G., 22 August 1868.

[2] Justus von Liebig, The Natural Laws of Husbandry, 1863, p.xii.

[3] Augustus Voelcker, 'On the Causes of the Benefits of Clover as a Preparatory Crop for Wheat', Journal (2), IV, 1868, pp.415, 422-3. Much continental research was carried out by J.B. Boussingault (1802-87) during this period and whose work did much to elucidate the role of nitrogen.

field of soil-bacteriology. The micro-organisms responsible were not isolated until 1891.[1]

We may now turn to a briefer consideration of the other main aspects of agricultural science represented in the Journal - geology and soils, and climatology. Agricultural geology received a great deal of impetus from the publication of John Morton's[2] On the Nature and Property of Soils, their connection with the Geological Formations on which they rest, the best means of increasing their productiveness, and on the rent and profits of Agriculture, in 1838. The importance of this book was that it was one of the first reviews of soil of any nation and went beyond a simple correlation of soils with underlying rock type, as was customary at the time, and recognised such factors in soil formation as local variations, slope of land, and agents of transport; he produced a classification which was in advance of the then usual textural classifications, as it recognised a grouping on more sophisticated characteristics: Morton divided soils into Aluminous (clayey), Calcareous (chalky or limey), and Silicious (sandy) groups with many sub-divisions.[3]

There was a good deal of enthusiasm shown for geology by the Society at the time of its foundation: a Geological Committee was soon formed, and there was a suggestion that the Society should undertake a survey of the soils of Kent and Sussex, although this did not come to anything and the Geological Committee had only a short existence. However, one of the earliest subjects announced as a prize essay topic was on soil analysis and appears in the first volume. It was awarded to Rev. W.L. Rham who gave detailed instruction

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[1] Russell, pp.163-4.

[2] Father of J.C. Morton.

[3] Russell, pp.80-5; B.T. Bunting, 'John Morton (1781-1864), A Neglected Pioneer of Soil Science', Geographical Journal, 130, 1964, pp.116-9.

on analytical procedures.[1] The same volume carried a review of the 'Physical Properties of Soils' by Professor Schübler,[2] and a survey of the agricultural applications of geology by Sir John Johnstone, one of the leading enthusiasts on the Geological Committee. Johnstone related how he found broad correlations between different geological strata on estates that he owned in Oxfordshire and near Scarborough and suggested that geological maps could be useful in such matters as identifying lime deficiencies and in seeking water supplies.[3] In the third volume Sir Henry T. De la Beche, Director of the Geological Survey, reviewed the connections between Geology and Agriculture in the South-West of England but this did not extend much beyond the demonstration of broad relationships between variations in fertility and the boundary lines of different geological strata.[4]

This sort of approach, although interesting, did not take the agriculturist all that far. It was left to Joshua Trimmer, a close friend of John Morton's, to develop the subject when, with reference to Norfolk, he demonstrated the importance of superficial deposits in relation to soil type. These are distinguished from the underlying rock ('solid geology') inasmuch as they are derived from areas outside of the area in question: gravity, ice, water or wind act as agents of transport. As Trimmer pointed out, virtually all the soils in Norfolk and Suffolk relate to superficial deposits, (or 'drift') termed 'till' or 'boulder clay', which by the rock fragments contained in them ('erratics') could be shown to be derived from as far away as Scotland or Norway. The mode

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1 W.L. Rham, 'An Essay on the Analysis of Soils', Journal, I, 1840, pp.46-59.

2 Ibid., pp.177-218.

3 John Johnstone, 'On the Application of Geology to Agriculture', Ibid., pp.263-75.

4 Henry T. De la Beche, 'On the Connection between Geology and Agriculture in Cornwall, Devon, and West Somerset', Ibid., III, 1842, p.22.

of transport of this material was a subject of much debate in geological circles at the time (it is now known to be of glacial origin) but Trimmer was able to show why the soil maps of Young, Marshall, and Kent had not borne much relation to solid geology and paved the way for a more meaningful agricultural assessment of soils.[1] Trimmer developed these ideas further in a prize essay on the agricultural geology of England and Wales in 1851. Here, again stressing the importance of superficial deposits, he maintained that geological classificatio on the basis of their fossil content was of little relevance for agriculture. Where there were not superficial deposits, most attention should be given to the mineral characteristics of rock. The essay was sophisticated in its reasoning, not least in the proposition that Trimmer advanced that in the agricultural assessment of soils location had to be taken into account with regard to markets and demand for agricultural produce, as well as the physical characteristics: poor soil in the vicinity of Manchester, Leeds, Sheffield or Birmingham was of 'greater value than better soil in a district more thinly peopled and remote from markets',[2] As we have already noted it is very rarely that economic considerations of this sort are raised in the early volumes of the Journal

Other surveys of agricultural geology in specific areas appeared in the Journal including J.F.W. Johnston's reports from North America (1853 and 1854) but they did not really serve to advance general principles very much. There were reports on various formations at home and overseas that were thought to have potential for further use, and investigations into the causes of unproductiveness in soils by Coleman and Voelcker. The most important work

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[1] Joshua Trimmer, 'On the Geology of Norfolk as illustrating the Laws of the Distribution of Soils', Journal, VII, 1846, pp.444-85.

[2] Idem, 'On the Agricultural Geology of England and Wales', Journal, XII, 1851, p.448.

in soil science in the Journal was in connection with soil absorption, especially investigations by J.T. Way in the early 1850s.

In 1850 H.S. Thompson contributed a paper to the Journal which detailed the results of some of his own private experiments undertaken in conjunction with an associate of his, J. Spence (a York chemist), which demonstrated that soil possessed the power to absorb ammonia from solution when passed through it.[1] Thompson had already communicated his findings to Way two years earlier, and Way had also received information from the Rev. A. Huxtable (rector of Sutton Waldron, Dorset, and an enthusiastic agricultural chemist) which provided additional support for Thompson's findings. Huxtable had found that urine passed through a filter bed came out as pure water,[2] and Way had immediately recognised the importance of these findings in that ordinary soils possessed the power to separate from solution and retain for use by plants bases from various alkaline salts, although he could only speculate about the cause of this phenomenon.[3] However, it had implications for such pressing matters as the application of the right sort of manures, the depth of drains, and providing assurance to farmers that liquid manure could be applied to fallow without fear of loss - as the soil was a 'filter' not a 'strainer' as previously thought.[4] Way gave a good deal of further attention to the problem before his resignation from the Society in 1857, but the full understanding of the action of the clay complex in the soil was not possible until after the turn of the century.[5]

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[1] H.S. Thompson, 'On the absorptive Power of Soils', Journal, XI, 1850, pp.63-74.

[2] J.T. Way, 'On the Power of Soils to absorb Manure', Ibid., p.313.

[3] Ibid., p.372.

[4] Ibid., pp.374-8.

[5] Russell, p.121. The work of Way and others in this very important area of research is discussed in S.D. Forrester and C.H. Giles, 'From Manure Heaps to Monolayers: the earliest Development of Solute-Solid Absorption Studies', Chemistry and Industry, 13 November 1971, pp.1314-1321.

The subject of agricultural climatology was first represented in a paper contributed by the Earl of Lovelace in 1848, which drew upon French work. It outlined the types of agricultural specialisation associated with the broad climatic divisions of Western Europe. One provocative suggestion was that the British Isles was not intrinsically suited for specialisation in corn-growing and that, in the absence of duties, the country would do better to concentrate on the breeding and rearing of cattle. [1] This article aroused interest, for the Journal Committee offered a premium for 1850 on 'The Climate of the British Isles, in its effect on Cultivation' and published two essays on the topic in volume XI. [2] Pusey considered that the prize essay on the topic was 'one of the most valuable contributions yet made by science to practical agriculture'. [3] Much more information was provided than had hitherto been available on the climatic reasons for agricultural variations within the British Isles by these papers, and there were explanations as to why wheat was better suited to the warm and dry conditions of the east whereas grass would grow all the year round in the South-West. Turnips did better in the north where there was adequate moisture and cool conditions to inhibit early maturity. This raised the question as to how far it was possible or desirable on climatic grounds to extend the four-course rotation to the west of the country. Simpson concluded that the most profitable course to intensify unproductive grassland was not to adopt the Norfolk practice but a modification which took the climate into account. This would include: 1. Oats followed by vetches; 2.

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[1] Earl of Lovelace, 'On Climate in Connection with Husbandry , with reference to a work entitled "Cours d'Agriculture", par le Comte de Gasporin, Pair de France (Membre de la Societe Generale d'agriculture, de l'Academic des Sciences, etc)...', Journal, IX, 1848, p.314.

[2] Nicholas Whitley, 'On the Climate of the British Isles in its Effect on Cultivation', Ibid., XI, 1850, pp.1-62 and B. Simpson, (same title) Ibid., pp.617-66. Whitley (a land-surveyor) was awarded the prize.

[3] Pusey, 'Note', Ibid., p.62.

Potatoes followed by rape; 3. Oats with seeds; 4. Seeds for pasture; 5. Beans; 6. Flax succeeded by winter turnips. [1]

Pusey drew attention to the practical significance of climatology for the farmer in his review of agricultural progress in the same volume. A Scotch farmer could fail in England or a Suffolk farmer in Cheshire if they adhered to their customary practice and did not take climatic variation into account. What was good practice in one part of the country might well not succeed under different conditions of climate elsewhere. In discussion of agriculture, farmers should 'not lose sight of our material variations in climate'. [2]

There were occasional further papers on the subject: a two-part account of the 'Influence of Climate on Cultivation' in 1859, [3] and Nicholas Whitley later contributed a review of the maritime influence. It could be maintained that information of this sort and, indeed, on the other branches of agricultural science, might have been of little value to the ordinary farmer. Fertilisers could be applied by trial and error without understanding their active constituents just as a particular crop could be found to flourish on a specific farm without knowing of its soil or climatic requirements. Yet in bringing knowledge of this type before the readers of the Journal the Society was fulfilling a broad educational function of great importance, for the more aware and informed agriculturists were about the theoretical basis of their practice, the more efficient that practice would be.

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[1] Simpson, pp.651-9.

[2] Philip Pusey, 'On the Progress of Agricultural Knowledge during the last Eight Years', Journal, XI, 1850, pp.394-5.

[3] Ibid., XX, 1859, pp.158-74 and 481-97.

Manures and Fertilisers

The early volumes of the Journal abound with short reports of experiments by land-owners, tenants, and agents to determine the effect of the various new fertilising substances in which there was great interest, especially nitrate of soda, guano, and superphosphates.[1] Pusey actively fostered these experiments and encouraged communications which reported on the findings, but as the experiments were unco-ordinated and experimental procedures were followed with varying degrees of scrupulousness, it was difficult to place reliance on the results. The Highland Society, and J.F.W. Johnston's Agricultural Chemistry Society, did much in the way of experimentation together with the Royal at this time, although Johnston soon lost faith in the trials conducted by ordinary farmers.[2] From the rather haphazard reports in the Journal of the Royal, certain general conclusions did, however, emerge.

The first volume has no less than five reports on saltpetre and nitrate of soda. The beneficial effects of saltpetre had been long known - George Kimberly quoted Virgil, Evelyn, and others in support[3] - but there was interest in nitrate of soda as a cheaper substitute. David Barclay, who stated that he had used it since 1833, having seen it advertised in newspapers, sent in a rather inconclusive set of reports from farms in Surrey, but the Earl of Zetland reported 'astonishing effects' when used on meadow-land while James Everett suggested that it was more effective on light land than on very cold soils. Further communications from Barclay in the second volume reported that nitrate of soda was 'giving general satisfaction' and was coming very much

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1 Reviewed by G.E. Fussell, 'The Early Days of Chemical Fertilisers', Nature, 195, 1962, pp.750-4.

2 Russell, p.133.

3 George Kimberly, 'On the Use of Saltpetre as a Manure', Journal, II, 1841, p.275.

into use'. [1] After this initial interest in nitrate of soda attention switched to alternatives such as guano, partly because they were cheaper and also because nitrate of soda had some undesirable side effects. The very luxuriant growth that it stimulated in corn crops led to lodging and mildew. Thus by the 1850s Pusey referred to it as 'once-fashionable' manure. [2] Pusey, though, was an enthusiast for the substance and tried to generate a revival of interest, and in the early 1850s the Journal again carried a number of reports on its use. At this time the price was falling as new supplies, particularly from Peru and Chile, were developed, while guano had become more costly and had suffered interruption of supply. Although evidence was still contradictory, it was advocated as a useful top-dressing and as a quick-acting restorative to correct bad conditions of land. It was persistently recommended that common salt be added to counteract the tendency to over-luxuriant growth, as this was held to produce stronger straw and a brighter grain sample. [3] Such was Pusey's enthusiasm for nitrate of soda that he contributed a paper expounding the 'natural law' whereby it acted as a manure, stressing the important role of nitrogen, and urging its substitution for guano. [4] This broughta strong attack by L. Vernon Harcourt who criticised Pusey's experimental procedures and sweeping assertions that nitrates could provide a complete substitute for guano. The value of nitrogen was not at issue, but Harcourt rightly rejected Pusey's view that nitrate of soda and guano were identical in substance and

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[1] David Barclay, 'Experiments with Nitrate of Soda', Journal, I, 1840, pp.423-9 and 'Experiments and Communication on the Applications of Nitrate of Soda as a Manure', Ibid., II, 1841, pp.117-46; Earl of Zetland, 'Experiment on the Application of Nitrate of Soda as a Manure', Ibid., I, 1840, p.280; James Everitt, 'Experimental Results on the Use of Nitre as a Top-Dressing for growing Crops', Ibid., p.281.

[2] Philip Pusey, 'Nitrate of Soda as a Top-Dressing of Wheat', Ibid., XII, 1851, p.202.

[3] See Ibid.,; also H.W. Keary, 'A Top-Dressing for Wheat, at Holkham', Ibid., XIII, 1853, pp.200-2.

[4] Philip Pusey, 'On the Natural Law by which Nitrate of Soda or Cubic Saltpetre, acts as a Manure, and on its substitution for Guano', Journal, XIV, 1853, pp.374-

value.[1] Although there was great interest in guano substitutes in the early 1850s, the fallacy of Pusey's reasoning was appreciated; the Agricultural Gazette commended Harcourt as 'right' and Pusey as 'wrong'.[2] Nitrate of soda was widely used as a top-dressing, but it was recognised that other manures could supply a wider range of beneficial manurial constituents to crops. The possible long term deleterious effects of nitrate of soda on soil structure were not appreciated, of course, at this time.

In the 1840s most attention was focused upon guano and phosphates as manurial agents. The first of these had been imported in about 1835 but did not receive widespread attention until six years later when Pusey inspected a sample at the occasion of the Liverpool meeting of the Society. The rapid adoption of the 'Wizard of the Pacific' (as Hoskyns termed it)[3] did not depend upon advocacy in the Journal or elsewhere, because its effects when applied to a range of crops (but especially grain) were readily apparent to the cautious sceptic. Thus a review of the development of 'Practice with Science' in 1856 maintained that guano did more than anything else to get rid of prejudice against science, and commented that those who at first ridiculed its application soon boasted as to how many tons they had applied.[4] As J.F.W. Johnston put it, guano came and, viewing results, a farmer would resolve to 'try some myself next year'.[5] There was also ceaseless advocacy in periodicals and at meetings to back this up: in 1849, when consumption was running at about eighty to one hundred thousand tons each year, Way observed that if any evidence was still required as to its value as a manure the farmer

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1 L. Vernon Harcourt, On the connection of Chemistry with Agriculture; its Uses and Abuses, 2nd edn., 1855, p.30.

2 A.G., 3 March 1855.

3 Talpa, p.66.

4 'Practice with Science', F.M.(3), IX, 1856, p.157.

5 J.F.W. Johnston, 'Present State of Agriculture...', p.217.

would 'find such distributed through any and every agricultural publication of the last eight years'. [1]

Although there were a number of reports of trials of guano published in the Journal in the 1840s the main area of interest surrounded the identification of its beneficial constituents and their value. In the first major statement on guano given to the Society, in 1841, Johnston maintained that ammonia and uric acid were its most useful components, although he stressed the wide variation in the ammonia content which ranged between seven and fifteen per cent in samples he had analysed. [2] Way provided a very important paper on the composition and money value of guano in 1849. It was a significant article because it initiated a phase of work which was to be of particular importance to members of the Society and agriculturists generally inasmuch as it attempted to ascribe a £. s. d. value to the beneficial constituents of the substance and thus provide a guidein the purchase of different samples. This was necessary as farmers were increasingly often offered valueless or adulterated material at high prices, and guano, was, in any case, subject to large natural variation in its composition. Through the work of the consultants, Way and Voelcker, buyers became increasingly accustomed to purchase by analysis, and they were aided, in the 1870s, by the Society's fearless exposure of sub-standard samples, an area of the Society's work which will be examined further in the later chapter on consultancy.

In 1849 Way identified the important constituents as ammonia, phosphate of

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[1] J.T. Way, 'On the Composition and Money Value of the different Varieties of Guano', Journal, X, 1849, p.196.

[2] J.F.W. Johnstone, 'On Guano', Ibid., II, 1841, pp.305-10.

lime and potash. He considered that ten pounds a ton was a fair price, but stressed that much depended on what the farmer actually wanted it for: Peruvian guano was an expensive way of obtaining phosphate of lime which could be more economically applied by means of such matter as ground coprolites.[1] As the fertiliser industry developed in a chaotic and unorganised manner, with so many different substances offered of varying quality, questions posed by the Society's Consulting Chemist were exactly those which the agriculturist would ask: what were the new substances so extensively employed? what was their composition in a state of perfection? how nearly did their actual condition approach what it should be? what average condition should the consumer look for in their purchase? [2] That he directed attention towards these important questions was the foundation of some of the most important work of the Society. One of Way's last agricultural papers before his resignation in 1857 was to show some of the difficulties involved with estimating the value of artificial manures; there was the imperfect knowledge of the principles of plant nutrition, the value of manurial constituents could change under varying soil and climatic conditions, and there were different sources of the same material. It was important work which extended and developed under Augustus Voelcker, who was already writing on the subject in the Journal of the Bath & West, papers which were commended by Way. [3]

Superphosphates initially posed a different set of problems. It had long

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[1] J.T. Way, 'Compostion and Money Value....', pp.214-5. It is interesting to note the concern that Way's estimates raised upon the consignees, Antony Gibbs and Sons, who thought that the Peruvian government might use them to raise the price. See W.M. Mathew, 'Peru and the British Guano Market 1840-1870', E.H.R.(2), XXIII, 1970, p.121.

[2] J.T. Way, 'On Superphosphate of Lime', Journal, XII, 1852, p.205.

[3] Idem, 'On the Value of Artificial Manures', Ibid., XVI, 1856, pp.533-4.

been known that bones could be a useful manuring agent, but that their action was uncertain and confined to certain classes of soils. This had been one of the questions posed by Henry Handley in his 1838 Letter. The reason for this is that their fertiliser value depends upon the calcium phosphate which bones contain, but which is inert until it comes into contact with acid. Some soils contain sufficient acidic substances to transform the inert calcium phosphate into a soluble compound that can be utilised by plants, while others do not have this property. This was one of the first problems examined by Lawes and it was on the basis of his discoveries that he took out a patent for the manufacture of superphosphates by treating bones and mineral phosphates with sulphuric acid, which he began to do at his factory at Deptford from 1843 onwards. [1]

Lawes did not publish his early findings but Liebig had described a method of making bone manure in 1840 by grinding the bones to a powder and mixing them with sulphuric acid and water. [2] It was this suggestion that made the greatest impression upon English agriculturists and which stimulated a great deal of experimentation in the 1840s, and it is interesting that the concept should have been taken up so quickly especially when it was largely ignored in scientific circles. The fourth, fifth, and sixth volumes carry articles dealing with experiments with bones and sulphuric acid contributed by the Duke of Richmond and John Hannam. Pusey was enthusiastic about Hannam's experiments, to which a prize was awarded, commending them to the Council as 'the best ever made in agriculture' and stressing that 'not a moment should be lost in communicating the facts'. [3] Initially, it had been thought the

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[1] Russell, pp.93-5.

[2] Organic Chemistry, 1840, pp.184-5.

[3] Monthly Council 2 April 1845 , F.M.(2), XII, 1845, p.464.

gelatine or fatty substances associated with the bones were the fertilising agent but it was soon appreciated that phosphates were the essential constituents and boiled bones were preferred. Good results were reported from the Duke of Richmond's Gordon estate, but Hannam had to admit that there was a great deal of trouble involved in preparing the mixture, and this precluded farmers from generally availing themselves of the technique. [1] Pusey quoted Richmond and Hannam's findings as a test of the Liebig theory but complained about the slow and tedious application 'nothing now seems wanting but some plan for bringing it within the ordinary routine of farming'. [2] Although farmers continued to use bones when they could utilise a cheap local source and local bone mills were quite widely established, the problem was solved by proprietary manufacture (on which Lawes held the monopoly) utilising either bones, coprolites, or overseas mineral phosphates.

In the enthusiasm for new fertilising agents, traditional manures were not neglected. One of the first prize essays was on liquid manure, awarded to Cuthbert Johnson, and later some very elaborate schemes were suggested for its full utilisation. Possibilities were to absorb it by means of litter in feeding boxes, or to collect it in tanks near the solid manure pit. Plans were devised for its application to the land using gutta-percha pipe and hydrants in conjunction with steam engines, and frequent application in a highly diluted state was envisaged. [3] Writers of the county reports frequently drew attention to

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[1] Duke of Richmond, 'On the Solution of Bones in Sulphuric Acid for the purposes of Manure', Journal, IV, 1843, pp.408-9; John Hannam et al., 'On the Use of Bones as a Manure with Sulphuric Acid', (and addition to paper) Ibid., V, 1843, pp.443-468 and 594-6; Idem, 'An Experimental Inquiry into the Theory of the Action and Practical Application of Bones as a Manure for the Turnip Crop', Ibid., VI, 1845, pp.71-2.

[2] Philip Pusey, 'On Superphosphate of Lime', Ibid., p.324.

[3] See particularly Peter Love, 'On the best Means of Applying Manure to the Land in a Liquid State', Ibid., XX, 1859, pp.22-31 and James T. Blackburn 'On the Economical Application of the Liquid Manure of a Farm', Ibid., XXIII, 1862, pp.1-16.

what was considered a waste of a valuable commodity. In Kent, liquid manure was 'neglected', and in Cornwall 'not preserved'(1845). The Management of manures needed 'some attention' in Suffolk, and tanks for liquid manure were 'not sufficiently seen' in the North Riding. In Devon, 'little attention was devoted to the management of this most valuable fertiliser'; there were 'no attempts to apply manure by distributing pipe' in East Lothian, and 'a common waste of liquid manure' in Oxfordshire. Although some enthusiasts such as Mechi, converted to a 'hose and jet' arrangement the practice of conserving and applying liquid manure never became very general, because the benefits were not sufficient to recover the considerable outlay involved. [2]

Although the economic employment of liquid manure on the farm was not an area where much progress was made, a good deal of attention was given to the most efficient modes of management of traditional farm-yard manure, particularly by Augustus Voelcker. In his first major paper to the Society on this topic, in 1856, he stressed that fresh dung contained a relatively small amount of soluble organic and mineral substances but as it decayed there was an increase in the nitrogen content. He also stressed that farm-yard manure contained all the constituents that plants required, and that the mechanical effect (in maintaining soil structure, although he did not express the point in these terms) was important, especially on clay soils, a consideration which was generally overlooked by the enthusiasts for 'artificials'. His advice included storing the manure and taking precautions against heavy showers falling on the

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[1] George Buckland, 'On the Farming of Kent', Journal, VI, 1845, p.258; W. Karkeek 'Cornwall', Ibid., p.442; Raynbird, ' Suffolk', Ibid., VIII, 1847, p.303; Milburn, 'North Riding', IX, 1848, p.520; Tanner, 'Devonshire', Ibid., p.454; Stevenson, 'East Lothian', Ibid., XIV, 1853, p.303; Read, 'Oxfordshire', Ibid.,XV, 1855, p.241.

[2] J.B. Denton, The Farm Homesteads of England, 1863, cited by Nigel Harvey, A History of Farm Buildings, 1970, p.145.

heaps (a point that had been said to be of no importance by Liebig). Voelcker deprecated the practice of keeping animals in open yards, for the collection of manure.[1] Lawes also reported on farm-yard manures,[2] and it was advised that farmers should look upon nitrogenous artificial manures as auxiliaries, rather than as complete substitutes for traditional manures.[3] A good deal of attention was given to the manurial implications of stock feeding with manufactured foods such as oil cake or cotton cake. Lawes's papers on this did much to provide understanding of integrated mixed-farming systems where high productivity could be maintained.[4]

A question to which scientists such as Way, Voelcker, and Lawes gave much consideration, was the agricultural value of town-sewage. This was a favourite topic in mid-Victorian times widely discussed in both popular newspapers and learned periodicals and the subject of extensive inquiry by Parliamentary Commissions.[5] The Royal was slow to enter the debate, but once it received attention in articles in the Journal and by lectures at the weekly Council meetings a very consistent line on the agricultural value of sewage was given to the members. This was almost entirely pessimistic as to the real agricultural

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1 Augustus Voelcker, 'On the Composition of Farm Yard Manures, and the Changes which it undergoes on keeping under different Circumstances', Journal, XVII, 1856, pp.191-260. See also the same author's 'On Farmyard Manure, the Drainings of Dung-heaps, and the absorbing properties of Soils', Ibid., XVIII, 1857, pp.111-50.

2 J.B. Lawes, 'Farmyard Manure', Ibid., XXIII, 1862, pp.45-8.

3 Voelcker, 'Commercial Value of Artificial Manures', Ibid., pp.275-6.

4 Lawes's first paper on this theme was in 1849, 'Agricultural Chemistry: Sheep-feeding and Manure', Ibid., X, pp.276-339. See also same author's 'Observations on the recently introduced Manufactured Foods for feeding Stock', Ibid., XIX, 1859, pp.199-204. Voelcker did extensive investigations into the composition of the various substances.

5 See my 'Nineteenth-Century Recycling: the Victorians and the Agricultural Utilisation of Sewage', History Today, 31, June 1981, pp.32-6.

worth of town sewage, in contrast to some of the extravagant claims that were advanced in non-agricultural circles, and by enthusiasts such as Mechi. In the first major statement on the subject in the Journal, in 1854, Way gave a series of elaborate analyses which demonstrated the nitrogen content of town sewage, but stressed that the problem was not the theoretical value but the economic utilisation of waste which created the difficulty. Schemes that were popular in the 1850s either involved the utilisation of town sewage in a piped natural state, or its manufacture into dry 'portable' manure. Way maintained that the potential value was mostly in the liquid matter and that the solid components were not very useful. He also stressed that town sewage was so dilute that it would be necessary to filter about half-a-million gallons to obtain one ton of dry matter, although most of the value was in the liquid. [1] Way's agricultural readers were no doubt pleased with his refutation of the line that was being taken by urban interests that because the value of town sewage was so great agriculturists should pay for its removal from towns in order to ease the impending rate-burden implied by the extension of water-sewage systems. Way maintained that it was quite unrealistic for towns to look upon sewage as a potential source of income. Agriculturists did not have need of low value, low price manures but wanted more concentrated fertilisers, and he held that the price which sewage would ultimately find buyers would always be below the cost at which it could be produced for use by them. [2] This was the view which was consistently taken by Lawes and Voelcker in their later considerations of the topic.

Lawes turned his attention to the problem as a member of the Royal Sewage

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[1] J. T. Way, 'On the use of Town Sewage as Manure', Journal, XV, 1855, pp.135-67. This was originally a lecture delivered to the Society in the spring of 1853.

[2] Ibid., pp.166-7.

Commission, appointed in 1857 to examine the best mode of putting the sewage of towns to profitable use. He presented some of the findings of his experience on this Commission, and evidence given to a House of Commons Select Committee on the subject in a paper in the Journal in 1863. Recognising that:

> Nothing has tended more to prevent a proper understanding between town and country - the producers of sewage and the consumer of manure - as to the commercial value of sewage... than the very exaggerated statements which are from time to time put forth on the subject, [1]

Lawes reviewed some of the evidence gathered by the Royal Commission and concluded that because London sewage was so dilute he had 'not the slightest doubt' that any attempt to apply London sewage would attend with pecuniary loss, and that the only persons benefiting from any scheme to pipe London sewage to agriculturists would be the contractors - the agriculturists would be unlikely to make a return on it.[2] Voelcker took much the same view. In a lecture to the Society in 1862, he reviewed the estimates that had been made by non-agriculturists of the value of sewage and suggested that they were fallacious because they compared sewage with concentrated fertilisers such as guano, whereas a more proper comparison was with farm-yard manure. Sewage irrigation was only likely to be useful on certain porous sandy soils and then only for quick-growing crops such as grass, certainly not for wheat. Arguing from the standpoint of the value of the produce of sewage irrigation rather than the theoretical vaue of its constituents, Voelcker maintained that its fertilising value was perhaps one halfpenny per ton. This was a

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[1] J.B. Lawes, 'On the Utilisation of Town Sewage', Journal, XXIII, 1862, p.86.
[2] Ibid., pp.87-8.

rather different view from that taken by non-agricultural chemists such as Hofmann and Witt who had estimated the value at two pence per ton.[1] In another lecture to the Society in 1865, Lawes was in agreement with Voelcker's estimate:

> I don't think a farmer could do very wrong in giving a halfpenny a ton; but he would do very wrong if he were to give 2d. or even a 1d. the year round, because the experience of all those who have used sewage is against it being worth any such sum.[2]

Although irrigation of adjacent farmland was the most consistently advocated means of utilisation of town-sewage the disadvantages that attended the system were given considerable attention. There were the huge quantities of sewage needed for any worthwhile results, there was the high cost of transportation in relation to the real manurial value, the difficulty of having to take the sewage all through the year and the limited range of crops to which it could be usefully applied - Italian rye-grass was found to answer best. In addition, there was also the nuisance-value of sewage to contend with. In the face of these difficulties a number of alternatives were canvassed, the most prominent of which were the earth-closet system and precipitation systems of turning sewage into a more valuable commodity than it was in its raw state.

The chief promotor of the dry-earth system was the Rev. Henry Moule Vicar of Fordington, Dorset, who outlined his system in a pamphlet, National Health and Wealth published in 1858, and summarised his approach in the Journal in 1863. Drawing upon the soil absorption research of Huxtable, Thompson, and Way, Moule envisaged a system whereby each house would be

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[1] Augustus Voelcker, 'Lecture on Town Sewage', Journal, XXIII, 1862, pp.462-9.
[2] J.B. Lawes, 'On Town Sewage', Ibid., (2), I, 1865, p.231.

supplied with dry earth which would render human waste innocuous and which could be recycled several times. Convinced of the value of this system, he took out patents on his own design of earth closets, with apparatus to effect the admixture, removal, and drying of the earth. Moule made high claims for the manurial value of the materials so produced, and though it would save the expense associated with the introduction of water-disposal systems. He was quite confident that there would be no difficulty in distributing sufficient earth to the householders in towns, and envisaged the formation of companies to carry the system out. If one-fifth of the population adopted the system he expected the annual production of one million tons of manure equal in fertilising power to guano.[1] Another system which obviated the use of water and so held out the promise of manure in more concentrated form was the Hyde 'Eureka System' where a private company collected the waste from each house in tightly closed boxes and used it to manufacture a patent manure.[2]

The most popular of the 'precipitation' systems - which involved the addition of materials to the raw sewage - was the 'Sillar's Patent ABC Process' carried out commercially in the 1860s at Leamington Spa and Hastings. The additions were Alum, Blood, and Clay (hence the name of the process), the material produced being advertised in the early 1860s for seven pounds per ton, with a claim that it was the equal of guano in fertilising power.

None of these alternatives found much favour in the Journal. Lawes and Gilbert, in their report to the Chemical Society (reprinted in the Journal)

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[1] Rev. Henry Moule, 'Earth versus Water for the Removal and Utilisation of Excrementious Matter', Journal, XXIV, 1863, pp.111-23.

[2] 'Town Sewage', Ibid.,(2), III, 1867, pp.468-9. This article was an abstract of a report given to the Chemical Society by Lawes and Gilbert.

dismissed the Moule system as clearly being impracticable for towns. The product of the Hyde 'Eureka System' was found to have very little manurial value, with an ammonia content of only one or two per cent. Lawes and Gilbert maintained that the water-system, with the great dilution of sewage which rendered its agricultural utilisation such a problem, was clearly the 'path of progress'.[1] Voelcker reported on the Sillar's A.B.C. 'native guano' in the Journal for 1870. Never one to shirk an unequivocal opinion of fertiliser worth on the basis of laboratory analyses, he pronounced the product as all but valueless. According to Voelcker, a few pounds of bone-dust and dried blood would contain the fertilising properties of a ton of 'native guano' and, stressing the very limited value of the 'A.B.C.' product, suggested that five shillings per ton would be a reasonable amount for the agriculturist to pay for it: about one-tenth of the asking price, which had fallen during the 1860s.[2]

Thus when Herbert Little presented his review of sewage-farming in 1871, he quickly dismissed the alternatives to water-disposal as either impracticable or worthless.[3] This left sewage-irrigation of which there were various examples in operation some of which, as at Romford and Barking, had excited a good deal of attention. Little's report was cautious but by no means despondent as to the viability of the operations that he described. He concluded by observing that even if there were great practical difficulties in the utilisation of town sewage for agriculture and it did not bear out the high hopes that had been entertained, the subject was still worthy of attention by the agriculturist.[4]

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1 Ibid., pp.468-70.

2 Augustus Voelcker, 'On the Composition and Practical Value of Several Samples of Native Guano prepared by the ABC Sewage Process of the Native Guano Company', Journal, VI, 1870, pp.415-24.

3 Herbert Little, 'Sewage-Farming', Ibid.(2), VII, 1871, pp.392-5.

4 Ibid., pp.419-20.

Morton, who had given the problem as much attention as anyone and was closely involved with the question through his work on the River Pollution Commission, reported on a select number of sewage farms - Cheltenham, Leamington, Tunbridge Wells, Doncaster, Chorley, and Bedford - for the Journal in 1876. Here, he was far from optimistic about future development: 'sanguine estimates' had nowhere been realised, heavy losses had been almost everywhere incurred by the purchasers of sewage for agricultural uses. Sewage had been confirmed as poor and weak manure which would not bear the heavy cost of distribution. It could be used for crops which needed large amounts of water: rye-grass, mangels, and garden crops were examples - but even then there were outcries about the wholesomeness of the food, and, concluded Morton, 'we may notice how ludicrously experience hitherto has almost everywhere upset the anticipations of the sanguine sewage agriculturist'. [1]

Voelcker effectively concluded the discussion in his 1878 review of the influence of chemical discoveries on the progress of English agriculture. He noted that the sewage question had not made much progress since 1860 and did not expect anything very new in the near future. Sewage could be irrigated for agricultural purposes where local conditions chanced to be favourable but generally entailed a loss. The best plan for its disposal, Voelcker considered, was to carry it out to sea, beyond any chance of it being brought back by the tide. Far from being a profitable agricultural commodity sewage was a nuisance which could only in very exceptional circumstances be turned to profitable account, and it was not reasonable to expect that agriculturists should bear the costs that its satisfactory disposal entailed. [2]

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1 J.C. Morton, 'Half-a-Dozen English Sewage Farms', Journal (2), XII , 1876, especially pp.409-10 and 433-8.

2 Augustus Voelcker, 'Influence of Chemical Discoveries on the Progress of English Agriculture', Ibid.,(2), XIV, 1878, pp.830-4.

Land Drainage

This topic was very much in the minds of the founders of the Society, because of the interest that had been aroused by the techniques of Smith of Deanston during the 1830s. Smith had adopted a uniform system of 'thorough' draining on a farm of about two hundred acres which he ran as an ancillary enterprise to his cotton-works in West Perthshire. He had written on his draining techniques for the first report of Drummond's Stirling Agricultural Museum in 1833, but knowledge of his methods was very restricted outside Scotland until 1836 when he was called to give evidence to Shaw-Lefevre's Select Committee on Agricultural Distress. There he described his methods of frequent drains and sub-soil ploughing. [1]

The members of the Select Committee, who included Henry Handley, were impressed enough to consider that draining, following Smith's methods, was the technique most likely to promote improvement of agriculture. Handley visited Smith's farm, which became an agricultural showpiece; Cobden quoted Smith in his speeches against the Corn Laws and Smith's book Remarks on Thorough Draining and Deep Ploughing was said to have sold twenty-five thousand copies by 1846, which, if true, would quite possibly make it the most widely read agricultural book of the times. [2] Smith stressed that he was primarily concerned with the removal of surface water with main drains $3\frac{1}{2}$' - 4' deep and sub-drains 3' - $3\frac{1}{2}$' deep at widths between 10' - 40', depending upon the soil porosity. Both Handley and Shaw-Lefevre were directly connected with the Journal as members of the Journal Committee and Pusey, in his introductory

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1 'Memoir of Jas. Smith Esq. of Deanston', F.M.(2), XI , 1846, pp.191-7; 'Select Committee on Agricultural Distress', B.P.P., VIII (pt. II), 1836, pp. 293-306.

2 'Smith Memoir', p.196.

survey on agricultural progress quoted Smith's methods as the greatest improvement since turnip culture and looked to a revolution on the English claylands if the Deanston system would allow the cultivation of the turnip upon them. [1]

Early communications on draining published in the Journal show the influence of Smith's approach. J. French Burke recommended draining at thirty inches to three feet. [2] Thomas Arkell's prize essay on the subject recommended that drains should be put in at twenty-four to thirty inches in depth. Arkell suggested that deeper draining would require few drains as they could then be placed wider apart, but did not favour the practice because of outfall difficulties. [3]

The same volume, however, contained a report by Josiah Parkes on drain tiles and drainage, the Society having offered a prize for tiles at the Derby meeting of 1843. Parkes took this opportunity to relate information that he had gathered on draining operations from parts of Kent and Sussex which purported to demonstrate his own view that deeper drains were to be preferred to the shallower operations recommended by Smith: 'The principle that less frequent but very deep drains are equally effective with more numerous and shallower ones, is recognised by these intelligent and practical farmers...'. [4] Parkes repeated his point in his examination of the influence of water on the temperature of soils in the fifth volume. [5]

The advice tendered by Parkes generated experiments among the members of the Society and two communications were published in 1846 supporting Parkes's

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[1] Pusey, 'On the Present State of the Science of Agriculture...', p.6.
[2] J. French Burke, 'On the Drainage of Land', Journal, II, 1841, p.283.
[3] Thomas Arkell, 'On the Drainage of Land', Ibid., IV, 1843, pp.323-4.
[4] Josiah Parkes, 'Report on Drain-Tiles and Drainage', Ibid., p.378.
[5] Idem, 'On the Influence of Water on the Temperature of Soils', Ibid., V, 1845, pp.154-6.

methods. C. Arbuthnot in a letter to Parkes said he was 'induced to make the experiment from reading an article written by you' and had put in drains at four feet in depth. These were in place of shallower ones that had not been effective on about seven acres of old grass. Water had discharged from the deeper drains while shallower ones had remained dry. He was now so convinced of the efficacy of deep drainage that he intended to redrain all of the land he occupied with tiles laid on the deeper principle.[1] Similarly, Rev. J.C. Clutterbuck attempted to show that 'deep drains must be more effective than shallow'[2] and Arbuthnot sent the results of further draining showing that his four foot drains in another ten acre field were 'throwing out of their mains vast quantities of water', and quoted his farm bailiff as saying, on the basis of this, 'The more instances I see of deep-drainage, the more I am convinced of its efficacy'.[3]

Parkes gave the most comprehensive statement of his views in a lecture given to the Society at the occasion of the Newcastle meeting of 1846. Although he recognised that there could be no fixed rule for depth or frequency that would be equally applicable to all soils he stated that it was his own practice to execute drainage at between four and six feet deep with distances of twenty and sixty-six feet between the drains. The evidence was 'irresistible' that any less depth than four feet would not be accompanied by such beneficial results. A 'mass of evidence' could be brought forward to show that drainage at that, or greater depths, was the most efficient and economical.[4] As Hoskyns wryly observed 'The tile may truly said to have fought its way downwards, inch by inch...'[5]

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1 C. Arbuthnot, 'Letter on Deep Draining', Journal, VI, 1845, pp.129-30.
2 J.C. Clutterbuck, 'On the Theory of Deep Draining', Ibid., p.489.
3 C. Arbuthnot, 'On Deep Draining', Ibid., p.573-4.
4 Josiah Parkes, 'On Draining', Ibid., VII, 1845, pp.232, 236.
5 A.G., 8 August 1846.

Towards the end of 1846 William Bullock Webster, a land agent and member of the London Farmers' Club, lectured at the Polytechnic Institution on drainage and claimed that four foot drainage on heavy clay would fail. In the Weald of Kent farmers were reverting to shallower (thirty inch) draining and he claimed to have travelled ten thousand miles gathering information on this point. [1] At a Council meeting held in February 1847 Webster presented his views and complained that the Society was giving sanction to an unsound system by persistently publishing articles advocating deep draining in the Journal. Pusey stressed that the Journal was open to opposing viewpoints and invited Webster to submit an article on the subject, adding that there was a need for more information on the subject. [2]

Webster's paper was published in the Journal in 1849. He condemned four or five foot drainage on 'very strong clay soils' where the problem was not from 'underwater' (groundwater or subsurface springs) but from rain, for three main reasons. The first of these was that on the heavy clays, it was likely that the rain would not reach the drains. Secondly, percolation to the drains was in any case so slow as to not rid the ground of water sufficiently quickly. The third objection was to Parkes's principle that the additional cost of deep drains could be compensated by increasing the width apart. Webster admitted that some draining had been too shallow, but was anxious that there should not be an excessive reaction to this. [3] As he stressed:

> Error in new systems is quickly propagated. The person who has reduced

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[1] F.M.(2), XIV, 1847, p.14.

[2] Weekly Council 24 February 1847, F.M.(2), XV, 1847, p.375.

[3] William Bullock Webster, 'On the Failure of Deep Draining on certain strong Clay Subsoils, with a few Remarks on the Injurious Effect of sinking the water too far below the Roots of Plants in very Porous, Alluvial and Peaty Soils', Journal, IX, 1848, pp.237-8.

> theory to practice with real or imaginary success, is proud of his sagacity and ready to proclaim it: he, on the contrary, who has failed, is by no means anxious to call the attention of the world to his mistakes... Perhaps, therefore, while so many successful experiments in deep drainage are being pressed upon the public with enthusiasm, I shall not be doing ill service in... showing that "profit and loss" on the drainage-ledger should have entries as well in the debtor as the creditor side. [1]

In support of his contention, Webster cited a number of correspondents showing that shallower draining was preferable. [2] It is interesting that one of these, William Barnes of Staplehurst (Kent), had been criticised at the discussions of the Maidstone Farmers' Club for his shallow draining, and, termed a 'partial drainer' on account of this. [3] Webster concluded by noting that all work up to 1843 (when Parkes started writing in the Journal) condemned deep draining on heavy clay, [4] and Pusey appended a note commending Webster's views. [5]

This article stimulated Arbuthnot to reiterate his views on the efficacy of deep draining; and J.H. Charnock, an Assistant Commissioner under the Drainage Acts, stressed the need to adjust drainage-depths to local soil conditions. [6] Pusey appended a note to Arbuthnot's communication stating that agriculture was indebted to Parkes for demonstrating the advantage of deep-draining on a majority of soils and to Webster for showing the failure of deep-draining on very heavy clays, and Pusey advised caution in draining

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1 Ibid., p.239.
2 Webster, 'On the Failure...', pp.240-7.
3 Goddard, 'Kentish Farmers' Clubs', p.82.
4 Webster, p.247.
5 Ibid., p.248.
6 C. Arbuthnot, 'On the Advantage of Deep Drainage', Journal, X, 1849, pp.496-502; J.H. Charnock, 'On Suiting the Depth of Drainage to the Circumstances of the Soil', Ibid., pp.507.

such soils too deeply.[1] The following year he expressed himself rather more forcibly on the matter. In a note to a further contribution by Webster which called into question the practice followed on the Duke of Wellington's Stratfieldsaye estate which had been cited by Parkes,[2] Pusey stated:

> It must be now regarded, not as a wholesome caution, but as an established fact, that there are certain clay formations in the south of England on which deep draining is not unlikely to fail.[3]

Thereafter, very few articles on under-drainage appeared in the Journal. Joshua Trimmer reported on the 'Keythorpe System' of drainage which occasioned a good deal of attention in the 1850s and Bailey Denton reviewed the progress of land drainage schemes funded by loans from government, or public companies,[4] but it was possible that Pusey had tired of the arguments - he wrote of 'taking leave of the subject' in his note to the last of Webster's communications - especially as Parkes's views, propagated by the Society, had in part been discredited, although adherents of Parkes's approach were probably still in the majority. A prize for an essay on underdrainage for 1854 was not awarded. It may be noted that Parkes resigned his position as Consulting Engineer in 1848, though no evidence has been found to connect his resignation with the controversy that he had generated.

A very important topic allied to, but distinct from, underdrainage,

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1 Ibid., p.502.

2 W.B. Webster, 'On the Mischief arising from Draining certain Clay Soils too deeply', Ibid., XI, 1850, pp.311-2.

3 Pusey, 'note', Ibid., p.312.

4 Joshua Trimmer, 'Notes on the Geology of the Keythorpe Estate and its relations to the Keythorpe System of Draining', Journal, XIV, 1853, pp.96-105; J. Bailey Denton, 'On Land Drainage and Improvement by Loans from Government and Public Companies', Ibid.,(2), IV, 1868, pp.23-43.

which did not receive much attention in the Journal was arterial or trunk drainage. This refers to the main river channels and water-courses as distinct from field drains and outfall ditches. Improvement of such channels was really a pre-requisite for efficient field drainage, otherwise water could not be properly removed from the fields. Also, if rivers could not cope with the extra volume of water that field-drainage, if executed properly, could generate, flooding would probably result especially in low-lying areas where the rivers were sluggish and weed-choked. In 1853 there was a report on the district drainage scheme that had been embarked upon on the Rye and Derwent in Yorkshire under special Act of Parliament [1] which was necessary for such works. The topic of trunk, or arterial, drainage was specified as the subject for a prize essay for 1854 and the award of fifty pounds was an indication of the importance attached to the matter. This was given to J.A. Clarke, but his was a rather inadequate account as it dealt mostly with the Nene, where large-scale reclamation work of fens had been undertaken since the sixteenth century or before and this area was not really representative of the problem as it was experienced over much of England. [2] Apart from Clarke's prize essay, however, the topic was almost entirely ignored in the Journal. Bailey Denton led a discussion on the effects of Under-Drainage on arterial channels in 1863 [3] and S.B.L. Druce reported on works carried out along the Upper Thames [4] but it was not until 1878 that there was a comprehensive review of the subject.[5]

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1 John Henderson, 'Report on the Rye and Derwent Drainage', Ibid., XIV, 1853, pp.129-52.

2 John Algernon Clarke, 'On Trunk Drainage', Ibid., XV, 1855, pp.1-73.

3 J. Bailey Denton, 'The Effect of Under-Drainage on our Rivers and Arterial Channels', Ibid., XXIV, 1863, pp.573-83.

4 S.B.L. Druce, 'An Account of an Embankment and Cutting... made to protect the District from the Flood-waters of the River Thames', Ibid.,(2), VI, 1870, pp.367-74.

5 W.H. Wheeler, 'Arterial Drainage and the Storage of Water', Ibid., XIV, 1878, pp.1-57.

Influence of the Journal

We may now proceed toward an assessment of the influence of the Journal utilising the following three-stage procedure: (1) An examination of the relation of the Journal to other printed media on agriculture between 1840-1880; (2) a consideration of contemporary comment on the Journal and its contents in order to obtain some indication of the regard with which it was held by agriculturists; (3) an analysis of 'information linkages' between the Journal and other printed media. By these means we can arrive at a fuller understanding of the way in which information on agriculture, particularly new methods and techniques, was generated and transmitted during the period under review.

Relation to alternative Printed Media

In the first chapter the development of agricultural newspapers and periodicals up to the time of the foundation of the Royal was examined and the following were identified as the most important in 1838:

Newspapers:	Bell's Weekly Messenger
	Mark Lane Express
	Farmers' Journal
Periodicals:	British Farmer's Magazine
	Farmer's Magazine
	Quarterly Journal of Agriculture/Prize Essays
	and Transactions of the Highland Society
	Transactions of the Yorkshire Society

We may firstly consider the development of the above between 1840-80 and then

proceed to a review of the most significant additions.

Of the newspapers listed above, Bell's and the Mark Lane Express continued in publication throughout our period; the Farmers' Journal [1] (dedicated to the maintenance of agricultural protection) ceased publication in 1846. Bell's, which still had the largest circulation of any rural newspaper in 1840, continued its long-term decline as competitors (The Field, began in 1853, is the best known of these) undermined its leading position. It needs to be stressed that Bell's, although well-known for the attention it gave to agricultural topics, was much more of a general newspaper specialising in rural affairs than the other newspapers considered here, and the agricultural content was restricted to the Monday edition. For this reason the Mark Lane Express is taken as the most important farming newspaper of the period, even though its circulation was lower.

Under successive editors the Mark Lane Express maintained a very close identification with the tenant farmers' interest. After Shaw's abrupt departure in 1852 (see pp.131-2) he was followed as editor of the Mark Lane Express by Henry Corbet who had been elected as Secretary of the Farmer's Club in 1846, a post that he held for twenty-nine years. The paper that he edited continued to give full coverage to technical and scientific farming but this was not Corbet's chief interest. He did not have a farming background, and was more concerned with agricultural meetings and stock shows. His outside writing was mostly for such journals as The Field, Bell's Life and the Sporting Magazine: his report of the Cardiff livestock (1872) is a good example of his style. [2] At the Farmer's Club, to which he devoted an immense amount of

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[1] 'New' was added to the title on 22 March 1841.

[2] Journal, (2), VIII, 1872, pp.373-402. Some of Corbet's essays were published as Tales and Traits of Sporting Life, 1864.

PLATE VII : HENRY CORBET.

Henry Corbet

Source: Farmer's Magazine.

(3rd Series, LIII,
April, 1878)

labour, he would typically lead discussions on 'Over-preservation of Game', 'Foxes versus Rabbits', or 'The Malt-Tax'. He established the horse show at Alexandra Park, and had a reputation for forthright criticism. Indeed, his writing could be extremely cutting at times, but , under Corbet, the Mark Lane Express maintained an 'individuality and reputation for thoroughness' which was continued by W.E. Bear who succeeded him in 1875. [1]

Of the periodicals extant in 1840, the Farmer's Magazine and British Farmer's Magazine continued in uninterrupted publication until 1881. It is important to note that the contents of the British Farmer's Magazine became identical to the Farmer's Magazine from 1846 onwards. The British Farmer's Magazine also changed from quarterly to monthly publication in conformity with this take-over. *The British Farmer's Magazine is the longest running proprietary* title of the nineteenth century, but it is misleading to look upon this (by implication) as the most successful periodical: that accolade should go to the Farmer's Magazine (which was under the same editorship and ownership as the Mark Lane Express), as after 1846 the British Farmer's Magazine was a separate publication in name only.

The Quarterly Journal of Agriculture (the 'Quarterly' was dropped from the title from 1843 onwards) continued to give full attention to scientific and technical agriculture, together with articles of a more general nature, with a bias towards Scottish farming affairs. In 1868 the title was changed to the Country Gentleman's Magazine and from then on agriculture occupied a much smaller proportion of the total contents, with other sections with titles

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[1] For memoir see F.M.(3), XLVIII, 1876, p.398 (from A.G.).

such as 'The Garden', 'Hunting','Fishing and Shooting', and 'The Country Gentlewoman'. It thus became relatively less significant as a medium for the spread of agricultural information compared to other titles which were devoted almost exclusively to agriculture and directly related topics.

The Prize Essays of the Highland Society, styled Transactions of the Highland and Agricultural Society of Scotland after 1843, continued to be published under the auspices of the Journal of Agriculture until 1866 when they were first published independently, with abstracts given in the other agricultural periodicals. The Transactions were issued annually from this time on, rather than quarterly as was the case under the older arrangement.[1] In the 1840s and early 1850s the Transactions teemed with reports of investigations and experiments but the diversity of content tended to decline over time and by the end of the 1860s there was a good deal of dissatisfaction . . . with the conduct of the journal. The North British Agriculturist disapproved of the yearly publication and questioned whether the information carried by the Transactions could not be better left to the agricultural press.[2] The Transactions of the Yorkshire Society also underwent a decline and by 1860 it had very limited content.

We may now turn to the significant additional agricultural newspapers and periodicals between 1840-1880. The most important new newspaper was the Agricultural Gazette, first published in 1844 as an addition to the Gardener's Chronicle, which commenced in 1841. We have already noted the importance of its editor, John Chalmers Morton. In the first edition, Morton outlined his

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[1] See Journal of Agriculture (3), I, 1866, p.114.

[2] 6th January, 1869.

editorial approach very clearly. He specified that the Gazette would carry (i) leading articles on agricultural topics, original matter, and proceedings of agricultural societies, with the proviso that it was not intended to report at length the after-dinner speeches, except on special occasions; (ii) reviews of book; and (iii) miscellaneous notices of events of general agricultural interest, extracts from works on farming subjects, replies to correspondents and market reports. All party political matter was to be excluded.[1] As the prospectus for the Gazette in the Chronicle stressed, 'while other Journals are absorbed in ephemeral disputes concerning matters of human legislation we hope to be engaged in the investigations and application of those great truths which regulate the action of plants and animals',[2] and this emphasis and neutral political stance was followed by Morton throughout his long career. The Agricultural Gazette was not published under a separate title until 1874.

The Gardeners' and Farmers' Journal commenced in 1847 with M.M. Milburn, land agent and Secretary to the Yorkshire Agricultural Society, as its agricultural editor. The first issue stated that the profits were to be distributed to the relief of 'aged and Indigent Gardeners and Farm-Bailiffs, their Widows and Orphans'. Between 1847 and 1854 it carried numerous reports of experimental agriculture and much matter relating to technical and scientific advance in farming, and items were frequently republished in the Farmer's Magazine and elsewhere. It seems to have become less important during the 1850s and this may have been because of the death of Milburn in 1854.[3] The title was incorporated with the Mark Lane Express in 1880.

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1 A.G., 6 January 1844.

2 Gardener's Chronicle, 2 December 1843.

3 See F.M.(3),VI , 1854, p.16 for Milburn's obituary.

The North British Agriculturist published in Edinburgh from 1849 onwards began as the Ayrshire Agriculturist (1843-8). It circulated mostly in the northern counties and in Scotland, but notice was taken of its contents in the leading London agricultural newspapers. Full attention was given to the proceedings of the Highland Society and technical matter on farming had a central place in the content.

The Farmer was originally another Scottish publication beginning life as the Scottish Farmer and Horticulturist in 1843, but was published in London from 1865 onwards and steadily developed in influence during the 1870s. [1]

The Chamber of Agriculture Journal and Farmers' Chronicle began in 1869 under the editorship of J.A. Clarke, who had written extensively for the Royal and The Times and who later edited Bell's Weekly Messenger. Although initially mostly concerned with legislative topics that were pursued by the chambers, it was soon expanded and gave coverage to practical farming questions and was thus quite broadly based. [2] It was amalgamated with the Farmer in 1881. More specialist newspapers were the Agricultural Economist and Horticultural Review, begun in 1870 as the organ of the Agricultural and Horticultural Co-operative Association, founded by E.O. Greening, and which was much concerned with the bulk purchase of non-adulterated fertilisers, and the Livestock Journal and Fancier's Gazette (1875). [3]

Of new monthly periodicals the Farmer's Herald, initially published from Chester in 1843 but with a countrywide circulation, was distinctive inasmuch

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[1] It is interesting to note that the Farmer was the forerunner of the Farmer and Stock Breeder (1889). It incorporated the Agricultural Gazette in 1925 and the old Mark Lane Express (via Farmer's Express and Farm, Field and Fireside, in 1938).

[2] See issue of 20 September 1869, which was the first enlarged edition.

[3] Continuation of Fancier's Gazette 1874-5.

as it was a monthly newspaper. Smaller in size than the weeklies it was also cheaper, selling at 3d. a copy in the 1850s. Although highly derivative in character, topics of current practical farming interest were given full coverage. The Agricultural Magazine was a revived title which ran with several confusing changes [1] between 1845 and 1859. It carried reports of lectures, discussions, lettings, the corn trade, and show reports as well as abstracted articles. Like the Journal of Agriculture it contained more light, non-agricultural pieces than did some of the other periodicals. The Journal of the Bath & West of England Society was Acland's revival, in 1853, of the old Letters and Papers and edited by him until 1860. It contained a mixture of original articles (by Voelcker and Morton among others) and matter reproduced from elsewhere, especially the Journal of the Royal. The Journal of the Farmer's Club issued from 1854 onwards was restricted in content to the lectures given to the Club in London, together with ensuing discussion, and the Proceedings of the Central Chamber of Agriculture were initiated in 1870. Different in character were Lawes and Gilbert's Rothamsted Memoirs begun in 1847 but most of the technical reports and articles that they wrote appeared in the Journal of the Royal.

A final class of periodical which deserves notice was the annuals. A leader in the field was Johnston and Shaw's Almanac issued each year between 1841 and 1872. Morton began his own New Farmer's Almanac in 1855, the Farmer also published its Illustrated Farmer's and Gardener's Almanac, and there were several others. The importance of these almanacs was that apart from

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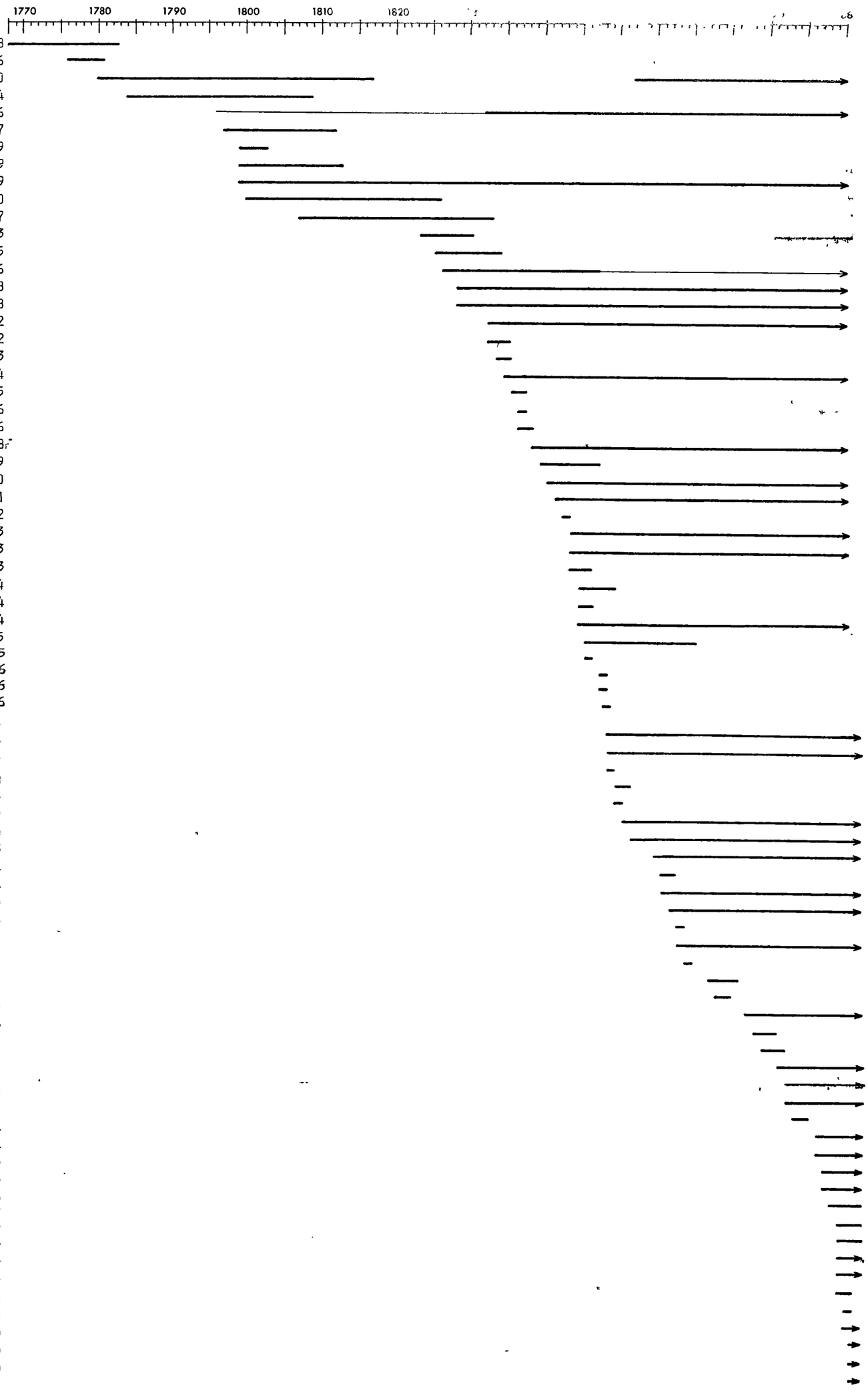
[1] Agricultural Magazine and Journal of Scientific Farming 1845-6; Agricultural Magazine and Plough 1847-51; Agricultural Magazine, Plough and Farmer's Journal, 1851-9.

Table VII: Agricultural Journals and Newspapers 1770-1880

SHORT TITLE, WITH YEAR OF FIRST PUBLICATION	
MEMOIRS OF AGRICULTURE	1768
FARMER'S MAGAZINE	1776
J. BATH AND WEST (1)	1780
ANNALS OF AGRICULTURE	1784
BELL'S WEEKLY MESSENGER (2)	1796
COMMS. BOARD OF AGRICULTURE	1797
RECREATIONS IN AGRICULTURE	1799
AGRICULTURAL MAGAZINE (3)	1799
TRANS. HIGHLAND & AG. SOC.	1799
FARMER'S MAGAZINE (EDINBURGH)	1800
FARMERS' JOURNAL (4)	1807
FLEMING'S WEEKLY EXPRESS (5)	1823
CORN TRADE CIRCULAR	1825
BRITISH FARMER'S MAGAZINE (6)	1826
QUAR. J. AGRICULTURE (7)	1828
VETERINARIAN	1828
MARK LANE EXPRESS	1832
FARMER'S MAGAZINE	1832
NEW FARMER'S JOURNAL	1833
FARMER'S MAGAZINE	1834
AG. & INDUSTRIAL MAG.	1835
BAXTER'S AG. ANNUAL	1836
AGRICULTURIST	1836
TRANS. YORK AG. SOC.	1838
FARMER'S JOURNAL	1839
J. ROYAL AG. SOC. ENGLAND	1840
JOHNSON & SHAW'S ALMANACK	1841
AGRICULTURAL ADVOCATE	1842
FARMER'S HERALD (CHESTER)	1843
LONDON CORN CIRCULAR	1843
ANN. REG. AG. IMPLEMENTS	1843
SCIENTIFIC & PRACTICAL AG'LIST.	1844
BRITISH CULTIVATOR & AG. REV.	1844
AGRICULTURAL GAZETTE (8)	1844
AGRICULTURAL MAGAZINE	1845
~~FARMER'S CHRONICLE~~	1845
~~AGRICULTURAL STATIST~~	1846
AGRICULTURAL ADVERTISER	1846
FARMER'S GAZETTE	1846
GARDENERS' AND FARMERS' J.	1847
ROTHAMSTED MEMOIRS	1847
FARMER'S FRIEND	1847
AGRICULTURIST	1848
CROSSKILL'S IMPLEMENT NEWSPAPER	1848
NORTH BRITISH AGRICULTURIST (9)	1849
POULTRY	1850
FIELD	1853
POULTRY CHRONICLE	1854
J. FARMERS' CLUB	1854
MORTON'S NEW FARMERS ALMANAC	1855
BRITISH YEAR BOOK FOR THE COUNTRY	1856
THORLEY'S FARMER'S ALMANAC	1856
FARMER'S RECORD	1857
THORLEY'S AGRICULTURAL GLEANER	1860
PRACTICAL FARMER'S CHRONICLE	1861
THE FARMER (10)	1865
FARMERS J. & AG. MAG.	1866
PRACTICE WITH SCIENCE	1867
C. OF AG. J. & FARMERS CHRONICLE	1869
AGRICULTURAL ECONOMIST	1870
PROC. CENT. CHAMBER OF AG.	1870
MILK J. & FARMERS' GAZETTE	1871
LIVESTOCK JOURNAL (11)	1874
POULTRY WORLD	1874
AG.STUDENTS' GAZETTE(CIRENCESTER)	1875
IMPLEMENT & MACHINERY REV. (12)	1875
DAIRYMAN	1876
CORN TRADE J.	1877
CORN EXCHANGE	1877
J. BRIT. DAIRY F. ASSN.	1877
POULTRY CLUB YEAR BOOK	1877
FARMER'S GAZETTE	1877
AGRICULTURAL WORLD	1878
LIVESTOCK J. ALMANAC	1878
COUNTRY GENTLEMEN'S ALMANACK	1879
FARMER'S & COUNTRY GENT. ALMANACK	1879
COWKEEPER & DAIRYMAN'S J.	1879



Notes

(1) Letters and Papers....1780-1816 (2) Little agricultural content before 1832. (3) Commercial and Agriculture Magazine 1799-1802 (4) Evans and Ruffy's Farmers' Journal and Agricultural Advertiser. (5) British Farmers' Chronicle 1826-9 (6) Contents identical with Farmer's Magazine after 1846 (7)'Quarterly' dropped 1843; Country Gentleman's Magazine 1868. (8) With Gardener's Chronicle until 1874 (9) Continuation of Ayrshire Agriculturist (10) Continuation of Scottish Farmer and Horticulturist; published in London 1867. (11) Fancier's Gazette 1874-5 (12) Implement Manufacturer's Review 1875-8.

carrying the sort of data that one would expect from such publications - important dates, markets, fairs, meetings, general and political information, and so forth, - they also provided a full review of the leading events and debates of the past agricultural year, and were thus a very good way for the agriculturist to keep up to date on matters of agricultural progress.

As the table of periodical titles shows, there were many more ephemeral publications but, often running for only a year or so, they did not establish a following. In addition to the strictly agricultural titles considered here, many others contained some agricultural content, such as the Journal of the Society of Arts, the Quarterly Review, and rural affairs papers such as The Field.

Before examining the relation of the Journal of the Royal to these various titles, we may briefly consider the status of the agricultural press in Victorian England. Morton and others often regretted that books and periodicals on agriculture were not very highly regarded by those for whom they were intended. As a whole, the agricultural press viewed itself as something of a 'poor relation' in the publishing world of the day. As the writer of Morton's obituary in the Agricultural Gazette noted, he was 'only a farm editor, we admit - and this means being an editor of a section of the press which has never had much recognition, from the public, and still less, from the state!.'[1] Part of this is attributable to changing social and economic conditions whereby agriculture and the problems of agriculturists were pushed into the background as far as public attention was concerned, which was in turn a reflection of the increasing preponderance of urban over rural interests. There was a tendency for rural affairs to be portrayed in the

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[1] A.G., 7 May 1888.

national press as backward, dull, something to be ridiculed. This was sometimes bitterly complained of in the agricultural press as the following extract from the Farmer's Magazine demonstrates. It is an attack on the way in which London daily papers reported the numerous autumn agricultural gatherings, which were sometimes made out to be merely extensions of the old protection meetings:

> We were much amused, a few years since, with a batch of men from the "gallery", who, in the dull time, went down specially to the Royal Bucks Agricultural Association at Aylesbury. They began with a good lunch, then they smoked their cigars, and wandered over the town to look at the gaol and the church, or at anything but the cattle show, which they carefully avoided. However, they were ready again in two or three hours for the dinner and Mr. Disraeli, with a full report of whose speech they started back again, having a supreme indifference for anybody else or anything else connected with the especial object of the occasion. Then with a proof at his side, the critic of the Sanctum goes to work. If the orator was cheered in the country, he is abused in the town. If he is a popular country gentleman the most pitiless ridicule and abuse is pretty sure to be his portion; and if the farmer is ever mentioned at all, it is only to be laughed at. Even Punch still imbues him with the vernacular of the comic countryman when he
>
> 'Took up to poarching in the sayzon o' the 'ear ". [1]

Another example of the way the agriculturist was portrayed in the London periodical press is this introduction to 'country newspapers' in Temple Bar, 1864, which demonstrates the patronising air with which agricultural affairs were often viewed:

> The English Farmer is a splendid specimen of the human race. He can

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[1] 'The Tone and Tendency of the Autumn Meetings', F.M.(3), XX, 1861, p.436.

> generally ride well to hounds and has of late years picked up some queer ideas at Cirencester and other centres of science... But the sort of writing which is intelligible to ordinary men is to him a mystery. He would make nothing of a Times leader. He would find the Saturday Review as inexplicable as if it were in sanscrit. His mind has run in other grooves; and he would have much the better of you or me, intelligent reader, if it were a question of judging a shorthorn or a crop of wheat. Small blame to our agricultural friend if he ignores what you and I think excessively interesting. One cannot do everything.[1]

If we consider the relations of the Royal Agricultural Society's Journal to the other periodicals that we have reviewed in the preceding pages, the outstanding point is that the Journal clearly represented the most important single collection of original material on scientific and technical agriculture. It was not the only source: the Journals of the other major agricultural societies - Highland, Yorkshire (especially in its early years) and the Bath & West - carried some original papers and reports, and original research of relevance to agriculture was published by learned societies; the Geological, Chemical, British Association, Royal Society, and Society of Arts were among the most important. Parliamentary Commissions and Enquiries also generated information, and there were numerous observations and experiments by practising farmers and others that were more likely to be published in the newspapers as the Journal as we have seen, was not really a topical forum except in the 1840s. Newspapers and periodicals were not without original articles but on the whole they were more derivative in character: the Journal of the Royal maintained its reputation as 'the best

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[1] 'Country Newspapers', Temple Bar, X, 1864, p.131.

collection of original agricultural essays in the language'. [1]

Although emphasis could vary, all the agricultural newspapers gave full coverage to technical and scientific progress in agriculture. By 1848, J.F.W. Johnston could observe that

> the weekly journal is considered badly conducted which in every number does not embody some scientific and especially some chemical information. Scarcely a provincial paper which boasts an agricultural corner but indulges freely in chemical nomenclature, as being now agreeable to the taste and within the easy comprehension of almost every farmer; while the bearings of geology and physiology on matters of rural industry are discussed by countless correspondents in the increasing though still too limited agricultural periodicals. [2]

As there was little concession towards popularisation of the Journal, the newspapers and periodicals provided a way in which original findings could 'filter down' to the tenant-farmer. Thus, any consideration of the influence of the Journal cannot be taken in isolation from the agricultural press as a whole which provided a vital 'relay' function. The periodicals and newspapers carried a great variety of content, but all gave attention to the affairs of the Royal. The Gazette made a conscious effort to republish articles because of the high cost of the Journal, [3] but all reproduced articles, sometimes with extensive comment. In addition, Council meetings and the shows were given full coverage, so that the content of the Journal and the other proceedings of the Society were constantly placed before the agricultural community.

This leads us to the question of the circulation and readership of the

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[1] A.G., 13 October 1866.

[2] J.F.W. Johnston, 'The Present State of Agriculture in its Relations to Chemistry and Geology', Journal, IX, 1848, p.205.

[3] A.G., 18 September 1852.

Journal, and the newspapers and periodicals to which it was so essentially linked. As the Journal was sent free of charge to members, basic circulation can be readily equated with the total of members in any year, which broadly fluctuated between five thousand and seven thousand during the period of this study (Figure II). To this may be added sales to non-members, but such sales were low before the 1870s - the accounts indicate that they were rarely as high as 250. In the 1870s when the Journal increased in popularity, there is evidence of an increase of sales to non-members. In 1873, when the membership stood at 5,916 the Journal Committee recommended an increase in the print from 6,000 to 6,500 and this was further increased to 8,000 in 1878 when the membership stood at 7,332. It is not justified to add these figures to the membership to arrive at a circulation total because as members received a copy whether they wanted it or not it was probable that many would not even open its pages. As Sidney put it, with characteristic forthrightness, 'He had never seen a work with so large a circulation that was so little read.'[2] This was during the unpopular phase of Frere's editorship and there is evidence that the Journal became a good deal more popular in the 1870s: assessments of the Journal are considered in the next section of this chapter.

It is not the direct influence of the Journal that we must look to so much as the way in which its information was linked to the alternative printed media which might be expected to be more widely consulted. Examples of these information linkages are analysed after a review of contemporary

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[1] A.G., 18 September 1852.

[2] At the General Meeting of 1867, F.M.(3), XXXIII, 1868, p.39.

assessments of the Journal, but before proceeding to this we need to give some attention to the circulation and readership [1] of the agricultural newspapers and periodicals of our period. Virtually our only source here is the parliamentary stamp returns for newspapers, the 1d stamp being compulsory until 1855. From these, the weekly average of stamps issued to the most important newspapers are presented as graphs in figure III for the thirty years 1840-1870, when the returns ceased to be published. [2]

These graphs show a number of interesting features but need much qualification. Bell's Weekly Messenger exhibits a continuous decline which had started earlier in the century as competitors took some of its market. The distinct dip in 1853 may be related to the launch of the Field which quickly established a reputation as a rural affairs paper and outsold Bell's by 1870. A difficulty in interpreting the Bell's returns is that it was only the Monday issue which had a significant agricultural content and the separate editions are not differentiated. It is also probable that the Monday

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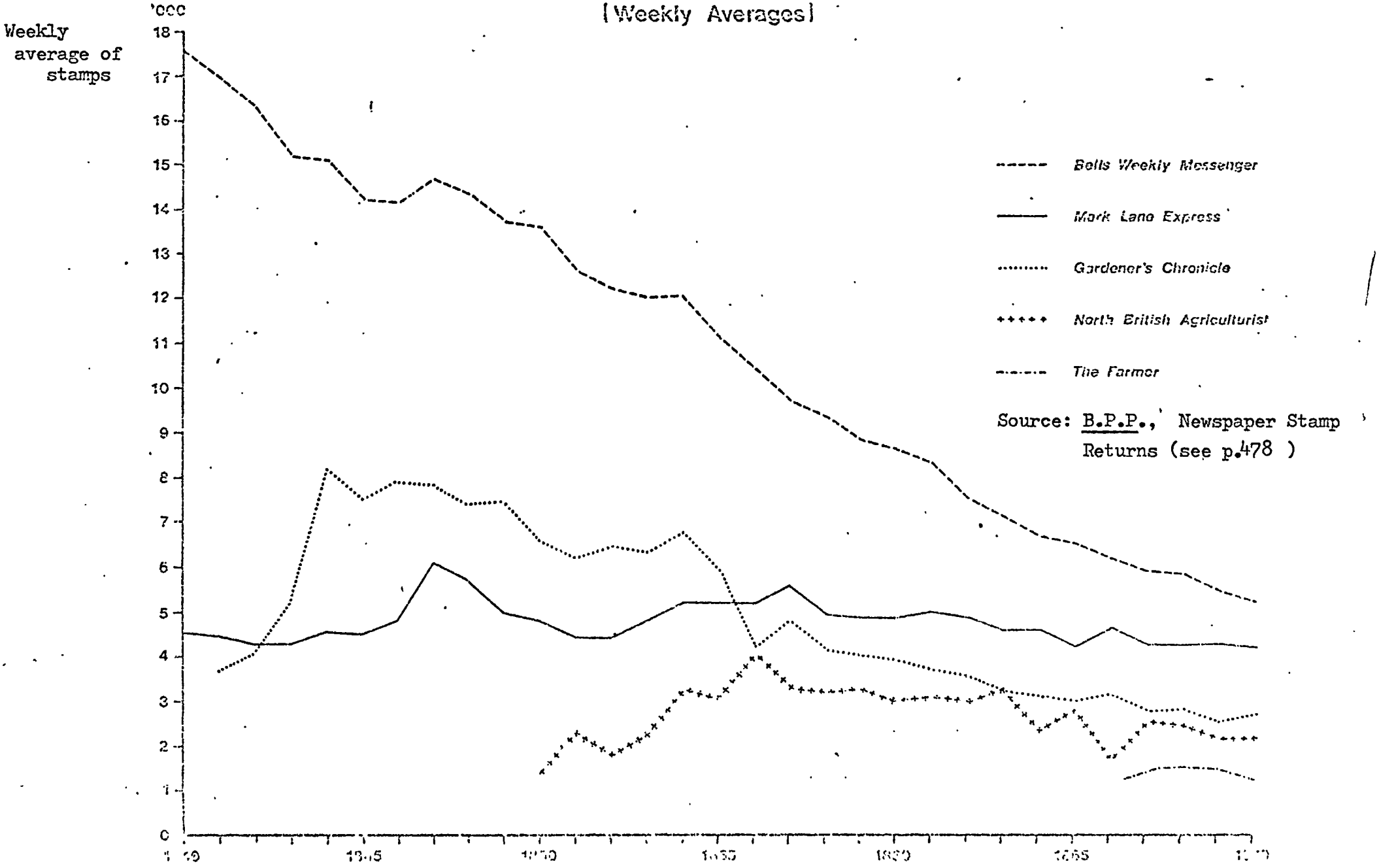
[1] The question of the literacy of agriculturists would seem not to be an issue for this period. Richard D. Altick gives a national literacy figure of 67% for 1841 (Victorian People and Ideas, 1973, p.60), and it seems probable that the occupiers of holdings of any substance - the potential readers of agricultural publications - would have had no difficulty in this respect. J.R. Walton (thesis, p.196) found illiteracy among Oxfordshire farmers negligible between 1837-80.

[2] On the use of the stamp returns see Joel H. Wiener, 'Circulation and the Stamp Tax', in J. Dan Vann and Rosemary T. Van Arsdell, Victorian Periodicals, 1978, pp.149-73. On the problem of the pre- and post-1855 returns, Alvar Ellegard, 'The Readership of the Periodical Press in mid-Victorian Britain', Goteborgs Universitets Arsskrift, LXIII, 1957, pp.4-40.

FIGURE III. Stamps issued to leading Agricultural Newspapers 1840-70

(Weekly Averages)



Source: B.P.P., Newspaper Stamp Returns (see p.478)

paper would also be taken by country readers who were not 'agricultural' readers. Thus the stamp totals need to be much reduced to establish the specifically farming readership but the issue is further confused by the fact that it seems likely that the agricultural readership of Bell's became steadily more important so that as the total readership declined, the agricultural readership became a larger proportion of the lower circulation. Interpretation of the Agricultural Gazette returns is complicated because it was sold in conjunction with the Gardener's Chronicle until 1874 and it is difficult to know how many purchasers were buying it for the 'gardening' or 'agricultural' sections. There is a distinct rise in sales indicated at the time of the addition of the Gazette (1844) but the Chronicle itself would probably be attracting new readers at that time. However, Morton thought that the Gazette picked up two thousand additional readers, [1] a level of sales that is indicated by the returns. The Chronicle shows the most marked decline at the time of the repeal of the compulsory stamp in 1855, and it may be that the 'gardener' readers were more urban-based and did not receive their papers by direct mailing, leaving the majority of the Chronicle stamps after that year as relating to Gazette sales. Unstamped issues of the agricultural newspapers after 1855 are an unknown quantity and may explain the apparent tendency of static or declining sales.

With these qualifications, some estimates of the basic circulations may be made. In 1850, a time of low readership attributed to the agricultural depression [2] the sales appear to have been as follows:

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[1] A.G., 26 December 1881. I am grateful to Dr. J.R. Fisher for drawing this reference to my attention.

[2] Gardeners' and Farmers' Journal, 30 December 1848.

Table VIII: Sales of Leading Agricultural Newsparers, 1850

Title	Annual Stamps	Weekly Sales*
Bell's Weekly Messenger	703,500	13,530
Gardener's Chronicle	338,000	6,500
Mark Lane Express	246,000	4,730
North British Agriculturist	70,300	1,350
Gardeners' and Farmers' Journal	60,500	1,160

* To nearest ten.

The Bell's figures have to be reduced to take account of the large non-agricultural readership and in the early part of the century, as we have seen, the Monday edition comprised less than one-third of weekly sales. By 1850 Bell's had strengthened its position as a rural affairs paper, but many of the Monday subscribers would probably remain 'country' rather than specifically 'agricultural' readers and for these reasons the indicated Bell's sales may still need to be reduced by two-thirds. If this is accepted, and the Chronicle sales are reduced by one-half to allow for the 'gardening' readers the figure indicated for the basic agricultural subscribers of the varied titles in 1850 is 14,870. By 1870 it may be that most of the stamped issues of Bell's and the Chronicle were for agricultural readers, the totals for year ending 30 June 1870 are as follows:

Table IX: Sales of Leading Agricultural Newspapers, 1870

Title	Stamps	Weekly Sales *
Bell's Weekly Messenger	272,000	5,230
Mark Lane Express	216,000	4,150
Gardener's Chronicle	140,000	2,690
North British Agriculturist	114,000	2,190
Farmer	66,000	1,270
Chamber of Agriculture Journal	43,000	830

* to nearest ten.

which indicates a basic readership of 16,360. If the sale of unstamped copies was significant then this figure will be an underestimate, though collateral evidence indicates that the total is of the right order of magnitude. The 1870s seem to have been a decade of steady but unspectacular increase in readership of all the agricultural titles [1] and the Farmer and Chamber of Agriculture Journal, as the most recent additions, may have gained new readers. Toward the end of 1873 Morton considered that the most 'liberal valuation of the united subscription lists' of all the weekly agricultural journals was 25,000. [2] The fact that Morton stressed that this was a maximum figure, and that the papers were gaining readers in the early part of the decade suggests that a figure some way between the sales estimate revealed by the stamp issue and Morton's figure would be correct, the stamp returns possibly underestimating the total on account of the unstamped issues.

Basic sales are, of course, not directly equivalent to readership levels and it is clearly necessary to consider the extent of multiple readership if we are to estimate how many agriculturists came into direct contact with the papers. It is likely that this would have been significant, for the numerous local farmers' clubs and agricultural societies put considerable stress on the maintenance of libraries and reading rooms [3] where the papers could be consulted and they would also be available at market hostelries; the difficulty is to estimate an appropriate multiplier.

That proposed here is a three-fold one, justified as follows. A discussion on the 'Farmers' Newspaper' in 1855 stated that modest tenant farmers

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[1] A.G., 26 December 1881

[2] Ibid., 15 November 1873.

[3] Fox, 'Local Associations', p.49.

would contribute 5/- towards the average annual subscription of £1. 10s. for an agricultural paper and then share it between a local group; thus one of the characteristics of the farmers' paper was its 'itinerant character, carrying the news of the week from farmhouse to farmhouse' and this indicates a six-fold multiplier, a level of readership that has been postulated for the popular press of the time generally and has been noted for a local newspaper in an agricultural context while the editor of Bell's Weekly Messenger thought that each issue was read by five different readers earlier in the nineteenth century.[1] However, it is considered here that a five or six-fold multiplier cannot be properly applied to the basic sales as many copies - those which went to substantial landowners or farm bailiffs - would not be likely to enter into multiple readership and there is the additional complication that some of the agricultural 'enthusiasts' of the time probably subscribed to more than one title. Thus the five or six-fold level of multiple readership indicated needs to be reduced, and it is also felt that it is better to err on the side of caution on this question. If a three-fold multiplier is applied to the basic sales that have been discussed then an estimate of readership of 40,000 to 50,000 between 1840 and 1870 may be taken as realistic.

This leads to the question as to the proportion of all agriculturists that came in contact with an agricultural paper. The census return enumerated 249,431 'farmers and graziers' in 1851 and 233,993 in 1881.[2] In addition, there were 'landowners' and 'farm bailiffs' to be counted among potential subscribers, while J.C. Morton thought that only those occupiers of holdings

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[1] 'The Farmers' Newspaper', F.M.(2), VI, 1854, p.486; Alan J. Lee, The Origins of the Popular Press 1855-1914, 1976, p.35; Stuart Macdonald, 'The Diffusion of Knowledge among Northumberland Farmers 1780-1815', A.H.R., 27, 1979, pp.31-2. B.W.M., 4 August 1811.

[2] J.H. Clapham, An Economic History of Modern Britain, II, 1932, p.263.

in excess of 100 acres could be reckoned as likely purchasers of agricultural newspapers.[1] In 1851 the census returned 36.2 per cent of farms - 80871 out of a total of 223,227 (including 7656 of less than 5 acres)-as being in excess of Morton's threshold size.[2] On the basis of the 1861 figures - which gave farm size in ten representative counties but which Clapham thought unsatisfactory in the lower levels[3] - Morton took only 22 per cent as being in excess of his 100 acre 'threshold' figure. He therefore estimated the potential readership of agricultural publications in 1865 as 120,000 persons, consisting of 50,000 farmers, 30,000 landowners, and 10,000 farm bailiffs from England and Wales with an additional 30,000 drawn from Scotland and Ireland.[4] It is probable that this is rather an underestimate if, in the calculations, undue bias has been given to the smaller holdings, and Morton revised his estimate of the potential readership upwards in the 1870s.[5] While it is difficult to draw precise conclusions, it may be reasonable to suggest that while the majority of agriculturists did not come into contact with an agricultural publication between 1840 and 1880 - a finding that is fully in line with contemporary observations - perhaps about one-third of the more substantial landowners or tenant-farmers, who may be expected to have had the role of 'opinion-leaders' or 'change-agents' did read agricultural newspapers in Victorian times, and it may be considered that this is by no means an insignificant proportion, despite Morton's several complaints about the indifference of agriculturists to the printed media.[6] Certainly at the levels of

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1 J.C. Morton, 'Agricultural Education', Journal, XXV, 1864, p.456.

2 Clapham, II, pp.263-4.

3 Ibid., p.265.

4 'Agricultural Education', p.456.

5 A.G., 15 November 1873.

6 'Agricultural Education', pp.455-6; A.G., 15 November 1873, 11 June 1877, 26 December 1881.

circulation that have been discussed some of the publications may have been at the margin of financial viability for the assemblage of extensive market information which was a feature of the newspapers was costly. Thus in 1872 the Mark Lane Express, at 7d., was the most expensive weekly newspaper published in London.[1] Neither were the papers made very attractive for the casual farming reader, as J.R. Fisher has pointed out,[2] and Morton complained of the greater success of 'lighter' rural affairs papers such as The Field, Land and Water, and Livestock Journal at the expense of papers such as the Agricultural Gazette the publication of which, despite some increase of sales during the 1870s, had been an 'uphill game' for its conductors.[3]

Apart from the periodicals and newspapers, there was also no shortage of new agricultural books and pamphlets during our period. Agricultural book sales statistics are very hard to come by for the nineteenth century, but Morton presented some figures in his 1865 lecture to the Royal on agricultural education, and a selection of these are reproduced in the following table:

Table X ; Sales of Leading Agricultural Books and Pamphlets, 1865

Title	Price	Date of Publication	Number sold
Johnson and Shaw's Farmer's Almanac	1 0	1841-65 (annually)	373,000
New Farmer's Almanac	1 0	1855-65 (annually)	9,000
The Agriculturist's Calculator (Blackie)	8 0	1851	10,000
Cyclopaedia of Agriculture (Loudon)		1825	9,000
Rural Cyclopaedia (Fullarton)	1 0 0	1848-52	9,500
Agricultural Cyclopaedia (Morton)	3 16 0	1856	8,500

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1 J. Grant, The Newspaper Press, III, 1872, p.127.

2 J.R. Fisher, 'Public opinion and Agriculture 1875-1900, unpub. Ph.D. thesis, University of Hull, 1972, p.23.

3 A.G., 26 December 1881. See also Nicholas Goddard, 'The Development and Influence of Agricultural Newspapers and Periodicals', A.H.R., (forthcoming).

Table X : continued

Title	Price	Date of Publication	Number sold
Lois-Weedon Husbandry (Smith)	1 0	1849, 1856	7,000
C.W. Johnson on Fertilisers	1 0	1844	c. 6,000

A number of other titles were included on Morton's list, but many of the sales were much lower than those which have been reproduced here - frequently below 1,000 - although an annual sale of 500 was claimed for Mechi's How to Farm Profitably. The list was not complete for it depended on the availability of statistics; no figures were given, for example, for Stephens's Book of the Farm. Of the leading publications, particularly worthy of notice is the popularity of Johnson and Shaw's Almanac with an average of 15,570 sales per annum over the 24 year period. It is not clear whether the 9,000 for Morton's own New Farmer's Almanac relate to annual figures or the total sales since its commencement. It seems possible that it was an annual sale, given the popularity of this form of publication and the respect with which Morton was held. The figures confirm cyclopaedias which brought together the best advice available as the most popular form of agricultural book, while the relatively high sales of the Rev. H. Smith's pamphlet is indicative of the interest aroused in his Lois-Weedon husbandry during the 1850s.

Morton deplored the reluctance of farmers to buy agricultural books and a reviewer of the second edition of Stephens's Book of the Farm complained that there was less demand for works on agriculture than for any other class of book and such remarks are not infrequently encountered during our period, [1] but even if farming books were not best-sellers, their sales, allowing for multiple readership (particularly of such works as Morton's own Cyclopaedia

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[1] Journal of Agriculture (N.S.), 1853, p.117.

of Agriculture) are not altogether insignificant, especially as few works attempted to give succinct summaries of the best advice and practice. Morton made some efforts in this direction with his own Handbook of the Farm series, the first title of which was Robert Warington's Chemistry of the Farm published in 1881 and was 'one of the most successful books ever issued on the subject' passing through fourteen editions and four revisions in twenty years. [1]

Any survey of the printed media on agriculture must also take account of the agricultural content of local newspapers which often had an agricultural basis and covered topics of farming interest, often derived from the national publications. It therefore seems that this variety of printed media could be significant in transmitting information about agricultural techniques to the more substantial Victorian agriculturists. Local discussions and meetings were probably more attractive and useful to the smaller farmer as mediums of instruction and, taken together, the Victorian farmer was really very well informed about advances in agricultural technique and new methods. Before we consider some of the linkages in the transmission of agricultural information during the period, we may consider how the agricultural community regarded the Society's Journal.

Contemporary Assessments of the Journal

The Journal was regularly reviewed in the more widely-read agricultural publications, although the reviewers may often have been 'enthusiasts' for the cause of scientific agriculture and not necessarily representative of agricultural opinion more generally.

There are abundant testimonies of the high regard in which the Journal

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[1] Russell, p.162. Warington worked with Lawes at Rothamsted after 1876.

was generally held during the initial 'Pusey Period' (as Earl Cathcart termed it).[1] As early as 1843 it was observed in the Quarterly Review that:

> The Journal of the Royal Agricultural Society will be a permanent monument to the honourable member for the County of Berkshire whose patriotic earnestness of purpose induced him to take on himself the gratuitous labour of its editorship. The same spirit of zealous endeavour to assist in teaching the farmers of England to meet the necessities of the times has prompted Mr. Pusey not only to prepare for the press the contributions of others, but also to enrich its pages with several most instructive articles from his own skilful pen on the recent improvements in agriculture and its actual conditions in some of our counties where it is most advanced.[2]

By the end of the 1840s the Journal was recognised as the 'most valuable part of the Society's labours'[3] and commentat this time note it as being 'excellent' or 'so useful'.[4] In the early 1850s there was consistent praise from reviewers in the Agricultural Gazette: in 1852, with Pusey's 'able editorship' it was said that no work had done more to increase and diffuse agricultural information;[5] part two of volume fourteen (1854) was said to be 'one of the most instructive and useful that has yet been issued', the reviewer noting that year after year, for so long a period, the large volumes of the Journal had been issued with unabated freshness and instructiveness.[6] Under Pusey's editorship the Journal had become the 'most useful and instructive periodical that agriculturists had ever read'.[7]

The generally favourable view taken of the 'Pusey Period' of the Journal was echoed in the tributes paid to him at the Carlisle meeting, at the time

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1 Cathcart, 'Thompson', p.531.
2 Quarterly Review, LXXIII, 1843, p.481, also quoted by Clarke, 'Pusey', p.6.
3 W.C.S., 'Expenses of the Agricultural Society', A.G., 27 January 1849.
4 F.M.(2), XXII, 1851, p.60 and II, 1852, p.127.
5 A.G., 7 February 1852.
6 Ibid., 28 January 1854.
7 Ibid., 14 July 1855.

of his death. The Journal was, according to Sir James Graham, the 'fountain of agricultural knowledge and useful information which, like irrigation well conducted, carried in a thousand different channels these little rills of information', [1] and this was typical of the comments made. Pusey's obituary in the Farmer's Magazine noted that the Journal was the best evidence of his endeavours for scientific farming. [2]

If there was criticism of the Journal under Pusey's editorship, it mostly concerned the place of science in its content. On the occasion of the change of editorship, an article in the Farmer's Magazine reviewed the progress of "Practice with Science". Although noting that the Journal had acquired a high reputation and that writing on agricultural matters seldom contained 'so large amount of wheat mixed with so small a quantity of chaff' there had been complaints that the editorship was too much like 'the consulship of Julius Caesar, or the First Napoleon: the early phase commenced with ... "Practice and Science" inscribed on its banners; the savans readily and cheerfully flocked to its standard, but their articles were too often science without practice, and smacked too much of the college'. The review went on to note, however, that the Journal in the course of its career broke down resistance to science aided by recognition of the efficacy of guano and other chemical manures. [3]

After the death of Pusey, the Journal received a more mixed reception. Part I of volume XVI (the first issued under the new regime), was noted as 'maintaining the character it had attained under Mr. Pusey's editorship', and

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1 F.M.(3), VIII, 1855, p.215.

2 'The Late Philip Pusey Esq.', Ibid.(3), VIII, 1855, p.132.

3 "Practice with Science", Ibid.,(3), IX, 1856, p.157.

Thompson's innovation of sections for statistical data and miscellaneous contributions were approved of.[1] The issues for 1856 reflected 'great credit on the arrangements made for carrying on the editorship of the work', maintained its 'high character' and were 'exceedingly interesting and useful'; part two of volume seventeen contained 'a number of very useful articles'.[2] At this stage the difficulties connected with the joint editorship of Acland, Hoskyns and Thompson had not become generally apparent but by the time of Frere's election to the editorship a groundswell of dissatisfaction with the conduct of the Journal and its content is detectable. At the 1857 General Meeting it was described as inadequate, and it was claimed that the Journal was hardly ever seen by many farmers being 'put down with despair', and there had been calls for the whole management of the Journal to be considered by the Council.[3] Looking over the period between 1855 and 1860 it was observed in the Mark Lane Express that 'never since the death of Mr. Pusey has the Journal, in public opinion, been done full justice to'.[4]

Thus Frere embarked upon his editorial duties under highly inauspicious circumstances: the Journal had fallen in the esteem of the agricultural community, and he was considered ill-qualified to undertake the work. For these reasons his own writing for the Journal came under particularly close scrutiny and was soon found wanting. Frere's survey of steam cultivation[5] was not considered very 'readable for the working man',[6] and on the basis of this and other contributions 'an indignant member' complained that his style

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1 A.G., 14 July 1855.
2 Ibid., 24 February, 23 August 1856, 14 February 1857.
3 F.M.(3), XIII, 1858; A.G., 31 July 1858.
4 M.L.E., 9 January 1860.
5 P.H. Frere, 'On the Present Aspect of Steam Cultivation', Journal, XXI, 1860, pp.401-3.
6 A.G., 9 March 1861.

was 'confused and unintelligible' and would have 'disgraced any schoolboy... when agriculture is put aside for "literary" attainments we are entitled to expect the latter to be the crême de la crême'. [1] The following extract is an example of Frere's style which was complained of in a review of the Journal in 1863. It was part of an editorial note on co-operative farms:

> In these days when strikes and other combinations antagonistic to freedom, to intelligence, and to progress are rife, for the short-sighted purpose of prctecting one calling to the injury of the community at large, (and especially of the largest and poorest class, whose right to gain an entrance into a trade or craft is thwarted), any plan which assists workmen . legitimately to unite in an undertaking on which their sympathies, their experience, and their intelligence may be brought to bear - an undertaking which holds out a prospect of considerable, and on the whole, steady profits, seems worthy of consideration and of such discussion as the leading features of the scheme naturally suggest. [2]

It is perhaps understandable that these long and involved pieces were not to the taste of the practical agriculturist.

Another aspect of Frere's contribution to the Journal that was objected to concerned some of the opinions that he expressed. Morton took particular exception to Frere's views on the position of the labourer in the latter's survey of steam-cultivation in 1860. The point at issue was the equalisation of work on the farm through the year. With horse-power, Frere maintained, the horse, if kept through the slack time, ought to be found some work but 'The man, feeling some of the drawbacks as well as the advantages of not being a "chattel" ' had 'to trust to kindness and discernment, with the poor-

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[1] Ibid., 14 September 1861.

[2] P.H. Frere, 'Remarks on Mr. Gordon's Letter' (on co-operative farms), Journal, XXIV, 1863, pp.172-3, quoted in 'Review of Journal', A.G., 21 March 1863.

-house in the background'. Morton thought that Frere's sentiments about the 'drawbacks' of not being a 'chattel', his view that the workhouse was the only alternative to spreading the farm work through the year, and also his advocacy of the Russian system of labourers' pass-books containing a statement of character to be 'monstrous and horrible'. [1]

Criticism at this time was directed not only to Frere but also to the Journal Committee and, more especially, its Chairman, H.S. Thompson. Part of this criticism surrounded matters of policy such as the question of prize essays and the 'forbidden topics' that were excluded from the Journal. There was also dissatisfaction over the way in which some material which was given to the Society as a lecture or paper at one of the weekly meetings was held back for inclusion in the Journal rather than given more immediate circulation. An example was Simmonds's very important statement, in 1861, on rot in sheep which was not much publicised. Thompson was thought to oppose admission of reporters to the 'Wednesday Afternoon' meetings (where Simmonds's paper was first given) in contrast to the view taken by Hoskyns and others. Sidney maintained that it was not consistent with the aims of the Society for such 'a significant statement' to be 'cuddled up on the shelves of the printing department... instead of being diffused to the world' and that the Journal, as a permanent record of agricultural progress, would not be harmed if some of the matter was first published in the agricultural press.[2] Corbet expressed the point very directly:

> The Journal thus promises to become as great a bugbear as the very Charter itself. You can't do this because of the Journal and you must not do that on account of the Charter, until one feels tempted

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[1] A.G., 20 December 1862.

[2] F.M.(3), XX, 1861, pp.432-3; A.G., 27 April, 18 May 1861.

to follow Old Noll's example and to march in with a file of common members... and the angry order to 'take away that bauble! ' [1]

Central to this discussion was the underlying issue of character of the Journal and its role in the agricultural community. In 1862 C.S. Read denounced it as 'bulky and ponderous' and another critic called for it to be published in a form that was more readable and 'come-at-able' by members. [2] Ordinary farmers, it was felt, were dissuaded from contributing information. [3] Sidney maintained that the principles under which it was managed were unlikely to make for success. There was widespread resentment over the payment of a salary to Frere, especially when, under his editorship, the Journal was perceived as being aimed towards the 'educated classes only' in contrast to the position that had obtained in Pusey's time when it had also been edited without payment. When Frere's successor was under consideration Thompson declared himself satisfied with the Journal to which Sidney retorted that 'every monkey admired its own mannikin'. Thompson was incapable, Sidney maintained, of making the Journal both useful and intersting and it was dull because Thompson insisted on making the person under him conform with his opinions. [4] In defence of his management, Thompson maintained that it was necessary to distinguish between a work of

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[1] Ibid., p.429.

[2] At the December General Meeting, F.M.(3), XXIII, 1863, pp.8-9.

[3] A.G., 15 March, 20 December 1862.

[4] Remarks at the July Meeting of members, 1868, F.M.(3), XXXIV, 1868, p.167.

reference which had the best articles that could be obtained and the weekly paper that could be more light and amusing. [1]

Although there were persistent attacks in the Farmer's Magazine and elsewhere - in 1866 it was held to be 'weak and deficient', [2] in 1868 'like a millstone around the neck, gradually sinking a sleepy crew', and that Frere's death 'did away with any embarrassment the Council might otherwise feel', [3] - there were still a number of individual articles that were very well received. Clarke's review of steam cultivation in 1863 was commended as being 'extraordinary for research and comparative power bestowed on its composition', and Dent's first stock report drew attention to the 'ability with which he advises and suggests'; it was held that 'seldom have we seen a Journal so calculated to take hold of public attention', [4] and the first issue of the new series (1865) was said to be 'an interesting and well-filled volume'. [5]

There was thus something of a divergence of opinion (between the Mark Lane Express and the Agricultural Gazette) as to the utility of the Journal under Frere's editorship. To a degree, this can be explained by the fact that Corbet was a good deal more outspoken and acerbic in character, whereas Morton was not the man to sustain longstanding animosity. Indeed, at the time of the death of Frere (who had, after all, held the post that Morton coveted), Morton recorded in the Gazette Frere's 'courage, perseverance, and ability under unusual difficulties' which had won him the 'cordial esteem of our readers'. [6] A further consideration is the high regard that Morton

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[1] Ibid., p.168.
[2] 'The New Number of the Journal', Ibid., XXVIII, 1866, p.434.
[3] 'The Present position of the Royal Agricultural Society of England', Ibid., (3), XXXIII, p.421.
[4] F.M.(3), XXIV, 1863, p.440.
[5] A.G., 25 March 1865.
[6] Ibid., 23 May 1868.

had for Thompson. In general, opinion expressed at the meetings of the Society was critical but by no means wholly condemnatory. If Frere's editorship saw the Journal undergo a rather dull period, it was still never far from the attention of the agricultural community and contained some highly important articles.

Jenkins came to the editorship under at least as inauspicious circumstances as did Frere. The Journal had fallen in public esteem - in 1868 Bailey Denton complained of its almost 'useless character' [1] - and the appointment of Jenkins was highly disapproved of, as we have seen. Yet despite these handicaps, Jenkins accomplished a remarkable revival in the fortunes of the Journal in a very short space of time. By the end of 1870 it was said that not one of the Journals of late years had so good a chance of being read as the one 'just issued by its "accomplished" editor', [2] and at the first Annual Meeting after Jenkins's appointment Sidney was pleased to pay tribute to his ability: the Journal was 'now valuable, not dull'. [3] By 1873 it was maintained in the Farmer's Magazine that the Journal was 'now an agricultural treasure and ought to be in the hands of every farmer', [4] and Mechi attributed to Jenkins the fact that farmers were much more likely to cut the pages of the Journals that they received in the 1870s than hitherto. [5] Of course, comment was not uniformly favourable but a distinct shift of opinion towards the Journal is detectable soon after Jenkins assumed the editorship. This was also connected to the general revival of the Society's fortunes brought about by approval of the stand that it took on adulterated fertilisers. Yet it is also a

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[1] J. Bailey Denton, letter, Ibid., 15 August 1868.
[2] A.G., 15 October 1870.
[3] F.M.(3), XXXVII, 1870, p.54.
[4] Ibid.,(3), XLIII, 1873, p.56.
[5] Journal of the Farmer's Club, December 1875, p.65.

reflection of the remarkable energy and talent that Jenkins brought to bear upon the Journal; under him, it was more of a 'living power' than it had been since Pusey's time.[1]

Information Linkages

We may now turn to an examination of the way in which information contained in the Journal was linked to the other printed media that have been reviewed. From the earlier extended consideration of the material in the Journal which related to the very important subject categories of agricultural science, manures and fertilisers, and agricultural drainage, the shift of ideas on plant nutrition (with the associated manurial implications) can be summarised as follows:

1840 Liebig's Organic Chemistry... dedicated to the British Association written at the request of J.F.W. Johnston, 1837.

1841 J.F.W. Johnston stressed the ammonia content of Guano as being an important fertilising constituent.

1843 3rd edition of Organic Chemistry in which Liebig denied the need to supply farm crops with additional nitrogen.
Playfair, Liebig's English translator, appointed Consulting Chemist to the Society.

1844 British Association approached Royal with regard to a programme of ash analysis.

1845 Way embarked upon ash analysis, funded by the Royal, at Cirencester.

1840-5 Miscellaneous experiments reported in the Journal, with contradictory findings.

1845/6 Liebig/Muspratt mineral manures.

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[1] A.G., 9 July 1877.

1847 Lawes's first paper attacked Liebig. Report of failure of Liebig's manures. A first report of ash analysis. Playfair resigned - Way appointed Consulting Chemist.

1848 Johnston at York: mineral theory 'death-blow'.

1849 Lawes appointed member of Council of Royal.

1850 No interest in ash analysis. Way reported to have serious doubts as to its value. Pusey repeated 'death-blow' view of mineral theory.

1851 Further Lawes article. Pusey stated 'entire failure' of mineral theory established. Rothamsted the principle source of 'trustworthy information'.

1853 Nitrogen main element for corn 'only fundamental truth' in agricultural chemistry (Pusey).

1856 Thompson: Lawes's experiments 'so conclusive'.

1857 Liebig first article in Journal but dispute 'too well known to deserve notice' (Farmer's Magazine). Voelcker replaced Way as Consulting Chemist.

This consistent shift away from Liebig to Lawes has also been noted by Peel [1] but our concern here is to consider how agriculturists viewed the controversy, especially as other national institutions did not present the same line: at the Association for the Advancement of Science, for example, Daubeny, who did not contribute to the Journal after 1842, tried to reconcile the opposing views, while agreeing with Liebig that nitrogen was not a necessary fertiliser constituent. [2]

In the 1840s, the agricultural journals gave, in general, full expression to the opposing viewpoints. An exception may have been the Highland Society Transactions which, according to the Gardeners' and Farmers' Journal refused

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[1] Peel, 'Practice with Science', p.12.

[2] Russell, pp.139-40.

a paper which attributed the beneficial effects of rape cake to azotised (nitrogenous) compenents in 1846. [1] There was far less immediate acceptance of Lawes in the farming journals than there was in the Journal of the Royal. Lawes's first paper was reprinted in full in the Farmer's Magazine in the spring of 1848 [2] and was not altogether well received. Several attacks were published by an anonymous 'T.L.C.', who went so far to state that:

> Mr. Lawes has, we believe, promised the infliction of another article on Agricultural Chemistry. We are satisfied that it will never see the light - the Journal of the Royal Agricultural Society will never again be disgraced with such worthless scientific instruction,

and called upon Lawes (i) not to presume to call his writing agricultural chemistry, (ii) to write commonsense and (iii) drop the use of favourite expressions that had no meaning. [3] The same issue contained an attack on Boussingault which led that value of manure according to its nitrogen content must be erroneous; the true value lay in 'its inorganic constituents'. [4]

Against these, and other articles which followed Liebieg, many comments were clearly critical of his views. In 1848 it was remarked in the Gardeners' and Farmers' Journal that 'we do not think the advocates of the indiscriminate application of mere mineral manures will long sustain the triumphant position which their great leader Liebig seemed to place them in when superphosphate of lime yielded large volumes of crops'. [5] The translator of a debate on manure between Liebig and Boussingault and Kuhlmann for the Farmer's Magazine

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[1] Gardeners' and Farmers' Journal, 11 March 1848.

[2] F.M.(2), XVI, 1848, pp.103-22, 321-47, 395-412.

[3] T.L.C., 'Remarks on Lawes' Paper on Agricultural Chemistry', Ibid.(2), XIX, 1849, p.8.

[4] Charles B. Boast, 'Boussingault's "Rural Economy", [illegible], Review of his Fallacies, and Remarks on Manures', Ibid., XVII, 1848, p.264. On Boussingault's contribution to agricultural science see F.W.J. McCosh, 'The Chemistry of Plant Nutrition, 1840-1860, with special reference to the Experiments of Boussingault', unpub., M.Sc. University of London, 1969.

[5] Gardeners' and Farmers' Journal, 11 March 1848.

(probably Shaw or C.W. Johnson) where Liebig stated that ammonia added to manure was useful but not essential felt it necessary to add that the

> views of the illustrious professor of Giessen are always worthy of attention, but until very strong corrobative evidence be produced, we are sorry to be of a diametrically opposite opinion...[1]

while a 'Lincolnshire Farmer' reviewing the controversy between Lawes and 'T.L.C.', recognised that Lawes's conclusions seemed to justify the practice of those who were looked upon as being the best farmers.[2]

In this way opinion in the agricultural community swung away from the principles enunciated by Liebig towards those put forward by Lawes and there was a time-lag of about five years between the appearance of Lawes's first general statement (in the Journal for 1847) and what can be taken as a general acceptance of his views, especially with regard to the question of the role of nitrogen. This can be illustrated with reference to the views put forward by J.C. Nesbit . Nesbit was extremely important as an agricultural educator in the 1850s, because he probably lectured more frequently to local farmers' clubs than any other scientist at the time and occupied a similar position to these smaller bodies as Way (and later Voelcker) did to the Royal. The early agricultural chemistry lectures that he gave to local audiences (based partly on work carried out at his agricultural chemistry academy at Kennington) were published in the Farmer's Magazine for 1846. Here he maintained that both organic and inorganic material was necessary in manures and fertilisers, but in rather ambiguous terms: the organic was necessary to 'take up' the inorganic. By 1852 his advice was unequivocal: 'for wheat those manures are

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[1] 'Liebig On Manures v. Boussingault and Kuhlman', F.M.(2), XVI, 1847, p.511.
[2] 'A Lincolnshire Farmer', 'Mr. Lawes and T.L.C.', Ibid.(2), XIX, 1849, pp.505-8.

best which contain ammonia or nitrogen.'[1] In the same year it was confidently stated by Augustus Voelcker that nitrogen was 'without doubt the most important of all fertilising substances', that nitrogen in a free state was not assimilated by plants, and that few would not ascribe the forcing effects of guano to the ammonia that it contained.[2]

In one sense it could be maintained that the understanding by the farmer of the scientific principles of manures and knowledge of their beneficial constituents was not of great consequence so long as the substances concerned were put to good use. If guano had a readily perceivable effect on wheat, the reason for this was not necessarily of concern to the agriculturist. Yet such a view would be mistaken on two main grounds. Firstly, knowledge of the valuable components of the different fertilising substances available would allow their application to be regulated with greater efficiency. The indiscriminate use of guano on crops which it did not particularly benefit was clearly very wasteful. Secondly, knowledge was useful as a guide in the purchase of fertilisers and analysis could indicate its real worth. Farmers could discriminate between different types of grade of fertilising substance and it was recognised that the success which would attend the adoption of artificial manures would in part depend upon the attention given by the farmer to the principles which regulated the manufacture of the fertiliser.[3]

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[1] J.C. Nesbit, 'On General Agricultural Chemistry, and the Nature and Applications of Manures', lecture I of On Agricultural Chemistry and the Nature and Properties of Peruvian Guano, 4th ed., 1856, originally given at Dorchester, 27 January 1852 and reported in F.M.(3), I, 1852, pp.139-48.

[2] Augustus Voelcker, 'On Artificial Manures in general and in Bone Manure in Particular', Ibid., p.416.

[3] 'Artificial Manures', in J.C. Morton ed., Cyclopaedia of Agriculture, 1855, p.115.

Interest in the Liebig/Lawes controversy declined during the 1850s, and was, as we have seen, no longer considered worthy of comment in the Farmer's Magazine of 1856. Acland gave attention to the issues in the Journal of the Bath & West and his views were brought together in a pamphlet of his on agricultural chemistry. This examined the question at dispute, gave full coverage of the conclusions of Lawes and Gilbert, and brought out the practical relevance of the debate for the agriculturist, but the controversy between Lawes and Liebig was then considered closed. [1] Most reviews of agricultural chemistry paid tribute to the stimulus that Liebig had given to the subject but to the English agriculturist he was an 'untrustworthy agricultural authority'. [2] It is instructive to compare the British experience of the development of ideas about plant nutrition with the American. Interest in agricultural chemistry was initially much greater in the British Isles because North America had greater reserves of untouched land in the 1840s. Guano was comparatively little used there but the problems that were discussed in Britain on fertilisers and adulterations in the 1840s became important a decade later. John Pitkin Norton, who led the agricultural chemistry movement in America and who was opposed to many of Liebig's views was much influenced by J.F.W. Johnston, whom he first visited in Durham and Edinburgh in 1844. [3]

The most important implications of the Liebig/Lawes controversy for the English agriculturist clearly had to do with the application of fertilisers of various types. Discussion of agricultural chemistry stimulated fertiliser manufacture, and by the early 1850s there was an astonishing variety of proprietary manufactures to choose from and these differed greatly in worth and

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1 'Notice' to Thomas Dyke Acland, Meat, Milk, and Wheat: an Elementary Introduction to the Chemistry of Farming, 1857.

2 A.G., 11 February 1860.

3 Margaret Rossiter, Emergence of Agricultural Science, pp.39, 91-108.

value. The section on 'artificial manures' in Morton's Cyclopaedia of Agriculture lists no less than twenty-two of these.[1] There was abundant advice offered on the application of fertilisers but it was scattered in a very diffuse form in the Journal, and in other periodicals, newspapers and books, and given in umerous lectures across the country at local farmers' societies and clubs. In examining the 'influence' of the Journal we need to assess how far the information tendered to farmers through these diverse channels emanated from the Royal through its publication.

We have shown the shift away from Liebig's views which are discernible in the alternative printed media and in lectures. As far as there were any general principles eatablished by the 1850s it was that (i) nitrogenous matter was an important constituent of manures;[2] (ii) that 'azotised' material was more important for wheat; (iii) that phosphates were particularly useful for turnips;[3] (iv) a persistent recommendation was the addition of salt to nitrogenous manures to counteract over-luxuriant growth and to strengthen straw.

The first three of these recommendations can be clearly traced to Lawes's early work published in the Journal in the late 1840s but backed up by a great number of additional observations and advice published throughout the agricultural press. The Rothamsted work accorded with practical observations and at the same time provided a theoretical base for what was becoming routine farm practice by the early 1850s. But such work, even if it did not necessarily directly affect practice had great practical importance: almost no authority discounted the importance of the ammonia content of guano (as Liebig had done) and, in its purchase, great stress was laid upon linking the

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1 I, pp.20-3.
2 F.M.(3),I,1852, p.416.
3 Ibid., pp.429-30.

price to the ammonia content by analysis. Here, the work of Way as Consulting Chemist to the Society, and which was first published in the Journal, was of importance, and it was a considerable influence on Voelcker who succeeded him.

Where did the agriculturist turn for advice on fertiliser application other than to the complex and sometimes contradictory information embodied in the various periodicals and newspapers? Many of the problems could be discussed at local meetings which could establish what would answer best in particular districts, but there were sources which brought knowledge together. Popular were Cuthbert Johnson's works on manures, [1] (as Morton's list of book circulation figures shows) and he was, in 1860, the 'longest-trusted and best-known authority on fertilisers'. [2] However, perhaps we may take Morton's own Cyclopaedia of Agriculture as representative of the information that was available, for there is reason to believe that it would be the most likely to be consulted. We have the statistics of publishing which show that it sold a large number of copies by the standards of the time despite its high price and it would seem reasonable to think that most local agricultural libraries would keep it. As it was first published in instalments, it had circulation additional to the sale of complete volumes and had currency until into the 1880s. Some estimate of the 'influence' of the Journal can be arrived at by examining how much of the information in the Cyclopaedia was derived from the Journal.

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[1] Cuthbert W. Johnson's Agricultural Chemistry for young Farmers series included On Saltpetre, On Gypsum, On Manures, On Crushed Bones, On Guano as a Manure and Employment of Salt in Agriculture, 1844.

[2] A.G., 11 February 1860.

The section on 'Artificial Manures' was one of the first to be issued - probably early in 1850 - and was hailed as the 'best summary of what is known that has yet appeared'. [1] The first part was written by Playfair who still placed stress on the mineral constituents as revealed by ash analysis as a basis for calculating manurial requirements, although some of the difficulties involved were also discussed. Precedence was given to the inorganic substances found in plants. [2] Organic constituents 'often of great importance' were dealt with in a single short paragraph, the reader being referred to other sections on 'ammonia' and 'carbon'. This piece, however, was written when ash analyses were being published in the Journal and the concept still had currency. A second part was written by John Hannam who cited Lawes's trials of nitrogenous manures on wheat as the evidence of the efficacy of such manures [3]: if there was a great amount of organic material in the soil, then there could be reliance on inorganic matter only in fertilisers, but it was 'seldom, indeed, that we should trust to a purely mineral compound'. Even on well-farmed land, nitrogenous manure was beneficial and Hannam cited experiments published in the Highland Transactions of 1848 and Lawes's experiments in support of this: 'experience' had 'condemned the theory that mineral food is all that plants require from the cultivator'. [4] There then followed a list of the twenty-two manufactured artificial manures then current, with information about composition, use, price, availability, directions for using, and remarks about the value. Particular attention was given to the balance of

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1 F.M.(2), XXI, 1850, p.411.
2 'Artificial Manures', in Cyclopaedia of Agriculture, especially p.113.
3 Ibid., p.117.
4 Ibid., p.119.

organic and inorganic constituents. [1] A second table listed combinations of fertilisers that had been suggested for various crops. A third detailed the results that had been published on the application of artificial fertilisers to specific crops over the previous ten years or so. This is most instructive as far as an estimation of 'input' of information derived from the Journal into the total body of knowledge is concerned:

Table XI : Place of first Publication of Experiments on Artificial Manures cited in Cyclopaedia of Agriculture (1855)

Place of first publication	number	Percentage of Total
1. Journal of Royal Ag. Soc.	19	35.8
2. Trans. Highland Soc.	12	22.6
3. Elsewhere	22	41.5

This confirms the Journal as the largest single source of experimental information during the 1840s as the third category comprised of experiments from a variety of scattered sources. The table is obviously by no means complete but does generally indicate the large amount of material that emanated from the Journal, along with the Highland Transactions. These experiments derived from the early years of the Journal when, as we have seen, Pusey encouraged short communications. The entry under 'manures' in the second volume of the Cyclopaedia was written somewhat later by John Hannam and Augustus Voelcker. Voelcker's summary derived partly from his experience at Cirencester - he was not a regular contributor to the Journal at this stage but he made reference to the 'over-estimation of the mineral theory, and to extravagant views respecting the function of ammonia of the atmosphere...'. [2]

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[1] Ibid., pp.120-3.

[2] 'Manures' in Cyclopaedia of Agriculture, II, p.329.

Nitrogen was put at the head of the list of the important constituents of manures, although the entire value of manuring substances could not be estimated only by the proportion of nitrogen that they contained.[1] The most important inorganic constituent was phosphoric acid, and this and nitrogen were the most valuable constituents in money terms.[2]

Although based upon his own research, reasoning and observations, Voelcker's article clearly drew very much upon the ideas of Lawes as had been enunciated in the Journal. Further evidence of the importance of research first published in the Journal is evident in a guide to manures and fertilisers published by the Agricultural Co-operative Association in 1874.[3] This included an essay on decorticated cotton-cake, which drew on analyses published in the Journal, and an address on the 'Economy of Artificial Manuring' by Charles Gay Roberts which referred extensively to papers from the Journal. The Association provided a clear and concise guide to the value of such research carried out at the Royal and elsewhere, to the agriculturist. In an article, 'Manuring no Mystery',[4] the way in which abstract research was being utilised was made clear:

> The superficial sneer recently directed toward our Association[5] by a manure manufacturer, that we add no original information to what was known before, is simply the sneer of one ignorant of our aims. We are not like the Royal Agricultural Society - explorers, pioneers of inquiry, discoverers. We gratefully accept the work done for us in that way by the eminent chemists and agricultural leaders of England and Germany. Our object is to utilise the knowledge thus obtained for the good of the many.[6]

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1 Ibid., p.331.
2 Ibid., p.332-4.
3 Augustus Voelcker, Charles Gay Roberts, J.C. Morton, Robert Wolff, and Edward Owen Greening, Agricultural Economy, 1874.
4 Ibid., pp.29-40.
5 Greening's Agricultural Co-operative Association.
6 Ibid., pp.31-2.

In giving advice on the best mixtures of artificial manures, information was in nearly all cases taken from 'results of the experiments at Rothamsted by Mr. J.B. Lawes and of those made for the Royal Agricultural Society under the superintendence of Dr. Voelcker.' [1] Recommendations for manure for mangel, cabbage, kohl rabi, potatoes, and sugar beet were directly taken from various of Voelcker's writings in the Journal; for grassland, Thompson's advice from the Journal for 1872, and for leguminous crops Lawes's advice on low-nitrogen manures. [2]

The period between 1855 and 1880 was not, on the whole, notable for the discovery of new fundamentals in England, but the painstaking trials and experiments by Voelcker, Lawes, and Gilbert who dominated the scene assembled more refined information on the principles of manuring. This was made available through articles in the Journal or in lectures - Voelcker, especially, visited clubs and societies. The Journal was the most important medium for original articles of this kind and,as through the work of the Agricultural Co-operative Association, the farming community took notice of its recommendations. In the matter of fertiliser progress, it was, therefore, a 'leader' in the field.

The same cannot be said of the position taken by the Society, and shown in the Journal, on another aspect of discussion on manures, the question of the agricultural utilisation of town sewage. Debate on this originated in the early 1840s essentially outside of the agricultural community and can be traced to Chadwick's report on The Sanitary Condition of the Labouring Population (1842) which, as is well known, generated something of a craze for the discussion of sanitary matters in the 1840s. [3] Liebig complained of the waste of thousands

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[1] Ibid., p.40.

[2] Ibid., pp.41-4.

[3] Richard D. Altick, Victorian People and Ideas, 1972, p.48.

of tons of phosphates in sewage being sent to the sea from towns while bones and guano were imported to maintain fertility at a high level. [1] Early contributions to the Journal sometimes show awareness of the question - a good example is in Rham's survey of Flemish agriculture which was well known for its utilisation of sewage - but there was no article devoted specifically to the topic in the Journal in the 1840s; neither was it the topic of a prize essay subject.

This was in contrast to the position outside the Society. One of the first agriculturists to devote attention to the matter was Smith of Deanston who was appointed as a member of the Health of Towns Commission and who made plans for the agricultural application of Westminster Sewage. [2] The Rev. Huxtable, in 1847, talked of the 'profligate waste of the most valuable manure in the world' (with reference to town refuse) [3], while Mechi, the greatest enthusiast in the agricultural community, related the merits of 'Hose and Jet' farms in the Agricultural Gazette and elsewhere. [4] In the late 1840s the agricultural newspapers carried many advertisements for manures manufactured from sewage for which extravagant claims were made: the Metropolitan Sewage Manure Company quoted how in Edinburgh, land had been raised in value from two shillings and sixpence to as much as twenty pounds per acre by this means.

The agriculturist was placed in something of a quandary. There was enthusiasm for the new manuring substances, and alternatives to guano - which cost ten pounds or more per ton - were attractive. But what was the value of sewage? Were patent manures based upon it of any use? How could sewage be

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[1] Liebig, Organic Chemistry, 3rd edn., p.165.

[2] 'Memoir of Jas. Smith Esq. of Deanston', F.M.(2), XIV, 1846, p.496.

[3] Rev. A. Huxtable, Lecture on Science and Application of Manures, 1847, p.22.

[4] The arrangement of Mechi's Tiptree Heath farm with its apparatus for the utilisation of his cesspool is fully described by him in the Cyclopaedia of Agriculture, pp.820-5.

profitably utilised? Would the agriculturist be justified in entering into contracts to take the sewage of towns at his own cost, as he was being increasingly asked to do by urban ratepayers? Regard for the potentialities was thus tempered with caution. William Shaw expressed the problem, in introducing the topic to the London Farmer's Club for the first time in 1848, in the following terms:

> I believe we are wholly in the dark as to the mine of wealth which may be worked in connection with sewage manure, wealth which is, unfortunately, day by day suffered to run to waste, whilst we are expending large sums in the purchase of foreign manure to enable us to produce food for the people. [1]

The Royal Agricultural Society was urged to take up the matter in 1845 [2] but evinced no enthusiasm. Thus while the London Farmer's Club received a lecture on the topic in 1848, the first given to the Royal was in the spring of 1853 and published in the Journal the following year. It seems likely that it was Prince Albert who caused the Society to take up the question some time after it was commonly discussed elsewhere. A letter on his behalf written by his secretary to Pusey in 1850 described Prince Albert's own filtering mechanism for obtaining manure 'as rich as guano' from sewage, and stated that he thought the subject so important that he brought it before the Society 'for their consideration and enquiry'. [3]

Once published, however, Way's statement of the question was immediately influential. It was welcomed as a counter to the increasingly extravagant claims which were advanced for sewage by the urban interests. As was remarked in the

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1 'The London Farmer's Club - Monthly Discussion', F.M.(2), XVIII, 1848, p.219.

2 'A Practical Man', Liquid Manure the Wealth of Towns: A Letter Addressed to the Royal Agricultural Society, 1845.

3 Prince Albert to Pusey on Town Sewage, 12 April 1850, B.R.O.,D/EBp F8/2. Prince Albert's method is described in Frederick Hahn Danchell, Concerning Sewage and its Economical Disposal, 1872, pp.32-4.

Agricultural Gazette in a review of the Journal for 1854 in which Way's article appeared, 'the more the matter is investigated, the less promising to the farmer is the aspect it wears'.[1] Way's paper was also favourably received in the Farmer's Magazine, which welcomed the 'practical spirit of the professor' and noted how often it was quoted at a recent London Farmer's Club discussion of town sewage, which had been led by Mechi.[2] Generally the Royal did not follow up the question with much interest. It looked upon 'pipes and steam engines... as the hobby of a few visionary and enthusiastic sanitary and agricultural reformers!'.[3] Thus, with regard to this question, the content of the Journal did not fully reflect one of the preoccupations of the time. Between 1860 and 1880 there were about ten substantive articles or discussions on town sewage in the Journal; there are well over one hundred references to the topic in the Agricultural Gazette between 1860 and 1870. But the 'influence' of the Journal articles on this subject was far in excess of their limited number. This was because Way, Lawes and Voelcker were much involved in the official investigations into the question by the Parliamentary Commissions. In 1858 Way and Lawes made a preliminary report on irrigation schemes in operation, including Rugby, Watford, Edinburgh, Rusholme, and Mansfield, and specific farms, including Mechi's at Tiptree and that of the Earl of Essex at Cassiobury (Herts) where the Watford sewage was utilised. In this, and further reports, they were generally pessimistic as to the real value of sewage: 'hose and jet' farms entailed great expense; the manufacture of manure from dry sewage was not

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1 A.G., 8 July 1854.
2 F.M.(3), VII, 1855, p.219.
3 Ibid.,(3), VII, 1855, pp.35-6.

successful; increases in yield were not so high as had been predicted. [1]

The evidence of the agricultural scientists carried a good deal of weight on these Commissions. As Lawes observed, 'I have experimented more upon manures than anybody else in the world, I dare say'. [2] They had to counter the extravagant claims of Liebig and others and it is noticeable that the line that they took, which was fully reported in the Journal, did not materially change from the position established by Way in 1853, in his first presentation of the subject to the Society. This was that there was nothing wrong with Liebig's ideas on the matter when viewed in the abstract but the practical implementation was another matter; [3] it was not realistic to compare sewage with other manures (Lawes)[4], and that:

> it is not a fair thing to say that, because the chemical value of ingredients of sewage is such and such, sewage is worth such and such; that does not follow at all; it might be carried as an absurdity (Voelcker). [5]

These were essentially the views that readers of the Journal were given, in contrast to the much more optimistic assessments that were so widely canvassed in the non-agricultural publications. In the 1860s ever more ambitious schemes were proposed - Mechi thought that London sewage could be transported profitably forty miles to the countryside, in the same way that Glasgow imported water from Loch Katrine, [6] while much interest was aroused by the scheme of Hope and Napier to build a culvert to transport

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[1] B.P.P., XXXIII, 1858, 'Preliminary Report of the Commissioners appointed to enquire into the best mode of distributing the Sewage of Towns and applying it to beneficial and profitable uses', pp.13-17; Ibid., 'Second Report', 1861, pp.20-37.

[2] Ibid., XIV, 1862, 'First Report of the Select Committee on the Sewage of Towns', p.17.

[3] Ibid., 'First Report...', 1862, pp.30-36.

[4] Ibid., p.17

[5] Ibid., p.37.

[6] Ibid., p.57; see also J.J. Mechi: On the Sewage of Towns as it affects Agriculture, 1860, for a statement of his views.

London sewage through Essex in order to achieve a reclamation of the Maplin sands. Liebig thought that this scheme would fail, and the City of London Corporation used Liebig's views to oppose the scheme, which they thought would not be to their best pecuniary advantage.[1] Intense public discussion of the issues particularly concerned the relative merits of different schemes, the actual potential of sewage for agriculture, the ways in which it could best be utilised, and the experience of the irrigation schemes that were in operation, especially in Edinburgh, Rugby, Watford and Croydon. Much of the evidence on which discussion was based was derived from the various Select Committees.

The agriculturist therefore had the sober estimates of the value of sewage put out by the Journal as Voelcker and Lawes undermined each alternative scheme of utilisation - earth closets, precipitation schemes, irrigation - in turn. On the other hand, there were the ambitious plans and the extravagant estimates which had a certain attraction, given the high cost of artificial manures. How, then, were the issues presented in the agricultural press? Generally, the Mark Lane Express/Farmer's Magazine followed the line taken by the Royal - we have already noted the favourable reception given to Way's first statement on the subject - which was that the agriculturist should be wary of schemes which entailed a payment for the use of sewage. However, full coverage was given to the various proposals, especially in the early 1860s when there seemed to be some chance of a breakthrough. As Morton put it in 1865:

> I suppose that if a sober view of the agricultural value of sewage manure were anywhere to be expected, it would have been in the columns of the Mark Lane Express. But what does the clever editor of that

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[1] Baron Liebig, Letters on the Subject of the Utilisation of the Metropolitan Sewage, 1866. See also my 'Nineteenth Century Recycling...'.

agricultural paper say? He declares that recent experiments, discussions, and discoveries have thrown so much new light on it, and made us all so much sanguine of a profitable issue, that an altogether new leaf in the book of agricultural progress has, in fact, been turned... [1]

However, agriculturists began to tire of the subject by the end of the decade, although Morton continued to be optimistic long after the Mark Lane Express had given up the topic. [2] Experience of sewage farms gained while a member of the Rivers Pollution Commission 1868-74 seems to have made him gradually less optimistic, as his 1877 article in the Journal demonstrates. Voelcker's dismissal of sewage, in 1878, as a nuisance rather than a valuable agricultural commodity was in many ways a statement of the line that had been implicit in the articles in the Journal for twenty-five years.

Voelcker's article did not put paid to the discussion. The Royal organised a sewage-farm competition at the occasion of the Kilburn show in 1879 and the question was revived by Robert Scott Burn in the Journal of the Bath & West in the 1890s. It is a subject which has been considered well worthy of consideration much more recently, [3] but as Dr. Fussell has noted, it took fifty years to find out that 'sewage was not the miraculous fertiliser its

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[1] J.C. Morton, 'London Sewage from the Agricultural Point of View ', Journal of the Society of Arts, XIII, 1865, p.185.

[2] In the 1860s and early 1870s scarcely a newspaper was without letters and articles on the subject. The following are a small sample of the many pamphlets published which consider the topic from its different aspects in the agricultural context: G. Rochfort Clarke, The Reform of the Sewers, 1860; Gilbert W. Child, The Present State of Town Sewage Question, 1865; Thomas Ellis, The Metropolitan Sewage, N.D; A Ratepayer, The Utilisation of the Metropolitan Sewage; Anon, The Agricultural Value of the Sewage of London Examined, 1865; John Parkin, The Utilisation of the Sewage of Towns, 1862; J. Bailey Denton, The Sewage Question, 1871; Rev. Henry Moule, Town Refuse the Remedy for Local Taxation, 1872; 'Veritas', The Sewage Precipitation Delusion, 1872; Dr. Letherby, The Sewage Question, 1872.

[3] J.C. Wylie, Fertility from Town Waste, 1955.

protagonists made it out to be'. [1] The influence of the Journal is clear in this process: it consistently provided an antidote to the extravagant claims and was the chief source, for the farmer, of accurate assessments of the agricultural value of sewage which ultimately proved substantially correct. Reclamation of the useful constituents of sewage is still an active research area, and sewage sludge is applied with benefit to the land, but widespread recycling of sewage has not usually been found to be an economic proposition.

With regard to the important subject area of drainage, our content review revealed (i) the dominance of James Smith's views until 1843; (ii) a switch to those of Josiah Parkes, who recommended under-drains at greater depth and increased width, until 1847; (iii) criticisms of Parkes's views by Webster, in time partially endorsed by Pusey, until 1850 after which year the topic was virtually excluded from the Journal. This exclusion did not apply to the other printed media, and drainage and the optimum depth of drains was continuously discussed in the Farmer's Magazine and Agricultural Gazette in the 1850s and 1860s.

Parkes's views, as stated in the Journal can be shown to have exercised direct influence over the way in which much drainage work was executed. Parkes was one of the chief witnesses to the Duke of Richmond's Select Committee of 1845 to enquire into the question of allowing the possessors of entailed estates to borrow money for the purpose of drainage. Introduced as 'Consulting Engineer to the Royal Agricultural Society' he unequivocally stated that near and shallow drains were neither 'so permanent nor effectual' as those put at greater depth with increased width. It was remarkable that

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[1] G.E. Fussell, 'Sewage Irrigation Farms in the Nineteenth Century', Agriculture, LXIV, 1957-58, pp.138-43.

virtually all the evidence brought forward in support of this contention had been published in the Journal; much of it related to the Kent farmers that Parkes had mentioned in his articles and who gave evidence, and the letter from Arbuthnot was quoted. Hewitt Davis advocated Parkes's views and stated that: 'I quite agree with all he has written'. Smith of Deanston also gave evidence to the Committee. He admitted that deeper drainage could be beneficial, but objected to any increase in distance between drains. Parkes's views carried the day and the Inclosure Commission who supervised drainage work carried out under the Public Money Drainage Act 1846, enforced a 'four foot rule' upon drainage work carried out under their auspices. [1]

To appreciate the significance of this, we may briefly consider modern practice. Although optimum depth of field drains is still a subject over which there is divergence of opinion, there are very few advocates of the draining of heavy clay at much over two and a half feet, although much greater depths may be advised for peaty land. Thus Nicholson (1952) states that 'deep draining in clay or moderately heavy land is difficult to justify because where the problem of waterlogging is caused essentially by rain water, it is wasteful to go much deeper, as the surface water does not then percolate downwards, otherthan through the disturbed soil on top of the drain trench.' Thus most modern drainage (on heavy clayland) is within three feet of the surface and two to two-and-a-half feet is a common depth on such soils. [2] Another consideration is thatapart from being less efficient costs also increase

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[1] B.P.P., XII, 1845, 'Select Committee (House of Lords) To Enable Possessors of Entailed Estates to Charge for the Purpose of Draining', pp.124-53, 163, 195. On state support for draining, see David Spring, The English Landed Estate in the Nineteenth Century: its Administration, 1963, especially pp.143-5.

[2] H.H. Nicholson, The Principles of Field Drainage, 2nd ed. 1953, pp.80-82. James A.S. Watson and James A. More, The Science and Practice of British Farming, 10th edn., 1956, p.69; D.H. Robinson ed., Fream's Elements of Agriculture, 14th edn., 1962, p.45; A.D. Trafford, 'Field Draining', Journal, 131, 1970, p.141.

with increasing depth, and one of the recurring themes in nineteenth-century drainage literature was that Parkes's low estimates of the cost of drainage almost invariably proved over-optimistic. [1]

If the principles advocated by Parkes were essentially erroneous when applied to heavy clays the question arises as to why they had such currency and popularity. To answer this, it is necessary to note that the techniques that he advocated were based on extremely limited experience, and his articles in the Journal mostly refer to a small group of tenant-farmers on Weald clay in Kent and Sussex, backed up by a few communications from landowners and land agents. The Weald clay is exactly the type of land which would not be drained at four feet today, on the grounds of both efficiency and cost, Webster's views as to the desirability of shallower draining have proved correct over time. Apart from the impervious nature of clay, which would mean that much of the surface water would never reach deep drains, there are often iron concretions at two feet or so below the surface, locally termed 'catsbrains', which compound this difficulty. [2] Why then could Parkes hold that deep-draining on such soils was superior? If we consider again his original articles and views [3] we find much stress placed upon observations that deeper drains tended to run earlier and produced greater discharge than shallower drains. In consideration of these findings, it is difficult to escape the conclusion that the discharge was really as the result of the under-drains tapping the ground-water, which, on low-lying clay-land, is frequently within four feet of the surface, particularly in wet seasons or periods of the year. The

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[1] J. Bailey Denton, Agricultural Drainage: A Retrospect of Forty Year's Experience, 1883, pp.3-4.

[2] For an account of the Weald Clay in this area, see B.C. Worssam, Geology of the Country around Maidstone, 1963

[3] Parkes's views as expressed in the Journal are grouped together in his Art and Philosophy of Drainage, 1847.

surface-water, which caused much of the problem for plant growth when it accumulated for long periods, would not be efficiently dealt with by deep-drains, even though they might discharge a profuse outflow.

In the 1840s the Royal had a great deal of 'influence' and popular regard and draining was widely identified as one of the most important and useful innovations. Parkes's views had an extraordinary hold on agriculturists. Apart from his direct influence over the way in which government drainage was carried out, we can readily perceive from a review of the periodicals and newspapers that he was highly regarded as a respected authority. A striking indication of this is the recollection, in 1878, that when there was a public debate between Smith and Parkes at the Society's Newcastle meeting in 1846 the 'advantage was so decisive in favour of Parkes' for whom there was 'enthusiastic cheering'. [1] Webster's first article in the Journal was republished in the Farmer's Magazine [2] but was considered 'a very meagre and superficial reply to the astute and philosophical reasonings of Mr. Parkes'. [3]

The leading authority on underdraining between about 1850 and 1880 was J. Bailey Denton. In 1854 he read a paper to the London Farmer's Club on 'The Results arrived at from the Several Systems of Drainage in practice during the last few Years', and gave a similar paper to the Society of Arts 'On the Progress and Results of the Under-Drainage of Land in Great Britain' the following year. In the first of these papers he contrasted the views of Smith and Parkes and although holding to the practice advised by Parkes, recognised that the principle of depth directly influencing distance and allowing for very cheap

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1 Agricultural Economist, 1 March 1878.

2 F.M.(2), XXI, 1850, pp.312-3. See also ' The Deep Drainage Question', Ibid., pp.429-30.

3 T.C. Scott, 'On Draining', (at the Chippenham Hundred Farmers' Club) Ibid., p.260.

draining was erroneous; but at the Society of Arts he reaffirmed his belief that the principle of deep draining was unshaken, that Webster's views could be dismissed, and that where deep draining had failed it was mostly because it had been badly executed. [1]

It is not until some twenty-five years later that we find Denton expressing an opinion which, if not changed in the essentials, is different in emphasis in the light of experience. In his evidence to the 1881 Commission on Agricultural Depression he stated that the rules prescribed by the Inclosure Commissioners in 1846 with regard to the necessary depth of parallel drains in clay soils and the distance between them had not been fully justified, and there had frequently been too great a width between the drains with increased depth. Parkes's principle that increased depth allowed for increased width was erroneous, and if Denton had the chance to do some of the drainage-work that he had executed again he claimed he would do it differently. [2]

By the turn of the century we find a clear rejection of Parkes's view, it being claimed by that time that underdrainage of four foot or more was not only inefficient and uneconomical but actually harmful, as where the water-table was substantially lowered shallow rooting plants, such as barley, would not be able to draw up the water by capillary action and might thus prove highly susceptible to summer droughts the effects of which could be exacerbated by deep draining of the type that had proved so popular in the 1840s. In no department of the drainage problem had there been so 'wide a divergence of opinion or so many mistakes made and capital wasted' as in the question of the depth and distance of drains, drains much beyond three feet

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[1] F.M.(3), VII, 1855, pp. 42-9 ; Journal of the Society of Arts, IV, 1855-56, pp.45

[2] B.P.P., XV, 1881, 'Minutes of Evidence taken before the Commission on Agriculture', pp.167, 218, 223. See also Journal of the Farmer's Club, May 1882, pp.75-6, quoted in Agricultural Drainage, 1883, p.16.

were a 'practical and economical mistake'. [1]

Much attention has been focussed on underdrainage a fundamental improvement of the nineteenth century and it is well-known that there was a considerable controversy over the depth of drains, that some drainage work was unsuccessful and that the returns on drainage investment were generally low.[2] Although by no means all Victorian drainage failed, much was technically deficient, especially on the claylands where so much was hoped for. The analysis of the ideas propagated by the Royal Agricultural Society gives insight into the ways in which the theory of deep drainage took so much hold upon the agricultural community and which probably made drainage-work often less effective than it might have been had a more flexible approach been adopted.

In the review of the Journal content the limited attention given to arterial drainage was noted. Interest in this aspect of the subject was stimulated by the wet conditions of 1852-3 when flooding of major river valleys, including the Severn, Trent, and Thames, was commented upon. [3] Bailey Denton led the call for attention to be given to the topic - he had addressed Pusey on the subject as early as 1842[4] - and it was probably the discussion in the Farmer's Magazine which stimulated the Society to offer a prize for the topic. This was awarded to John Clarke's rather unsatisfactory essay after which trunk drainage was not represented in the Journal until 1878.

This was in contrast to the situation in the other farming literature where articles on the subject were not infrequent. This, in turn, provides an

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1 G.S. Mitchell, A Handbook of Land Drainage, 3rd edn., 1908, pp.16-7, 61-2.

2 On these various points see particularly Ernle, 6th edn., pp.365-7; F.M.L. Thompson, English Landed Society in the Nineteenth Century, 1963, pp.250-1; H.C. Darby, 'The Draining of the English Claylands', Geographische Zeitschrift, 52, 1964, pp.190-201; Chambers and Mingay, pp.175-7; A.D.M. Phillips, 'Underdraining and the English Claylands', 1850-1880: a Review', A.H.R., XIX, 1972, pp.44-55.

3 See, for example, 'Arterial Drainage', F.M.(3), III, 1853, pp.119-23.

4 See F.M.(3), V, 1854, pp.16, 213-5.

illustration of the way in which the terms of the Society's Charter sometimes inhibited its contribution to agricultural progress, for arterial drainage improvement needed legislation which thus made it a 'forbidden' subject for the Society. The Drainage Act of 1861 paved the way for group schemes and came out of a meeting of agriculturists and landowners held at the Society's Hanover Square headquarters during the previous Smithfield Club Show Week, [1] but although several Council members were involved, the Society could not give its formal support.

Not much progress was made with arterial drainage, for schemes needed the united action and consent of groups of landowners over extensive drainage districts and this was often difficult to secure. Neglect of main river channels could render underdrainage, where properly executed, ineffective, as they could not always cope with the increased run-off at times of heavy rainfall. On low-lying clays the problem was particularly acute and may have constituted a serious impediment to agricultural progress on such land. Writing on the Weald clay in 1846, [2] George Buckland observed that the 'drainage of many portions of this level tract might be much facilitated by improving the River Beult, by which an extensive area of the country would be highly benefitted' but W. Topley, writing on the agricultural geology of the Weald in the early 1870s commented that the trunk drainage was so badly cared for that meadows were often flooded for weeks on end.[3] Extensive drainage work during the twentieth century has by no means eradicated the problem, as plate VII, taken after a period of heavy rain at the end of 1979, shows.[4] When William

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1 'River Reform', F.M.(3), XIX, 1861, pp.12, 13, 19-22.

2 G. Buckland, 'On Farming of Kent', Journal, VI, 1845, p.281

3 W. Topley, The Geology of the Weald, 1875, p.249; See also Idem, 'The Agricultural Geology of the Weald', Journal (2), VII, 1872, pp. 241-67.

4 This is a view of the Weald Clay Vale about six miles south of Maidstone, and has been flooded by the Beult.

PLATE VIII: ARTERIAL DRAINAGE PROBLEMS 1980.

Photograph showing flooding on the Weald clay of Kent.

Little visited the South-East for the 1881 Commission on Agricultural Distress, he noted that it was an 'incontestable fact' that remedial trunk drainage was required, but that there was no authority responsible for the maintenance of arterial works or empowered to make improvements[1] and this seems to have been a fairly general situation.

It would be possible to give a number of additional examples of means by which Journal information found its way to the farmer and influenced the agricultural community. When members of the London Farmer's Club visited Lois-Weedon to examine the Rev. Smith's methods, which had occasioned so much interest, it is clear that they had Lawes's adverse report, published in the Journal, very much in mind.[2] The preface to Long and Morton's The Dairy of the Farm (1885) paid tribute to the way in which H.M. Jenkins (through his Journal articles) had made known the best of French and Danish practice, while the reports of stock, implements exhibited at the shows, and animal health were constantly before the agricultural community. The Journal did not always carry the topics that were of most interest to the agricultural community and some subject areas were totally excluded from its pages. Yet the preceding analysis has confirmed its position as the leading collection of articles on the technical and scientific aspects of agriculture in early and mid-Victorian England which had importance even if they were not read directly by the ordinary farmer. Some topics moved 'upwards' from the experience of individuals, as in the fertiliser experiments of the 1840s or observations on drainage or crop rotations. Others moved 'downwards' from the authoritative articles published by acknowledged experts such as Simonds, Lawes, Voelcker, and others. Thus the Journal was an integral part of an agricultural information system of considerable sophistication.

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[1] B.P.P., XV, 1881, 'Mr. Little's Report', pp.406-7.

[2] 'The Practical Value of the Lois-Weedon System', F.M.(3), XVIII, 1860, p.505.

CHAPTER IV COUNTRY MEETINGS 1839-80

The Location and Organisation of the Shows

Selection of a location for the country meeting to be held in 1839 was one of the first considerations of the Committee of Management soon after its formation. The Minutes do not record which alternative places were discussed, but the reason for the choice of Oxford was given as its central situation.[1] During the Oxford show week representations were made by a deputation of Cambridgeshire farmers, led by Jonas Webb, that the show be held in Cambridge the following year.[2] There was a determination to visit a manufacturing district in 1841 and Liverpool was decided upon after some consideration had been given to Manchester.

The location of the first three shows was therefore chosen on somewhat of an ad hoc basis, but there was an early resolve to place the peripatetic scheme on a regular plan. William Shaw proposed a committee to consider the formation of districts which would be visited in turn by the Society[3] but not much appears to have been done until Shaw again raised the question the following year[4] and a Committee which included Handley, Richmond, Spencer, Pusey, French Burke, Fisher Hobbs, R.W. Baker, and Humphrey Gibbs was formed. To this, Shaw presented his own 'district' scheme which was as follows:

> The Middlesex District: Middlesex, Surrey, Kent, Sussex, Hampshire, including the Isle of Wight and the Channel Islands.

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1 Minutes of Committee of Management, 26 June 1838, p.30.
2 Cambridge Independent Press, 20, 27 July 1839.
3 Minutes of Committee of Management, 11 March 1840, p.320.
4 Monthly Council, 3 November 1841, F.M.(2), IV, 1841, p.464.

The Western District: Cornwall, Devon, Somerset and Dorset.

The South Wales District: Pembroke, Cardigan, Carmarthen, Brecknock, Glamorgan, Monmouth, Radnor, Hereford and Worcester.

The North Wales District: Anglesey, Carnarvon, Merioneth, Montgomery, Denbigh, Flint, Cheshire, Shropshire, and Staffordshire.

The North Eastern District: Derby, Northamptonshire (North), Leicestershire, Lincoln, Rutland.

The Yorkshire District: Yorkshire, and Lancashire, including the Isle of Man.

The Northern District: Westmorland, Cumberland, Durham, and Northumberland, including Berwick-on-Tweed.

The Eastern District: Norfolk, Suffolk, Cambridgeshire, Essex, Huntingdon, and Hertfordshire. [1]

These divisions were then accepted by the December Council and presented to the end-of-year General Meeting, together with the suggestion that the districts for the country meeting for the next four years after Bristol (already determined for 1842) should be nominated in advance. The rotation of districts principle was applied retrospectively to those towns that had already been visited (Oxford, Cambridge, and Liverpool). Bristol was in the 'Western District' so the 'North Eastern District' was nominated for 1843, the 'Middlesex' for 1844, the 'North Wales' for 1845, the 'Northern' for 1846, and the 'South Wales' for 1847. In 1845 Fisher Hobbs initiated a discussion on the importance of determining upon the rotation when the first cycle terminated, and another committee was formed to consider this. [2] In 1846 Pusey successfully moved that the district for 1847 be changed from 'South Wales' on the grounds that it was too near Shrewsbury which had been visited in 1845. Another

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[1] District Committee 24 November 1841.

[2] Monthly Council 2 July 1845, F.M.(2), XII, p.113.

consideration was the lack of a railway connection, considered to be a *sine qua non* for a successful meeting after the 'Shrewsbury experience' where inadequate communications had detracted from the success of the meeting,'[1] and the 'Midland District' was substituted in its place.[2] This district scheme was kept in operation through the 1850s and 1860s (it was reaffirmed in 1861)[3] until, in December 1867, William Torr supported by Jacob Wilson, brought forward a new division:

District		Area
A	:	Durham, Northumberland, North & East Ridings.
B	:	Cumberland, Lancashire, Westmorland, West Riding.
C	:	Derbyshire, Leicestershire, Northamptonshire, Nottingham, Rutland, Warwick.
D	:	Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Huntingdonshire, Norfolk, Suffolk.
E	:	Berkshire, Buckinghamshire, Huntingdonshire, Kent, Middlesex, Oxford, Surrey.
F	:	Cornwall, Devon, Dorset, Somerset, Wiltshire.
G	:	Gloucestershire, Hereford, Monmouth, Worcestershire, South Wales.
H	:	Cheshire, Salop, Staffordshire, North Wales.

The rationale given for this new district scheme was that there was a greater correspondence to geological provinces than had hitherto been the

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[1] A.G., 1 May 1847.

[2] Monthly Council 25 March 1846, F.M.(2), XIII, p.469.

[3] General Meeting 22 May 1861, F.M.(3), XIX, 1861, p.431.

case and, by according more with recognisable farming regions, would thereby give the country meetings a greater significance. While Shaw's original scheme had contained some rather curious geographical divisions, it may be questioned whether the revision was much of an improvement, although it met with approval when presented to the members. [1] Some small amendments were made in 1870 when the following order of succession was agreed to:

District:	A D F C B G E H
Order of succession:	1 2 3 4 5 6 7 8

to commence in 1873 (district A). [2]

However, it was not long before a further reconstitution of the districts was made. In 1876 the following were agreed to:

A : Northumberland, Cumberland, Durham, Westmorland,
B : Yorkshire,
C : Cheshire, Lancashire, North Wales,
D : Staffordshire, Salop, Warwick, Worcestershire, Hereford, Gloucestershire, North Wales,
E : Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Northamptonshire, Rutland,
F : Cornwall, Devon, Dorset, Somerset, Wiltshire, Hampshire, Berkshire, Oxford, Surrey, Sussex, Middlesex,
G : Norfolk, Suffolk, Cambridgeshire, Huntingdonshire, Bedfordshire, Buckinghamshire, Hertfordshire, Middlesex, Essex.

The reason for this change was so that each district should contain a sufficient number of large towns able to receive the Society for by this time the size of the show had grown to such an extent that it was much more difficult to find a town of a suitable character that was able to provide an adequate site and full facilities for the show. [3] This revised scheme

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[1] Monthly Council 4 December 1867, and General Meeting, F.M.(3), XXXIII, 1868, pp.36-8.

[2] Ibid., 6 July 1870, F.M.(3), XXVIII, p.138.

[3] Ibid., 1 November, 6 December 1876, 7 February 1877, F.M.(3), L, 1876, p.423, LI, 1877, pp.37,198.

was scheduled to begin, in alphabetical sequence, in 1879, but as other circumstances later persuaded the Society to hold a metropolitan show in that year, the rotation did not begin until 1880 when Carlisle was chosen.

In 1841 a list of 'country meeting queries' had been drawn up specifying necessary criteria which any town had to fulfil if it was to be considered as a candidate to receive the Society. The Council had to be satisfied on the following points:

> A statement of the acreage of the land on which it was proposed to have the showground and erect the pavilion.
>
> The distance of the showground from the terminus of the railway.
>
> The distance from the centre of the town.
>
> Whether a supply of water was available and, if not, an estimate of the price of conveying it.
>
> A statement of the remuneration required for the six weeks that the land was required.

The correctness of the information supplied in answer to the queries had to be certified by the parties providing it, who were also required to provide a tracing of the land. [1] The queries were revised in 1844 when additional information was required on the land where it was proposed to conduct the trial of implements, which had rapidly become one of the most important parts of the country meeting proceedings, the distance of the town from the surrounding market towns, and a statement as to whether there was any room in the town capable of containing five hundred persons for dinner, and the expense of hiring it. [2] These queries were revised and amended from time to time, and reflected the change in the character of

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[1] Monthly Council 8 December 1841, F.M.(2), V, 1842, p.60.

[2] Ibid., 3 April 1844, F.M.(2), IX, 1844, p.548.

the show; the great Society Dinner assumed less significance, the implement trials assumed more. Indeed, by the 1870s the cost of organising these was one of the most significant items of show expenditure and in 1871 a specific question was added to the cost of land needed for the trials. [1]

The district for the country meeting was made known up to four years in advance. It was then open for towns within the district to compete for the honour and prestige, but more particularly profit, of receiving the Society. The normal course of events was for a local meeting to be got up to promote the object of attracting the Society to a specific location, and a local subscription fund opened in support. Deputations from competing towns would then 'wait upon' the Council in the spring of the year preceding the event, although after 1872 full deputations were not required and only two representatives were requested to answer any questions that the Council might have. [2] Competition among rival towns was often intense, and bitterness was engendered when a particular town considered that it had been unfairly passed over by the Council. Thus when the town for the 1872 show was being considered, there was 'little desire on the part of the city or county of Hereford to invite the Royal' as it was 'not forgotten that it was once very undeservedly rejected', [3] a point which referred to the choice of Worcester nine years earlier. Individuals often set great store in their attempts to attract the Society to their own particular locality. According to H.H. Dixon, the choice of Bury St. Edmunds

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[1] Monthly Council, 5 July 1871, F.M.(3), XL, 1871, p.138.

[2] Ibid., 6 March 1872, F.M.(3), XLI, 1871, pp.349-50.

[3] 'The Royal Agricultural Society's Meeting in 1872', F.M.(3), XXXIX, 1871, p.165.

over Ipswich (1867) was a 'staggering blow' to Fisher Hobbs, after which he only appeared once again at the Council before his demise. [1]

It was in order to avoid the disappointments and ill-will that were felt when one competing town was chosen over another, particularly when a subscription had been got up and a trial site obtained, that Brandreth Gibbs initiated a change in the procedure of selection in 1876. Instead of the queries and competition, it was proposed that the Country Meeting Committee draw up a schedule of requirements for the show, to obtain information on the capabilities of towns within the specified district for the year to fulfil the Society's requirements, and these were then to be considered so that a list in order of preference could be presented to the Council for a decision. [2]

The detailed aspects of the adequacy of the facilities of individual towns in meeting the Society's requirements was one vital consideration in the choice of country meeting locations and was very important in deciding the success or otherwise of the event. There were also broader considerations. The greatest difficulty was to balance the desirability of the Society's going into remote districts where it was thought a great deal of good might result from bringing new techniques to the notice of backward regions, and the need to generate adequate receipts to ensure financial viability. It was not until Chester (1858) that a profit was made on the show, though it was recognised that in making a loss, the Society was nevertheless fulfilling its broader educational mission. In the 1870s, however, the expenditure connected with the shows was such that losses were not viewed

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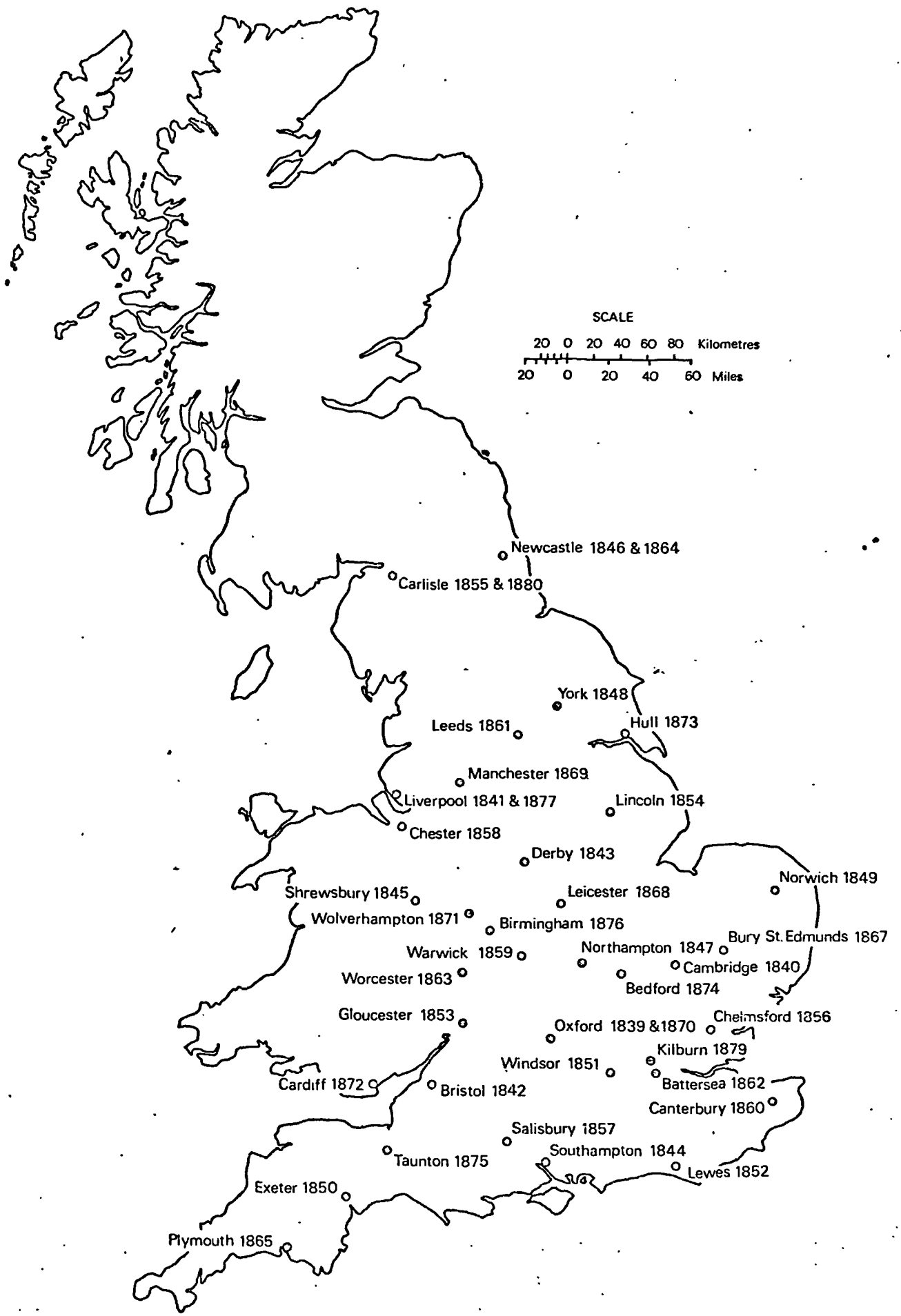
[1] Dixon, 'Agricultural Society', p.303.

[2] Monthly Councils 7 June, 1 November, 6 December 1876, F.M.(3), L, 1876, pp.6, 423; LI, 1877, p.37.

Location of Country Meetings 1839-80



with such equanimity. The following details of the attendance (after 1852) illustrates the importance of location:

Table XII : Attendance at the Royal Shows, 1853-80

Year	Location	Attendance	Year	Location	Attendance
1853	Gloucester	36,245	1867	Bury St. Edmunds	61,837
1854	Lincoln	37,635	1868	Leicester	97,138
1855	Carlisle	37,533	1869	Manchester	189,102
1856	Chelmsford	32,982	1870	Oxford	75,749
1857	Salisbury	37,342	1871	Wolverhampton	108,213
1858	Chester	62,539	1872	Cardiff	87,047
1859	Warwick	57,577	1873	Hull	163,413
1860	Canterbury	42,304	1874	Bedford	71,989
1861	Leeds	145,738	1875	Taunton	47,768
1862	Battersea	124,328	1876	Birmingham	163,413
1863	Worcester	75,087	1877	Liverpool	138,354
1864	Newcastle	114,483	1878	Bristol	122,042
1865	Plymouth	88,036	1879	Kilburn	187,323
1866	No Show - Cattle Plague		1880	Carlisle	92,011

Attendance figures are not available before 1853 but between twenty and twenty-five thousand were thought to have visisted the first two Oxford and Cambridge shows [1] and attendances in the late 1840s were probably of a similar order to the figures recorded between 1853 and 1857, as the attendance at Lewes in 1852 was estimated at eighteen thousand and thought to be 'half the usual number' due to the fact that the show was held in

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[1] Ernest Clarke, 'The First Two Country Meetings of the Royal Agricultural Society', Oxford 1839; Cambridge 1840', Journal (3), V, 1894, pp.212,230.

the midst of an election, in an inaccessible location, and with very oppressive summer heat. [1]

The shows blossomed as mass spectacles in the late 1850s. Increased attendance and division of the implement trials contributed to the profitability of Warwick and Chester. Steam trials were a great attraction at this time. Canterbury was a set-back for the Society partly because the location was inaccessible from many parts of the country and also because the major implement firms organised a mass defection from the show as part of their campaign against the conduct and objectives of the trials. Large attendances at Leeds, Newcastle, Birmingham, and Liverpool, and associated profitability, in contrast to shows held in more sparsely populated districts, such as at Bury and Taunton, highlighted the dilemma that a rural location, where there might be greater educative benefit, would probably be attended with pecuniary loss. At urban locations, where receipts were swelled by the non-agricultural spectators, a sound financial result was much more certain. Although it was recognised that the success of a meeting could not be judged on financial viability alone, it was a factor that could not be ignored. Losses in the 1840s were often in the region of two thousand pounds and constituted the greatest single call on the Society's funds. Losses were of over £3,500 at Battersea, Bedford, and Taunton in contrast to the profit of £9,153 at Manchester in 1869 and £4,283 at Liverpool in 1877. Although by this time the Society ran a substantial accumulated fund, the losses of the rural shows took the greater proportion of the subscription income which might otherwise have been turned to alternative uses. The Kilburn exhibition of 1879 lost the Society over £14,000 which had to be

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[1] F.M.(3), II, 1852, p.76.

met by the sale of funded capital, and which accounted for about half of the Society's reserves (built up from life subscriptions) at that time.

Commentators such as Morton and Corbet gave a good deal of attention to what they considered a 'proper' location for the country meetings. Morton was not against visits to 'manufacturing' districts where he thought that agricultural machinery would be subject to searching and worthwhile scrutiny, [1] but he particularly valued expeditions into remote districts where (as at Carlisle, 1855) he thought the Society had a 'mission' to perform. [2] Morton put forward a three-fold rationale in the choice of show locality. The Society could take its members to a district where, as he put it, the area could teach them through its superior general level of farming; Lincoln (1854) was an example, where it was recognised in the report of the Illustrated London News [3] that the implements would be 'more criticised and less stared at' than in Shropshire or Devonshire. Alternatively, the Society could visit more central districts such as Northampton or Warwick where access was easy for members from different parts of the country and where they could 'teach each other', or they could go to a more backward district where, Morton hoped, the Society might be instrumental in breaking up prejudice or stimulating new activity. [4]

As the attendance and the number of implement exhibits increased so the number of towns that were in a position to provide the space and the facilities required decreased. The first shows at Liverpool (1841) and Newcastle (1846) occupied seven and ten acres respectively; by the time the Society visited these towns a second time the requirement had risen to forty-two acres (Newcastle 1864) and seventy-seven acres (Liverpool 1877). In

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1 A.G., 1 May 1847.
2 Ibid., 28 July 1855.
3 22 July 1854.
4 A.G., 14 July 1860.

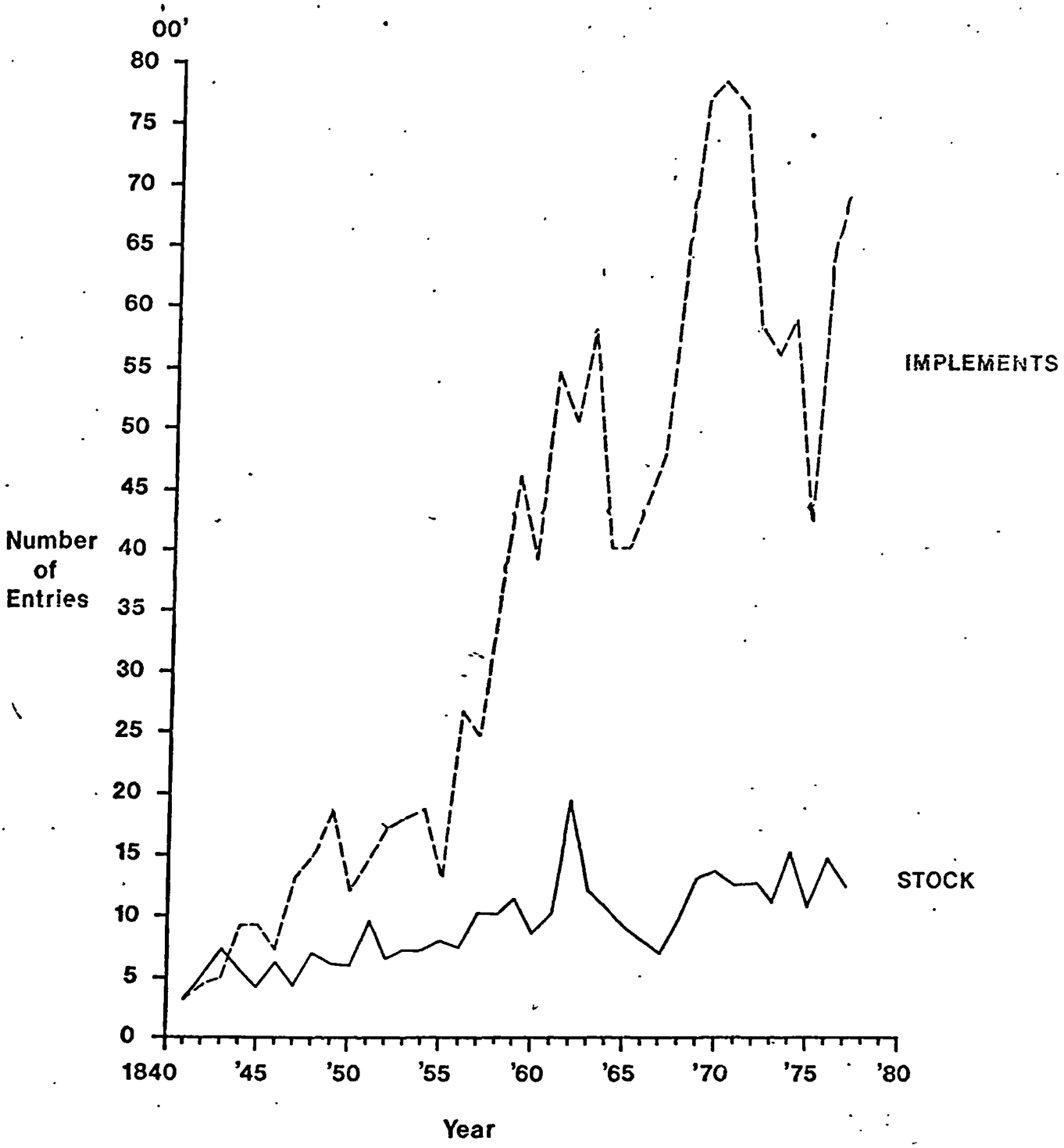
the 1870s the combined length of the shedding needed to accommodate the exhibits of implements and stock amounted to several miles; at Kilburn (1879), the most ambitious of the shows in the series considered here, there were 22,903 feet of shedding and 11,878 articles exhibited on 704 separate stands. After the financial failure of the Kilburn show (mostly on account of the exceptionally wet weather) there was some contraction in the size of the event, but the sixty-acres needed at Carlisle in 1880 was still four times the size of the area occupied at the time of the first visit to the town twenty-five years previously.

The increase of the area taken up by the show reflected the expansion in the number of agricultural exhibits (see figure V), particularly implements, but was in large part accounted for by the 'miscellaneous' department. Here, entries and exhibits, often with but a tenuous connection with agriculture, occupied an enormous amount of space. This section of the show had a useful function in as much as it generated income and attracted the casual visitor - the one-shilling entry 'holiday folk' - whose attendance helped towards overall financial viability. Nevertheless, the miscellaneous exhibits got rather out of control by the 1870s by which time the show as a whole had grown beyond a fully manageable size. Not least, it put an immense strain upon the judges who had to distribute a handful of the Society's medals for some novelty or useful gadget found within the formidable array of items. The complaint of the stewards at Warwick (1859) that if they had devoted but one minute to the four or five thousand items assembled for their inspection the task would have occupied nine days was oft-repeated. Exception was taken to the necessity to examine such items as

apple-parers, alarum-bells, bedsteads, breach machines, beer-engines,

FIGURE V:

Number of Implements & Stock exhibited at the Royal Shows 1841-1877



Source: Society Reports

bells, counting-machines, cages, deed boxes, filters, gun-covers, game-bags, hammers, knife-cleaners, machines for aiding digestion, microscopes, odometers, perambulators, roasting jacks, sewing-machines, sign-paintings, trunks, thermometers, urns, varnish, whisks, window-frames...[1]

In the 1870s the Society attempted to control the growth of the miscellaneous exhibits by increasing the price of showyard space and catalogue entries. After 1872, there was a prohibition on duplicate entries by individual exhibitors but, as the graph showing the number of items exhibited shows, this prohibition was not very successful in its aim.

These, then, were the financial and logistical contraints that were placed upon the choice of location of the show. *In the 1860s and 1870s there was* a tendency to alternate between a profitable urban location and an unprofitable rural location to achieve financial balance, and an increased *reluctance* is discernible on the part of many members of the Council to undertake the risk of financial failure that was likely to attend a show held in a very remote location. As Dixon pointed out, by the end of the 1860s, it was considered essential to visit some extensive manufacturing district every third year on financial grounds and it was for this reason that Manchester (1869) was chosen instead of Preston against the advice of the Country Meeting Committee.[2] The point was well-illustrated when the Society returned to the North-West in 1877. When the town was selected by the Council; the previous year the voting was Carlisle four votes, Liverpool thirty-two and Preston three.[3]

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[1] 'Report of the Miscellaneous Department at Warwick', Journal, XX, 1859, p.323.

[2] Dixon, 'Royal Agricultural Society', pp.301-2.

[3] Monthly Council 3 May 1876, F.M.(3), XLIX, 1876, p.420.

There were three metropolitan shows held by the Society between 1839 and 1880. The first two, Windsor (1851) and Battersea (1862) were occasioned by the International Exhibitions when it was thought appropriate that the Society should also be in London for the year. Windsor was confined to a stock exhibition, but Pusey was in charge of the agricultural implements at the Crystal Palace. Battersea was an exception to the generalisation that an urban location for thw show usually generated a profitable result for the Society. Reasons for the loss was attributed to such matters as the difficulties associated with the supply of green fodder to the stock (which alone cost the Society nine hundred pounds), the relative inaccessibility of the showground, and the rival attractions of the Derby (as the Royal show was held earlier than usual that year) and the Handel Festival. Dixon maintained that the 'penny-boats' which brought along crowds from the East End did much to mitigate the loss which was incurred. [1]

The suggestion of a London show was a sensitive issue for the Society with regard to its position in the agricultural community. There were undoubtedly some members of the Council for whom the annual trek to the provinces held little appeal. In 1857 Lord Feversham suggested that the time had come for the meeting to be held in London, a proposal which was not well-received by the agricultural press. [2] Corbet's report of the Warwick (1859) meeting complained of the tendency to hold the shows relatively close to the capital instead of at more remote locations. [3] Some suggestion was made that a great annual meeting might be held in London in conjunction with the Smithfield Club

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[1] loc. cit.

[2] A.G., 19 December 1857.

[3] M.L.E., 18 July 1859.

with associated local meetings organised by district committees to try out implements first seen at the London Show, [1] but this proposal was not taken up.

The 1879 Kilburn meeting was brought about partly by pressure from the implement-manufacturers. There was long-standing antipathy between many of the larger machinery firms and the Society over the operation of the 'prize-system' and the conduct of the implement trials. In the 1860s and 1870s the manufacturers made repeated complaints about the expense which attended the transport of large tonnages of implements for exhibits to distant parts of the country, especially as the railway companies evinced an increasing inclination to withdraw concessions which they had been anxious to afford during the earlier part of the Society's, and their own, existence. Alfred Crosskill expressed considerable impatience with the decision to hold the 1867 show at Bury St. Edmunds which he held to be inadequately served with railway communications and general accommodation.[2] There was more concerted action against the choice of remote locations during the 1870s. Part of this was connected with the long-standing arguments over the 'prize-system' but in 1875 the Agricultural Engineers' Association urged that the trade could best be served by a large summer meeting held near to London under the auspices of the Society. [3] In a deputation to the Council, the engineers maintained that although it had been necessary to go out to remote districts to bring to their attention new techniques and implements, conditions had changed and it was not unreasonable to expect the agricultural public to avail themselves of better internal travelling facilities and instead go to the

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[1] A.G., 9 January 1858 (letter from E.W. Moore).

[2] Alfred Crosskill, 'Agricultural Shows and their Influence on Agricultural Progress', (Paper read to the London Farmer's Club) F.M.(3), XXIX, 1866, p.375.

[3] F.M.(3), XLVIII, 1875, p.407.

larger centres of population. For the manufacturers, it was said that exhibitions at shows in remote parts of the country were no longer an important means by which implements were introduced to the agricultural community. The foreign trade in implements had assumed much greater importance and foreign agents could not afford to attend the shows as they were co-incident with the harvest over much of Europe.[1] Although it was considered that the insistence of the agricultural engineers on a London show, or at least shows restricted to large centres of population, was contrary to one of the fundamental principles of the Society, it was agreed to hold a show in the Metropolis as an experiment,[2] and 1879 was determined as the year for this after 1878 had first been considered. Brandreth Gibbs maintained that the financial loss at Battersea gave no proper indication of the likely success of another London show.[3]

Having decided upon the experiment, the Society went whole-heartedly into the promotion of the 1879 meeting at Kilburn as a great international exhibition of agriculture. Apart from the largest ever entry of live and dead stock on a site of 103 acres, attractions included a working dairy and exhibitions of butter-making on the English, French, Danish, and Swedish systems, cheese-making, seed exhibitions, and an assembly of ancient and modern implements to demonstrate the progress that had taken place - which did not meet with the approval of the manufacturers as it implied that the shows were responsible for the progress, which they were always at pains to deny.[4] In addition, there was a refreshment department, daily editions of the agricultural newspapers, a well-served members' club, and reading and writing facilities. There

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1 Monthly Council 2 February 1876, F.M.(3), XLIX, 1876, p.201.
2 Ibid., 5 April 1876, F.M., p.347.
3 Ibid., 3 May 1876, F.M.(3), XLIX, 1876, p.420, LIV, 1878, p.10.
4 F.M.(3), LVI, 1879, p.357.

were exhibitions of hives and honey with 'bee manipulations'. The show turned out to be little short of disastrous for the Society, mostly as it co-incided with one of the wettest periods of the century, which soon reduced the showground to a quaking morass of mud. Tons of burnt earth were brought in together with thousands of railway sleepers to combat the effects of continuous rain upon the showground. Because of these difficulties, the spirit was 'washed out' and the showyard, instead of being the great festival of agriculture that was intended, presented a 'thoroughly wet and dreary appearance'. So thick was the mud that half the week was over before many of the implement stands were ready for inspection, and adverse reports deterred potential visitors from attending. Planks, pathways, and wattle hurdles preserved spectators from 'at least falling into more than a certain depth of mire' but the mud spurted up through the interstices and twenty three years later Joseph Darby reminisced that

> Everyone who visited Kilburn retains vivid recollections of its incessant downpours; of the planks laid down in the leading avenues and without which they would have been perfectly impassable... one man slipped and falling between two of the planks, was so tightly wedged that it was difficult to pull him out. [1]

The weather was in very large part to blame for the disappointment of Kilburn though it must also be noted that the 'Mansion House Fund' organised by the City of London in support of the show had not been so liberally subscribed to as had been hoped and - with hindsight - there was severe criticism of the groundarrangements, it being alleged that the provision for drainage had been inadequate. [2] The need to sell out a substantial proportion of the

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[1] F.M.(3), LVI, 1879, p.90 (from M.L.E.); Illustrated London News, 5, 12 July 1879, Joseph Darby, 'Reminiscences of Royal Shows', Mark Lane Express Carlisle Supplement, 7 July 1902, p.22.

[2] Implement and Machinery Review, 1 August 1879.

accumulated fund to make good the deficit [1] led to a resolve to limit the size of the 1880 Carlisle show. There were higher entry charges for miscellaneous exhibits, welcomed by exhibitors and members as allowing for a more detailed examination of those items that were shown. There were gold and silver medals restricted to new and 'practically useful' machinery. Some of the new features of the Kilburn shows, such as the bee 'manipulations' and pisciculture, were kept at Carlisle, which again suffered from very wet weather. [2]

The shows of the late 1870s had come a long way in terms of size and attendance from the rather meagre efforts of Oxford and Cambridge, with which there was some initial disappointment. In the early years it was the great dinners which were the focal point of the meetings, but these gradually lessened in importance. Judging of stock was carried out in private until 1862 and the machinery trials were not a major spectator part of the show as the trial grounds were often some way from the main site, and the trials were sometimes held at a separate time of the year. The exhibits of implements and the daily parades of stock were a focal point for most visitors, and as steam machinery assumed considerable significance in the 1850s and 1860s the 'machinery in motion' section was a great attraction. Parades of horses were particularly popular, although the Society eschewed such 'sensational' elements as 'horse-leaping', made notorious by Sidney at the Agricultural Hall after 1864, and the Society was at pains to disown the leaping-exhibition got up by the Manchester Local Committee in 1869.

Most towns which played host to the Society took considerable trouble to make the visitors welcome. The whole event would turn into a sort of

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[1] Special Council 6 August 1879, F.M.(3), LVI, 1879, p.188.

[2] 'The Next Royal Show', and 'The Royal Show at Carlisle', F.M.(3), LVII, 1880, pp.126, 384; LVIII, 1880, p.119.

agricultural carnival or festival occasion. At Exeter (1850) the streets of the city were decorated with triumphal arches made of laurel and illuminated with variegated gas lamps, with banners proclaiming 'Peace and Prosperity' and 'Success to Agriculture'. One thousand two hundred sat down to the pavilion . dinner, there was a balloon ascent, and an outdoor barbecue where the central attraction was a huge joint of beef cooked by gas. The anniversary meeting was a sort of 'national holiday'; at Carlisle (1855) the houses were decorated with evergreens, flags, and wreaths, and at Salisbury 1857 - a 'brilliant success' - there were illuminated fir-trees placed around the market square. In the wake of the shows would be all the paraphernalia characteristic of a Victorian public gathering - side shows, a fair, firework displays, and picnic parties. The shows were very fully reported by all sections of the press and thereby took on very much more than local significance. They were national agricultural events and there were many agriculturists who, like Henry Corbet, looked forward to attendance as their 'annual treat'. [1] Although there was a tendency to look for constant progress in the shows, not all were equally successful. The Kilburn catastrophe has already been noted, but to Morton the Canterbury show of 1860 was 'unquestionably a failure', [2] while to Henry Corbet - who could recall the 'downpour of Gloucester' (1853) and the 'dullness of Lewes' (1852) - nothing was 'so utterly cheerless' as the Wolverhampton show of 1871. The town, which was 'not a terrestrial paradise', was associated with 'bad weather ... an unsavoury showground'; the result was the 'most miserable meeting' which the Royal Agricultural Society had ever held

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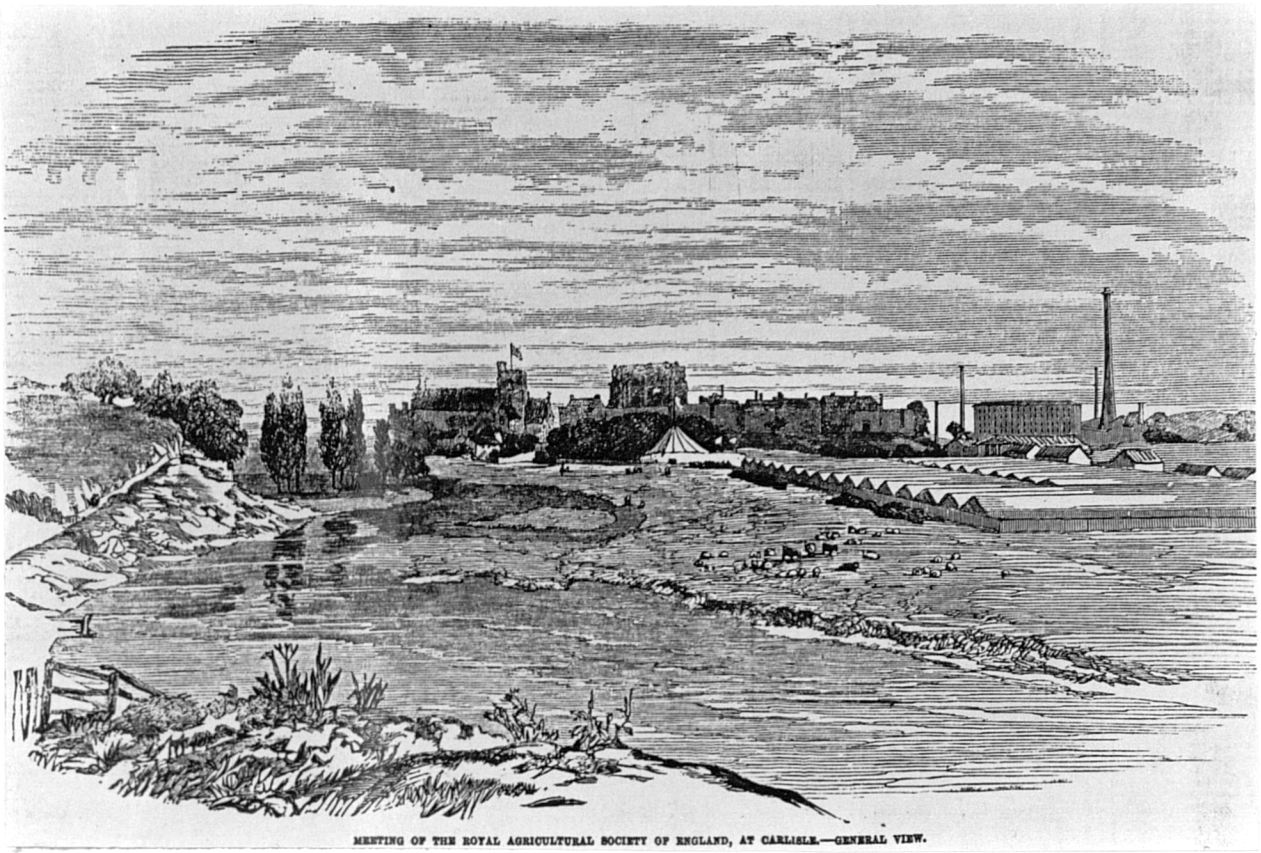
[1] The flavour of the shows as described here is based upon the reports in the Illustrated London News especially 20 and 27 July 1850, 16 July 1853, 11 August 1855, 1 August 1857, 1 August 1868.

[2] A.G., 14 July 1860.

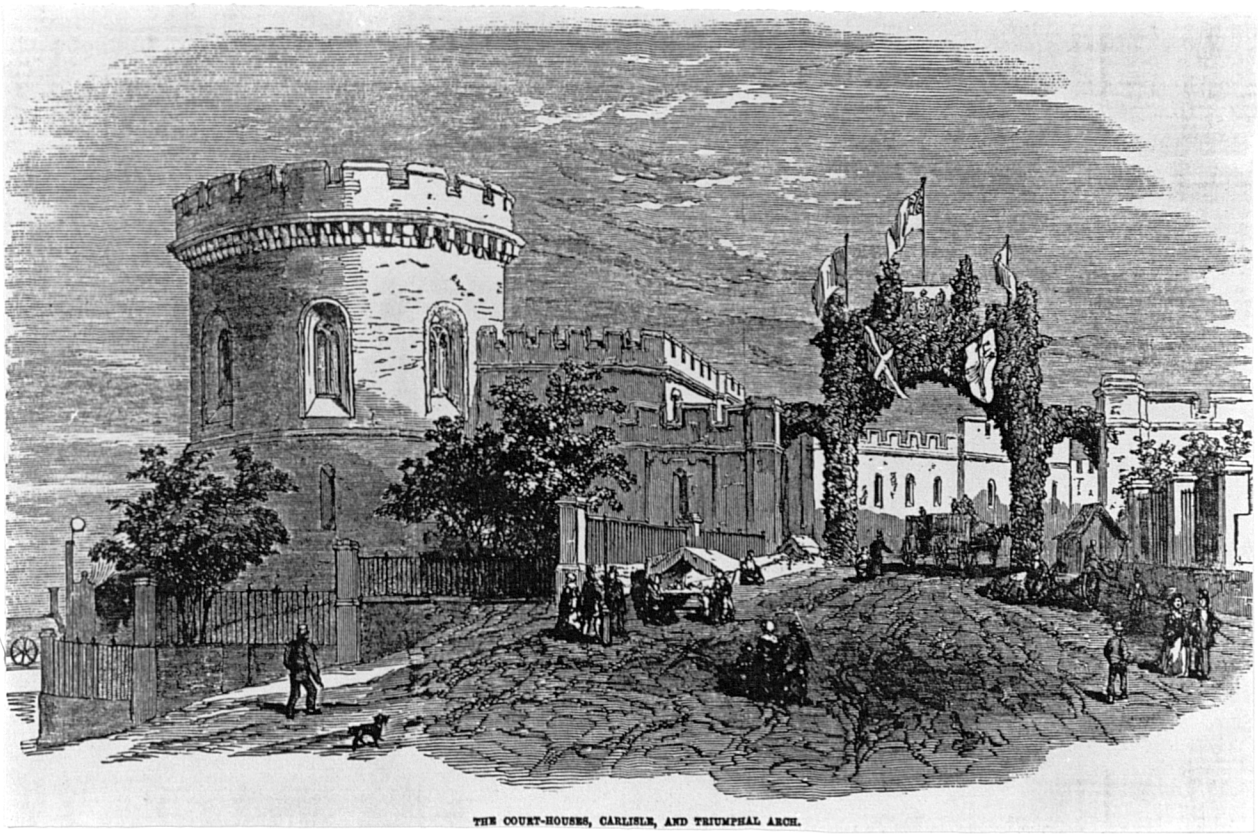
PLATES IX - XIV: VIEWS OF ROYAL SHOWS.

PLATE IX: CARLISLE 1855 - GENERAL VIEW.



MEETING OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND, AT CARLISLE.—GENERAL VIEW.

PLATE X: THE TRIUMPHAL ARCH.

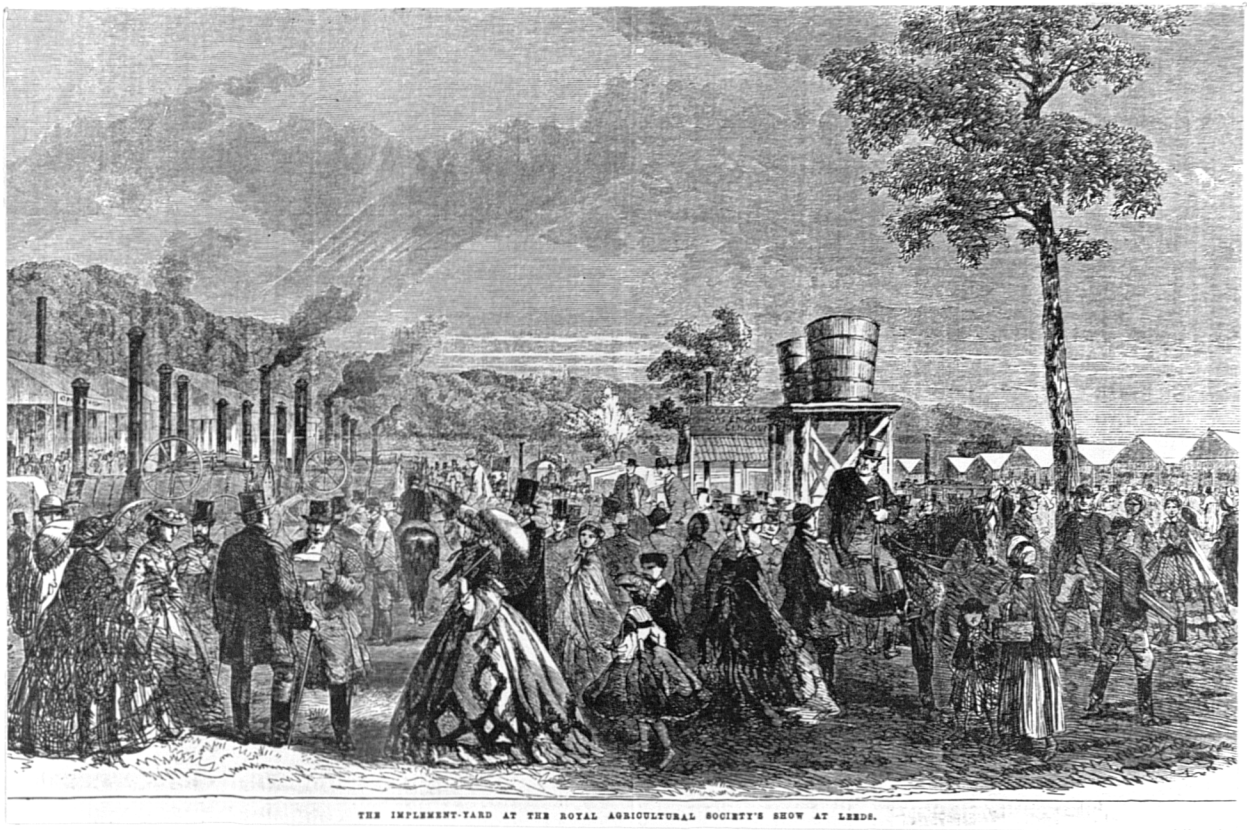


THE COURT-HOUSES, CARLISLE, AND TRIUMPHAL ARCH.

Source: Illustrated London News.

(11 August 1855,
p.181)

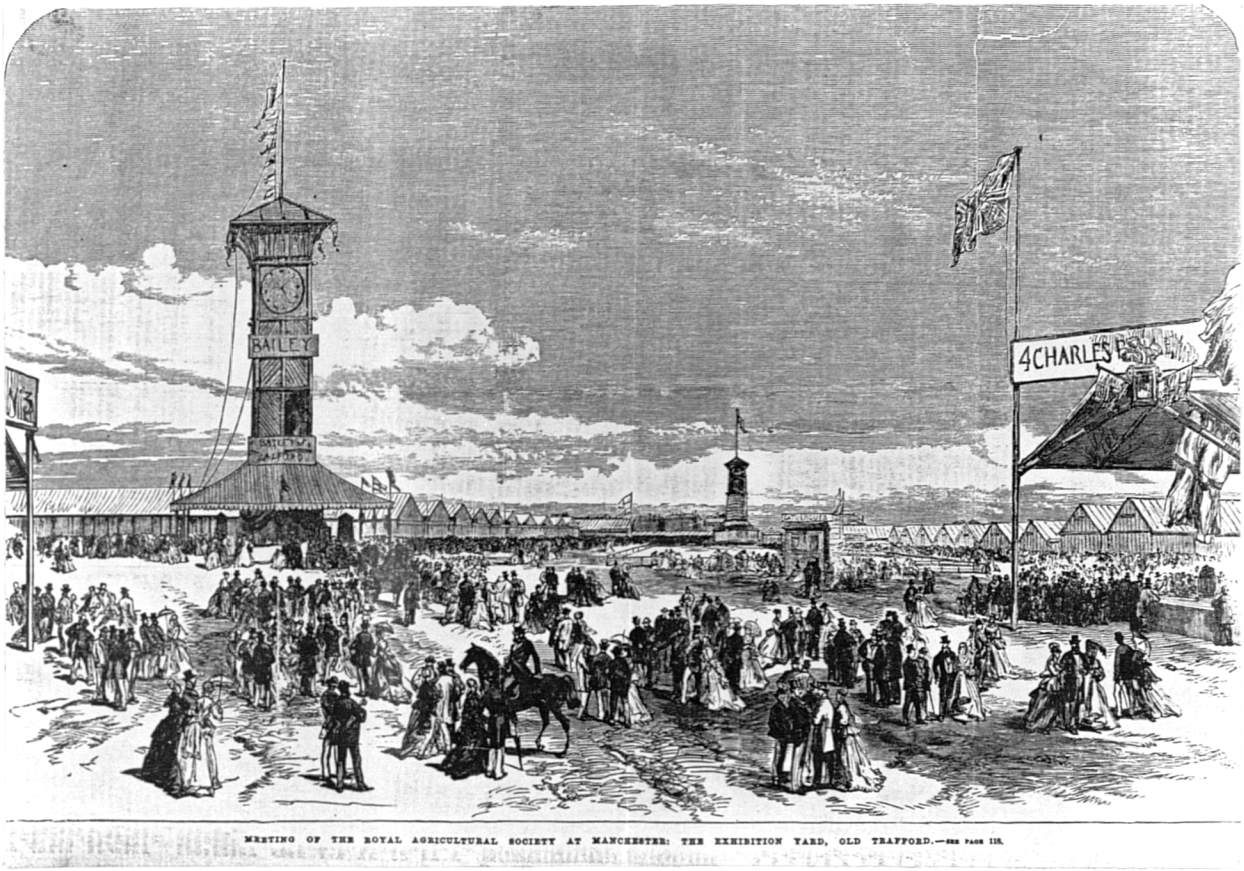
PLATE XI: LEEDS 1861



THE IMPLEMENT-YARD AT THE ROYAL AGRICULTURAL SOCIETY'S SHOW AT LEEDS.

Source: Illustrated London News.
(27 July 1861, p.79)

PLATE XII: MANCHESTER 1869.

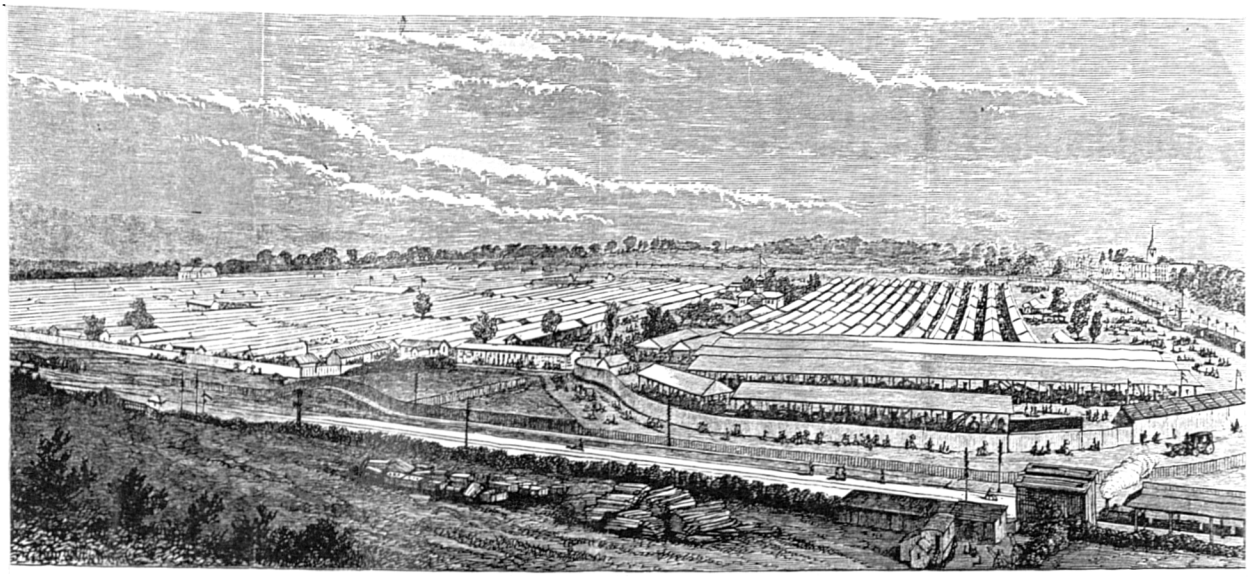


MEETING OF THE ROYAL AGRICULTURAL SOCIETY AT MANCHESTER: THE EXHIBITION YARD, OLD TRAFFORD.—see page 118.

Source: Illustrated London News.

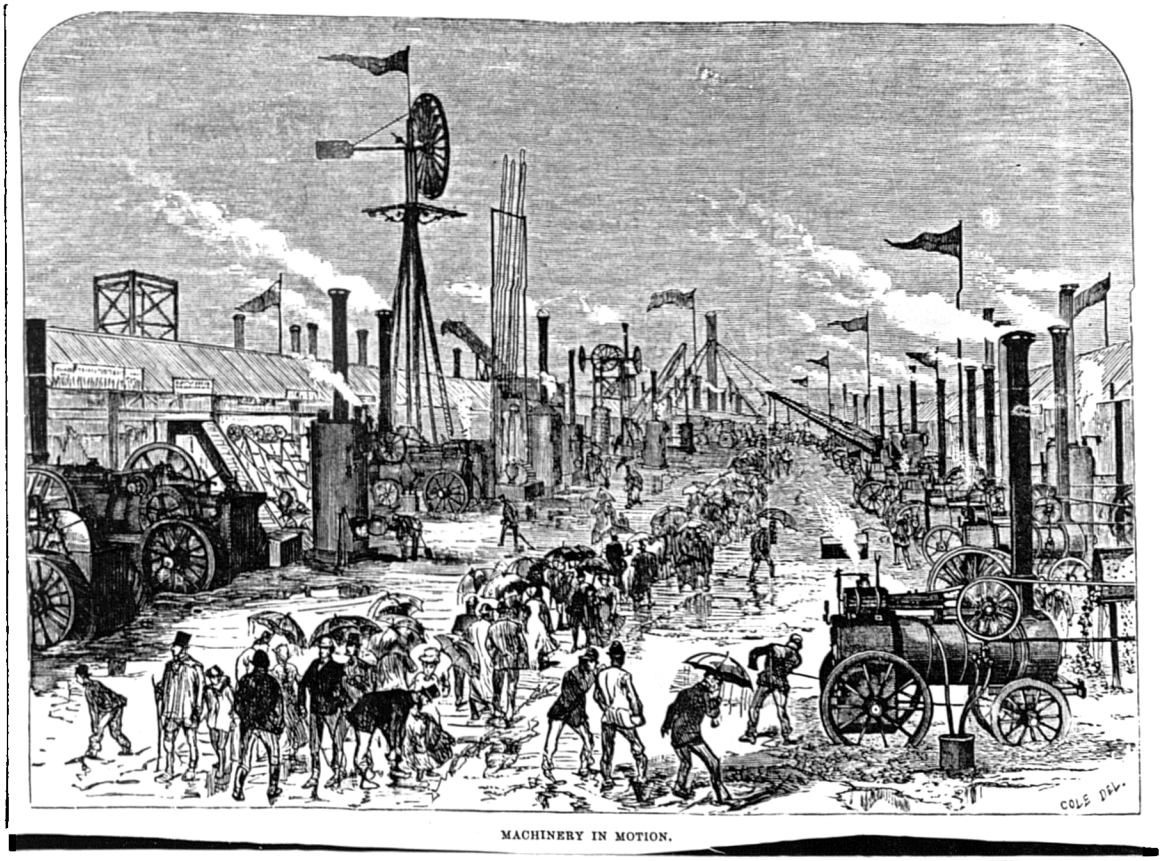
(31 July 1869, p.108)

PLATE XIII: INTERNATIONAL EXHIBITION KILBURN 1879,
A GENERAL VIEW.



INTERNATIONAL EXHIBITION OF THE ROYAL AGRICULTURAL SOCIETY IN LONDON: THE SHOW-YARD AT KILBURN.

PLATE XIV: MACHINERY IN MOTION.



MACHINERY IN MOTION.

Source: Illustrated London News.
(5 July, 1879,
pp. 12, 41)

and absent were the 'municipal civilities or hospitalities so common to these occasions'. [1] As Corbet himself suggests, this was very much the exception to the rule, and apart from complaints about over-charging for accommodation the annual shows usually generated a great deal of ambience. Mr. Mechi would sometimes give a lecture or two at 'fringe meetings' and it was no accident that the Tiptree Hall 'gatherings' were also held in July to which those who were interested might proceed at the conclusion of the Royal meeting.

The general administrative aspects of the show were the responsibility of the Secretary and his Hanover Square assistants, but the underlying organisation was, between 1843 and 1875, master-minded by Brandreth Gibbs, also Secretary to the Smithfield Club and partner in the old-established seed-firm. This was an interesting aspect of agricultural continuity for the firm of Thos. Gibbs & Son of Half-Moon Street, was appointed official seedsman to the Society in 1843, a position that it had also had in relation to the 'old' Board of Agriculture. Humphrey Gibbs organised the first few shows, but it was to Brandreth Gibbs that the growth and prosperity of the shows was in large measure attributable, and whatever criticisms there were of the 'prize system', the conduct of the trials, and occasional shortcomings inevitable in connection with any undertaking of such size and complexity all sources pay tribute to his skill and dedication as Honorary Director. This was recognised by the award of a knighthood on his retirement in 1875 (when he was succeeded by Jacob Wilson), the first time such an honour had been given for purely agricultural services.

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1 F.M.(3), XL, 1871, p.147.

2 For memoir of Thomas Gibbs see F.M.(2), XIX, 1849, p.220; on Brandreth Gibbs, A.G., 31 December 1853, 14 December 1872; F.M.(3), IX, 1856, p.16, XXXI, 1867, pp.1-2; Journal (2), XXI, 1885, pp.611-620.

Machinery Trials and the 'Prize System'

One of the most prolonged debates in the early proceedings of the Society concerned the conduct of the trials of agricultural machinery carried out as part of the country meeting programmes and the 'prize system', as the award of money or medals for merit or innovation in machinery was generally known. This debate has gone largely unnoticed by historians of nineteenth century agriculture, apart from a recent brief comment by H.S.A. Fox. [1] It was much more than an 'occasional' disagreement [2] between the manufacturers of agricultural machinery and the Society, and by the 1870s it could be noted by Henry Corbet (who defended the system) that a 'periodical attack' on it was a 'certainty'. [3] It is important to consider the arguments, because they bore very closely upon the basic ways by which the Society thought that it was possible to stimulate agricultural progress.

The award of prizes for invention or merit was, as we have seen, a central part of the work of the Society of Arts during the second half of the eighteenth century and the model was followed by many other institutions. The rationale of the system according to William Shipley (founder of the Society of Arts) was that 'profit and honour are two sharp spurs, which quicken invention and animate application [4] and, in the late eighteenth century, although there was a certain amount of criticism of the way in which the system was operated by the agricultural societies, it was not so controversial as it was later to become. At the time of the formation of the Royal some commentators questioned why the system was necessary for the encouragement of

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1 'Local Farmers' Associations', p.50.

2 Orwin and Whetham, p.102.

3 'Horse Shows and the Prize System', F.M.(3), XXXVIII, 1871, p.274.

4 Allan, p.43.

agricultural progress:

> It has also struck me as a remarkable circumstance that it is reckoned necessary to hold out premiums to induce a man to exert himself for his own advantage. Self-interest is the ground spring of human action and if any man will not exert himself for his own profit I should consider him almost past redemption.

wrote 'Rusticus' to the Farmer's Magazine, adding that no Society rewarded the manufacturer to adopt the spinning jenny or the mule, [1] and such sentiments were sometimes repeated in the local press. [2] Experience of the early country meetings of the Society led to a very wide-ranging debate centred around the question of the organisation and conduct of the trials, the virtue or otherwise of the system by which the agricultural machinery firms had to compete with each other on the Society's trial grounds under public scrutiny, and the influence of the award of prizes upon agricultural development, particularly in agricultural machinery.

At the first two country meetings, at Oxford and Cambridge, there was no thought of arranging an implement trial. Indeed, implements occupied a subsidiary place to stock on the Society's initial scale of agricultural importance with only two implement prizes offered for 1839 - for a gorse crusher and 'any agricultural implement'. In the event, the Society's gold medal was awarded to Ransomes of Ipswich, whose assembly of six tons of assorted agricultural implements was one of the leading features of a show that had not otherwise generally fulfilled the expectations of the Society's founders. Ransomes again attracted a great deal of attention in 1840 when,

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[1] F.M. VIII, 1838, p.163.

[2] See, for example, 'Agricola', ed., Letters on the Rules and Regulations of Agricultural Societies, 1842 (originally published in the Chester Courant 1840-1).

at the Cambridge meeting they showed great banks of ploughs, comprising eighty-six different varieties, elevated on planks to a height of twenty feet.[1] Two hundred pounds was allocated for implement prizes at Liverpool the following year but there was no pre-determined plan to hold a trial, although there were ad hoc efforts on Aintree racecourse where the twenty year old James Howard came out best.[2] Immediately there were problems encountered; the report of the Liverpool show mentions that the brightly painted new ploughs were not the best for practical working, being insufficiently 'worked-in', that there were delays occasioned by the press of spectators, and there was insufficient time to allow a proper trial.[3] At Bristol the following year (1842) George Webb Hall provided trial-grounds for the ploughs but the arrangements met with far from universal approval, and the growing volume of criticism reached a peak at Derby in 1843 when William Shaw was forced to admit in a Mark Lane Express leader that the Society's attempts to effect an adequate implement trial up to that time had 'wholly failed'.[4]

The trials that year were held at Rough Heanor, some distance away from the main showyard. As the soil characteristics were unfavourable for ploughing and there was some difficulty in obtaining horses, no awards were made. The Rough Heanor field had only been obtained at the last minute, the local Committee not having given the matter much thought. Conflict between the Society and the manufacturers was apparent at this time, J. Allen Ransome leading their opposition to what were considered to be inadequate arrangements. Some of the ploughing that was carried out was, to observers, of a very

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[1] E. Clarke, 'The First Two Meetings of the Royal Agricultural Society', Journal (3),V,1894, p.231 ; Oxford and Cambridge Show reports Journal, I 1840, p.lxiv, II 1841,p. xiv.

[2] A.G., 28 July 1879; Dixon, 'Royal Agricultural Society', p.166.

[3] Journal, III, 1842, pp. cxiv-v.

[4] 7 August 1843.

inferior nature. In an 'open letter' to Lord Spencer a 'Plain Derbyshire Farmer' complained in the Mark Lane Express that he had seen furrows of irregular width and depth. If such ploughing had been seen in his own fields he would have been 'ashamed of both himself, his implements, and his workmen'. Worse, such an exhibition could prejudice the cause of improvement for it could help to confirm spectators in their old prejudices. According to the 'Plain Derbyshire Farmer' at the Derby show

> 'Well, we are satisfied with our old ploughs now, eh, mates?' was a constant question. 'Why, I think that we shall go home contented' the nearly uniform answer, whilst at every turn some lusty sexagenarian was seen instructing his chubby faced nephews in the danger of novelty. [1]

At the Council dinner during the show week Ransome addressed some forcible remarks on the conduct and purpose of the trials and it is from this time that the almost universal opposition of the major implement firms can be distinguished. He called for more thorough trials carried out not just as an amusement for the crowd but as a demanding test of the best implements. If this were done, the awards would then be valued far beyond their nominal value. [2]

At the first available opportunity after the show Evelyn Denison (later Lord Ossington) raised the subject of the future of the trials. He complained that he had taken a group of his own tenants and a village implement maker to the show with the object of selecting the best tools, and ascertaining the comparative merits of those in the same class, but that the show,

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[1] M.L.E., 24 July 1843. See also the Report of the Derby Meeting in F.M. (2), VIII, 1843, pp.103-4, 119-20.

[2] F.M.(2), VIII, 1843, pp.127-8.

although not without value, had given little guidance in the matter of choice and selection of implements. He called for a larger number of judges, with subdivision of their work.[1] At a Special Council in August comprehensive new implement trial regulations were drawn up at the instigation of William Miles. The number of judges was to be increased and the length of the trials extended. However, there was not a great deal of optimism that the changes would lead to very much improvement.

At a Council Meeting in 1845 Ransome brought forward a motion in which he was supported by Fisher Hobbs that prizes for ploughs, drills, and tile machines should not be awarded until subsequent trials had been made at the expense of the Society, under the direction of the stewards and judges and in a different locality; a Committee was formed (which included Ransome, Hobbs and Pusey) to investigate the best way in which this could be carried out.[2] The result of the Committee's deliberations was a deferred trial at Pusey, Berkshire, but the judges for the year did not report very favourably on the experiment, taking the view that just as much could have been achieved without the delay.[3]

Despite these problems the implement department of the Show expanded considerably during the next few years although some of the major firms, such as Ransomes, often refused to participate. The increase of size added to the difficulty of adequate testing and inspection, for ever more implements had to be considered in the allotted time. Thus in 1847 it was complained in the Agricultural Gazette that

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1 Weekly Council 19 July 1843, F.M.(2),VIII,1843, p.144.

2 Monthly Council 2 April 1845, F.M.(2), XI, 1845, p.463.

3 'Report on the Exhibition of Implements at the Shrewsbury Meeting' Journal, VI, 1845, p. 309.

> At Northampton the short time allotted to the judges rendered their awards of less value than would otherwise have been the case. [The implements] could not be done justice to in the few moments at the judges disposal, and much of the quality and quantity of the work done depends upon the skill of the workmen. [1]

Similarly, it was noted in 1849 that 'work which might occupy the judges for a fortnight was done in a day or two' and there were comments such as "You don't think that I care anything about a trial such as that", overheard of an exhibitor on learning of a decision that had gone against him. [2] The following year it was recorded that Ransome's and others were dissatisfied with the way in which the business of the showyard was conducted, when only seven minutes was taken over a stand of thirty implements. [3]

The Society was not unaware of these criticisms but it was very troublesome to come to terms with the difficulties associated with the conduct of a satisfactory trial. Not least, their actual organisation presented a huge problem. Thus in 1855 it was complained that exhibitors did not always know when a particular piece of machinery was due to be tested and had to endure lengthy waits in the fields, sometimes in pouring rain. [4]

William Fisher Hobbs returned home from the Carlisle meeting, at which he had been Senior Implement Steward, determined to attempt to improve the general conduct of the trials. He was impressed with the need for revision of the implement prize-sheet and suggested to the Council that the implements might be arranged into classes for the purpose of more extended trials. [5]

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1 A.G., 24 July 1847.
2 Ibid., 27 July 1849.
3 Ibid., 3 August 1850.
4 Ibid., 28 July 1855.
5 William Fisher Hobbs, 'Report on the Exhibition and Trial of Implements at the Carlisle Meeting', Journal, XVI, 1856, pp.528-9.

At the first full Council after the summer recess, two leading implement makers, Ransome and Garrett, called for a conference between the manufacturers and the Society, and this was arranged for early December. [1] As a result of this meeting Col. Challoner and H.S. Thompson, leading members of the Implement Committee, recommended to the Council that in future the country meeting trials be confined to specified classes of implement, to rotate on a triennial basis. [2] At the February Council the following division of implements for trial was agreed to:

1856: Implements for the tillage and drainage of land (Ploughs, Harrows, Cultivators, subsoilers, clod-crushers, Rollers, Tile and Brick machines, Implements for Drainage).

1857: Implements for the cultivation and harvesting of crops (Drills, Manure Distributors, Horse Hoes, Mowing machines, Reaping machines, Horse rakes, Carts, Waggons).

1858: Implements for the preparation of crops for market, or cattle food (Engines, Thrashing machines, Dressing machines, Chaff engines, Mills, Oilcake Breakers).

In addition, there were to be prizes for the best steam-cultivator and reaping machine, as well as departments for new and miscellaneous implements. [3]

The implement manufacturers expressed satisfaction with this new arrangement, but at the same time launched a concerted attack against the continued operation of the prize system itself. In a memorial signed by nearly all of the leading implement manufacturers of the day (eighty-two signatures)

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[1] Monthly Council 7 November 1855, F.M.(3), VIII, 1855, p.475.

[2] Special Council 12 December 1855, Ibid.(3), IX, 1856, p.6.

[3] Monthly Council 6 February 1856, Ibid.(3), IX, 1856, p.201.

it was complained that the system of offering money prizes for competition among the makers led to the production of 'ingenious peculiarities' rather than useful and practical machines, and was also unfair in operation in that it led to undue acclaim of one to the deprecation of all the other competitors when the merits were frequently more or less equal. In place of the money prizes, the manufacturers called for reports by the judges to be given to the exhibitors, before the general exhibition day. There was no objection made to the award of large prizes to particular areas which needed encouragement - steam ploughing was an example at the time - or to the distribution of medals for worthwhile inventions. [1]

This suggestion did not receive any support from the Council and the agricultural community was, in general, not prepared to give up the system. William Torr, for example, complained at the Athlone meeting of the Royal Agricultural Improvement Society of Ireland that the implement manufacturers had combined essentially to prevent open competition between them so that they could protect their position against any new entrants into the business, who would obtain prominence if they happened to gain a prize at the expense of one of the well-established firms. [2] This theme was echoed by Corbet, who always vigorously defended the prize system, and considered that the award of money prizes had constantly kept alive the spirit of agricultural improvement. [3]

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[1] 'Memorial Presented to the Council of the Royal Agricultural Society of England and its Committee on Implement', F.M.(3), IX, 1856, pp.205-6. It is interesting that the manufacturers operated in loose association at this time, as the date of the foundation of the Association of Agricultural Engineers is usually taken as 1875 (see R. Trow-Smith, Power on the Land, 1976).

[2] A.G., 4 October 1856.

[3] 'The Implement Makers and the Royal Agricultural Society of England', F.M.(3), IX, 1856, pp.204-5.

The concerted campaign of the implement manufacturers was maintained by the publication of two pamphlets in 1857 which excited a good deal of notice. These were William Day's [1] Mechanical Science and the Prize System in Relation to Agriculture, and The Manufacture of Agricultural Machinery considered as a Branch of National Industry, by 'A Manufacturer' for the Association of Agricultural Engineers. Day went over the ground covered by the exhibitors' memorial of 1855 and stressed the point that whatever usefulness the prize system may have had in the early history of the Society, the tendency was now too much for it to encourage novelty without practical purpose; but he made the additional observation that constant alteration and modification of machinery made necessary for annual competition stopped implements becoming cheaper as there was less opportunity to practice economies of scale in manufacture. [2] The 'Manufacturer' reviewed the rise and progress of the implement trade and, although acknowledging the part played by the Society, stressed other important influences including the agricultural press and the cheapening of transport made possible by the extension of the railway. The pamphlet called for longer trials geared to the ordinary practice of farming and for the Society to form a committee consisting of the consulting engineer and farmers to determine 'points of excellence' in agricultural machinery and the relative importance of each point. The trials would provide the data for comprehensive reports and the show would have a full exhibition of implements with 'machinery in motion', considered to be one of the most attractive parts of the show. [3]

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[1] Day was editor of the Jersey Argus; The 'Manufacturer' may have been Charles Howard.

[2] Mechanical Science and the Prize System , p.43.

[3] The Manufacture of Agricultural Machinery , pp.19-22.

A review of The Manufacture of Agricultural Machinery in the Farmer's Magazine did not think that the 'Association of Agricultural Engineers' had made out a case and found little merit in their suggestion that there should be straightforward reports rather than prizes with no indication of relative merit. [1] Another review of the pamphlets found little in the arguments against the system, but conceded that much depended on how the trials were conducted. If done properly, it would then be a matter of little substance as to whether the value of any particular machine was expressed in a 'favourable report' or a twenty pound note; 'Catalogues would read as well with "took the first class report at Warwick", in flaming capitals as "took the first prize of ten pounds at Salisbury" '. [2] The sub-division of the trials, as operated after the Carlisle Show, was thought to invalidate the manufacturers' points. Although it was admitted by supporters of the prize system, such as Corbet, that errors had been made during the early years of the trials, nevertheless in the late 1850s it could be confidently asserted that 'no-one can mention a single prize implement at any of the great shows that is not well adapted for the every-day purposes of the farm, nor point out a novelty which has received a certificate of merit that is not a useful and meritorious invention'. The criticism of too hurried a trial no longer held up when, as in 1858, the trials, which formerly occupied three or four days for all the implements extended over eight days for only one-third of the former number, and it was also maintained that the Society's jury of practical farmers, aided by their consulting

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1 'The Prize System - as now opposed by the Implement Makers', F.M.(3), XII, pp.116-7 (probably written by Henry Corbet).

2 'R.S.B.', (probably Robert Scott Burn) 'Agricultural Machinery, and the Prize System', Ibid., XVI, 1859, p.296.

engineer and other men of science with a full range of testing equipment at their disposal, were well able to find out some useful information during the course of a trial. [1] There was more agreement that local societies were ill-equipped to carry out full-scale trials and to award prizes, and it was recommended that they would do well to follow the example of the Norfolk Society and offer awards for the best collection rather than for individual implements. [2] Of the larger societies, the Bath and West discontinued competitive trials in the late 1850s. T.D. Acland, then the dominant figure in that Society, justified the decision by claiming that farmers were the best judge of what to buy, and did not need the guidance of prizes awarded under rather artificial conditions. [3]

In 1858, as the triennial system was due to end that year, a committee was formed to consult with a deputation from the implement manufacturers and report to the Council in June. [4] In view of the protracted controversy over the prize system this development was viewed with some interest with regard to the adoption of a policy for the future. [5] Evidence of continued disagreement between the Society and the manufacturers is suggested by the fact that Col. Challoner, Chairman of the Implement Committee, was not able to report to the Council with any firm advice until December, the manufacturers having made recommendations during the intervening period. It was decided to extend the schedule over four years:

1859: Ploughs, Harrows, Cultivators, Rollers, Tile and Brick Machines, Draining Machines.

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[1] 'Agricultural Implements and the Prize System', F.M.(3), XV, 1859, p.269, (from Oxford Journal).

[2] Ibid., p.329.

[3] T.D. Acland to Editor of Oxford Journal, Ibid., p.330.

[4] Monthly Council 5 May 1858, Ibid., XIII, 1858, p.519.

[5] 'The Royal Agricultural Society - Proceedings in Council', Ibid., pp.495-6.

1860: Combined and other Thrashing Machines, Chaff Cutters, Mills, Oilcake Breakers.

1861: Drills, Manure Distributors, Horse Hoes, Hay Machines, Mowing Machines, Reaping Machines, Horse Rakes, Carts, Waggons.

1862: Fixed and Portable Steam Engines, Fixed and Portable Finishing Machines, Hand Dressing Machines, Barley Hummellers. [1]

The Warwick meeting of 1859 passed off uncontroversially under the new division but the implement makers organised a boycott of the Canterbury meeting the following year. Their reason for taking such extreme action was not very clearly specified in advance, and nothing was said by them at the May General Meeting of 1860. The immediate point of contention appears to have been that the Canterbury Local Committee wanted a ploughing match held under its own auspices, which the manufacturers chose to interpret as breaking faith with the quadrennial division embarked upon in 1859. However, the leading implement firms competed in an alternative event, a ploughing match on Weald Clay at Marden, Kent in the May of the year, this being held as a more suitable season, which then, of course, by inference, placed a question mark over all the previous plough trials held in July. The conclusion in the Farmer's Magazine was that the 'conduct of the great implement houses is to the world at large incomprehensible'. [2]

Justification for the boycott was given by the manufacturers in Newton's London Journal of Arts and Sciences as (1) that the Society had broken faith with the exhibitors in departing from the quadrennial division (this referred to the local committee's prizes at Canterbury); (2) that the prize sheets were so indefinitely worded, that the makers were in the dark as to the

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[1] Monthly Council 1 December 1858, F.M(3), XV, 1859, p.74.

[2] 'What the Implement Makers Want', Ibid.(3), XVIII, pp.39-40.

kind of machines that the Society wished to encourage; (3) that the trials were unsatisfactory and the awards capricious, inasmuch as the time devoted to the trials were very limited and there were no fixed principles of judging laid down for the guidance of judges; that the exhibitors had no power to object to the appointment of the judges, whether on the ground of their competency, or their business relations, or to the choice of the consulting engineer, who stood in the position of umpire; (4) that the reports of the trials were meagre, inaccurate, and incomplete, and published so long after the show as to be of little service either to the public or to the trade; (5) that the expenses of attending, exhibiting and competing for prizes had so much increased that the business resulting from attendance at the Royal Agricultural Show was no longer commensurate with the outlay that was required. [1]

The firm of Ransome and Sims gave detailed reasons for their refusal to exhibit at Canterbury and Leeds (1861). They claimed that, although they had been immensely successful in winning prizes and commendations up to that time, their 'exertion and outlay ' was no longer adequately repaid. Remuneration for exhibiting could, according to Ransome's be expected by: (1) direct sales in the saleyards, (2) by subsequent sales in the show district, (3) by increased sales at home and overseas in consequence of their having received the Society's prizes and (4) by the value that the public put on the prizes as evidence of character of the manufacturer and of the excellence of his productions. Ransome's were prepared to admit to the validity of the

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[1] Anon., 'The Royal Agricultural Society and the Implement Makers', Newton's London Journal of Arts and Sciences (No.5), LXVIII, 1860, p.67. See also 'Implement Makers and Implement Prizes', F.M.(3), XVIII, 1860, pp.341-2 (comment from the Economist on the Newton's Journal article).

first three heads but considered that the awards of the Society could no longer be considered a solid guarantee of excellence to the public. A manufacturer with a high reputation to maintain did not need to compete; if he did, he required that the terms be clearly defined at the outset, that the trial be conducted at a suitable season, with proper mechanical staff, and well-informed men to act as judges. Ransome's took the view that the outcome of the trials did not materially affect their standing with the agricultural public so that their expenses and exertions were not justified on commercial criteria. They also claimed that they had not been given satisfactory information by the Council on the interpretation of the prize-sheet for Canterbury, or assurances on the conduct of the trials. In reply to the question (posed by many agriculturists) 'what do you want? what will satisfy you?' Ransome's asked for trials of much longer duration, under conditions approximating to those likely to be experienced in everyday use, clarification of the prize-sheet, more judges and mechanical staff, a report of the trials and reasons for the decisions to be made on the prize-list, and less frequent trials of well-established implements.[1]

The debate had more than purely agricultural significance, for the International Exhibition of 1862 stimulated further interest in the issues. Samuel Sidney introduced the topic at the Society of Arts where he drew very heavily on the experience of the Royal Agricultural Society and claimed that it had failed to reward improvements of the highest importance but rewarded, instead, useless inventions. The award of prizes was a 'pleasant occupation for amateurs' which was justified for academic excellence, sport, skill, or horse-racing but was inappropriate for matters of business or

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[1] Ransome's and Sim, Reasons for not exhibiting at the R.A.S.E. Meetings Canterbury 1860 and Leeds 1861, 1861. This was given quite wide distribution by the newspapers. There is a copy in the Ransome's archives at the Museum of English Rural Life, University of Reading, TR/RAN/PI/AS/R55.

or invention. Corbet, who attended Sidney's lecture defended the system against Sidney's characteristically strident tirades and maintained that its operation had brought the best implements into general use. [1]

Corbet's view was nearer to that generally held by the agricultural community. An important exception was Morton in the Gazette who, as we have seen, had been critical of the conduct of the trials at an early stage in their development. The clearest statement of his views is to be found in his very important paper given to the Society of Arts in 1863. Here he repeated many of the points that had been made so frequently over the previous few years - that awards were made on the basis of an insufficient trial, at the wrong time of the year, conferred too great an advantage on pure novelty, and disorganised the routine of the work of the factories. In support of these contentions, however, Morton produced some interesting evidence, and as a well informed, unbiased, and thoughtful observer of the agricultural scene, his views deserve considerable attention. Morton maintained that he had examples of implements - he did not give specific names - whose sales had been given no extra impetus when they received a prize. Others had been consistently rewarded, but never came into general use. One firm, Morton maintained, had followed the advice of judges for improvements and, as a consequence, its sales steadily fell from seven to eight hundred of the implements annually down to no more than fifty, only to regain sales when the firm reverted to the old, 'unimproved' pattern, the manufacturer having been told by his workmen that he had been 'bamboozled' by twenty years' false leading'. [2]

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[1] Samuel Sidney, 'On the Effect of Prizes on Manufacturers', Journal of the Society of Arts, X, 1861-2, pp.376-80.

[2] J. Chalmers Morton, 'Agricultural Progress: Its Helps and Hindrances', Journal of the Society of Arts, XII, 1863, pp.64-5. For Corbet's comment on this paper see 'The Prize-System, as put at the Society of Arts', F.M.(3), XXVI, 1864, pp.9-11.

H.S. Thompson replied to Morton's points in his survey of the work of the Society during the first twenty-five years of its existence the following year. He maintained that the opponents of the prize system fixed their attention too much on the defects and shortcomings of the system, some of which were readily admitted. Thompson, like the majority of the Council and ordinary members, preferred to keep the system, which he believed to be very useful in deciding the merits of the various implements on offer and to encouraging improvements.[1]

How far, then, did the manufacturers have a valid case in their persistent complaints? Certainly the trials were at times superficial and carried out under adverse conditions. Ploughing grounds were often baked hard in July while crops were sometimes still green for the reaping-machine trials. After a period of rapid developments in the 1840s it was probably true that in the standard implements - ploughs, harrows, rollers and so forth - there was not much to choose between the products of the major implement houses, so to give a prize to one, with the rest 'no-where', was to give rise to an understandable cause for resentment. It was, as Morton put it, impossible in a few hours' trial to 'fish out the microscopic differences which may exist'.[2] There was undoubtedly truth in the oft-stated claims that the awards sometimes were a reflection on the skill of the ploughmen than on the actual quality of the machine and that the Society and the system encouraged the production of machinery which was got up to win a prize but not fitted to practical work. The degree to which the need to compete and make perpetual small modifications to the implements significantly

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1 H.S. Thompson, 'Agricultural Progress and the Royal Agricultural Society', Journal, XXV, 1864, pp.11-18.

2 'Agricultural Progress', p.64.

increased the price of the products to the farmer is difficult to quantify but as this point was made by so a reliable a source as Morton, who had direct access to figures provided by leading firms, it suggests that the contention was not without foundation. Richard Garrett claimed that his costs in competing in the first twenty-one shows came to no less than thirty thousand pounds with special staff who were up to all the 'dodges'. The expenditure had not been justified because some customers, he claimed, specifically asked not to have a prize machine because it would not answer their purpose. [1] The manufacturers sometimes attacked the Society's consulting engineer who was in charge of the testing. Howard called on C.E. Amos (who filled this position from the time of Parker's resignation in 1847 until 1870) to resign in 1864, partly because his firm (Amos & Easton) was regularly engaged in trading in agricultural implements, so that the independence of his judgement was under question. [2] There is little to support the view that his work as consulting-engineer was anything less than highly competent and unbiased, and the Council refused to entertain these complaints. [3]

Though some of the manufacturers' complaints were not without substance the agricultural community for the most part took the view that the trials were worthwhile despite the acknowledged imperfections and suspected that the chief cause of the implement-makers' hostility was their desire to preserve their established positions and make it more difficult for new men to enter the field. It is problematical to decide how far this was an underlying

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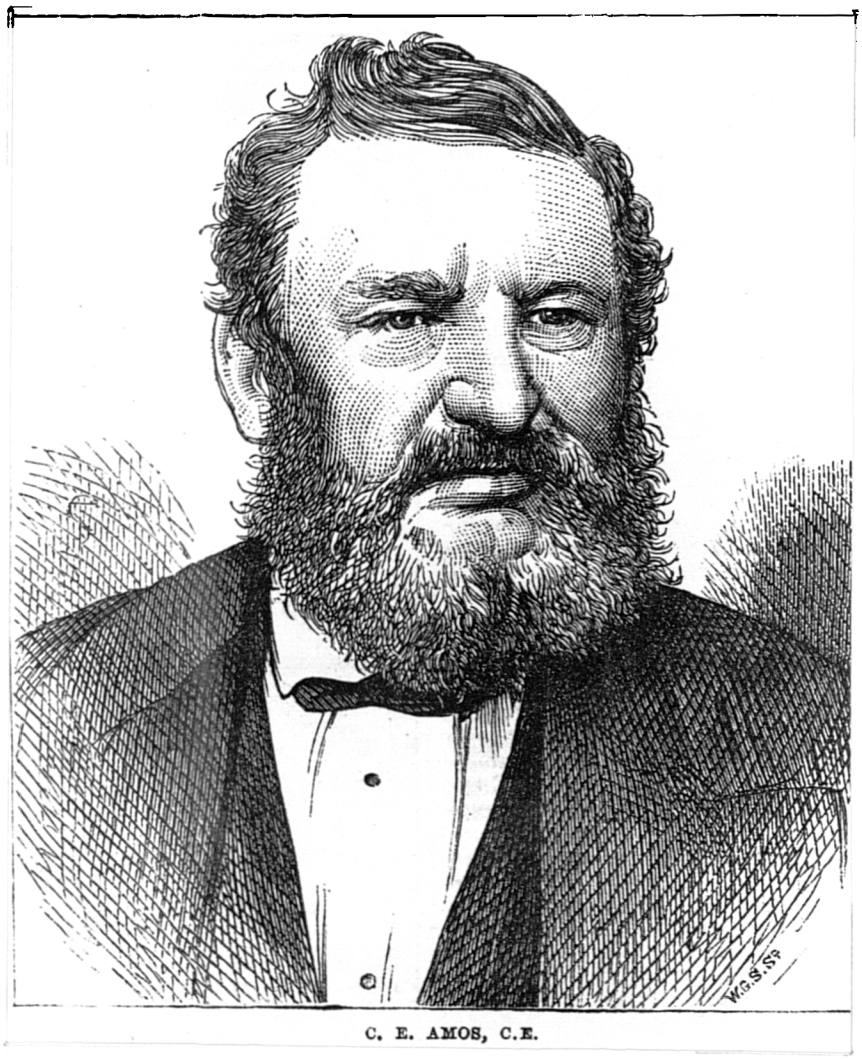
[1] Letter, A.G., 16 January 1864.

[2] F.M.(3), XXV, 1864, pp.228-9. See also A.G., 20, 27 February 1864; 7 December 1872 for memoir of Amos. The firm of Amos, Easton, and Anderson was appointed as consulting engineer on his resignation.

[3] Monthly Council May 1864; F.M.(3), XXV, 1864, pp.502-3.

PLATE XV: C. E. AMOS.



C. E. AMOS, C.E.

Source: Morton's Almanac For Farmers And Growers.

(1873, p. 19)

motive for the manufacturers' continued onslaught against the system, but there is limited evidence which suggests that the leading firms had very tight control of the home market and were determined to maintain their grip. This is seen in the controversy over the leading implement firms' refusal to supply the Agricultural Co-operative Association with their products in bulk at discount prices, preferring instead to maintain a monopoly of selling agents whose margin was in excess of twenty per cent. [1] It was for this reason, also, that they refused any discount to customers buying directly through the Royal Show, [2] and James Howard was bitterly attacked when he gave a dinner for five hundred of his agents on the eve of the 1874 show. [3]

The concern to maintain established positions on the part of the firms is therefore quite probably a motive leading to the manufacturers' antipathy towards the repeated trials. The most just criticism of the Society is that it continued to have trials for well-known implements and was vague when laying-down the specification of the sort of improvements that were required. It is also difficult to escape the conclusion that some of the enthusiasm of the agricultural community for the trials was because of their 'entertainment' value - the spirit of competition between the leading firms in pitting their best implements against each other on the trial field. Thus it is not difficult to appreciate that a non-competitive trial with detailed reports rather than prizes might have rather more limited appeal for the spectators. When the leading implement firms promised an outstanding display of implements in return for the Bath and West Society's agreement to discontinue

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[1] Agricultural Economist, 1 June 1871.

[2] Ibid., 1 November 1871.

[3] Ibid., 1 August 1874.

competitive trials, it was said that attendance suffered as a result: 'Wells [1862] was the finest collection that was ever seen - and nobody came to see it ! ' Absence of prizes led to a certain lack of spice. Thus the Bath and West ploughing match at Taunton (1870) was like a salad without the dressing, an opera without the orchestra, or a battle fought with blank cartridge'. [1]

Most of the 'successionalists' returned to the fold in 1863 and 1864 although some of the firms continued to refuse to compete. When the scheme of sub-division came up for review in 1863 (the Battersea Meeting of 1862 having interrupted the sequence embarked upon at Warwick in 1859) the Council determined to revert to the triennial division of 1856-8. This had been urged by Col. Challoner, still Chairman of the Implement Committee, [2] for reasons that were not very clearly specified but which did not excite much comment at the December General Meeting, which was taken up with Sidney's general criticisms of the management and with Morton's plea for the Society to take up the question of agricultural education. The new scheme lasted until 1867 (as there was no show in 1866) but there was more extended discussion of the trial division in 1868. On the motion of Joseph Shuttleworth (himself an implement manufacturer) the manufacturers had been invited to confer with the Implement Committee [3] over the future arrangements and the deputation had urged their predictable demands - a further sub-division, medals instead of money prizes, the cessation of prizes for certain machines, the appointment of juries of qualified mechanical engineers and practical farmers, reports of trials (carried out before the

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[1] F.M.(3), XXII, 1862, p.527; XXXVIII, 1870, p.12.

[2] Monthly Council 5 August 1863, F.M.(3), XXIV, 1863, p.236.

[3] Ibid., F.M.(3), XXXIV, 1868, p.37.

show) to be sold with the catalogue, and more manufacturers to be given seats in the Council. [1] The Implement Committee and the Council did not accede to all of the requests, but did agree to a quintennial division;

1869: Machines and Implements for Harvesting crops.

1870: Fixed Engines, worked by steam and other power, and machines for Preparing Food for Stock.

1871: Machinery for the Cultivation of Land by Steam Power and Traction Engines.

1872: Portable Steam Engines and Machines and Implements for Preparing crops for Market.

1873: Machinery and Implements for the Tillage of the land by Horse-Power.

In addition there were some concessions to the manufacturers: three judges for each trial, the prize-list to be published at least twelve months in advance of the meeting, the trials to be concluded before the general opening of the show to the public. At the Leicester show of 1868 it was requested that the horse-power tillage implements to be tried should be sent by 7 July and it was stated that there would be a further trial of steam cultivation machinery after the harvest, a preliminary selection only having been made at the time of the show. [2]

The 1870s saw a movement by the Society towards at least some of the principles that had been urged for so long by the manufacturers. The incentive to do this was initially concern over the mounting cost of the trials. The question was asked whether useful results could not be obtained for less cost, the Society having incurred a loss of some four thousand pounds at Oxford (1870) and Wolverhampton (1871), and the trials seemed an obvious item where economies might be made. A Special Committee on Receipts and

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[1] Ibid., 5 February 1868, F.M.(3), XXXIII, 1868, p.264.

[2] Ibid., 4 March 1868, F.M.(3), XXXIII, 1868, p.340.

Expenditure, appointed in November 1871, examined ways of saving money which included the possibility of further extending the quintennial system adopted in 1868. [1] This development prompted further activity on the part of the manufacturers and at a meeting held by them at the Salisbury Hotel on 27 February 1873 they resolved to urge upon the Council their old point of abandoning the prize system in favour of carrying out thorough trials at a suitable time of the year, with a comprehensive report. The Council was not prepared to accede to the manufacturers' request to abandon implement prizes at this stage, but a nine-fold division of implements was agreed to which would have pre-determined the trials for a period up to 1881.[2]

One of the disadvantages of *such an extensive divsion was that it* pre-supposed, for nearly a decade, the pattern of implement development at a time of quite rapid change; at the 1872 General Meeting C.S. Read had urged that the Society should not wait three or four years to try a particular implement if something came up which was particularly deserving of attention. [3] The nine-fold division of trials was not followed through because in 1874 there was renewed pressure, this time from the Society's Finance Committee, to reduce show expenditure. Charles Randell and Col. Nigel Kingscote maintained that the trials had been pushed too far, that they were too costly to the Society, and that repeated trials of standard implements did little good because the distinctions to be drawn were so fine. Instead, it was recommended that the Society's trials should be essentially confined to inventions or new developments. There was no uniformity of opinion on the Council that this course

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[1] Monthly Councils 6 December 1871, 5 June 1872, F.M.(3), XLI, 1872, p.62, XLII, pp.4-5. See also 'The Smithfield Club Show Week', Ibid., XLI, p.43.

[2] Monthly Council 7 May 1873, Ibid.(3), XLIII, 1873, p.482.

[3] Ibid.(3), XLIII, 1873, p.56.

was the right one to follow but gradually the scheme of adopting a much more limited trial was supported. It may also be noted that Col. Challoner, one of the 'old guard' on the Council, who had staunchly promoted the traditional scheme through his position as Chairman of the Implement Committee, died in 1873. At this time there was serious discussion as to whether the trials should be abandoned completely but a compromise was decided upon whereby the classes of machinery kept for test were much reduced, being restricted essentially to those in which there was most interest and progress at the time - double tillage, elevators, thatch-making machinery, agricultural locomotives, and waggons for agricultural locomotives, with trials on alternate years only. This latter point was not agreed to , but the trial for 1876 was restricted to reaping-machines and sheaf-binders only, tried at Leamington and not at the Birmingham showground,[1] and the pattern was followed at Liverpool (1877) and Bristol (1878) where there was a trial of automatic sheaf-binders only, with silver medals available for inventions.

These changes were inevitable given the great increase in the variety and excellence of agricultural machinery over the forty year period that we have reviewed, but they continued to be resisted by commentators such as Corbet who maintained that the time for abandoning the prize-system would 'never come' and that the abolition of trials would be 'ill-advised and injudicious', [2] while the Agricultural Economist condemned the proposal as 'suicidal'. [3] Morton on the other hand, was on the Council of the

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[1] Monthly Councils 9 December 1874, 3 March, 8 December 1875, F.M.(3), XLVII, 1875, pp.50, 271, 2, XLIX, 1876, p.53. See also Journal implement reports.

[2] 'Implement Makers and the Prize System', F.M.(3), XLIII, 1873, pp.383; 'Implement Trials and Premiums', Ibid., XLVII, 1875, pp.229-30.

[3] 1 April 1875.

Agricultural Engineers' Association which urged not only the abandonment of the prize system, but also the principle of the Society going into remote districts. Morton thought that this latter principle was vital in the 1840s and 1850s - although the Shrewsbury experience of 1845 had emphasised the essential requirement of good communications for the success of the shows - and his change of view can probably be accounted for by his appreciation of changing conditions of awareness and mobility. In contrast, Corbet continued to oppose such a change to the end of his career. In 1875, he thought the idea of a London show for the Royal, without trials or premiums to be 'without interest'. [1]

Stock Shows and their Problems

The 'prize-system' and the optimum mode of conduct for the trials were the outstanding problems of the implement department of the early Royal shows. Before turning to a consideration of the progress which took place in agricultural machinery during our period, we may switch our attention to the other great section of the annual meetings, the exhibitions of livestock. These were perhaps the most popular features of the Royal's annual gatherings but, as we shall see, generated a range of problems that were as acute as those which related to the machinery side.

Stock assumed a much greater importance to the founders of the Society than implements: this is indicated by the balance of the premiums put up for the Society's first two country meetings. At Oxford (1839) 50 sovereigns were offered for a draining plough and 20 for a gorse-crushing machine, with the same for 'any other implement'. In contrast, the stock premiums exceeded 750 sovereigns. The period under study saw the implement section of the shows expand far beyond anything envisaged at the outset; while the entries of stock

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[1] 'The Working of the Prize System', F.M.(3), XLVIII, 1875, pp.406-7.

underwent a much less dramatic increase (as shown in figure V) the range of animals exhibited showed a marked extension between 1839 and 1880.

In the 1840s the stock prize sheets had a standard form. Shorthorns, Herefords, and Devons were the three great divisions of cattle, with an extra class for 'any other breed or cross'. In sheep, the classes were for Leicesters, Southdowns and other short-woolled sheep, and for longwools not qualified to compete as Leicesters. There were divisions for agricultural horses and hunters, and pig classes which were restricted to 'large' and 'small' breeds. There were attempts to bring out the animals specific to the particular localities of shows. Thus there was an extra class for the 'Channel-Island Breed of Cattle' at Southampton in 1844 and for sheep best adapted to mountain districts at Shrewsbury (1845) and Newcastle (1846), while Sussex cattle were prominent at Lewes in 1852. At Windsor (1851), which was confined to stock because of the extensive machinery exhibits at the International Exhibition, there was an attempt to assemble all the improved breeds. Thus there were cattle classes for Channel Islands, Sussex, Longhorns, Scotch Horned, Scotch Polled, and Welsh Breeds. Horses during this early period were classified according to type rather than breed.

In general, entries for the various special classes at the early shows were small. Thus Richard Milward, in commenting on what he saw as the 'complete failure' of the Welsh Breed class at Gloucester, maintained that the Society should cease to offer prizes for anything but the three recognised breeds of cattle. He thought that the five animals shown in response to the Society's premium of seventy pounds for the Welsh breed to be not worth that sum in their tot value.[1] Twenty shows later Henry Corbet (who had been present at Gloucester),

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[1] Richard Milward, 'Report on the Exhibition of Livestock at the Gloucester Meeting of the Society', Journal, XIV, 1853, p.457, noted by R.J. Colyer, 'Some Welsh Breeds of Cattle in the Nineteenth Century', A.H.R., 22, 1974, p.2.

in his report of the Cardiff exhibition of 1872, remarked that cattle 'peculiar to the district' were those which were known the world over - the Shorthorns and Herefords - whereas the Castle-Martins, Angleseys, and Montgomershires were little more than curiosities. [1]

However, the period after Milward's reports saw a number of local animal breeds gain national recognition. The Sussex made advances - a Herd Book was established in 1855 - and joined the Herefords and Shorthorns as a regular class, although they declined in popularity in the latter part of the nineteenth century. [2] The Norfolk and Suffolk Red Polled cattle advanced in the 1860s when their breeders made a determined effort to monopolise the 'other classes' between 1863 and 1865, [3] and thereafter classes were regularly provided for them and they gained status when their Herd Book was established in 1873. [4] The neglected Longhorns showed a revival at the Birmingham meeting of 1875, and classes were provided for them in the shows that followed. The dairy classes also advanced during the late 1860s and the report of the second Oxford Show (1870) called for the 'Channel Islands' to be divided into Guernsey and Jersey classes which was done the following year at Wolverhampton although some of the exhibitors entered their cattle into the wrong classes.

Extension of variety was nowhere more a feature than of the sheep. Although the early shows often had more successful local classes for sheep than they did for cattle - Gloucester was a good example where the Shropshires made a great impression - the first permanent addition was for 'Shortwools other than Southdowns' at Salisbury in 1857. At Chester the following year

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[1] Henry Corbet, 'Report on the Exhibition of Livestock at Cardiff', Journal (2), VIII, 1872. pp.374-5.

[2] See J.P. Boxall, 'The Sussex Breed of Cattle in the Nineteenth Century', A.H.R. 20, 1972, pp.19-23.

[3] Noted by Scott Watson, History of the Royal Agricultural Society of England 1839-1939, p.50.

[4] C.S. Read occupied the chair at the Norwich meeting which took the initiative on this. See the Farmer, 27 October 1873.

there were classes for Shropshires, Hampshires, West Country Downs, Oxfords, and Cheviots. The Shropshires were given their own class from Canterbury (1860) onwards, and the Oxford and Hampshire Downs, the Cotswolds and Lincolns had become permanent additions by the 1870s. Pigs were also a growing feature of the shows, and horses came to prominence in the 1860s and 1870s with classes for Agricultural (Shires), Clydesdales, and Suffolks.

The stock exhibitions were attended with a number of problems. Not least, there was the question of the transport of the valuable and often delicate animals and their housing and feeding over the week of the show. When Thomas Bates decided to exhibit his Shorthorns at the first Oxford show, - where they constituted one of the leading features - he had to convey them by steamship from Middlesborough to London and then by barge up the Aylesbury branch of the Grand Junction Canal, the whole journey taking three weeks.[1] The extension of the railway system in the 1840s eased these difficulties and enabled the Society to bring together specimens of stock from all parts of the country at their annual meetings.

As far as there was any recognised objective in the stock exhibitions and in the award of prizes, it was to encourage improved breeding of animals, and especially the quality of 'early maturity'. There was, however, continuous controversy over the conditions in which stock should be exhibited and, by extension, the utility of the stock shows was often questioned.

The fashion for showing very large obese animals derived from the tradition set by the Smithfield Club earlier in the century. Here, the emphasis was on

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[1] Cadwallader John Bates, Thomas Bates and the Kirklevington Shorthorns, 1897, p.266.

feeding and fattening for the pre-Christmas fatstock show which was much expanded during Victorian times. The state of the animals exhibited had always given rise to much criticism, leading to the old jibe that the animals were 'too dear to buy and too fat to eat'. [1] The answer to the critics of the Smithfield Club activities was that their endeavours were to encourage the most efficient food conversion in the production of meat, [2] though the degree to which that was so was rarely quantified.

The over-fed condition of much of the stock shown at the early country meetings of the Society soon generated intense criticism: 'whoever saw a well-made giant?' queried T.C. Hincks in 1845, adding that the judges should have instructions not to give awards to animals which were so overgrown that their points were obscured by the accumulated layers of fat that covered over imperfections. [3] With continuous complaints of this kind - the animals exhibited at York (1848) and the decisions of the judges at that meeting were widely condemned [4] - and ineffectual efforts by a few members of the Council (such as Lord Portman) to deal with the problem, the issue was taken up by Earl Ducie in 1852. He was prompted by the experience of the Lewes exhibition of that year where a number of overfed beasts had died in the extreme heat that was a feature of the show-week.

Ducie formally proposed that as there was widespread agreement that something ought to be done to arrest the evil of high-feeding for exhibition, which was incompatible with the Society's objective of developing the best breeding stock,

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1 J.F. Burke, ed., British Husbandry, 1834, p.23.

2 See, for example, Clark Hillyard's defence of 'The Utility of Public Cattle Shows', British Farmer's Magazine, I, 1826, pp.326-9. I am grateful to Nigel Harvey for drawing this to my attention.

3 T.C. Hincks, Hints for Increasing the Practical Usefulness of Agricultural Shows, 1845, pp.14-17.

4 See, for example, 'On the overfed state of Animals exhibited at the Show of the Royal Agricultural Society', F.M.(2), XVIII, 1848, p.273, (from M.L.E.).

a committee should be formed to investigate the matter.[1] It was as a result of discussions on the best policy to adopt that at Gloucester the following year the Society instituted 'juries' to adjudicate the condition of cattle, sheep, and pigs exhibited, and to indicate that they would be disqualified if found to be in an over-fed state.

This action was much approved of by commentators as it was generally considered that overfeeding was a major obstacle to progress in the stock section.[2] At Gloucester, animals which were disqualified under the new system included pigs that 'could not stand', sheep which found some 'difficulty in respiration', and rams which, 'like the Romans of old, preferred taking their meals in a reclining position'.[3] Yet these disqualifications proved to be very controversial. It was claimed that the 'reclining' position of the disqualified rams was only a reflection of their 'docility and aptitude to fatten',[4] and there was determined opposition to the restrictions from influential stock-breeders such as Col. Towneley, some of whom boycotted the Gloucester show on that account.

Thus little progress was made over a matter which was generally considered to be a serious weakness in the Society's proceedings. It was recognised that animals were trained-up specially for the show - the process reminded Corbet of 'the renowned commander who marched his men up the hill for the purpose of marching them down again' - and there was Pusey's observation that there was not much difference between the 'cattle of July' (breeding stock at the Society's show) and the 'cattle of December' (fatstock at the Smithfield

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1 F.M.(2), II, 1852, p.540.
2 A.G., 16 July 1853.
3 F.M.(3), IV, 1853, pp.140-1.
4 Ibid., pp.176-7. See also p.174, 'The over-fed Breeding Stock Question'.

Show).[1] Widespread abuses included not only feeding up the show stock with large rations of linseed cake but also, it was alleged, gin cream, and aniseed. At the Lincoln show - where the jury-system was abandoned and over-feeding was noted as being very prevalent - additional malpractices such as filing the pigs' teeth to give a false impression of youth, and artificial shearing of sheep to accentuate symmetry and to hide defects were widespread.[2]

Ducie died in 1853 and much of the initiative for reform was then lost. Thereafter, the overfed condition of the stock exhibited continued to be perceived as a major problem, but one which seemed to be incapable of solution in the face of the breeders' general opposition to reform. The show reports contain continual allusions to this unsatisfactory state of affairs; at Carlisle (1855) it was stated that some of the pigs were 'much above the age stated on the certificates and so overfed that they could not possibly be considered in breeding condition',[3] and at Chester (1858) Samuel Jonas complained of the high condition of the cow and heifer stock which was 'unnatural and opposed to common-sense'.[4] In the 1860s John Dent Dent (a particularly perceptive agricultural commentator) made continual complaints in his capacity as Steward of Stock. At Worcester (1863) many of the pigs were unable to walk from their crates to the pens and some were disqualified. The sheep had been clipped and trimmed to make 'charming models of symmetry'. At Plymouth (1865) the bulls were 'overfed and inactive' and difficult to get into the showring.[5] Many other comments of this sort could be cited, and thus, in 1871, Morton, in

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1 'Exhibitions of Breeding Cattle and the Royal Agricultural Society of England', Ibid., V, 1854, pp.104-6.

2 Ibid., VI, 1854, pp.104-9 & 164-5; Scott Watson and Hobbs, p.243.

3 William Simpson, 'Report on the Exhibition of Livestock at the Carlisle Meeting of the Society', Journal, XVI, 1856, p.504.

4 Samuel Jonas, 'Chester Report', Ibid., XVIII, 1858, p.365.

5 John Dent Dent, 'Worcester' and 'Plymouth' Reports, Ibid., XXIV, 1863, p.472 and (2), I, 1865, p.360.

answer to the question as to what was meant by 'show condition' was tempted to reply 'a hopeless obesity, a constitution endangered, a system forced to an unnatural extent, a pampered condition of body anything but fitted to withstand the hardship to which cattle are constantly subjected'. Instances were not unknown of animals breaking down under 'severe training', and force-feeding also gave rise to damage in the reproductive system. [1] Many of the leading breeders refused to exhibit - just as some of the implement manufacturers stayed away - and Torr, Bowly, Kingscote, and Booth were among names that were generally absent from the lists.

The problem was a reflection of the extremely subjective nature of animal judging. There was also an inherent contradiction between the desire for the quality of 'early maturity' - which implied a large size at an early stage - and the need for lean stock for breeding purposes rather than fatstock for the butcher. In the 1840s Thomas Bates called for the Society to encourage the all-round qualities of stock and not to merely reward 'the chance obesity of the individual', but his proposals, which included the idea of an award for family groups of stock as an indicator of merit over more than one generation, failed to raise much enthusiasm in the Society and the emphasis continued to be on 'early maturity' with the attendant temptation to produce animals that were unusually large for their age. [2]

The process of judging always posed a number of problems. It was carried out in private during the early years and decisions were kept secret until announced at the Council dinner. The private judging system broke down at Battersea in 1862 under the impatience of the crowd after which public judging became 'the

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[1] Morton's Almanac for Farmers and Growers, 1871, p.59.

[2] Cadwallader John Bates, Thomas Bates and the Kirklevington Shorthorns, 1897, pp.vii-viii, 308-11.

order of the day'. [1] It was often difficult to obtain judges of the right calibre (as many of the acknowledged experts would themselves be exhibitors) and this contributed to the situation whereby animals which failed to gain an award at provincial shows could be successful at the Royal, or Society decisions were reversed at the Highland. In order to preserve anonymity neither the names of animals nor their pedigrees were made known during the early years of the shows, but in the 1870s there was intense debate about the way in which the judging could be best carried out and the amount of information that should be given to the judges.

Public debate centred around suggestions made by E.A. Fawcett, a well-known Shorthorn breeder, at the occasion of the Bedford meeting of 1874. His points included those which had been so widely discussed over the previous thirty years - that prizes were too often awarded to fat rather than breeding animals, that Ducie's proposals had never been seriously acted upon, and that animals were still especially prepared for the shows by feeding with cod liver oil, milk and sugar, rum, brandy, and treacle. In addition, there was the question of the same judges acting at more than one show during the year and the fact that animals were often led into the showring by well-known men, so that the impartiality of the judges was questioned. [2] The most contentious issue here was whether the names of the owners and the pedigrees of the competing stock should be given to the judges and there was spirited debate over what became known as 'judging by catalogue'. This was allied to the matter as to whether it should be a condition that, to gain a prize, Shorthorns should have an entry in the Herd Book. Here the division of opinion was between those who held

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1 'The Public Judge', F.M.(3), XXIV, 1863, p.257.

2 'The Royal Agricultural Society - Mr. E.A. Fawcett's Suggestions', Ibid.(3), XLVII, 1875, p.78.

that an unregistered sire was a 'permanent flaw' and those who considered that too much attention was often given to pedigree alone, which sometimes clouded objective judgement.

For the Birmingham show of 1876 it was proposed by Dent that the full catalogue should be placed in the hands of the judges. This came in the wake of a move by Richard Stratton to relax the pedigree rule - which was rejected [1] - but the argument then was that, if it was desirable for stock to have four crosses of blood, then the judges should know what these were. Full information, it was thought, might counter the exhibition of overfat animals at a show of breeding stock and that as there was no show where some of the animals were not already known by the judges it was more equitable to group them together under the same terms. [2]

This proposal was generally very poorly received in the agricultural community. It was considered that to place the full catalogue in the hands of the judges might serve to shut out the new or rising men from exhibiting, and E.A. Fawcett, whose suggestions had served to make the issue one of central concern, considered the proposal undesirable as the judges could hardly fail to be influenced by the names of eminent breeders. [3] There was the suspicion that the pedigree would assume more significance than the competing animals, [4] that 'visible merits' would be outweighed by 'high lineage'. [5] 'Judging by catalogue' was seen as likely to lead to the situation whereby the judge would either be charged with favouritism and unfairness or risk refusing

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1 Monthly Council 8 December 1875, F.M.(3), XLIX, 1876, p.56.

2 Ibid., 2 February 1876, p.199.

3 See discussion at General Meeting 10 December 1874, F.M.(3), XLVIII, 1875, pp.55-6.

4 B.W.M. I, 21 December 1874; see also M.L.E., 14, 28 December 1874, 4 January 1875; North British Agriculturist, 16 December 1874.

5 Agricultural Economist, 1 March 1875.

a prize to a worthy animal because the judge and the owner happened to be well acquainted with each other.[1] Against this Samuel Sidney maintained that numbers rather than names did not always ensure secrecy and that the best animals were often well known before appearing at the shows. In answer, it was pointed out that horse shows (for which Sidney was responsible at the Islington Agricultural Hall) were quite different from Shorthorn shows where ownership and pedigree were bound to be taken into account in deciding what was best.[2] In the face of this almost universal opposition from the agricultural community, the 'complete catalogue' proposal was not proceeded with by the Council of the Society and Dent's motion was defeated.

Another controversial suggestion about judging was the question of the utilisation of a scale of points to bring in greater objectivity. This was urged upon the Society by Lord Kinnaid, the Scottish agriculturst.[3] There was less unanimity as to the merits of this proposal than on 'judging by catalogue' issue. It was supported in the Farmer on the grounds that it had been successfully adopted in Australia and America and that in the hands of competent judges the 'points system' could prove useful in guiding young breeders.[4] It was hoped that a 'points system' would overcome the 'national evil' of overfed breeding stock.[5] It would make the judging process less 'empirical' and circumvent the predilection of the judges as, for example, whether they were 'Bates' or 'Booth' men.[6] Against this it was maintained that the system could be just as inaccurate as the traditional method, that it

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1 A.G., 20 March 1876.

2 Ibid., 3, 10, April 1876.

3 For a memoir, see 'The Late Lord Kinnaid as an Agriculturist', F.M.(3), LIII, 1878, p.145 (from North British Agriculturist).

4 The Farmer, 20 October 1873.

5 Ibid., 3 November 1873.

6 Ibid., 20 October 1873.

would be tedious and take up too much time, and that animals might have qualities that it would be impossible to incorporate objectively into a points scale.[1] The Society's disinclination to take up Kinnaid's suggestion was not generally criticised as it was admitted that his ten pound prize for the best cow or heifer of Shorthorn breed judged on the points system at the Scottish Midland Counties Show at Kinross had not been successful.[3] Twentieth century assessments of the points system have shown that it is not particularly useful in picking out small differences between stock.[4]

Thus although there was considerable discussion of the problems of judging the show animals very little in the way of changes were made and the fundamental problem of acceptable show condition remained largely unresolved. The Kilburn stock report still made reference to 'animals in unprofitable high condition winning prizes year after year'[5] and Thomas Plowman, in his 1885 address to the London Farmer's Club on 'Agricultural Societies and their Uses' referred to the Kilburn report and admitted that prizes were often awarded to overfed stock. All were agreed that something ought to be done to discourage the exhibition of such animals, yet at the same time it was acknowledged that if all the stock were exhibited in store condition the animal which would not do well under any feeding regime would be placed on the same level as those which possessed the capacity to do justice to the best treatment.[6] The question of the influence of the Society's shows on the development of livestock will be considered after the review of the implement department that follows.

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1 A.G., 8, 29, November 1873.

2 Agricultural Economist, 1 December 1875.

3 North British Agriculturist, 15 July 1874.

4 J.E. Nichols, Livestock Improvement, 1944, pp.25-6. See also Charles S. Plumb, Judging Farm Animals, 1919, pp.2-16.

5 Journal (2), XV, 1879, p.631.

6 Journal of the Bath and West and Southern Counties Association (3), 1885-6, pp.172-3.

Progress in Agricultural Machinery

The graph of the number of implement entries at the Royal shows between 1841 and 1877 (p. 318) shows clearly the substantial increase which took place over the period and which was frequently the subject of comment. Although the trend is upwards, there are marked fluctuations which deserve comment. Distance from the main centres of manufacture is an important reason for below-average implement entries. This was the case in 1850 (Exeter), 1855 (Carlisle), 1864 (Newcastle), 1865 (Plymouth), and 1875 (Taunton). A steep rise in the number of implement entries is apparent in the late 1850s and this was checked in 1860 when the leading manufacturers withdrew from the Canterbury show. The lower number of entries apparent in the early 1870s was a result of the rule brought in in 1871 to prohibit the exhibition of duplicate implements.

Some supporters of the Society were inclined directly to attribute the increase in the number and range of agricultural implements to the Society's efforts. The implement makers not unreasonably rejected this argument, though their motive in so doing was linked to their antipathy towards the 'prize system'. H.S. Thompson admitted that it was difficult to prove a causal link between the Royal's shows and the development of machinery [1], while in 1855 J. Allen Ransome made a point of countering Hoskyns's contention (at the Society of Arts) that advances in agricultural mechanics up to that time had come about largely through the Society's influence. He maintained that the evidence of the first few shows could not be taken as being representative of the state of agricultural machines as the Royal was then a new body which was not generally known. He added that many of the implements in general use in 1856 had been in existence

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[1] H.S. Thompson, 'Report on the Exhibition of Implements at the Norwich Meeting, 1849', Journal, X, 1849, pp.529-30.

in the early 1840s and improved only in matters of detail during the intervening period: this referred to drills by Garrett, Hornsby and Smith; ploughs by Ransome, Howard and Barrett; zig-zag harrows by Howard; portable thrashing machines by Ransome, Garrett, Barrett, and Exall; clod crushers by Crosskill; turnip cutters by Gardner; haymaking machines by Wedlake; chaff engines by Cornes, Ransome, Garrett, Richmond and Co., as well as a wide variety of rollers.[1] Most of these implements had been described by Ransome himself in 1843;[2] he identified the most significant additions to the standard implements available as Garrett's lever horse hoes; Grant's, Smith's, and Howard's lever horse-rakes; Bentall's broad share plough; Bushe's, Baxter's and Phillip's root pulpers; Biddell's bean cutter, and a variety of improvements in chaff-cutters and mills. He attributed the more general use of the standard implements to superior manufacture at no extra cost, the facility of transit made possible by the railways, the necessity for economising on farming costs, and to the opportunities afforded by the Society's annual exhibitions for observation, test, and comparison.[3]

Whatever the range of opinion as to the exact part played by the annual meetings with regard to progress in implements, the opportunity for viewing, testing, and evaluation of agricultural machinery did constitute a radical 'change of environment'[4] for the implement-makers and the shows provided a focus around which successive 'storm-centres'[5] of interest in particular types of agricultural machinery revolved. In the 1840s there was particular

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1 J.A. Ransome, Journal of the Society of Arts, IV, 1856, pp.283-4 (in reply to Chandos Wren Hoskyns, 'The Progress of English Agriculture During the Last Fifteen Years', pp.271-81 of Ibid.

2 The Implements of Agriculture.

3 Ransome, Journal of the Society of Arts, p.284.

4 S. Blake, 'An Historical Geography of the British Agricultural Engineering Industry 1780-1914', unpub. thesis, University of Cambridge, 1974, p.123.

5 Dan Pigeon, 'The Development of Agricultural Machinery', Journal (3), I, 1890, p.266.

concern for all types of cultivating equipment - improved ploughs, rollers, clod-crushers, - as well as seed drills, and drainage tile machinery. Steam engines for the farm received a good deal of attention during the late 1840s and 1850s, especially for threshing, and steam tillage was a preoccupation of the late 1850s and 1860s. Reaping and mowing machines were given continuous attention after Pusey's report of the McCormick reaper shown at the Great Exhibition of 1851 and these constituted the most important department for trial in the 1870s. An excellent survey of progress in most areas of agricultural machinery has been provided by G.E. Fussell[2] and detailed descriptions of developments will not be given here. Rather, an outline review of the trials and assessments of some of the implements and machinery exhibited at the country meetings will be given as part of an overall attempt to gauge the impact of the Society's shows.

In the first two show reports there was a hint of disappointment at the quality of implements exhibited. The main prize put up by the Society was for a gorse crusher but this was not awarded as none of the entries met the specifications laid down with regard to efficiency and price. Numerous drills were shown at Cambridge but only those by Garrett and Groundsell were deemed adequate. There was little variety noted in turnip and straw-cutters. Wood's iron roller was praised along with Crosskill's clod-crusher, but the machine which attracted most attention was a tile and sole maker exhibited by Beart of Godmanchester and which was awarded the Society's medal.[3]

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1 Philip Pusey, 'On McCormick's Reaping Machine', Ibid., XII, 1851, pp.161-2.

2 The Farmer's Tools, 1952.

3 'Oxford' and 'Cambridge' Implement Reports, Journal, I, 1840, pp.lxiv-lxx and II, 1841, pp.xiii-xvii.

At Liverpool in 1841 it was noted in the report that there had been a 'vast stride' in agricultural mechanics since the first show at Oxford, and this was attributed to the congregation at a single point of agricultural engineers from a variety of locations. It was noted that implement manufacture was passing from the hands of village blacksmiths to men of greater skill and capital. There were a number of novelties shown, including a reaping machine. Ransome's exhibited a portable steam engine for threshing and there were trials of ploughs on Aintree racecourse. At Bristol (1842) improvement was particularly noted in drills, including those designed to deposit manure with the seed. [1]

Although these early shows developed in a rather ad hoc manner several points had emerged as to the usefulness and future potential of the implement department of the annual meetings. The number and variety of exhibits had increased, the general standard and finish of the implements was acknowledged to have improved, and it had become recognised that trials were necessary to discover merit, although how these could be carried out to best advantage had already become a problem. This early experience enabled the Society to be more specific in the identification of improvements to which the implements were thought to be susceptible. Thus the Southampton (1844) prize-sheet stated that the Society wished to call attention to the improvement of apparatus for steaming roots, of small or portable corn-mills, of broad shares for paring stubbles, of horse-hoes and of agricultural harnesses, and gearing generally. Prizes were offered for ploughs, drills, scarifiers and harrows but the judges had the power to make an award for any invention outside of the

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[1] 'Report of Implements Exhibited at Liverpool', and 'Report on the Exhibition of Implements at the Bristol Meeting of 1842', Ibid., III, 1842, pp.cii-cxviii and 341.

standard range of agricultural machinery.

A feature of the Derby (1843) awards was the premium of ten sovereigns for the drain-tile for agricultural purposes sold at the cheapest rate during the previous year, with account to be taken of durability and local circumstances affecting the cost of production. As adjudication proved to be impossible, the prize was not awarded and instead silver medals were bestowed upon the Tweeddale hand-tile machine; F.W. Etheredge, of Southampton; John Read, for cylindrical pipe-tiles; and to Messrs. Ransome for an improved Beart brick-machine. Josiah Parkes was laterable to obtain information on production costs and found that the price of tiles ranged from £1. 0s. 0d. to £2. 2s. 0d. per 1,000 depending upon the type of machine and size of tile.[1] At Southampton the following year thirteen machines were shown and three were put to trial by the judges (the rest not being sufficiently prepared). Attention was given to the rate of output of the drainage tiles from the machines, the best of which (Etheredge's manufactured by Ransome's) producing 960 per hour, although it may be noted that the duration of the trial was only six minutes. Parkes claimed that the machine exhibited by Clayton, which did not perform so well because the clay available was in too moist a state, had regularly turned out 1,500 pipesper day at a price as low as 12s. 0d. per 1,000. Further, Clayton's machine was noted by Parkes as having the important facility of screening the clay for stones which might otherwise impede the manufacturing process.[2]

In this way intense interest focussed around the progress of the draining-tile machines. At Shrewsbury in 1845 14 machines were exhibited of which the judges selected 3 for trial - Beart's, Clayton's, and Scragg's. Beart's - which

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[1] Josiah Parkes, 'Report on Drain-Tiles and Drainage', Journal, IV, 1843, p.376.
[2] Idem, 'Report on the Exhibition of Implements at the Southampton Meeting, in 1844', Ibid., V, 1845, pp.390-1.

had earlier been so much praised by Pusey and others - was now found to be inferior. both with regard to the removal of stones from the clay and the quantity of work done in a given time. Scragg's machine was on a new principle in that it was of horizontal construction and moveable, whereas Clayton's was vertical and fixed. Among various features thought to be superior in Scragg's construction was the mode of cutting off the pipes or tiles to determinate lengths and the output - 20,000 (inch bore) pipes per 10 hour day.[1] The superiority of Scragg's machine was confirmed at Newcastle (1846)[2] but in the absence of Parkes at Northampton the following year a question was placed around this judgement. It was pointed out that although Scragg's was the most powerful - by then able to produce 25,000 - 30,000 pipes per 10 hours - at £35 it was much more expensive than the others and, since it would be impossible to stack or find shed-room for drying all the pipes it was capable of producing there seemed little advantage in the high potential output. The prize was given to Sanders's machine, which sold at £12. 12s. 0d. There was also a note from the judges that far too much attention was given to the machines as most of the cost of production of drain pipes was accounted for by the manual labour needed to dig the clay, transport it to the machine, stack the finished tiles and so forth.[3] At York (1848) a machine by Whitehead took the premier award, while at Norwich (1849) there was a falling-off in the number of machines entered and Whitehead's, Scragg's, and Clayton's were still found to be the best.[4]

Norwich marked the end of a 'phase of progress' or 'period of special growth'

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1 Idem, 'Report on the Exhibition of Implements at the Shrewsbury Meeting', Ibid., VI, 1846, pp.318-19.

2 Idem, 'Report on the Exhibition of Implements at the Newcastle-upon-Tyne Meeting, 1846', Ibid., VII, 1847, p.692.

3 'Report on the Exhibition of Implements at the Northampton Meeting, 1847', Ibid., VIII, 1848, pp.354-5.

4 H.S. Thompson, 'Norwich Implement Report', p.549.

(as Earl Cathcart termed it[1]) in draining-tile machines but they came under periodical scrutiny at the later shows during our period. At Chelmsford (1856) the same three makers as had been most successful in the 1840s - Scragg, Clayton, and Whitehead - were dominant, but Whitehead was the only one of these three which remained in the trials at Oxford in 1870. By then the interest which surrounded this department was only a shadow of that which had been aroused during the earlier period.

The reasons for the interest in draining-tile manufacture in the 1840s are easy to identify, given the optimism which surrounded draining as a permanent improvement of heavy land. The parallel enthusiasm for grubbers, scarifiers, clodcrushers, harrows, and various types of improved cultivating equipment shows an associated concern for improving the growing conditions for plants, for many of these implements had the purpose of securing a better tilth or seedbed. Alfred Crosskill patented his clodcrusher in 1841 and it received a number of awards at the Royal shows; by 1844 it was said to be an 'almost universally known and improved machine'[2] and at Northampton three years later its merits were considered to be 'so well known and appreciated' as to not make it worth taking from the yard for trial.[3] Awards were also gained by the Uley cultivator (invented by John Morton) which was found superior to the Biddell extirpator at Southampton on the grounds that it needed less power and travelled further without choking.[4] It was also awarded a prize at Shrewsbury and Newcastle. A good deal of attention was excited in 1845 by a Norwegian harrow which left the land light and loose rather than firm in character, as was the case with

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1 'Remarks on the Implement Department at Bury', Ibid.,(2), III, 1867, p.589.

2 'Southampton Report', p.372.

3 'Northampton Report', p.346.

4 'Southampton Report', p.373.

the Crosskill clod-crushing roller.[1] So much impression was made by the Crosskill implements, however, that in 1846 the judges recommended the award of the Society's gold medal for the various improvements that had been made to his rollers and clod-crushers over the previous five years or so.[2]

A great deal of interest also surrounded drills and dibbling machines. Of the latter, that patented by J.W. Newberry in 1840 consistently gained prizes at the early shows. Drills, which were ousting the broadcast method of sowing the seed at this time underwent marked improvement and change so that by the early 1860s, as G.E. Fussell has pointed out, they were in their principles very similar to those used at the present time. Although there were many different manufacturers, the products were all essentially similar.[3] The leading firms - Grounsell, Smyth, Garrett, Hornsby, Wedlake, Coultas, and Ransome - had all received awards for their drills at the Society's shows.

Trials of ploughs were a regular feature of the early shows and these generated the greatest animosity between the implement makers and the Society over the 'prize system' as so much depended on the condition of the trial ground and the expertise of the operator. At Southampton Ransome's took three out of the four plough prizes.[4] The following year, at the deferred trial at Pusey, their ploughman was considered to have taken 'too wide a slice for the depth' which gave his work an unsatisfactory finish and their prize-plough of 1844 was found to be unable to cope with very heavy land,[5] while Howard's ploughs were found to be generally superior at Newcastle.[6] Concern in the trials was for quality in the work and for efficiency in operation. Under the periodical system

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1 'Shrewsbury Report', p.372.
2 'Newcastle Report', pp.693-6.
3 The Farmer's Tools, p.113.
4 'Southampton Report', p.364.
5 'Shrewsbury Report', p.310.
6 'Newcastle Report', p.686.

of trial brought in after Carlisle (1855) ploughs were tried at Chelmsford (1856), Warwick (1859), Newcastle (1864), Leicester (1868) and Hull (1873). At Chelmsford an improved dynamometer (developed by C.E. Amos, the Consulting-Engineer) was used to measure the force exerted in the traction of the ploughs and Ball, Howard, Ransome's and Sims, and Bentall monopolised the prizes. At Newcastle, efficiency was expressed in terms of units of power needed to remove 1 cubic foot of earth, where a power-unit was defined as the force required to lift 1lb 1ft high. [1] Ransome's and Sims and J. F. Howard were again the most successful, as they were to be at Leicester four years later. A feature of this latter show was the exhibition of three double-furrow ploughs which were not tried as there was no class for them. These were not new in concept, but became much more of a feature of the Hull trials of 1873 where they were shown to be of greater efficiency than the standard single furrow type.[2] Hull was the first of the Society's shows to employ a scale of points for implements, a development which was much approved of, but as the scale was not announced to the competitors in advance of the show the experiment had less influence than it might otherwise have done. [3] Ransome's and the other leading firms did not exhibit at Hull allowing Ball (Rothwell), Hunt (Leicester), Hidyson (Louth), and Snowden (Doncaster) to take the prizes given for the conventional ploughs. The Points of Merit consisted of weight, price, strength, and simplicity, economy in power and draught, perfection of work with horse, flatness of sole in furrow, neatness of laying slices and burying vegetation, and efficiency of shim coulter. [4] The tabulated results of the trials were given in different form

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1 'Report on the Newcastle Show-yard', Journal, XXV, 1864, pp.418-9.

2 John Coleman, 'Report of the Trials of Ploughs, Harrows, etc. at Hull', Ibid., (2), IX, 1873, p.538.

3 'Hull Report', p.526.

4 Ibid., p.528.

at each of the individual shows which makes it difficult to trace improvements in efficiency over time. Hunt's prize wheel plough 'not exceeding 2cwt.' at Hull had a draught of 414lbs and sold for £6. 1s. 0d; Ball's wheel plough 'not exceeding 2½cwt' which took the Hull prize for that class had a draught of 764lbs. at a price of £5 12s. 6d. Yet it was very difficult to assess from the trials whether the plough which gained the prize would be best fitted to everyday agricultural use. The trials were usually only for one or two minutes, often less, so that nothing could be said about the durability of the instrument. This might have been a very important consideration for the ordinary agriculturist with limited resources who could not afford to have an implement out of commission to undergo repair.

The impression of progress in the implement section over the range of farm equipment which became standard in the 1840s is of continual small increments rather than of extensive novelty or innovation. The areas where the most dramatic advances were looked for were in farm steam engines - which replaced tile-machines as a focus of interest in the late 1840s - steam cultivating equipment, and harvesting machinery.

The portable steam-engine for threshing exhibited by Ransome's had constituted the 'great novelty' [1] of the 1841 Liverpool meeting. Steam-power had been already utilised for this operation in northern England and Scotland but it was the mobility of the Ransome's engine which particularly caught attention. The construction was simple and the weight only thirty-five hundredweight. At a later trial it was found to consume about half a hundredweight of coke per hour and to use water at the rate of thirty-six gallons over the same period. The machine was found to issue no sparks from the chimney, an important safety feature.

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[1] 'Liverpool Report', p.cvii.

The output of work was found to be far in excess of hand-threshing machines (Ducie's and Ransome's) tried at the same time as it threshed 245 sheaves producing 1260lb. of wheat in 23½ minutes, compared with 20 for a similar time period and 2 men in the case of Ducie's machine and the same in just over 11 minutes (with 4 men) in the case of Ransome's hand-threshing machine.[1] At Bristol the following year the Ransome's steam engine had been improved with regard to mobility as it was now shown with four instead of two wheels and with the power of the engine used to give locomotion to the carriage.[2] There were four agricultural steam-engines exhibited at Southampton of which the prize was awarded to that manufactured by Cambridge of Market Lavington. Doubt was cast on the fuel consumption of Cambridge's machine, it being considered that it would consume twice as much fuel as claimed by the maker, while another steam-engine, Dean's, was thought to be 'inefficient and dangerous in the extreme'.[3] This led to a call for the Society to raise the value of the award offered for steam-engines, then standing at five pounds, in the hope of bringing out better machines. Thus the premium was raised to twenty-five pounds at Newcastle and to fifty pounds at Northampton. There were seven portable machine and one stationary machine exhibited at the latter meeting and there were considerable problems encountered in the trials. Tuxford of Boston, selected as a judge, was rejected by the implement-makers as he was himself an agricultural engineer, while some of the engines exhibited were considered to be dangerous.[4] Ten steam engines were tried at York (1848) with the results tabulated to give details on such aspects of working as time to get up steam and the coal consumed during that initial period, coal consumption per horse power, and steam pressure. Considerable variations in working were

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1 Josiah Parkes, 'Of a Trial of Messrs. Ransome's Portable Steam Threshing Engine...', Ibid., pp.cxvi-cxviii.

2 'Bristol Report', p.351.

3 'Southampton Report', p.385.

4 'Northampton Report', pp.330-2, 334, 340-1.

found; the prize was given to Hornsby of Grantham for an engine which sold for £225 and delivered horse-power at the rate of 7lbs of coal per hour while Cambridge cheaper at £155 but with a consumption of 23lbs of coal per horse power per hour failed to find favour. [1] The following year H.S. Thompson could point with satisfaction to what he took as matters of criticism in steam engines at York having been rectified at Norwich [2] where C.E. Amos employed a force-resisto to make a more accurate assessment of the efficiency of the machines. Two prizes were offered, and awarded to Garrett of Leiston (1st, £50) and Clayton & Shuttleworth of Lincoln (2nd, £25).

At the successive trials of steam-engines efficiency as measured by fuel consumption became the chief focus of interest. Yet there were problems in this; the Exeter (1850) report pointed out that it was lightness and portability that were as important to the farmer as sheer economy in work. There was a danger that engines would be entered for trials which were too expensively constructed and of too large a size to be of practical value, but which would carry off the prize by winning the 'race' with low fuel consumption. This led to a call for regulations to limit the capacity of steam-engines to the same nominal power - six horse power was suggested by the Exeter judges - and with a weight limit of fifty-five hundredweights. [3] Despite this caution, however William Fisher Hobbs made the following comment in his 1855 Carlisle report:

> The conditions of competition laid down by the Society for portable steam-engines have unfortunately led to the production of engines only intended for winning the Society's prizes, and known as "racing" engines, requiring the nicest care... This result has,

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1 'York Report', p.408.

2 'Norwich Report', pp.529-30.

3 Col. Challoner, 'Report on the Exhibition and Trial of Implements at the Exeter Meeting, 1850', Journal, XI, 1850, pp.466-7.

> I fear, arisen from too strict an attention being paid to the conditions relating to the economy of fuel, without a corresponding regard being had to the general character and usefulness of the engine

and called for new regulations on the construction and trial of steam-engines, especially with regard to a lengthened period of testing on an ordinary farm. [1]

Under the triennial system of trial instituted by Hobbs, steam-engines were next tried at Chester in 1858 where 112 were entered in the show. Some of these were found to be highly dangerous, and led to a regulation whereby exhibitors had to have their boilers examined, and a certificate of fitness issued, before being allowed to get up steam. [2] Tuxford of Boston took the prize for the eight-horse portable steam-engine, Hornsby of Grantham for the twelve horse portable - by virtue of quality and design of the machine - and Barrett, Exall, and Andrews (Reading) for the fixed engine class. [3]

There were further trials of steam-engines at Worcester (1863), Bury (1867), Oxford (1870) (fixed), and Cardiff (1872) (portable). The Worcester report looked at the economy of fuel question in some detail. High fuel consumption could be an indication of a more simple, and therefore more durable, machine. On the other hand, the high consumption machines could more readily sustain damage to the boiler tubes because of ill-regulated heat. In general, there was a tendency to look for durability, refinement of finish, and a 'good serviceable engine' rather than complicated construction designed to economise on fuel. [4] By the time of the Oxford trial it was said that whereas the first

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[1] William Fisher Hobbs, 'Report on the Exhibition and Trial of Implements at the Carlisle Meeting, 1855', Ibid., XVI, 1855, p.506.

[2] Sir A.K. Macdonald, 'Report on the Exhibition and Trial of Implements and Machinery at the Chester Meeting', Ibid., XIX, 1858, pp.313-4.

[3] Ibid., p.316.

[4] Anon., 'Report on the Worcester Show-yard', Ibid., XXIV, 1863, pp.493-6.

question had formerly been the initial price of an engine a greater consideration was the annual repair bill for keeping the machine in use as well as the daily fuel expense.[1] The trials at Bury and Oxford were a good deal more sophisticated in terms of regulations and testing than had earlier been the case, but the merits of the different engines were still ascertained by assessing the actual work done from a given weight of fuel. Some of the machines showed a 'general air of bad design and equally bad workmanship' (Mr. Eagle's engine) and the winning engine, by Clayton and Shuttleworth, was found to be seven and a half times more efficient than the worst that was tried.[1]

The fixed and portable steam engines were used to drive farm machinery such as bone mills, guano breakers and various crushers, cutters and grinders, as well as threshing machines. All of these underwent periodic trial and showed significant improvements in construction and efficiency. The Chester (1858) trial of threshing machines - 'the most important trial of this kind of machinery ever undertaken'[2] - expressed some dissatisfaction with the general quality of work performed by the steam-machines, only four out of fifty-five meeting with approval, and few could complete the work without injury to the grain or produce cavings or chaff free from corn.[3] At Canterbury and Worcester, threshing machinery again came into competition. At the former, threshing machines were tried without finishing machinery, at the latter all the prizes were given for finishing machines. At Bury, the judges made approving comment on the course that had been decided upon which was to offer prizes

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1 John Coleman, 'Report on the Trials of Implements at Oxford', Ibid(2), VI, 1870, pp.441-61.

2 'Chester Report', p.328.

3 Ibid., p.334.

for both, acknowledging the value of the simpler and more complicated machinery under different circumstances. Doubts were expressed as to the usefulness of much finishing equipment as the crop was often insufficiently uniform to afford an even sample as it left the machine and the motions were too unsteady and irregular for good dressing, so that the result was not worth the power consumed. [1] The Bury judges also called for a discontinuance of the prizes for horse threshing machines because they were so inefficient and clumsy when compared to the steam machinery that had made such significant advances: horse-power machines were 'indicative of a backward condition of agriculture'. Instead, they called for a cheap and simple straw elevator, or 'any other labour-saving application'. [2]

At Cardiff (1872), the next occasion on which threshing machinery was tried, striking advances in finishing machinery were noted, to the extent that single-blast machines were all but superseded. Cardiff was the first show at which a prize was offered for a straw-elevator although by that time the apparatus had already become a 'familiar, as well as valuable' appendage to the threshing-machine. [3] By 1872 it was said that the expensive and complicated threshing machines had by their economy superseded the sixpenny flail, even though they were less efficient in the use of energy compared with hand-labour. This was illustrated with reference to calculations taken from Morton's Hand Book of Farm Labour which estimated that a labourer would expend 1,400,000 foot-lbs. in threshing four quarters of wheat by flail and preparing for the market - estimated to be seven days' work. This was only about one-tenth of the power required to

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1 'Bury Report', p.592.

2 Ibid., p.593.

3 'Cardiff Report', pp.434-5, 446.

do the same work by machine, but by their respective costliness hand-power was 'gold', horse-power 'silver' and steam-power 'copper': 'he who uses hand-power for work that can be done by steam is penny-wise and pound-foolish' was the judges' conclusion at the Cardiff trials. [1]

The significant advances made in the application of steam-power to farm operations from the late 1840s onwards naturally led to optimism over the question of cultivation by steam. Evelyn Denison moved that the Society should offer a prize for this at a Special Council held on 8 February 1854 [2] and the announcement of a £200 award (later increased to £500) for a steam cultivator 'that shall, in the most efficient manner turn the soil and be an economical substitute for the plough or the spade' created a good deal of interest. [3] It was thought important that any machine that qualified for a prize should be capable of doing more than merely grubbing or pulverising the soil and possible savings in time, as well as economy, were taken as an important potential benefit. [4]

The Society's prize instituted the well-known series of steam-ploughing trials at the country meetings in the late 1850s and 1860s, [5] and as the various types of steam-plough tackle have been very fully described, they will not be considered here in detail. At Carlisle, the competitors were Usher of Edinburgh whose machine of the moving locomotive principle proved very unsatisfactory under limited trial and Fisken's stationary engine cultivator which, though inadequate under trial, seemed to the judges to offer more promise. [6] At

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1 Ibid., p.443.

2 F.M.(3), V, 1854, p.206.

3 See, for example, A.G., 21 April 1855.

4 A.G., 14 July 1855.

5 Discussed by Clark C. Spence, God Speed the Plough, 1960, and Harold Bonnett, Saga of the Steam Plough, 1965, especially pp.47-9. See also John Haining and Colin Tyler, Ploughing by Steam, 1970.

6 'Carlisle Report', p.525.

Chelmsford (1856) it was considered that there was no reason to doubt that steam cultivation would be accomplished and that agriculture would be rescued from the 'reproach that it had been unable to use steam in its daily operation, an agency that had brought prosperity to other industries. [1] The trials featured apparatus by Smith of Woolston and Fowler of Leeds. Smith's machine was adjudicated to be outside the Society's stipulation that the ground should be fully turned over while Fowler's, though recommended to the Council for notice, was considered to be insufficiently economical to qualify for a prize. [2] At Salisbury in 1857 there was much less optimism over the potential of steam-ploughing and the ground provided for the trials was extremely unsuitable. [3] Nevertheless, the Society's prize was awarded to Fowler at Chester the following year, where the judges were of the opinion that it could effect real savings over conventional horse-ploughing. Among the unsuccessful competitors were rotary machines by Ricketts and Burrell (Boydell's principle) and Howard's manufacture of Smith's patent, which was awarded a gold medal. [4]

Further trials during the 1860s need to be viewed in conjunction with the surveys of the progress of steam cultivation that were a feature of the Journal at this time. The last of these, in 1867, suggested that the steam-tilled land perhaps amounted to 200,000 acres [5] which, as G.E. Fussell has pointed out, was a negligible proportion of the total arable land of the United Kingdom. [6] The reports by J.A. Clarke and others showed that steam cultivation could bring real benefits in terms of speed of work, depth of ploughing, and economy, given the conditions of large fields of uniform shape

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1 'Chelmsford Report', p.579.

2 Ibid., pp.579-80.

3 'Salisbury Report', pp.424-5.

4 'Chester Report', pp.320-8.

5 'Reports of the Committees appointed to investigate the present State of Steam Cultivation', Journal (2), III, 1867, p.367.

6 The Farmer's Tools, pp.89-90.

and topography.[1] In his reports of trials of steam-cultivating machinery carried out at Wolverhampton in 1871 Clarke looked for a further extension of steam-cultivation and wrote of 'many hundreds' of sets in operation at that time; he noted also a contract hire company in Northumberland which employed a capital of £42,000 and which tilled 60,000 acres with 20 double-engined sets of steam tackle. The 'extraordinary economy in cost of steam as compared with horse-tillage' was 'taken for granted as already thoroughly proved and well-known' by the judges at Wolverhampton, and the trials resolved themselves into a public demonstration of well-known systems, with notice taken of the speed and quality of the work and the merits of the different pieces of machinery.[2] The extension of steam-tillage looked for by Clarke in the 1870s does not, however, seem to have been realised. The conditions for economical steam ploughing were rarely met and there was the disadvantage of a large amount of capital being tied up in the equipment. Further, it came to be appreciated that there were sometimes substantial disadvantages of deep ploughing: Mechi admitted that it had been 'a great and unprofitable mistake' to bring to the surface so much glutinous subsoil at Tiptree.[3]

The early history of the development of reaping machines is well-known. There had been interest in mechanical reaping since classical times and a number of ineffective inventions appeared in the late eighteenth and early nineteenth centuries. Many of the features of the modern reaper are attributed to that developed by Rev. Patrick Bell in 1826. Some of his machines were sent to America and then reappeared as McCormick and Hussey reapers at the Great

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1 Orwin and Whetham, p.105.

2 John Algernon Clarke, 'Report on the Trials of Steam-Cultivating Machinery at Wolverhampton', Journal (2), VII, 1871, pp.472, 480.

3 See 'The Pause in the Development of Steam Cultivation', F.M.(3), LIII, 1878, pp.213-4; A.G., 24 March 1879.

Exhibition of 1851 where they excited a good deal of interest.[1] Pusey hailed them as 'the most important addition to farming machinery' since the threshing machine had first begun to take the place of the flail and pointed to a saving of horse-labour and independence from casual workers - 'strangers... who cannot always be found' - as being the chief advantages that they had to offer the farmer.[2]

Thereafter, trials of reaping-machines were a regular feature of the Royal shows. At Lewes (1852), where they constituted the 'greatest novelty' and excited 'the most lively interest' Garrett's machine on the Hussey principle was awarded the prize, but Thompson noted that at the various other trials conducted at different localities throughout the country results had been inconclusive as to the best type of machine.[3] This was the pattern at the Society's trials with the decision of one year being reversed at the next meeting. Thus the prize was awarded to Crosskill for Bell's at Gloucester (1853), Dray for Hussey's at Lincoln (1854), and Burgess and Key for McCormick's at Carlisle (1855). Contemporaries sometimes took these contrary decisions as being indicative of the weakness of the trial-system[4] but it is clear that although the conditions of the trial grounds differed markedly - and were often highly deficient for their purpose - and judges' preferences sometimes swayed decisions, there were a series of cumulative small improvements which meant that it was unlikely that any one machine would prove to be continuously superior to another.

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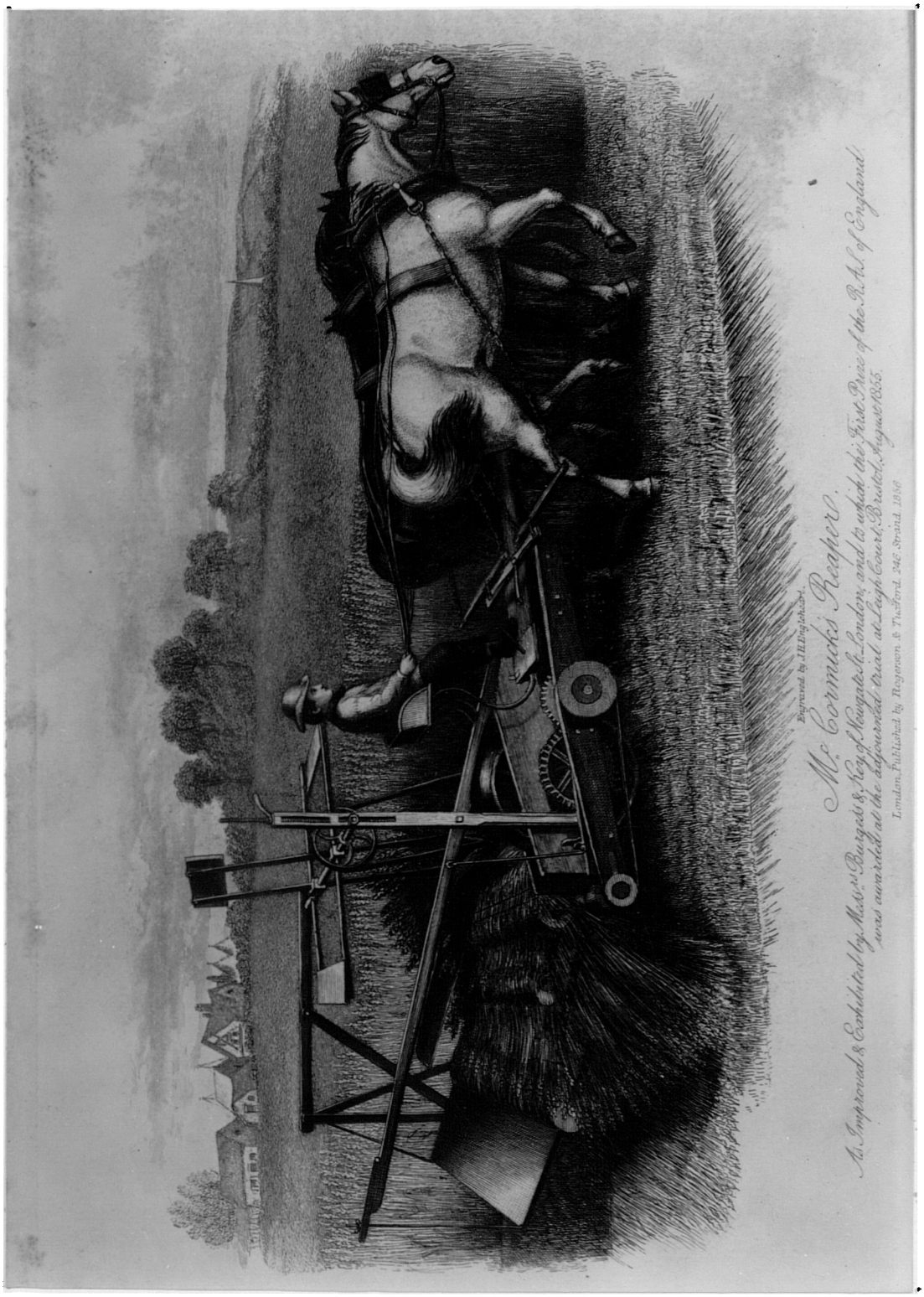
1 For discussion of early reaping-machines see The Farmer's Tools, pp.115-27.

2 Philip Pusey, 'On Mr. McCormick's Reaping-machine', Journal, XII, 1851, p.160.

3 'Lewes Report', pp.302-4. For discussion of the technical details of the various reaping machines see The Farmer's Tools, pp.127-37. The Society's trials are also discussed in that source.

4 A.G., 22, 29 September 1855; Samuel Sidney, 'On the Effect of Prizes on Manufactures', Journal of the Society of Arts, X, 1861-2, p.376.

PLATE XVI : McCORMICK'S REAPER.



Source: Farmer's Magazine.

(3rd Series IX,
May, 1856)

Substantial advances were made during the 1860s and 1870s. Self-rakers were shown by McCormick and Samuelson in 1862 and interest surrounded mechanical, as opposed to manual, delivery at Plymouth (1865) and Manchester (1869) A further development was in one-horse rather than two-horse reapers though at Manchester several claimed that one-horse machines were found to be too heavy. [1]

Between 1875 and 1878 the Society's trials were restricted to mowers and reapers. Of the mowers - for which a prize had first been offered at Salisbury in 1857 - it had been concluded at Manchester that any of the best machines constituted a safe purchase for the farmer but at Taunton (1875) improvements were noted in strength, lightness, and cost. At Manchester none of the one-horse mowers had been tried on account of their excessive draught; at Taunton all fourteen entries except Hornsby's were rejected as being too heavy, but the judges noted distinct advances. Of the two-horse machines, the gap between the best and worset tried was much narrower than at Manchester and most were found to be well-constructed and robust. [2] At Birmingham (1876) several manufacturers of reaping machines abstained from competition; the steam-reaper of Aveling and Porter received notice as did the sheaf-binder exhibited by Walter A. Wood. [3] A gold medal for sheaf-binders was the only prize put up by the Society at Liverpool the following year, but this was not awarded. At Bristol four wire binders and three string binders were exhibited; after several had been withdrawn from trial and others tried on very unsuitable ground, the gold medal was given to the machine exhibited by Burnell, Waite, Huggins, and Co. (McCormick's) and Walter A. Wood's were highly commended. [4] These were both wire-binders which were disliked by English farmers for fear of portions of wire passing

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[1] The Farmer's Tools, pp.134-5.

[2] John Hemsley, 'Report on the Trials of Implements at Taunton', Journal (2), XI, 1875, pp.631-9.

[3] Jabez Turner, 'Report on the Exhibition of Implements at Birmingham', Ibid., XII, 1876, pp.596-8.

[4] John Coleman, 'Report on the Trials of Sheaf-binders and Miscellaneous

through the threshing machine, to the possible injury of stock if the wire was mixed with the straw.[1] The Society's gold medal was given to the McCormick string sheaf-binder at the Derby show of 1881.[2]

The progress and adoption of reaping-machines in the British Isles has been subject to a good deal of scholarly attention. E.L. Jones has argued against the conventional view that there was an oversupply of agricultural labour until the end of the third quarter of the nineteenth century and has suggested that labour shortages began to manifest themselves after 1850 and that it was seasonal work, particularly the harvest, that was most affected by this shortage at the same time as the labour demands of the systems that underpinned high farming increased.[3] E.J.T. Collins has followed this position and accounted for his estimate that three-quarters of the British corn crop was still harvested by hand tools in 1870 by showing that a deteriorating harvest labour situation was met by labour savings from 'intermediate technology': improved hand tools, especially the scythe and the bagging hook, rather than from the widespread adoption of the reaping-machine.[4] P.A. David has stressed the difficulties of terrain in explaining the slower adoption of the reaping-machine in the British Isles compared with the United States allied to the risks, low returns, and insecurity of capital due to the absence of formal tenant-right associated with investment in land improvement which was often necessary for full harvest mechanisation. David suggests that the increased interest in reaping-machines in the 1870s may have been due to the fact

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1 Ibid., p.76.

2 Robert Neville, 'Report on the Exhibitions and Trial of Implements at the Derby Meeting', Ibid., XVII, 1881, p.601.

3 E.L. Jones, 'The Agricultural Labour Market in England 1793-1872', E.H.R.(2), XVII, 1964-5, pp.322-38.

4 E.J.T. Collins, 'Harvest Technology and Labour Supply in Britain 1790-1870', unpub. Ph.D. thesis, University of Nottingham, 1970. For a summary see E.H.R.(2), XXII, 1969, pp.453-73.

that the land least suited for mechanisation was the first to go out of production in the 1870s.[1]

Contemporaries were also interested in the question as to why the reaping-machine arrived on the scene fairly late in the British Isles when compared with the United States. H.S. Thompson accounted for the lack of interest in harvest mechanisation prior to the 1851 Great Exhibition as being due to the continued prevalance of land with high ridges and deep furrows, the costliness of British machines, the inability of farm labourers to look after machinery properly, and the cheapness of English labour.[2] If we follow the argument of Jones and Collins, the appearance of the reaping machine at Crystal Palace co-incided with the beginning of the period of increasing labour difficulties in English agriculture - as indicated by Pusey's report - and this would in part account for the interest in the reaping trials during the 1850s and 1860s. Collins points to a number of reasons as to why the 'intermediate technology' should have been preferred to full mechanisation, among which was the need to protect work for labourers who were still needed for other farm operations.[3]

It is doubtful whether the early machines had a great deal to offer the average agriculturist. They had been developed for American conditions where the grain yield was lower and the straw less luxuriant: Thompson admitted that those who had been among the first to purchase reaping-machines in England found them something of a hindrance and detailed a number of difficulties associated with machines constructed on both the Hussey and McCormick principles. These included the clogging of the cutting knives leading to frequent stoppages, heavy draught, the difficulty of delivery when the crop

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[1] P.A. David, 'The Landscape and the Machine: Technical Interrelatedness, Land Tenure and the Mechanisation of the Corn Harvest in Victorian Britain', in D.N. McCloskey, ed., Essays on a Mature Economy: Britain after 1840, 1971, pp.145-205.

[2] 'Lewes Report', pp.304-5.

[3] Thesis, pp.274-6.

was heavy, too great a width for ordinary farm-gates, and high price, although he was optimistic that the problems would soon be overome. [1]

As there was a very restricted time each year when improvements could be tried out, it may well be that the Society's trials carried out in advance of any general demand for harvest machinery fulfilled a particularly useful function. Even if we accept the Jones/Collins thesis about the deteriorating agricultural labour market betwen 1850 and 1870, the labour question became much more pressing during the 1870s due to increased rural-urban migration, agricultural trade unionism, and falling farm incomes. A heightening of concern for labour-saving machinery is apparent during this decade [2] and in 1875 it was acknowledged at a Council discussion on the future of the Society's trials that the encouragement of labour-saving machinery was all important. [3] It may not be unreasonable to claim that the Society's encouragement of reapers and mowers gave the agriculturist a choice of machinery of greater sophistication and usefulness at a time when it was particularly needed than would otherwise have been available, although it was maintained in the Implement Manufacturer's Review that the Society did not offer enough prizes for labour-saving machinery when the labour question was uppermost in the mind of '80 out of a 100 farmers'. [4]

The Influence of the Shows

In 1845 Morton wrote in the Agricultural Gazette of the influence and importance of the Royal shows. He noted that as a result of the recently concluded Shrewsbury meeting it was possible that a valuable implement

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1 'Lewes Report', pp.305-10.

2 See, for example, The Harvest and the Use of Machinery', F.M.(3), XLIV, 1873, pp.4-5; discussion on labour-saving machinery at the Ixworth Farmers' Club reported in Ibid., XLVI, 1874, pp.45-8; 'The Implement Trade and the Strike', Ibid., pp.269-70.

3 Monthly Council 3 February 1875, Ibid., XLVII, pp.188-9.

4 6 December 1877, p.1283.

had found its way into a district where it had been hitherto unknown, agricultural engineers had been instructed in the faults of their manufactures, and the pride taken by many exhibitors of stock had been humbled before the evidence of superior skill on the part of others. The award of premiums had, 'to some extent', indicated the qualities in implements and animals deemed worthy of praise, while the assembled farmers had carried home truths and opinions new to them. [1] Morton therefore looked to the shows to encourage the adoption of new implements, to bring about improvements in detail in agricultural machinery and stock, and to facilitate the exchange of ideas and opinion. He also had reservations about the utility of the prize system and the emphasis given to the social nature of the occasion. Instead of the lavish pavilion dinners, Morton would have preferred lectures at 'public breakfasts' dominated by 'scientific and practical men'. [2] By the late 1870s it was maintained, with considerable justification, that the Society's show was unquestionably 'the sight of the year for those of a bucolic turn of mind' and that many thousands of British farmers 'would not like to miss the Royal'. [3]

The interchange of ideas and opinion that the gathering together of agriculturists at these great annual events facilitated, together with the critical examination of implements and stock in the showground, was a significant 'influence' of the Society's shows, but it is very difficult to measure in a precise way. With the point in mind, however, that the shows had a general function of stimulating awareness of agricultural progress, we can attempt some assessment of the influence that the shows had upon the development of implements and stock.

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[1] A.G., 26 July 1845.
[2] Ibid.
[3] 'Liverpool Report', (1877), p.531.

As far as implements are concerned, the Royal shows clearly provided a valuable focal point for the testing of innovations and improvements in machinery. Although many of the leading implement houses such as Garrett and Ransomes[1] were already well-established by 1840, the start of the Society's sequence of shows and trials can reasonably be taken as a major 'catalyst' in the emergence of a fully-fledged British agricultural engineering industry between about 1835 and 1870.[2] Major firms such as Crosskill, Howard, Smyth, Cooch, Bentall, Wedlake, and Hunt came into national prominence by exhibiting at the shows, participating in the trials, and winning the Society's prizes.

There are very few examples of the Society bringing forward a specific innovation by the advance announcement of a premium. Rather, manufacturers used the shows to bring innovations and improvements in machinery to the notice of potential buyers, sometimes in advance of a specific demand for that product. J. Wrightson, reviewing the progress in agricultural machinery between 1841 and 1877 for the Agricultural Gazette, pointed to the chief implement landmarks at the shows as the scarifiers, cultivators and dibbling-machines of the early 1840s, the developments in drain-tile machines and portable steam-engines, the steam trials, and the improvements in harvesting machinery, all of which had provided successive foci of interest at the Society's shows.[3]

Wray Vamplew has recently attempted to quantify the improvements in agricultural machinery that took place, using the data contained in the Society's annual implement reports.[4] Vamplew's project is an interesting one, but his attempt to establish price and quality indices over time suffers from the

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[1] For histories of these firms see R.A. Whitehead, Garretts of Leiston, 1963, and D.R. Grace and D.C. Phillips, Ransomes of Ipswich, 1975.

[2] Blake, thesis, p.49.

[3] A.G., 11 July 1877.

[4] Wray Vamplew, 'The Progress of Agricultural Mechanics: the Cost of Best Practice in the mid-Nineteenth Century', Tools and Tillage, III, 1979, pp.204-14.

deficiencies inherent in the data. As much of the testing of implements was hurriedly and imperfectly carried out it is difficult to ascertain how far an increase of price was a reflection of technical advance. Vamplew's conclusion is that the majority of implements and machinery became cheaper without a disproportionate drop in quality, or, where prices rose, there were adequate compensatory quality increases.[1]

This impression is borne out by examination of contemporary comment, and although the advances cannot be directly attributed to the shows, the catalystic nature of the Royal meetings can reasonably be taken as an important factor leading to advances. The main caveat is that it is by no means safe to assume that implements which gained prizes in the showground were necessarily the first choice of the working-farmer. As we have seen, the trials and the decisions of the judges were often called into question, and cheapness and durability were often preferred to technical sophistication; this was part of the case of Morton and the manufacturers against the 'prize-system'. Morton claimed that he knew of many classes of machinery that had been awarded prizes but which had neve come into general use, and of cases where showground success had failed to give any impetus to sales.[2] Examples included Cambridge's roller, where 'thousands were sold' before the merits were recognised by a prize, and Bentall's broadshare which, according to Morton, received 'hundreds of testimonials' before it was appreciated by the Society. Smyth (Peasenhall) was one of the largest drill-makers but 'always in the background' with regard to prizes. The Uley cultivator and Biddel's scarifier which had been so

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[1] Ibid., p.212.

[2] 'Agricultural Progress', p.64.

successful during the early days of the Society had never been generally adopted. Newberry's dibbling machine which had gained several awards was, according to Morton 'nowhere' in 1864. [1] Of dibbling machines generally, Wrightson commented that he could not recommend purchase of the 'elaborate machines exhibited in the shows'. [2] W.W. Good complained that many of the articles seen in the showyards could only be 'worked at a loss' [3] and it was a fairly general criticism that the Society had failed to reward inventions of the highest importance and given prizes to useless inventions. [4] Judges, it was alleged, would give prizes to machines which they would not necessarily buy themselves [5] while Richard Garrett maintained that his customers often specifically ordered not to have a prize implement as they knew it would not answer their purpose. [6]

Some of the criticisms were perhaps overstated, and they can also be turned around to suggest that they derived from the success of the shows in stimulating progress. Dislike of the 'prize-system' partly arose from the fact that many of the implements were so similar in quality that to award a prize to one as opposed to another was to confer too abrupt a distinction upon the successful machine; but this uniformity might itself be a reflection of rapid technical progress brought about by the bringing together the products of the leading firms at the annual shows for the purpose of comparison and trial. It was a more just criticism that the Society sometimes encouraged development in directions which were not very useful: the emphasis on expensive tile-machines with a capacity much above that which could be fully utilised and the promotion of 'racing' steam-engines are two examples.

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1 A.G., 20 February 1864.

2 J. Wrightson, 'Agricultural Machinery', in G. Phillips Bevan, ed., British Manufacturing Industries, IX, 1876, p.150.

3 Where are we now? p.24.

4 Sidney, 'On the Effect of Prizes...', p.376.

5 Crosskill, 'Agricultural Shows and their Influence...', p.376.

6 A.G., 16 January 1864.

A secondary objective of the shows and trials of machinery sponsored by the Society was to encourage the adoption of machinery. On the whole, it seems that the award of a prize to a specific machine was no guarantee of increased purchaes; and if the statements of some of the leading implement makers are to be believed, showground success could actually depress demand. It is unfortunate that the sales records of nineteenth century agricultural engineers are extremely thin so that they cannot be used to trace the sales of a specific implement or its adoption in a particular locality. [1]

In the 1840s there is the distinct impression given that, despite the intense interest in cultivating equipment at the Society's shows, sales were relatively flat. Thus H.S. Thompson, who saw the purpose of the country-meetings as the encouragement of the general diffusion of *the best existing* implements and of continued progress in their improvement [2] detailed marked increases in sales of steam engines, thrashing machines, and drills between 1848 and 1852. He attributed the increases to the improvements that had been made - particularly in steam engines - under the guidance of the Society's trials. [3] The steep increase in the number of exhibits at the shows in the 1850s may be taken as indicative of an increased demand for agricultural implements of all kinds during that period. This is confirmed by Morton's 1861 statement on 'agricultural experience' where he related substantial increases in the output of turnip and chaff cutters, thrashing machines, and reapers. [4]

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[1] The shortcomings of agricultural engineering records are discussed by Blake, thesis, pp.28-31. I am grateful for advice from Mr. D.R. Phillips, of the Museum of English Rural Life, University of Reading, on this point. The most useful source for the study of the adoption of implements are newspaper advertisements as pioneered by J.R. Walton in A Study in the Diffusion of Agricultural Machinery in the Nineteenth Century, University of Oxford, School of Geography, Research Paper No. 5, 1973, and 'Mechanisation in Agriculture: a Study of the Adoption Process', in Change in the Countryside, pp.23-42.

[2] 'York Report', p.381.

[3] 'Lewes Report', pp.312-4.

[4] J.C. Morton, 'Some Lessons of Recent Agricultural Experience', Journal of the Bath and West Society, VIII, 1861, pp.220-39.

The founders of the Society thought that the Royal would have the function of bringing implements to the notice of farmers in particular districts where they were unknown. The shows may have had this role in a limited degree in the early years. A communication from the West Cumberland Agricultural Society to Morton maintained that

> Thanks to the Royal Agricultural Society's holding their meeting in Carlisle [1855], I believe that exhibition was instrumental in opening the eyes of many of our Cumberland mechanics. Previous to 1855, our county was wont to boast of her ploughmen, but when it came to the test at Carlisle, we were all beaten upon our own soil; not that our ploughmen were deficient in skill, but they had not the implements to work with. [1]

On the other hand, from limited evidence it would seem that show success did little to change established local loyalties with respect to implement purchase. Thus it was noted that Ransome's, who took many of the prizes at the Southampton (1844) meeting 'never gained a footing there' while Howard of Bedford, who won four of the first plough prizes at the Chelmsford (1856) meeting had, by 1864, 'never sold twenty ploughs within a radius of twenty miles of the place'. [2] The function of the shows for communicating information about agricultural machinery changed between the 1840s and 1860s and the general management and philosophy behind the shows did not altogether keep pace with the change. Thus Alfred Croskill could remark in 1866 that the importance of shows was diminished because, with the cheap press and a general increase in facilities for intercommunication there was not the same scope for the shows to extend and communicate agricultural knowledge. [3]

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[1] Quoted in 'Agricultural Progess...', p.64.

[2] A.G., 20 February 1864.

[3] 'Agricultural shows and their Influence...', loc. cit.

Morton attached far more importance to the implement sections of the shows than he did to the livestock exhibitions, for it was in agricultural engineering that he looked for the greatest advances. In reply to a critic who thought that the Gazette paid insufficient attention to the stock without which the Royal shows would have 'dwindled away' Morton maintained that improvements in cultivation exerted an influence over a wide variety of agricultural department whereas the influence of improvements in breeds of cattle were much less pervasive. [1] Yet it is clear that for many of the show displays of farm stock were a major attraction. Less exception was taken to the notion of giving premiums to prize animals, as opposed to implements, but, as we have seen, the condition of the show animals was a matter of continuous controversy. And just as it is difficult to make a precise estimate of the 'influence' of the shows on the development and diffusion of improved farm machinery, so their influence on the improvement of farm livestock is problematical. The two main ways in which the Royal shows could be expected to influence livestock progress was in the encouragement of better breeding stock for 'early maturity' - and hence the more efficient and economical production of meat and other livestock products - and in the establishment of new breeds.

It is very difficult to arrive at any hard estimate of the improvement in livestock performance that took place over the period, still less to attribute it to the influence of the show-system of which the Royal meetings were the most developed example. There was much criticism of the subjectivity of the judging, and no thought was given to performance or progeny testing which would help to establish the real worth of prize animals. A number of objections have been made to accepting 'show standard' as a specific breeding aim. These

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[1] A.G., 15 August 1846.

include the danger that show judgement tends to overemphasise appearance or points of conformation of individuals that require a high standard of feeding or husbandry that cannot be sustained for commercial production, at the expense of more utilitarian traits. In addition, show standard is often not consistent with the physiological balance needed for commercial production.[1]

These factors are very evident in reviewing the stock awards at the early Royal shows where the stress was very much upon 'symmetry' and 'points of conformation' in cattle and sheep. E.A. Fawcett was among many who attacked the stress given to appearance in prize animals: 'straight on this side, straight on that side, and on all sides'.[2] Among the 'utilitarian' traits which were discouraged among Shorthorn cattle - the breed which excited the greatest interest - were the production of lean meat and a good milk yield. Thus Robert Smith in reporting on the livestock shows at Chester (1858) asked: 'are such animals really in a state for breeding and milking - one (at least) of the uses of the beast? It would be well if more attention were paid to the lean meat of a shorthorn, and less to superfluous fat'.[3] J. Dent Dent called attention to the neglect of milking qualities in his 1864 report on the livestock at Newcastle, considering that breeders had too much lost sight of this quality in their desire to produce the utmost symmetry of form with early maturity. At Plymouth the following year he again protested against that breeders of fashionable stock entirely ignored the milking qualities of their cattle.[4] The Manchester report stressed the desirability of encouraging

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1 J.E. Nichols, Livestock Improvement, 1944, p.122.

2 E.A. Fawcett, 'Shorthorns: their general Utility for all Purposes', in J. Wight, ed., The Treasury and the Homestead, I, 1877, p.81.

3 Robert Smith, 'Report on the Exhibition of Live Stock at Chester', Journal, XIX, 1859, p.365.

4 John Dent Dent, 'Report to the Council on the Cattle Exhibited at Newcastle', Journal, XXV, 1864, p.426 and 'Report on the Exhibition of Live Stock at the Plymouth Meeting', Ibid.(2), I, 1865, p.366. See also Robert Trow-Smith, English Livestock Husbandry 1700-1900, 1959, p.241.

the milking qualities of all three of the main breeds of cattle at the expense of the desire to secure every additional pound of beef. [1]

Show animals were often unrelated in their condition to that which was of practical use on the farm, but the Royal meetings did provide a focus whereby emerging breeds could gain notice and general standards laid down. Breeders in a particular district could monopolise the 'other classes' which in turn would lead to the establishment of a separate category for that specific class: this then allowed their points to be demonstrated allowing for greater uniformity and fixity of type. Thus in 1863 it was claimed that the Oxford Downs and Shropshire sheep, which had recently made substantial advances, had not yet a sufficient degree of uniformity to make for easy judging. A great variety of appearance was noted among the Oxfordshires while the Shropshire breeders complained that the judges had mistaken type and gone mainly for size.[2] At Oxford (1870) which was especially notable for a large number of entries in the different sheep classes (some leading examples of which are shown in plate XVII) there were still comments on the lack of uniformity in the Cotswolds and the Shropshires.[3] At Hull (1873) the latter were noted as making a recognisable advance towards standards that had been laid down by the Oxford judge three years earlier.[4]

The Royal shows might therefore be taken as being instrumental in aiding the general diffusion of the leading breeds of farm animals, such as the Shorthorns, Herefords, and Devons, and contributing to the demise of inferior local breeds, although Walton has shown that the location of the meetings did not materially influence the pattern of Shorthorn adoption. [5]

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1 W. Wells, 'Report on the Exhibition of Livestock at Manchester', Ibid., V, 1869, pp.517-8.

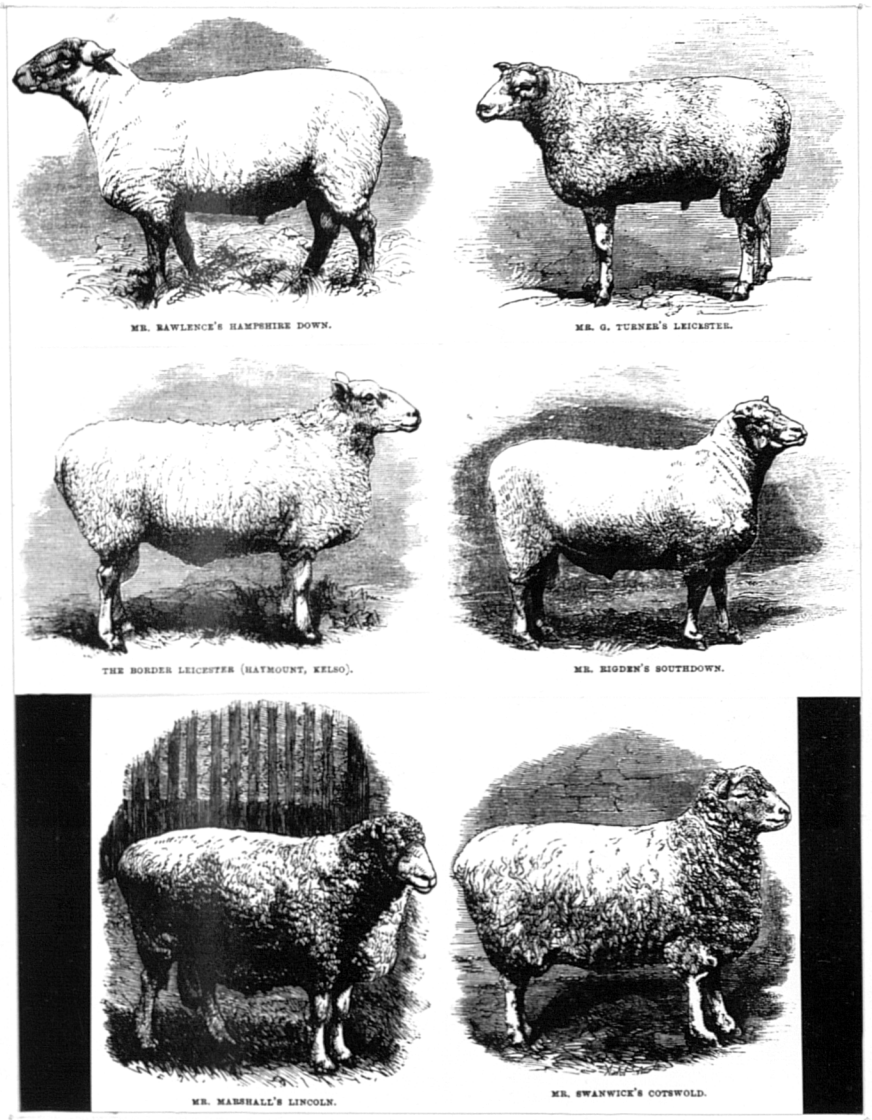
2 'Worcester Report', p.473.

3 D. Reynolds Davies, 'Report on the Exhibition of Live Stock at Oxford', Ibid.(2), VI, 1870, pp.556, 560.

4 Richard Milward, 'Report on the Exhibition of Live Stock at Hull', Ibid., IX, 1873, p.519.

5 Thesis, p.372. Walton also notes that membership of the Royal was not a precondition of breeding pedigree livestock as only 31% of breeders registered in the Shothorn Herd Book of 1850 were Society members.

PLATE XVII: SHEEP EXHIBITED AT OXFORD 1870.



Source: Morton's Almanac For Farmers And Growers.

(1874, pp.63-5)

Local breeders could use the shows for promoting improved breeds which were thought to have worthwhile qualities, such as the Norfolk and Suffolk Polled cattle and the Sussex, while it was a reasonable claim that the Society brought the Oxford Down and the Shropshire Down sheep to the attention of mutton-producers. [1]

Perhaps one of the significant influences of the Royal shows was to foster the trade in pedigree livestock. The award of a prize to a particular animal, especially cattle, conferred upon it a value which was far in excess of that which it would otherwise have had for breeding purposes. Col. Towneley's 'Master Butterfly' (plate XVIII)the first-class Shorthorn at the Chelmsford show of 1856 created a new record when it was sold for twelve hundred gns. for expo: to Australia, [2] but such a price was regularly exceeded in the 1870s. Buyers from the United States, Canada and Australia were noted as buying many of the best stock at Oxford in 1870 where a price of two thousand guineas was paid for a seven year-old Shorthorn cow. [3] The export trade in pedigree livestock which developed in the 1870s put a particular significance on prize-winning animals; Shorthorns and Herefords were particularly sought after and formed the basis of overseas herds which were to provide the meat imports into the British Isles, a prominent feature of the last two decades of the nineteenth century. [4]

These, then, were the influences of the country meetings of the Royal. There were trials of implements where, whatever the criticism of their conduct and of

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1 Robert Leeds, 'Report on the Livestock exhibited at Bedford', Ibid., X, 1874, p.599.

2 'Chester Livestock Report', p.361. See F.M.(2), XXIV, 1863, p.1 for memoir of Towneley. Master Butterfly's rather inauspicious Australian career is recalled by 'The Druid', Saddle and Sirloin, pp.340-1.

3 'Oxford Report', p.535.

4 See Edith Whetham, 'The Trade in Pedigree Livestock 1850-1900', A.H.R., 27, 1979. pp.47-50.

the 'prize-system' increases in efficienty and utility of standard implements accumulated year-by-year and new types of agricultural machinery were tried out. And whatever the shortcomings of the livestock shows, the annual exhibtions of animals gave a chance for the spectators to inspect the products of the leading breeders and to compare their standards with their own stock. Improved standard breeds were also brought to their attention at the shows. Contemporaries such as Morton tended to stress that it was not so much the 'show' as the 'gathering' which did the most 'good' [1] and certainly it provided an ideal occasion for the interchange of agricultural opinion. The impact of the Royal shows was increased by the fact that they were national rather than local events and were thus linked to the agricultural press which reported the proceedings and criticised their management. Implements were given prominence in advertisements and reports by means of fine woodcuts produced by the firm of Hare and Company,[2] and the shows were clearly seen as a focal point for taking stock of 'agricultural progress'. At the turn of the century Joseph Darby could remember the Royal meetings of the 1850s and recalled how he looked to them to demonstrate the best of improved implements and stock.[3] Whatever their criticisms of the show system - and many of these were not without justification - most contemporaries were agreed that they conferred a great amount of benefit upon the agricultural community even though, with improved management, they might have achieved more.[4]

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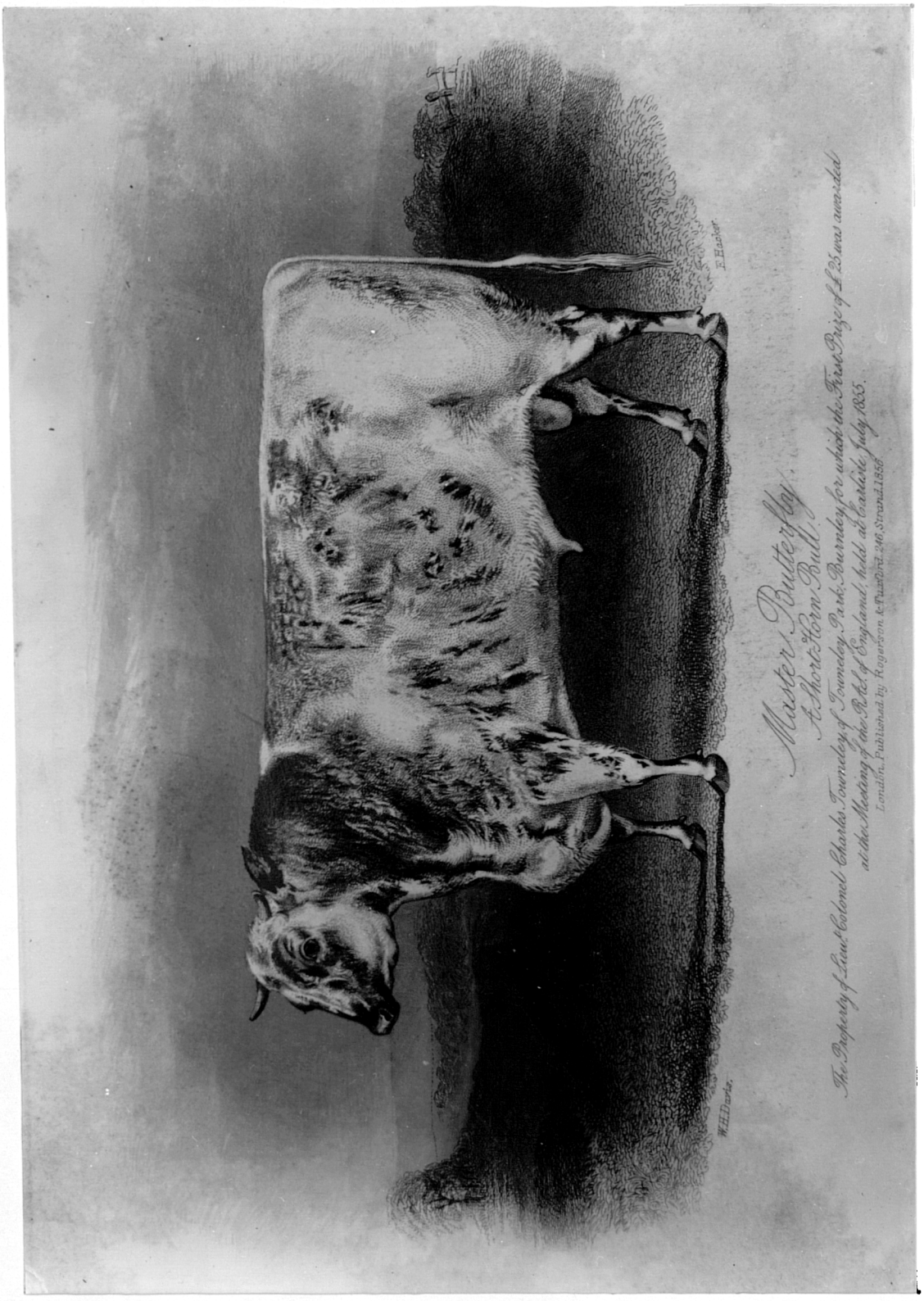
1 A.G., 26 December 1846.

2 See Martin Andrews, 'The Firm of Hare & Co. Commercial Wood-Engravers', unpub. B.A. dissertation, Univ. of Reading, 1976.

3 'Reminiscences of Royal Shows', Mark Lane Express Carlisle Supplement, 30 July 1902.

4 Crosskill, loc. cit.; Implement and Machinery Review, I, 1875, pp.42-3.

PLATE XVIII: MASTER BUTTERFLY.



Source: Farmer's Magazine.
(3rd Series, IX,
April 1856)

CHAPTER V : CONSULTANCY AND EDUCATION

The Veterinary Problem

At the time of the formation of the Society William Youatt had been conducting a campaign through the pages of the Veterinarian for reform of the Royal Veterinary College. As we have seen (pp.94-5) Youatt was an enthuasiastic supporter of the Society and a close friend of William Shaw. Youatt's charge against the College was that its attention was almost wholly devoted to the horse, to the neglect of other domesticated animals. Shaw published a number of extracts from the Veterinarian in the Express and Farmer's Magazine in order to give full coverage of Youatt's views. Youatt claimed that instruction given by Coleman and Sewell at the College was quite inadequate to enable its students to deal with the ailments of the general range of farm animals other than the horse. According to Youatt, no students who qualified considered that they were efficiently instructed in the anatomy and physiology and diseases of sheep and cattle. Youatt called for lectures on these subjects which would fully occupythe attention of one teacher and who would give 'a long, connected, well-studied course'. [1]

Youatt's criticism were not without justification. The London Veterinary College had been founded in 1791 after the Odiham Agricultural Society had sent some of its young members to France to obtain veterinary instruction. A young French veterinary surgeon of great promise, Vial de St. Bel, had then come to England, and in conjunction with members of the Odiham Society,

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[1] 'The English Agricultural Society and the Veterinary Art', F.M.(N.S.), I, 1839, p.24 (from Veterinarian).

laid the foundations of the London School. In the early years extensive courses were held on such topics as operations, botany, pathology, and epizootic diseases but these were abandoned on the early death of the founders.[1] Edward Coleman was appointed to the professorship at the age of twenty-eight in 1793 and thereafter the development of the veterinary profession was almost entirely in his hands. One of his first acts was to reduce the course of training from three years to six months, thereby receiving extra tuition fees. Coleman often seems to have been ignorant of the main body of veterinary knowledge available at that time. The emphasis on the horse came as a result of his appointment as 'medical superintendent' of the horses of the Artillery. It must also be added that many authorities considered that a knowledge of the horse was sufficient to understand all other animal diseases, and that the treatment of the horse was a much more lucrative undertaking for the veterinary practitioner, as it was of higher value than other domesticated animals. Generally, Coleman opposed change and progress. He had an autocratic attitude, and a monopoly of the veterinary profession. This was the background to Youatt's campaign in the Veterinarian. He had a concern for the pathology of animals other than the horse, and the foundation of the English Agricultural Society was seen by him as a valuable opportunity to achieve his object of broadening veterinary education.[2]

Under Youatt's influence, and with Shaw's support, the veterinary question was one of the first considerations of the Committee of Management of the

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1 'The Veterinary College', F.M.(2), XVII, 1848, pp.312-3 (originally a letter to M.L.E.).

2 Information from Sir Frederick Smith, The Early History of Veterinary Literature, III, 1930, especially pp.15-17, 28-9.

English Agricultural Society. A Veterinary Committee deliberated during July and August 1838 and reported to the Management Committee on 5 September of that year. This report, which was readily adopted, determined upon an approach to the Governors of the Royal Veterinary College asking for lectures to be established on animals other than the horse and that every pupil be required to attend them, William Sewell and Charles Spooner, teachers at the College, having already consented to deliver such lectures subject to approval. This approach to the Governors of the College also carried with it an offer to defray expenses, and there was a request to meet with the Governors during the autumn. [1]

It was a year before anything came of this move. Youatt continued his attacks on Coleman for sending pupils out into the country ignorant of the animals they would have to deal with, while Coleman continued to oppose the idea of an extension of the activities of the college. Reference was made to the Society's efforts to confer with the College Governors to the meeting of members in December 1838 but no further progress was reported at the General Meeting the following May. [2]

Coleman died, however, in July 1839 and at the same time the Management Committee determined to make a formal offer of a grant to the Veterinary College. Two hundred pounds per annum was put up for suggested lectures on the diseases of cattle, sheep and pigs to be given at the College with comparative anatomy, and this was accepted. [3]

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[1] Minutes of Committee of Management 5 September 1838, pp.67-70; 'The English Agricultural Society, and the Royal Veterinary College', F.M.(N.S.), I, 1838, p.451 (from Veterinarian).

[2] 'The Veterinary College and the English Agricultural Society'; 'The English Agricultural Society and the Veterinary College'; First General Meeting 18 December 1838 and First Annual General Meeting 22 May 1839, F.M.(N.S.), II, 1839, pp.38-9, 65, 109-10, 273, 469.

[3] Minutes of Committee of Management 10 July 1839, p.240.

The importance of the diseases of cattle and other animals, for so long neglected, was given added impetus by the first appearance of foot-and-mouth disease in England during August 1839 at Stratford, near London. By the end of the year it had spread throughout England and into some parts of Scotland and continued severely to affect herds in 1840 and 1841.[2] The response of the Society was to issue a circular on the 'epidemic among cattle' to all subscribers.[3] William Sewell, who succeeded Coleman as Professor at the College designed the circular, with an addition by Youatt advocating the separation of the sick from the healthy animals - the importance of which was not appreciated by Sewell.[4] The circular, describing the symptoms and advocating sulphur, Epsom salts, and bleeding as remedies also called for informatio on varieties of the complaint and additional remedies that may have been found efficacious.[5]

The Governors and Sewell refused to give serious attention to the additional studies that the Society had called for and endowed with their two hundred pound grant. In March 1840 Handley instigated a committee (composed of himself, Shaw and Youatt) to enquire how the money was being expended.[6] There were claims in the Veterinarian, Express and Farmer's Magazine that the Society was getting little value for its money. Sewell was said to have given only three lectures during the year and they were a 'miserable fiasco' occupying a few minutes at the end of an ordinary lecture.[7] In the November

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1 Minutes of Committee of Management 10 July 1839, p.240.

2 H.M.S.O., Animal Health: A Centenary 1865-1965, pp.135-6.

3 Council Minutes 8 April 1840, p.

4 Smith, III, p.128.

5 See 'Epidemic among Cattle', Journal, I, 1840, pp.cxcii-cxcvi.

6 Minutes of Committee of Management 11 March 1840, p.330. This notes that Youatt withdrew through illness.

7 'The Royal Agricultural Society and the Veterinary College', and 'The Veterinary College', F.M.(2), III, 1841, pp.38, 51; Smith, III, p.127.

of the year, on the motion of Shaw, it was determined to withdraw the two hundred pound grant unless the College could show that some firm steps had been taken to,improve instruction in the diseases of cattle, sheep and pigs. [1] The Council, however, accepted an assurance from Sewell that substantial sums had been expended on a cattle infirmary at Islington (which was, in fact, soon abandoned) and resolved to continue the grant subject only to information on the annual number of cattle lectures and the number of students obtaining certificates. [2] It was the outbreak of another severe cattle disease, contagious bovine pleuro-pneumonia (one of the most serious animal plagues) during 1842, which finally forced the Governors of the Veterinary College to create a Chair of Cattle Pathology.

This was given to James Beart Simonds, who was also to act as Consulting Veterinary Surgeon to the Society. Born in 1810 of a Suffolk agricultural family, he had entered the Veterinary College at the age of twenty-eight. He also attended Youatt's lectures, and Youatt seems to have been instrumental in obtaining the post for him. This was the start of a very long and not altogether successful association with the Society. He followed Spooner as Principal of the Veterinary College in 1871 (Spooner having succeeded Sewell) and was forcibly retired ten years later as a result of illness. He soon recovered and continued his connection with the Society, as Consulting Veterinary Surgeon and Examiner, almost to the end of his life in 1904. According to Sir Frederick Smith, his discourses were as 'lifeless and uninspiring as his manner', [3] but he was the dominant influence in veterinary matters with the Society during most of the period covered in this thesis.

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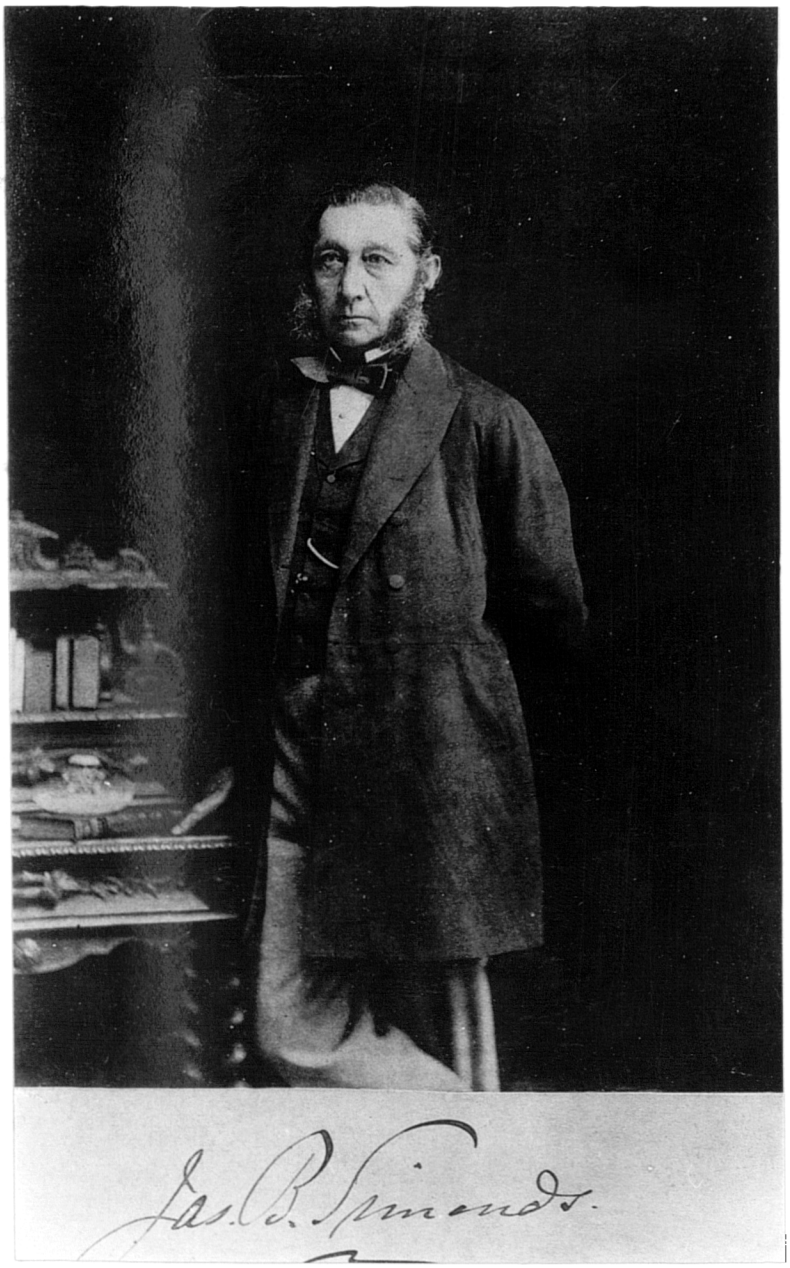
[1] Monthly Council 3 November 1841, F.M.(2), IV, 1841, p.464.

[2] Ibid., 2 February 1842, F.M.(2), V, 1842, p.222.

[3] p.89. For Simonds's autobiography see Veterinarian, LXVII, 1894.

PLATE XIX: J. B. SIMONDS.



Source: Veterinarian 1894.

(LXVII, May, 1894)

with important consequences.

The early attempts of the Society to give direction to the veterinary profession were, of course, controversial, given the entrenched position of the College. The veterinarians did not approve of Youatt's attempts to try to unite veterinary science and agriculture, and in 1841 Youatt openly attacked the members of his profession whom he considered obstructive in their wish to withold the 'secrets' of veterinary practice. Yet relations between Youatt and the Society became strained because he disapproved of the terms of the Sewell circular put out under its auspices. Youatt objected to the instruction to bleed and purge rather than to immediately call veterinary help. Spencer seems to have taken credit for this, his intention being to save the farmer the cost of professional veterinary advice. Smith considers that Youatt's repudiation of the Sewell circular (in the Veterinarian) was responsible for the fact that he was ousted from the Council in 1842 and virtually ignored at the Derby meeting of 1843. At this time the extensive pleuro-pneumonia was given little attention by the Society; Simonds was not much interested in epizootic diseases at this stage.[1]

It was not long before the Society again evinced dissatisfaction with the way in which the annual veterinary grant was used. Fisher Hobbs moved another enquiry in 1847, [2] and it was no doubt this which encouraged Simonds to give a lecture to the Society at the General Meeting of 1847 and for Sewell to attend and invite members to visit the College to observe what was done there, although Shaw objected to the way that Sewell ignored

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[1] Smith, III, pp.148-51.

[2] Monthly Council 3 February 1847, F.M.(2), XV, p.218.

the fact that the College was under the receipt of the annual two hundred pounds. [1]

In 1849, Simonds was made an Honorary Member of the Society. He lectured frequently at the country meetings and to the Council. An address on the reproductive organs of animals at York in 1848 was followed by lectures on the digestive organs of the ox and sheep, 'Pleuro-Pneumonia' (Norwich 1849), 'Rot in Sheep' (Exeter 1850), and 'Parasites' (Lewes 1852). At this time, too, the Society made its own attempt to gather information on animal diseases, and the Veterinary Committee drew up a list of queries for any members whose stock was affected by pestilence. These asked for information on the local conditions, the nature of the disease, weather conditions and so forth, and the Veterinary Committee had discretion as to whether Simonds was to be sent to the local areas to inspect the stock. If he was so sent, the Society paid him a professional fee of two guineas, plus another guinea for personal expenses, but the individual member had to pay the travelling expenses involved under normal circumstances. [2]

The late 1840s and early 1850s therefore saw a consolidation of the influence of Simonds within the Society, with his lectures, visits to farms, and inspections of stock at the country meetings. Relations with the Veterinary College itself were less satisfactory. The grant had been put into suspension in 1848 but the following year a committee was formed to again confer with the Governors of the College as to how their 'mutual object' could best be carried out. [3] This led to a renewal of the grant

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[1] Report of General Meeting, F.M.(2), XVII, 1848, pp.62-3. For attacks on the Veterinary College see also pp.312-13.

[2] Monthly Council 7 August 1849, F.M.(2), XX, 1849, p.253.

[3] Ibid., 6 November 1850, F.M.(2), XXII, p.499.

under the condition that the College furnish the Society with an annual report of their proceedings with respect to animal diseases, and that members of the Society could send diseased cattle, sheep and pigs on the sames terms as if they were subscribers to the Royal Veterinary College. [1]

In 1861, the Council pressed for an increased number of lectures from Simonds to the pupils at the College on Cattle Pathology, and requested reports on the animals sent to the infirmary by members. At the same time the general veterinary privileges of members were revised. Provision was made for consultation by Simonds where the case was less serious than would justify the Society paying the fees, and members were also enabled to obtain consultations by letter and post-mortem examinations. [2]

Dissatisfaction with the work of the Veterinary College continued. In 1869 Jacob Wilson again raised the question as to whether the Society was getting value for money from the veterinary grant. [3] The Veterinary Committee concluded that the portion of the grant, fifty pounds, specifically allocated to the College for research into the diseases of cattle, sheep and pigs, (an arrangement entered into in 1862) had not been sufficiently set aside for that purpose and recommended that one hundred and fifty pounds be retained by the Society for that object. More control over the College was sought and the Professor of Cattle Pathology was asked to carry out such experiments as the Society may require. [4] Not much came of this and the general dissatisfaction of the Society with its link with the College reached a new peak of intensity. Little information

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[1] Ibid., 5 February 1851, F.M.(2), XXIII, p.196.
[2] Ibid., 5 June 1861, F.M.(3), XX, 1861, p.5.
[3] Ibid., 18 December 1869, F.M.(3), XXXVII, 1870, p.36.
[4] Ibid., 2 March 1870, F.M.(3), XXXVII, 1870, p.310.

had been received from the College and reports that had been requested on such matters as the working of the Contagious Diseases (Animals) Act, suggested pleuro-pneumonia experiments, an incidence of acorn-poisoning, and an outbreak of splenic apoplexy (anthrax) allegedly due to the feeding of cattle on land irrigated with sewage had not materialised. Dent, Thompson, and others thought that it was time that the Society should take the initiative and have its own veterinary professor. [1] The report of the Committee formed to consider this concluded that the link with the College existed to (i) advance veterinary science by means of instruction afforded to students at the College and (ii) to enable members to obtain best assistance in the case of outbreaks of disease among their stock, which in turn would advance the cause of veterinary science by providing information by way of reports of cases treated. Neither of these objects had been achieved as well as was hoped. The complaint remained that the veterinary surgeons knew plenty about horses but insufficient on cattle, sheep and pigs to inspire confidence, and members had found it difficult to obtain help from the College. More thorough instruction to the students was called for, as well as regular reports from the College, and it was requested that a deputation of Governors should meet with the Society. [2] Not much came of this and according to Thompson the delegation that met the Council in May 1871 did not represent the governing body as a whole. [3] No reply to further communications had been received by November but further consideration was halted by the death of the Principal of the College, Charles Spooner. [4] According to Smith, he had long been 'definitely opposed to every

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[1] Monthly Council 1 March 1871, F.M.(3), XXXIX, 1871, p.317.

[2] Ibid., 3 May 1871, F.M.(3), XXXIX, 1871, pp. 499-500.

[3] Ibid., 7 June 1871, F.M.(3), XL, 1871, p.11.

[4] Ibid., 1 November and 6 December 1871, F.M.(3), XL, 1871, pp.502 and XLI, 1872, p.60.

new idea that did not emanate from himself'. [1]

Simonds was appointed as Principal of the College in succession to Spooner. The College then underwent something of a rejuvenation, with new buildings erected under his direct supervision. Simonds had been calling for radical reforms through the pages of the Veterinarian (which he helped to edit after Youatt's death in 1847) since the early 1850s, and it was Spooner who had resisted these reforms. It is clear, also, that as a result relations between Spooner and Simonds were very strained during the time that one occupied the post of Principal, the other the Professorship of Cattle Pathology. [2] It is in this context that we can appreciate the generally good accord between Simonds and the Society on the one hand, and the continual antagonism between the Society and the College on the other. On his election to the Principalship, the Governors of the College insisted that Simonds give up his position as Veterinary Inspector to the Society, but he continued as Consulting Veterinary Surgeon. The veterinary grant was renewed, but for one year only. [3] At the Half-Yearly Meeting of 1872 the Council was able to report the increased activity at the College and revised arrangements for veterinary services agreed with it. [4]

At the root of the dissatisfaction with the Veterinary College in the 1870s was the attitude of Simonds to the various infecting diseases of animals which were severely affecting the stock of the country. The exasperation arose from his view that there was little more to be discovered on infectious diseases about which he himself knew very little. There were criticisms of the insufficien-

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[1] IV, p.66.

[2] Ibid., pp.87-9.

[3] Monthly Council 6 March 1872, F.M.(3), XLI, 1872, p.349.

[4] Ibid., 1 May 1872, and Half-Yearly Meeting 22 May 1872, F.M.(3), XLI, XLI, pp.512, 551-4.

numbers of experiments carried out at the College and this led to a renewed attempt to terminate the grant in 1875. According to Lord Vernon the arrangement had been 'unsatisfactory for twenty years, ever since he was first connected with the Society'. There were moves to bring in a connection either with the Royal Agricultural College, Cirencester, or the Brown Institution, a research department of the University of London founded in 1871 to enquire into animal diseases. [1]

As a result of these deliberations an annual grant of five hundred pounds was voted to the Brown Institution. The Principal, F. Burdon-Sanderson, undertook to make scientific enquiries into diseases of animals and to advise members with regard to outbreaks of disease. The first project involved the purchase of eight animals which were to be infected with pleuro-pneumonia as the basis of a detailed scientific examination into the disease. Simonds offered to assist with the project and continued as a Consulting Veterinary surgeon in a private capacity. [2]

The pleuro-pneumonia project proceeded slowly because of the prohibition of the movement of infected animals. It was followed by important enquiries into anthrax and liver fluke. Anthrax was the first of all infectious diseases demonstrated to be caused by a specific organism, and continental research in the 1870s had shown how it resolved itself into very resistant spores when conditions were unfavourable for its growth. In this way, a piece of ground could remain infected with the dormant spores over a long period, especially in the cool conditions obtaining in the British Isles.

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[1] Ibid., 3 February, 3 March, 5 May, 2 June, 30 June 1875, F.M.(3), XLVII, 1875, pp.272, 431; XLVIII, 1875, pp.43, 94-5.

[2] Ibid., 4 August, 3 November, 8 December 1875 and 1 March 1876, F.M.(3), XLVIII, 1875, pp.195, 430, and XLIX, 1876, pp.55-6, 279-80.

As a result of the anthrax investigations sponsored by the Society, it became more generally known that the bacterial infection that caused 'splenic apoplexy' could remain buried in the earth, and that inoculation could be used as a preventative measure. The fluke investigations were in response to the severe outbreaks of 1880, a reflection of the prevailing wet conditions, and at this time the complete lifecycle of the parasitical organism which is the cause of 'rot' in sheep (identified by Simonds in 1861) became more understood. [1]

Apart from its not very successful encouragement of veterinary research and teaching the Society was also directly involved in veterinary investigations, the most important of which were Simonds's surveys into the continental methods of inoculation against pleuro-pneumonia and the possibility of the spread of rinderpest into the British Isles (see pp.195-7). The arrival of the latter complaint, or 'cattle plague' as it was generally known, in 1865 was one of the most important agricultural events of the nineteenth century. The control of contagious animal diseases then became one of the most vital aspects of the 'veterinary problem' and we may now turn our consideration to the Society's attitude to the suppression of animal disease by legislative means and its contribution to the development of public policy on this question.

As we have seen, Simonds's conclusions as to the likelihood of the spread of cattle plague into the British Isles were essentially reassuring. Although lacking in great ability, his opinions as Professor of Pathology and the Society's Veterinary Officer carried a good deal of weight. Any

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[1] Monthly Council 5 May, 2 June 1880, F.M.(3), LVI, pp.168-9 and LVII, pp.28-9. See also 'Practice with Science', Ibid., pp.430-1; A.P. Thomas,'Report of Experiments on the Development of Liver-Fluke (Fasciola Hepatica)', Journal (2), XVII, 1881, pp.1-29; W.S. Greenfield, 'Report on an Experimental Investigation on Anthrax and allied Diseases made at the Brown Institution', Ibid.,pp.30-44. A new arrangement was entered into with the Royal Veterinary College in 1879.

restriction on cattle importation, that the theory of foreign origin of cattle diseases would seem to imply, was likely to be interpreted as a back-door reimposition of agricultural protection, so Simonds's conclusions were well-received by numerous vested interests.

There was another view. In 1857 John Gamgee, chief protagonist of the 'germ theory' of disease, had opened his 'New Edinburgh Veterinary College' in opposition to the established Edinburgh College presided over by Professor Dick and which was as moribund as its London equivalent. Gamgee had an outstanding and original mind, and at that time led a crusade against the then prevalent practice of trading in diseased meat. [1] Gamgee's was the most eloquent voice in opposition to the Simonds' 'establishment' view that the country was safe from cattle plague. In 1862 he was appointed by the Privy Council to conduct an enquiry on the subject of 'Cattle Diseases in Relation to the Supply of Meat and Milk', special markets for foreign stock and a system of veterinary inspection of animals for market. This did not find much support in government circles, although his fears had a sympathetic hearing from Sir George Grey, Home Secretary, and Earl Russell, then President of the Council. Among the Council of the Royal Agricultural Society, Edward Holland readily accepted Gamgee's opinion.

In 1863 Gamgee convened a congress of leading veterinarians at Hamburg and returned home convinced of the imminent danger of the importation of cattle plague by virtue of the improvements in land and sea communications.

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[1] On this, see particularly Richard Perren, The Meat Trade in Britain 1840-1914, 1978, pp.50-68. On the distinguished Gamgee family, see Ruth D'Arcy Thompson, 'The Gamgees - Medical and Veterinary', Veterinary History, III, 1974, pp.3-7. Gamgee's College moved to London in 1865 as the 'Albert Veterinary College Limited' but failed three years later.

He warned against this danger in prophetic letters to The Times in 1863 [1] but failed to alert general public, and farming, opinion on the matter. Edward Holland in 1863, and Sir George Grey the following year, were not able to obtain sufficient parliamentary support for their proposed Diseased Cattle and Cattle and Meat Importation Acts which provided for controls more stringent than opinion was at that time ready to accept. The Society as a body was essentially on the sidelines in the matter, for Gamgee's opinions were at so much variance with those of its own veterinary authority (Simonds), and additionally, the measures that Gamgee advocated required legislation and the provisions of the Society's Charter were then adhered to so rigorously as to preclude discussion on such issues even if they had been considered necessary.

The first [2] outbreak of cattle plague occurred in the metropolis towards the end of June 1865. It is generally accepted that the disease was brought in among a cargo of cattle shipped from Revel to Hull thence transported to London. A local veterinary surgeon called in Simonds on 4 July who reported

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[1] 10 and 13 November 1863, quoted in Animal Health. A Centenary, 1966, pp.13-14, from which the information on the legislative enactments on cattle disease has been drawn; pp.125-34 of this volume deals with cattle plague, also published as Sherwin A. Hall, 'The Great Cattle Plague of 1865', Agriculture, 72, 1965, pp.484-4, and British Veterinary Journal 122, 1966, pp.261-4. On the general background to animal disease legislation see Idem, 'The Stimulus for the Statutory Control of Animal Diseases in Great Britain', Veterinary History, VI, 1975-6, pp.3-12. Gamgee's position has been put in perspective by John Fisher, 'Professor Gamgee and the Farmers', Ibid., (N.S.),I, 1979-80, pp.47-63. Gamgee abandoned veterinary science in 1868 and turned to research in low-temperature physics in North America. He was later responsible for the opening of the first ice-skating rink ('The Glaciarium' in Chelsea).

[2] Rinderpest had been prevalent between 1745 and 1757.

to the Privy Council six days later that cattle were dying. Despite his elaborate disavowal in his autobiography, it seems very probable that Simonds initially failed to recognise the cattle disease, which was not correctly diagnosed until the end of the month, possibly by Gamgee himself. [1] As to the confounding of Simonds's prediction that cattle plague would not reach the British Isles, made by him so confidently only eight years earlier, his explanation was that he never contemplated that the cattle trade would expand to the extent that the disease would be directly imported from the Baltic ports, and that his confidence had been with the measures taken in Germany and Belgium to halt the spread of the scourge across country. [2]

By virtue of the initial delay in diagnosis the disease spread rapidly; by 24 July there were eighty-two centres of infection and the Privy Council issued the first of several orders under the Act of 1848 which had been originally designed to deal with sheep-pox. This order provided for the appointment of twenty-one veterinary inspectors for the metropolis, under the direction of Simonds. Further orders increased the number of inspectors and made provision for them to operate in parts of the country away from London. Many of the inspectors were unqualified and quite unable to furnish the sort of report and advice required. As it was their unqualified opinion which could arbitrarily lead to the compulsory slaughter (without compensation) of stock thought to be diseased, incidences of cattle plague were often concealed and the disease continued to spread rapidly. Partly in response to this a 'Veterinary Department' of the Privy Council with Dr. Alexander Williams, an Edinburgh medical graduate, as its first Secretary, was created on 14 October 1865. In the same month a Royal Commission was appointed

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[1] Smith, IV, pp.100-02; Animal Health, pp.16-17.

[2] 'Autobiography', Veterinarian, LXVII, 1894, p. 742.

to investigate the origin, cure, and prevention of the disease. Its first report was published on 11 November but there was no uniformity of opinion as to the most appropriate measures to adopt; a second report in the February of the following year was little more helpful. At the end of that month, however, the Cattle Disease Prevention Act received Royal Assent, having been rushed through Parliament in a week, and its stringent provisions had an immediate impact on the incidence of cattle plague. [1]

With this brief outline in mind, we may now turn to the part played by the Society in these developments, especially with regard to the evolution of public policy. Here, it must be stated at the outset that the Society was slow to become involved in the question and the impression given by Scott Watson that the legislation passed on 20 February 1866 (which was to prove the turning point in the fight against the disease) was the result of pressure from the Society, so that, by implication, the Society was at the head of affairs in the matter, is incorrect. [2] The sequence of events was as follows.

Early in the crisis a Standing Committee was formed by the Society to keep in touch with developments and a circular was issued to members on 30 August 1865 which urged co-operation with the various government orders that had been issued. This circular deplored the continued trade in diseased stock, advised against purchase of store animals in markets and fairs, and suggested that newly obtained animals should be subjected to quarantine for up to fourteen days. Further, warning was given that no person in charge of sick animals be allowed to go near healthy ones and that all sheds, stables, straw, and manure be thoroughly disinfected if in contact with

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[1] Animal Health, pp.15-23.

[2] Cattle Diseases Prevention Act; History of the Royal Agricultural Society of England 1839-1939, p.111.

diseased stock. The circular also gave details of the symptoms of the most important cattle diseases - pleuro-pneumonia and foot-and-mouth as well as cattle plague. In November, Earl Cathcart proposed that Voelcker (the Consulting Chemist) should give a lecture on disinfectants. All this was useful enough, but it could hardly be said that the Society was giving a lead in the developing crisis. The Royal Commission issued an interim report (31 October 1865) advising the abandonment of the slaughter policy, which was dropped in a Consolidated Order of 23 November. The Commission advocated the curtailment of the inland movement of live cattle, but this was opposed at that time by the agriculturists on the Committee (including C.S. Read) as an impracticable measure. Some control of movement was vested in local authorities (in place of slaughter), but this was inefficiently applied and the final weeks of the year saw an acceleration in the number of cases reported. [1]

Concerted action on the part of the Society did not take place until the December Council Meeting when Charles Randell moved that a deputation be arranged to meet with the Lord President of the Council. This meeting took place the following day (7 December) when it urged the cessation of all fairs and markets, or severe restrictions on the live animal trade, slaughter of foreign animals at the point of disembarkation, no movement of animals on public roads from any farm that had suffered from the disease within two months, uniformity of the regulations throughout the country, and government-sponsored experiments on an extensive scale to ascertain the true nature of the disease. [2]

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[1] 'The Cattle Plague'; Monthly Council 1 November 1865, F.M.(3), XXVIII, 1865, pp.321-2, 450, 499-508; Animal Health pp.131-2.

[2] Monthly Council 6 December 1865, F.M.(3), XXIX, 1866, pp.50-1.

The Society's deputation must be seen in the context of parallel developments. A deputation from the London Farmers' Club had met Sir George Grey (Home Secretary) on 27 November and urged severe restrictions on cattle movement, including the prohibition of all foreign imports. Cattle were to be allowed to be sent alive to market, so long as they were slaughtered immediately. [1] At the same time, a meeting had been advertised for 14 December at St. James's Hall for the purpose of adopting some means of arresting the cattle plague. This had been got together by the Wakefield Farmers' Club (and the initiative of Charles Clay) and was attended by the representatives of nearly one hundred local associations. This meeting generally supported the Royal Agricultural Society's resolutions, although there were criticisms that the Society had been slow to take up the matter. [2] In fact, it can be seen that it was the London and Wakefield Farmers' Clubs which galvanised some action of a positive nature on the part of the Society after a delay of four months.

Another deputation was agreed to early in February 1866 and this urged more stringent action upon Earl Russell. This deputation, led by Lord Walsingham, advocated such measures as compulsory slaughter with compensation, prohibition of the movement of straw or manure which might be infected , slaughter of imported cattle at the point of importation, and a ban on live internal movement, to the effect of turning ordinary cattle markets into dead meat markets. [3] It is important to note in assessing the Society's role here that the deputation took place on the

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[1] 'Deputation to the Lords of the Privy Council', F.M.(3), XXIX, pp.68-9.

[2] 'The Cattle Plague', (Report of St. James's Meeting 14 December 1865) Ibid., pp.73-4.

[3] Monthly Council 7 February 1866 and 'Deputation to Lord Russell', Ibid., pp.240-2.

very day (12 February) that legislation was introduced in Parliament by Sir George Grey. Thus the Society was one step behind the developments, although the legislation was broadly in accord with the Society's resolutions. In making the case for a rigorous slaughter policy much more was owed to the efforts of Albert Pell than the Society. Pell was part of a deputation from the county of Leicester that met with Russell five days before the meeting with the Royal Agricultural Society, and Pell also instituted a national conference (again at the St. James's Hall) held on 8 February. It was this that impressed upon Grey the necessity of the slaughter policy, which was then part of the Cattle Diseases Prevention Act which received the Royal Assent within a week.[1]

The rigorously enforced stringent measures led to a rapid diminution of the incidence of cattle plague recorded during the remainder of the year:

Table XIII ; Incidences of Cattle Plague, 1866

Week ended 20	February	1866:	17,875	cases.
4th week	April	" :	4,442	"
" "	June	" :	338	"
" "	December	" :	8	" [2]

There were sporadic cases recorded in 1867 but the country was officially considered free from the disease in the September of that year.

It is not difficult to appreciate the initial resistance to the slaughter policy. When the disease first became widespread agriculturists were offered all sorts of 'cures', including arsenic, sulphuric acid, hemp-oil, and lime-

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[1] Thomas Mackay, ed., The Reminiscences of Albert Pell, 1908, pp.198-202; T. Duckham, 'The Progress of Legislation against Contagious Diseases of Livestock', Journal (3), IV, 1893, p.270.

[2] Scott Watson p.112; slightly different figures are given in Animal Health p.23. This authority (p.134) states that the rapid diminution of the disease was due to the effectiveness of legislation and not to a natural decrease after Farr's Law.

water. Bi-carbonate of soda had its advocates, to be applied by pouring soda-water down the infected animal's throat. The theory that spontaneous origin was occasioned by excessive heat had its adherents, and this implied that there was no necessity to interfere with the cattle trade and the 'liberty of the subject'. [1] Certainly it is understandable that the owners of infected herds should have hankered after a 'cure' rather than submit their animals to the pole-axe.

The Royal Agricultural Society did not come out of the episode very well. The tardiness with which it took up the matter was due to its inhibition over involvement in 'political' issues and which, as we have seen (pp.117-8), led to the formation of a new organisation, the Central Chamber of Agriculture with its local branches. Corbet, in particular, expressed great bitterness about the part played by the Society in the crisis. With considerable justification he attacked the fact that the second part of the Journal for 1865 contained no reference to cattle plague. [2] The frustration felt by many agriculturists over the way in which the Society's Charter inhibited the formulation of policy on the cattle plague, and which was apparent in lectures given to the Society by Simonds and Cathcart in 1866, was expressed by Corbet in a lecture to the London Farmers' Club on 'The Cattle Plague and the Government Measures' in the following terms:

> The idea of a number of influential agriculturists gathered together to talk over the cattle plague without, however, venturing to touch upon the means employed to subdue it, is so sorry a joke that I do not believe after-ages will ever credit its occurrence.

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[1] See 'The Cattle Plague and its Origins', 'Causes of the Cattle Plague', 'On the Cattle Plague - its Origin, Prevention, and Cure', and 'The Cattle Plague - The Government and the Veterinary Surgeons', F.M.(3), XXVIII, 1865, pp.374-6, 377, 397, 482-3.

[2] 'The New Part of the Royal Agricultural Society's Journal, The Cattle Plague', Ibid., pp.259-61.

Corbet also had harsh words for the 'uselessness of the veterinary profession' in general, and Simonds who 'did not like interlopers' in particular. In time, however, it was generally accepted that the veterinary opinion that there was no 'cure' was correct, although Corbet's 'interlopers' observation was not without justification. [1]

The experience of the 1866 Act led to further legislative enactments to deal with contagious animal diseases in 1867 and 1869. The latter legislation was much more comprehensive as it extended powers to cover diseases other than cattle plague, it having been found that isolation and restrictions in transit with respect to cattle plague had also reduced the incidence of pleuro-pneumonia. In the 1870s the Society was rather less inhibited on the question of animal disease legislation and it played a more active and positive role in the evolution of policy, although its voice was, of course, only one among numerous others. Cattle plague was recorded in 1872 and 1877, again imported via Hull and London. Rigorous implementation of the 'stamping out' policy restricted the incidence to a total of only 1,341 cattle, [2] but the effectiveness of these measures encouraged agriculturists to press for legislation to cover pleuro-pneumonia and foot-and-mouth disease.

Between 1869 and 1872 there was a serious increase in the number of foot-and-mouth cases recorded, which totalled 52,164 in the latter year. [3] The Society voted funds of one hundred pounds towards an investigation into the causes of the periodic

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1 F.M.(3), XXIX, 1866, pp.304, 307-8. See also M.L.E., 22 January and 5 February 1866.

2 Animal Health, p.134.

3 Ibid., p.136.

outbreaks, and Col. Kingscote moved for a deputation to meet the Privy Council to urge it to use every power within its means to control the disease. The deputation, received by W.E. Forster, Vice-President of the Privy Council, stressed the part played by the importation of Irish cattle in causing outbreaks of the disease and the fact that many large towns did not enforce the regulations that did exist with sufficient stringency. Forster, in reply, pointed out that foot-and-mouth was one of those diseases which was serious enough to cause considerable damage but not bad enough to allow the imposition of strong precautions of the type that had been justified by the cattle plague. Forster maintained that it was impossible to treat Ireland as other than part of the United Kingdom for the purposes of regulations of the cattle trade. In addition, he stressed that meat was very dear and that Government regulations pressed very heavily upon the importation of stock, 'to lead people to the inference that the Government made meat dear'. [1] Forster invited the Society to make written suggestions, and to this end the Secretary, H.M. Jenkins, undertook an extensive survey into the trade in animals during the summer and autumn of 1872. The Society's Cattle Plague Committee considered Jenkins's detailed recommendations as a result of which they were able to put twenty-five resolutions to the December Council. These recommendations included the extension of powers which existed for cattle plague and pleuro-pneumonia and foot-and-mouth, detailed instructions for the cleansing and disinfecting of the means of transit of cattle and lairs and yards at markets, ports, and railway sidings, with adequate provision of food and water, that cattle dealers be licensed, that sheep and cattle should not be carried in the same truck, that there should be a proper system of inspection

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[1] Monthly Council 3 July 1872, F.M.(3), XLII, 1872, pp.125-7.

by the Privy Council, that there should be uniformity in the regulations, that in cases of cattle plague there should be a power of slaughter over animals in adjacent fields, and that there be no relaxation in the prohibition of importation of animals from Russia or from countries trading with Russia so long as cattle plague existed there. The same meeting noted the outbreak of cattle plague in the East Riding of Yorkshire and an increase in the number of cases of pleuro-pneumonia. A tendency to conceal cases and 'treat' the diseases were reasons put forward for the continued prevalence of the disease. [1]

A Select Committee [2] concluded in 1873 that the enactments required to exterminate foot-and-mouth would be so strong as to be impossible to carry out and recommended that the Privy Council should cease making orders for the check of the disease. [3] This led some members of the Council to again lay its recommendations before the Government. The report of the Select Committee was taken as 'not the opinion of agriculturists' but it is important to note that even within the Council of the Society there was no uniformity of opinion over the sort of powers which were necessary over diseases other than cattle plague. J. Dent Dent, who had been a member of the 1873 Select Committee, was not in favour of restrictions or slaughter for foot-and-mouth or pleuro-pneumonia, and it was decided in 1874 to send another deputation to the Privy Council on the matter only by the narrowest of margins -fifteen votes to fourteen. [4]

This further deputation was essentially a re-affirmation of the proposals that had been put to the Privy Council in December 1872 as a result of

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[1] Monthly Council 11 December 1872, F.M.(3), XLIII, 1873, pp.50-2.

[2] B.P.P., XI, 1873, pp.189-976.

[3] Duckham, p.273.

[4] Monthly Council 6 May 1874, F.M.(3), XLV, 1874, pp.307-8.

Jenkins's report. The deputation considered that there was too much stress placed by the Select Committee on the impossibility of 'stamping-out' animal diseases without very stringent measures, and that too much account had been taken of the evidence of the cattle dealers.[1] As a result of this deputation, foot-and-mouth again was made a notifiable disease.

Legislation on cattle disease continued to be governed by the Act of 1869 which allowed free importation, with powers for the Privy Council to issue orders to prohibit trade, of subject cattle to quarantine or slaughter as was considered necessary. The Society objected to the permissive nature of the measures, which vested control in local authorities. At the root of the difficulty lay the difference in attitude between county and borough authorities. In general, the latter evinced a high degree of antipathy toward the measures which were viewed as an hindrance to internal trade and a cause of the high cost of meat.

It took a third out-break of cattle plague, in 1877, to bring about further legislation. The Council continuously debated its views during the first part of the year. There was a body of opinion which wanted the immediate cessation of the importation of all live cattle, although the majority view was that the governement at that time was unlikely to agree with such an extreme measure. Jacob Wilson argued for slaughter at the point of export, rather than at disembarkation. Cathcart and others opposed this on the grounds that it would cut off the supply of offal, on which many of the poor were dependent, as it would not stand the cost of transportation over long distances. There was general dissatisfaction with the operation of the Contagious Diseases (Animals) Act 1869 which was considered to be too

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[1] Monthly Council 3 June 1874, F.M.(3), XLVI, 1874, pp.33-6.

permissive and led to too many variations in the implementation of the regulations by the local authorities. But the owners of stock were also at fault, as many did not enforce the power of prohibition of entry to their farms vested in them by the Act. Many still held to the atmospheric theory of contagion, that 'most unfortunate of all delusions' whereby it was held that cattle disease was brought in 'by the air'. As Simonds pointed out, many owners sent stock to market after they had been in contact with the diseased animals, and many local authority inspectors were not well versed in the regulations. In general, there was strong advocacy of slaughter, isolation, and total prohibition of the importation of foreign livestock. A deputation from the Council, in conjunction with the Shorthorn Society, met with the Duke of Richmond at the Privy Council in April, 1877, and was successful in obtaining an Order in Council (16 April) which provided for restriction of movement in Middlesex and the Metropolis and also halted the conveyance of manure out of London. [1]

A new Select Committee was convened and particular emphasis was placed on the cattle importation question in its brief:

> to inquire into the causes of the recent outbreak of cattle plague and the measures taken for its repression; and into the effect that the importation of live foreign animals has upon the introduction of disease into the country and upon the supply and price of food.

This time, the Society was well organised in pressing its own views upon the Committee. A 'Cattle Plague Evidence Special Committee' was formed [2] and Kingscote, Booth, Wilson, and Jenkins gave great assistance with the evidence heard, with daily attendance at the House of Commons. The

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[1] Monthly Councils 7 February, 7 March, 11 April, 2 May, 1877, F.M.(3), LI, 1877, pp.193-6, 279-83, 314-7, 388-90.

[2] Ibid., 4 July 1877, F.M.(3), LII, 1877, pp.121.

effort put in by the Society on the issue at this time was recognised in the congratulations offered to the Society by C.S. Read at the December General Meeting. [1]

The Act of 1878 which came out of the Select Committee's recommendations made greater provision for slaughter and increased compensation, which was to be paid for centrally in the case of cattle plague but out of local funds in the case of pleuro-pneumonia. There was to be prohibition of importation of all animals from Russia, and of cattle from Germany (except Schleswig-Holstein) and Belgium, with powers available to the Privy Council to make further prohibitions as was thought fit. The Committee was of the opinion that there should be no further restriction on the importation of foreign animals with respect to foot-and-mouth disease and pleuro-pneumonia, unless there was prohibition of movement in districts declared to be infected within the country, the limits of these districts to be fixed by the Privy Council. These provisions went some way in meeting the requirements of agricultural opinion and there was particular approval of the principle of the isolation of infected districts, despite bitter criticisms that the original proposals had been weakened during the passage of the Bill through Parliament. [2] The Society was strongly criticised by the Duke of Richmond for promoting the international stock exhibition at Kilburn in 1879 which, with some justification, he thought was inconsistent with their insistence on the cessation of international trade in livestock, although the Society had always maintained (and this was a provision of

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[1] F.M.(3), LIII, 1878, p.60.

[2] 'Cattle Disease Orders of 1878' and 'The Contagious Diseases (Animals) Act, 1878', F.M.(3), LIV, 1878, pp.159-60, 253-4, (from M.L.E., 2 September).

the Act) that stock could properly be brought into the country for 'special' purposes if subject to a full period of quarantine. [1]

The 1870s therefore was a period when the Society made a direct contribution to the development of policy on the control of cattle diseases although its failure to act at the time of the first outbreak of cattle plague contributed to a serious weakening of its position in the agricultural community. There were great difficulties in the way of a sound and coherent policy - many agriculturists resented the restrictions and interference implied by the regulations - while government did not view with enthusiasm any restriction in international trade in animals which led to the charge of back-door protectionism. The Society's voice was only one among many, but the Privy Council certainly came to regard it as the most influential and important expression of agricultural opinion on a very complex matter.

The Chemical Committee and the Consulting Chemists

Lyon Playfair was appointed as Consulting Chemist to the Society in 1843, being succeeded in 1847 by J.T. Way (who was the first Professor of Chemistry at Cirencester) when Playfair's increasing scientific commitments made it impossible for him to devote the requisite amount of time to the Society's affairs. Way resigned rather abruptly ten years after his appointment for reasons which are not entirely clear. In return for thanks tendered for his efforts at the half-yearly meeting of 1855, he had stated that he had 'but one interest, which was that of the Society. His whole life was mixed up with the Society...' [2] Yet shortly after this his resignation

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[1] Monthly Council 11 December 1878, F.M.(3), LVI, 1879, pp.4-5.
[2] F.M.(3), IX, 1856, p.8.

was tendered.[1] Way suffered from ill-health - his resignation letter came from Milan where he was undergoing convalescence - but he soon returned to public life. It has been suggested that he found undue pressure put upon him by the Society to complete his papers and reports in haste.[2] Certainly Sidney announced that he was glad that Way had resigned, on the grounds that if the Society was going to maintain a chemist it was 'absolutely necessary' that he should 'do something for his money'.[3] Generally, however, Way seems to have been very popular among the body of members. Morton considered that the Society at that time owed much of its reputation to the labours of its chemical officer.[4] Way was a very good lecturer and had high popularity among the ordinary tenant farmers; hence it was deplored that the Society had given 'their old ally but a cold good-bye'.[5]

Way was followed by Augustus Voelcker (who had succeeded him at Cirencester) and who was also Consulting Chemist at the Bath and West Society. Voelcker resigned from Cirencester in 1863 (along with the other academic staff over an internal disagreement with the new Principal) and set up a private practice in London. Here he did much of his work for the Society, which did not take steps to maintain its own laboratory until 1878. At first, Voelcker does not seem to have made a very favourable impression, and he was compared to his disadvantage with Way. His first lecture was not well reviewed by the Farmer's Magazine, for example, and his speaking style was said to be 'rambling and illogical'.[6] This assessment soon changed, however,

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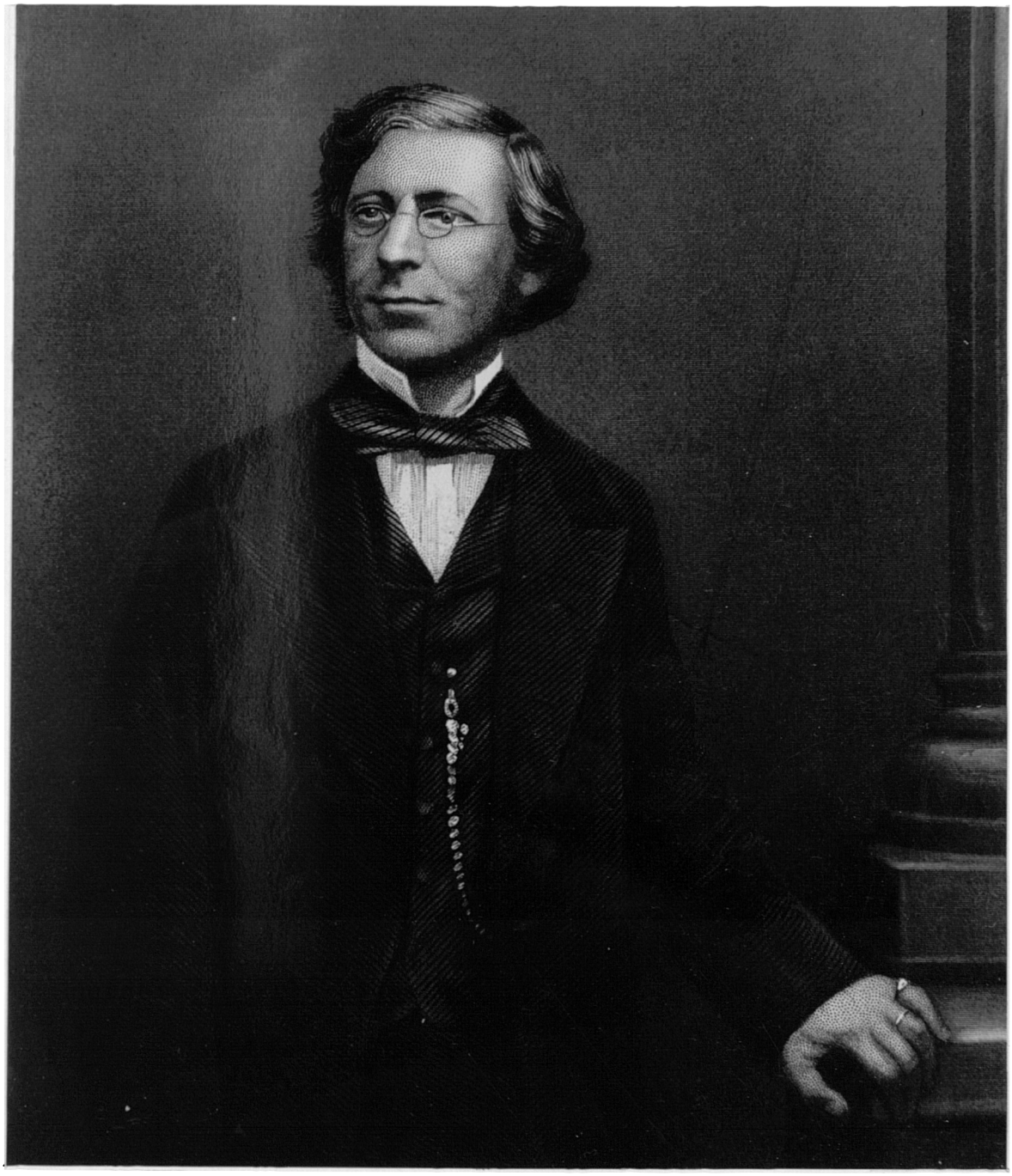
1 Monthly Council 2 December 1837, F.M.(3), XIII, 1858, p.66.
2 Lynette J. Peel, p.17.
3 At the Half-Yearly Meeting 1857, F.M.(3), XIII, 1858, p.73.
4 A.G., 13 February 1858.
5 'The Royal Agricultural Society - Proceedings in Council', F.M.(3), XIII, 1858, p.495.
6 Ibid.

PLATE XX: AUGUSTUS VOELCKER.



Source: Farmer's Magazine.

(3rd Series, XXXVI,
July, 1869)

and Voelcker's appointment inaugurated a most fruitful phase in the Society's work. He became extremely popular with the agricultural community, an eloquent testimony to his acceptance being his election as President of the Farmer's Club in 1874. At his election, C.S. Read maintained that in future ages the name of Dr. Voelcker 'would be coupled with Mr. Lawes in connection with the advancement of agriculture'. According to Read, who later expressed great reservations as to what science could accomplish for agriculture, Voelcker was a

> ... model agricultural chemist. He did not dogmatise, he did not theorise, he did not make theory a tyrant in agriculture, but let science and practice go hand in hand.

No man 'ever more happily united "Science with Practice" '. [1]

The other leading agricultural chemists - Way, Lawes, Nesbit - shared these characteristics. They carried out long, painstaking, laborious investigations but did not make exaggerated claims for their work or what science could achieve for agriculture. They respected the opinions of farmers and as they lectured widely to local meetings they had an important role in raising the general level of knowledge of the scientific basis of farming. As Dixon stressed, farmers were quite prepared to go to a lecture delivered by Voelcker whereas they would not read a Journal article on the same topic. [2]

The Society's Consulting-Chemists had two-fold duties. The first was

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[1] Farmer's Club Dinner Report, M.L.E.,14 December 1874. See also memoir of Voelcker in F.M.(3), XXXIV, 1869, p.3.

[2] 'Royal Agricultural Society', Gentleman's Magazine (N.S.), III, p.304. See also 'The Modern Professor', F.M.(3),IX, 1855, p.414.Voelcker was a native of Frankfort-on-the-Main and studied at the University of Göttingen where he took the degree of Doctor of Philosophy in 1846. He went to Edinburgh the following year at the invitation of J.F.W. Johnston and was appointed to the Cirencester professorship in 1855. He continued as Consulting-Chemist to the Royal (and the Bath and West) until his death in 1883 when he was succeeded by his son J. Augustus Voelcker.

to carry out investigations into aspects of the chemistry of agriculture, either on their own initiative or on the direction of the Chemical Committee. The Consulting-Chemists received a retainer from the Society and fees for the analyses that they performed. Three hundred pounds was allocated as an annual grant for enquiries in 1849. The scientific work of the Society's Consulting-Chemists has been referred to in the section on agricultural science in Chapter III. Way's important work for the Society included research on the absorptive powers of soils and the composition and value of fertilisers and town-sewage. Voelcker carried on with some of this work and also gave particular attention to the chemistry and management of dung-heaps, animal nutrition, dairy chemistry, and the composition of various manufactured cattle-cakes. It was, however, the analytical work of the Consulting-Chemists, especially Voelcker, which was of most interest to the majority of members and it is that aspect of the work that will now be considered.

With the ready acceptance of 'artificial' fertilisers in the early 1840s - which the Society itself had done so much to encourage - came the problem of widespread adulteration in the fertiliser and feeding stuff trade. As early as 1844, at the Southampton meeting of the Society, there were attempts to form an association to protect the farmer against the frauds that were becoming quite general. All the agricultural commodities were open to adulteration of some kind. Common salt was added to nitrate of soda, sand was mixed with guano, bone waste and 'scutch' was imported from Scotland to Hull to be combined with crushed bones and sold to 'simple farmers' as genuine bone-dust. Thus farmers' clubs were advised in the Agricultural Gazette to consult chemists before making purchases of guano.[1]

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[1] A.G., 6 & 20 July 1844.

Adulteration of guano was practiced not at the point of importation or by the consignees - Gibbs & Sons had a British guano monopoly between 1848 and 1861 [1] and Brandreth Gibbs was, of course,one of the principals of this firm - but by local merchants. The background to this was the action of the Peruvian government in forcing up the price because of its extreme financial dependence on guano as a sole export commodity. [2]

The Council of the Society soon responded to the growing complaints arising from the guano trade and the widespread frauds perpetrated on the purchasers of the substance. Pusey compiled a list of merchants known to be involved in fraudulent dealings and this was the background to the facility of chemical analysis brought in for members at competitive rates in 1849. This later developed into a very important part of the Society's work. Further responses included communications with Palmerston (by Richmond on the Society's behalf), on the need for a cheap and abundant supply of guano, and as a result the Admiralty instructed naval captains to search for new supplies of guano in the arid parts of the tropics. The Chemical Committee prepared instructions and queries and, in addition, the Society offered a fifty pound prize for an essay on the geographical distribution of guano which, it was hoped, would aid the search for new supplies. Fisher Hobbs and Shaw also initiated a deputation to request the Government to use diplomatic pressure to effect a reduction in the price of guano. [3]

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[1] W.M. Mathew, 'Peru and the British Guano Market', E.H.R.(2), XXIII, 1971, p.114.

[2] This point is developed by Mathew. See also John Peter Olinger, 'The Guano Age in Peru', History Today, 30, June 1980, pp.13-18.

[3] Monthly Councils 3 March 1847, 1 and 29 May 1849, 10 July 1850, 3 December 1851, 2 June 1852, F.M.(2), XV, 1847, p.376, XIX, 1849, p.553, XX, 1849, pp.74-5, XXII, 1850, p.211; (3), I, 1852, pp.64-5, II, 1852, pp.262-5. See also 'Fraud in Sale of Guano', Ibid.,(2), XV, 1847, pp.559-60 (from M.L.E.) and Annual General Meeting 13 December 1851, (3), I, p.67.

A further response was to offer a thousand pound prize for a guano substitute. This was urged by Fisher Hobbs and his motion, which was readily adopted, was as follows:

> That a prize of £1,000 and the gold medal of the Society, be offered for the discovery of a manure equal in fertilising properties to the Peruvian Guano, and of which an unlimited supply can be furnished to the English farmer at a rate not exceeding £5 per ton. [1]

There was little optimism among commentators that the prize was likely to be awarded. [2] The supply, quality, and price of guano continued to be of great concern to members [3] and no less than one hundred and forty seven entries for the guano competition had been received by the time of the Half-Yearly Meeting in 1854. It was not surprising that the prize was not given despite the numerous claims. It might well be said that in some ways the prize was an absurdity as if a guano-substitute could be developed the reward to the inventor would be such as to make the sum of the prize seem insignificant. Nevertheless it did stimulate a good deal of public debate and prompted serious consideration of the ways in which fertilisers were utilised, and their value. There was interest in fish manure and town-sewage as substitutes, but no effective artificial alternative was found. At the same time, the heightening of awareness of the adulteration problem by the Society's efforts does seem to have led, for a time, to a diminution of the general problem. Thus in his annual report for 1860 Voelcker was able to state that very few adulterated guanos had been brought to his notice and that inferior artifidal manures did not find so ready a sale

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1 Monthly Council 7 July 1852, F.M.(3), II, p.266.

2 'On the Discovery of an Artifidal Manure as Fertilising as Peruvian Guano', Ibid., pp.173-4 (from Gardeners' and Farmers' Journal).

3 See Comments at the General Meetings of 11 December 1853 and 22 May 1854 F.M.(3), V, pp.8-9, 485, and ' The Guano Question', Ibid., pp.272-3, 300, 314-5, 332-3.

as they had done a few years earlier. Of more concern than the sale of inferior guano was the re-crushing of oilcake and mixing with it a proportion of waste before replacing it in the press. [1]

Adulteration again emerged as a problem towards the end of the 1860s. There were several reasons for this. The advance in the price of guano encouraged farmers to buy samples at under the 'goingrate ' and these were nearly always adulterated. In addition, there were many inferior samples of guano sold as some of the best qualities became worked out and that which came from the Guanape Islands was generally not so good as that from the Chincha Islands which had been worked first. Other cargoes were damaged by sea-water in transit. The shortage of fodder occasioned by the dry summer of 1868 led to an increasing demand for feeding-cake and with it the temptation to offer an adulterated or inferior article. Manufactured superphosphate varied very widely, and purchase by analysis was the only way of obtaining value for money. In 1870 the Chemical Committee drew attention to the very poor samples of bone manure analysed by Voelcker and recommended that they be published in the Minutes of the Council. As a result Morton, who had in turn published the report in the Agricultural Gazette, was threatened with legal proceedings. In response to this, the Council determined that it would stand by any report published under its authority, and informed Morton accordingly. [2]

This led to a new phase in the work of Voelcker, the Chemical Committee and, indeed, the Society generally. It was thought that the publication of names and addresses of merchants engaged in the supply of an inferior

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[1] Weekly Council 20 February 1861, F.M.(3), XIX, 1861, pp.149-50.

[2] Monthly Councils 2 March and 6 July 1870 (Reports of Chemical Committee) F.M.(3), XXXVII, 1870, p.310 and XXXVIII p.137.

article would have a deterrent effect. The publication of the results, together with the increasing number of instances of adulteration experienced by purchasers caused a rapid increase in the amount of analytical work carried out by Voelcker for members of the Society:

Table XIV : Number of Chemical Analyses, 1867-1880

1865	312	1870	580	1875	704
1866	335	1871	730	1876	720
1867	341	1872	657	1877	642
1868	432	1873	670	1878	724
1869	465	1874	645	1879	1018
				1880	1201 [1]

The increase in 1879 is a result of the opening of the Society's own laboratory at Hanover Square and the lowering of charges that took place at the same time. In the early 1880s the number of analyses averaged about fifteen hundred each year. As a result of the policy of publication, it was not long before the Society became involved in litigation.

The first case arose from Voelcker's report of August, 1870, in which he condemned a sample of bone meal as sub-standard. In the proceedings that followed it came out that the manure manufacturer named had not claimed that the mixture supplied by him was anything else than that which Voelcker had found it to be - an inferior mixture of bone and bone-waste. It transpired that it had been resold as 'pure' by the manufacturer's agent and for this reason a nominal verdict with costs was given against the Society. The Society was obliged to withdraw their statement which implied that deception had been employed by the manufacturer. Although the verdict went against the Society a moral victory was claimed in that the case helped to

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[1] From the annual reports of the Consulting Chemist given by Gilbert, 'Voelcker', p.316.

expose a practice that was widespread, the representation by agents of an inferior article as 'pure'. [1]

A second case arose out of the publication of the Quarterly Report in the Mark Lane Express of 11 March 1872. It was alleged that the feeding of inferior cake supplied by Ayre and Kidd of Hull to John Wells (a member of the Council) had occasioned the death of cattle. It had been sold as 'best' linseed-cake but Voelcker had found it to be very bad, a 'dirty' linseed-cake containing cotton-seed and the sweepings of corn-warehouses. This was denied, and as trade of the firm was alleged to have fallen off as a consequence of publication, damages of one thousand pounds were claimed. In the course of the proceedings of the case it transpired that the article supplied was termed 'triangle-best linseed-cake' and contained up to fifty per cent sesame seed and bran. It was admitted that some of the cake only had thirty per cent linseed and that this was not put in the advertising circulars; 'we can't put everything in a circular. A baker would not state the number of currants he puts into a cake .' The case went against the Society as it was accepted that the cake had been sold as 'triangle-best' and 'pure' and that it was recognised that such cake would contain a mixture of ingredients. The plaintiffs were awarded ten guineas damages with costs - a derisory fraction of their claim. Although the Society lost this action, a great moral victory was claimed and the second part of the Journal for the year was delayed to contain the proceedings in full. [2]

The consequences of this case were considerable. Perhaps more than anything else the action of the Society and its Chemical Committee in facing the problem

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[1] The case, Bradburn v. Royal Agricultural Society of England, was widely reported See F.M.(3), XL, 1871, pp.15-16, and Journal (2), VII, 1871, pp.465-9.

[2] Special Council 21 August 1872 F.M.(3), XLII, 1872, p.269; 'Kidd v. Royal Agricultural Society of England' Journal (2), VIII, 1872, pp.481-682.

of adulteration restored the links between the Society and the broad base of the agricultural community. Here was a necessary role for the Royal, for only it was equipped to go to law and expose the dishonest commercial practices which were so detrimental to the interests of the agriculturist. C.S. Read - who, as we have seen, had earlier been very critical of the Society - was full of praise for its exposure of the Hull inseed trade. Nothing the Society had ever done had shown so much value to the farmer, and the eseential role of a great agricultural society, Read claimed, was to do for the farmer something that he could not do for himself. [1] Messages of appreciation were received from a number of farmers' organisations, including the London Farmer's Club, the Smithfield Club, the Central Chamber, and numerous local associations and clubs, some of which sent contributions towards the substantial costs that had to be paid by the Society. [2]

Another consequence was the formation of a 'Hull Pure Linseed Cake Association' to regulate the trade. Crushers were required to tell if composite cakes were such and not sell them as 'pure' linseed cake. [3] Not very much came from this Association. For a time 'pure' linseed cake was sold under the Association name but Voelcker found some of this to be inferior quality, containing badly-screened linseed with small weed-seeds and starchy materials. Excuses were made that bin-sweepings had got in accidentally or that the screens were out of order, but although some vendors took sub-standard samples, back, when Jenkins tried to communicate with the Association in 1874, he found it difficult to obtain a reply. Eventually he was informed by a manufacturer that it was a 'fine point' if the Association

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[1] Comments at the Half-Yearly Meeting 12 December 1872, F.M.(3), XLIII, 1873, p.55.

[2] Monthly Councils 11 December 1872 and 5 February 1873 Ibid., pp.51-2, 234.

[3] Advertisements were placed in the M.L.E. Bell's Weekly Messenger, 19 August 187

really did, or did not, exist. In time it became clear that the original officers had resigned and that although there had been some attempt to reconstitute the Association, the whole organisation was not very effectual. As Jenkins pointed out, if the Association had no executive the public were misled by the publication of a trade mark or emblem purporting otherwise. Although Voelcker was able to report a drop in the numbers of sub-standard cake samples sent to him during the year after 'Kidd v. Royal' the improvement was only partial. [1] Inferior cake meant a cost penalty for farmers coming under increasing economic difficulties; in the worst cases it led to deaths of stock. In part, though, the agriculturist was at fault through enthusiasm to buy fertiliser or feeding-stuffs at under the market rate, despite continuous warnings by the Society and other associations.

An answer to the adulteration problem was seen as the encouragement of the farmer to buy fertilisers or feeding-stuffs only by guaranteed analysis. The Chemical Committee gave considerable attention to devising forms of guarantee for various types of fertiliser and cake, but it was difficult to get one to cover all the various circumstances. Forms were drawn up for linseed-cake, rape-cake, decorticated cotton-cake, undecorticated cotton-cake, rice-meal, bones, dissolved bones, mineral superphosphates, compound artificial manures, nitrate of soda, sulphate of ammonia, shoddy, peruvian guano, and refuse manuring matter, asking for a statement of the price per ton, a declaration of purity and, where appropriate, a guaranteed chemical analysis. Detailed instructions were given as to the way in which samples sent for investigation were to be packaged. [2]

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[1] Monthly Councils 2 July and 10 December 1873, 4 February and 1 April 1874, F.M.(3), XLIV, 1873, pp.140, XLV, 1874, pp.81-2, 221-3, 457-9.

[2] Ibid., 6 March 1872 F.M.(3), XLI, 1872, pp.347-9; Journal (2), VIII, 1872, pp.227-240.

The Society's action in trying to educate the farmer not to buy fertilisers or feeding stuffs at under the market rate was strongly supported by the agricultural press who urged the farmer to protect himself by buying by analysis. [1] In particular, mention must be made of the Agricultural Economist, the monthly organ of the Agricultural and Horticultural Co-operative Association founded by E.O. Greening (the Manchester manufacturer of wire fencing). This gave full attention to Voelcker's reports and support for the Society's crusade against adulteration and sub-standard products. 'Deep and heartfelt gratitude' was expressed for the Society's action with regard to the Hull linseed-crackers in 1872. [2] The Association also made bulk purchases of fertilisers and feeding stuffs and made these available to members at concessionary rates. One point of discord between the Association and the Royal came in 1878 when Voelcker condemned as sub-standard a sample of bone-meal supplied by the Co-operative Association. [3] This led to a protest by Greening to the effect that the Society should not make a statement affecting another Association without prior consultation. [4] It transpired that the bone-meal was not up to standard because of an accident in manufacture. The incident does show that under the technological conditions of the time, varieties in quality were likely to occur even without any nefarious intent. Another point was that there was often disagreement on the chemical analysis, even when carried out by expert practitioners. [5]

If the work of the Society and the Co-operative Association does seem to have diminished the cases of gross fraud perpetuated in the 1870s,

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1 'Buying by Analysis', F.M.(3), XXXVIII, 1870, pp.135-6.

2 Agricultural Economist, 1 September 1872.

3 Monthly Council 6 June 1878 F.M.(3), LIX, 1878, pp.37-8.

4 Ibid., p.136.

5 Agricultural Economist, 1 July 1878.

adulteration was still an ever-present problem for the agriculturist; cases were most often encountered by Voelcker where materials were bought at less than the market price or not labelled as 'pure'. In 1876 Jenkins addressed a circular letter to all members and the secretaries of county agricultural societies stressing that cake should only be bought as 'pure' and with guidance as to the minimum acceptable levels of nitrates, phosphates, etc. in 'artificials'. Sulphate of ammonia, for example, was required to have not less than twenty-three per cent of ammonia, and nitrate of soda ninety-four to ninety-five per cent nitrate. [1] This circular seems to have been very much appreciated by members and there is evidence that landlords distributed copies to their tenants. Local associations were also active here. The Cotswold Association, for example, had one thousand copies printed and distributed. [2] Warnings to buy by analysis were not, however, a full answer to the problem. As was pointed out in the Agricultural Economist, for the small farmer an adequate analysis of his purchase might add up to ten per cent to the total cost. For these men to buy by analysis was akin to the doctor in Punch who 'advertised gratis for the poor and then told the washerwoman to give her child unlimited chickens and port wine and take her to Baden-Baden'. The mass of tenants were 'not yet ready for teaching by circular'. The answer of the Agricultural Economist was to buy from co-operatives and it deplored the fact that co-operation was not considered admissible as a topic by the Royal. [3] It is worth noting, however, the rather slow progress made by agricultural co-operation during the 1870s. The Association had complaints to the effect that some of its own prices were ten to twenty per cent above the trade price, but that the published accounts showed very little profit. The answer given

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[1] Monthly Council 1 March 1876, F.M.(3), XLVIX, 1876, p. 49.

[2] Ibid., 5 April 1876, F.M.(3),XLVIX, 1876, p.343.

[3] 1 September 1876.

was that members were getting up to fifty per cent better quality for a fifteen per cent premium on price, but many still preferred a lower price and lower quality. [1] It was not until 1893 that legislation was passed to afford a measure of protection in the purchase of fertilisers and feeding stuffs.

The supply and quality of guano continued to be of particular concern during the 1870s. Reference has already been made to the decline in quality that was becoming apparent to the purchaser as the Chincha Island deposits became worked out and that from the Guanape Islands was substituted. As the price continued to rise, the Society urged that the trade be conducted on the basis of linking price to standard analysis. [2] The Society obtained estimate of the amounts of guano remaining in response to the fears about declining supplies. The best estimate was in the order of seven and a half million tons in 1874. Voelcker analysed a number of different samples submitted by the Admiralty, and he found a very variable nitric acid content. At this time Voelcker pointed to the likelihood of extensive nitrate deposits in southern Peru. In response to the high moisture content in guano samples submitted to him - as much as twenty-five per cent - Voelcker urged treatment with sulphuric acid so that it could be sold as 'dissolved' in a powdery condition by standard analysis. Works were established at the Victoria Dock for this purpose. The main bone of contention was the demand by the Peruvian government for a uniform price regardless of quality and their imposition of an export duty on the cheaper nitrate of soda, and the Society made protests about this. The response of the Peruvian government was to suggest that merchants

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[1] Agricultural Economist, 1 April, 1 July, 1 September, 1 October, 1876.

[2] Monthly Council 11 December 1872, F.M.(3), XLIII, 1873, pp.51-2.

would receive compensation for poor quality which, as the Agricultural Economist was quick to point out, would have been disastrous for the agriculturist.[1] The whole guano problem must, of course, be seen in the context of the chronic indebtedness of Peru and the situation was only eased by political change in that country together with a shift toward the use of Chilean nitrates in the 1880s.[2]

Voelcker's experimental work for the Society was carried out at the Royal Agricultural College at Cirencester until 1865, and after that on experimental plots maintained by his various friends. Much of this work was on the comparative value of different top-dressings and although it did not lead to the establishment of any new fundamentals it constituted a valuable additional body of knowledge on the effects of fertilising substances which was incorporated into popular literature, as in the fertiliser charts published by the Agricultural Economist. In 1875 Charles Randell suggested that experiments should be instituted to ascertain the accuracy of Lawes's figures as the manurial value of the different types of animal food. His interest in this was specifically related to the provisions of the Agricultural Holdings Act of that year which made statutory provision for compensation to outgoing tenants for unexhausted improvements, subject to arbitration. This, of course, was the first fruit of the campaign for tenant-right started by Shaw and Pusey some three decades earlier. Up until that time the Society had shown little interest in maintaining its own

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1 Monthly Councils 11 December 1872, 3 June, 1 July, 9 December 1874, 3 November 1875, F.M.(3), XLIII, 1873, pp.51-2, XLVI, 1874, pp.36, 140-1, XLVII, 1875, p. ; XLVIII pp.429-30. See also ' The Supply of Guano', Ibid., XLV, 1874, p.553; Agricultural Economist, 1 April 1877.

2 W.M. Mathew, 'Peru and the British Guano Market 1840-1870', E.H.R.(2), XXIII, 1970, p.126-7 ; Olinger, ' The Guano Age in Peru', p.17-18.

experimental farm, which might well have been considered valuable additional activity. Indeed, in discussion of Randell's proposal it was said that a 'second Rothamsted' would be beneficial and hope was expressed that 'one day' it would be established. Randell stressed that Lawes's figures needed to be put to a series of practical tests before they were likely to be generally accepted. He envisaged a number of experiments to be carried out by 'practical farmers' and it is interesting that he thought it a great affront when it was stressed that unless experiments were carried out with as much care as they were at Rothamsted, they would be valueless. Randell considered it a severe reflection on the farmers of England that they were not able to carry out field experiments. [1]

A report on Randell's suggestion was produced by the Chemical Committee. Although in favour of experiments to determine manurial values, it was stressed that experiments would need to be thoroughly conducted to be worthy of confidence. Land extending to ninety acres and buildings at Woburn were offered to the Society by the Duke of Bedford. It was proposed that Lawes and Voelcker would draw up a suitable programme to be carried out under their supervision and control. This did not satisfy Randell who maintained that 'practical farmers' knew more about animals and feeding than Lawes and Voelcker. [2] In November, 1876, the Chemical Committee made their own suggestions for the study of the manurial value of different feeding stuffs and when these were not accepted the Committee resigned, although the point of misunderstanding was soon cleared up. [3]

The first plan provided for study of a series of fertiliser regimes on a

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[1] Monthly Council 3 November 1875, F.M.(3), XLVIII, pp.432-4.

[2] Ibid., 5 April, 3 May, 1876, F.M.(3), XLXIX, 1876, pp.343, 421.

[3] Ibid., 1 November, 6 December 1876, F.M.(3), L, 1876, pp.420-23; LI, 1877, p.36.

three-acre plot. This did not please Randell who considered that the proposed experiments were not sufficiently in tune with the original object, the study of the manurial values of different feeding stuffs. [1] Further controversy was generated when a committee, formed to look into the allegedly foul condition of the Crawley Farm (part of the Duke of Woburn's donation) recommended that the manager of the farm be dismissed. As a result of this, Lawes resigned from his association with the project. He considered that the manager, Cathcart, was very unfairly treated. The farm had been received in a weedy state and most effort had been expended on getting the experimental plots into reasonable condition. Lawes's reservations went further than this, however. He claimed that the first results showed that the experiments had not been properly conducted and he attributed this to the fact that they had been done by practical farmers under the direction of scientists residing at a distance. He objected to the experiments being carried out by a new and untrained resident manager and stressed the importance of the care and training needed if worthwhile scientific results were to be accumulated. [2] Thus the start of the Society's involvement with the experimental farm was not very auspicious, but over the next few decades some important experimental work was carried out, particularly on lime loss on light soils, trace elements, and green manuring. The experiments on residual manurial values were inconclusive, but tended to show that they were rather less than had been expected. [3]

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[1] Ibid., 6 December 1876, F.M.(3), LI, 1877, pp.34-5.

[2] Monthly Councils 6 February, 3 April 1878, F.M.(3), LIII, 1878, pp.218, 375; 'The Woburn Experiments', F.M.(3), LVI, 1879, pp.378-80.

[3] J.A. Voelcker and E.J. Russell, Fifty Years of Field Experiments at Woburn Experimental Farm, 1936. See also A.E. Johnson, 'Woburn Experimental Farm: a Hundred Years of Agricultural Research', Journal, 138, 1978, pp.18-26.

The Consulting Botanist

Although it had been urged in the 1850s that a botanical officer would be very useful to the Society [1] nothing was done in this direction until 1871 when J. Dent Dent, then Chairman of the joint Journal and Chemical Committee, suggested that the Society should engage a Consulting Botanist at an annual fee of one hundred pounds. The duties of the botanist were to be the analysis of plants and seeds, with occasional Journal papers. There was also a suggestion that an entomologist should be appointed at the same time, but this was left until Miss Ormerod's appointment in 1881. H.S. Thompson was delegated to fill the new position, and he secured the services of Charles W. Carruthers, F.R.S., chief of the British Museum Botanical Department. [2] At the same time, a Botanical Committee was formed, presided over for many years by Charles Whitehead. Carruthers had been at one time lecturer on Botany at Gamgee's New Veterinary College and later assistant to the Secretary of the Royal Society of Edinburgh; while there he contributed geological articles to the Chambers's Encyclopaedia. He came to the British Museum in 1859 and was appointed Keeper of Botany twelve years later. [3]

The immediate background to Carruthers's appointment was the Adulteration of Seeds Act , 1869. This had been promoted by the Chambers of Agriculture (particularly the Lincolnshire Chamber) to afford some protection against fraudulent practices in the seed trade, analogous to those carried out with fertilisers and feeding-stuffs. Fraud was less widespread in the case of seeds, but prevalent malpractices included the killing of cheap seed (such as German rape) to be mixed with more expensive seed such as turnip or clover. This increased the margin of the merchant, but reduced the value

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[1] A.G., 27 March and 10 April 1858.

[2] Monthly Councils 5 July and 6 December 1871 F.M.(3), XL, 1871, p.11, and XLI 1872, p.64.

[3] 'S.W.C.', 'Mr. William Carruthers', Journal, 70, 1909, pp.3-5.

of the seed to the agriculturist. Another problem was the sale of inferior or old samples of indifferent germination. [1] As it was not known how far the 1869 Act would be successful in its object in improving the seed trade, and as adulteration of seed was an offence, it was felt that there was useful work that could be performed by a Consulting Botanist at the Society.

Botanical services for members included an opinion as to the genuineness and age of cloverseed and turnipseed samples, examination for dodder infestation, determination of species, and reports on plant diseases. Thus much of the Consulting-Botanist's routine work was to prepare reports for members on the purity and germinating power of seed-samples; Carruthers soon had occasion to issue warnings on inferior or mixed clover and rye-grass seed. [2]

The first major project carried out for the Society by Carruthers was in connexion with Earl Cathcart's one hundred pound prize for an essay 'On the Potato Disease and its Prevention'. Ninety-two essays were sent in in response to this, and they were read by Carruthers, Whitehead, and Jenkins. In their assessment on these submissions Carruthers and his co-adjudicators had to report that none of the essays related anything that was new and most referred to theories and remedies that were already well-known. As the essayists were not up-to-date in their botanical knowledge, the prize was withheld. Instead, it was suggested that the funds donated by Earl Cathcart be devoted to an investigation of the life-cycle of the potato fungus and a prize be put up for the development of disease-proof potatoes in both early and late varieties. The Highland and Irish agricultural societies were invited to participate in this project. [3]

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[1] See 'The Adulteration of Seeds Bill', F.M.(3), XXXV, 1869, pp.434-5 and XXXVI, pp.77-9.

[2] Monthly Council 6 December 1871 and 11 December 1872, F.M.(3), XLI, 1872, p.64, XLIII, 1873, p.52.

[3] Monthly Council 5 November and 10 December 1873, F.M. (3), XLIV, 1873, p.511, and XLV, pp.82-3.

As a result of this initiative Professor de Bary undertook a special investigation of that part of the life-history of the potato fungus Phytophthora Infestans that was still unknown and this suggested that potato disease was propagated by infected tubers. W.G. Smith claimed to have discovered the rest-spores of the potato-disease in 1875 [1] but de Bary cast doubt on this discovery in his detailed but inconclusive report to the Society the following year. [2]

The trials of 'disease-proof' potatoes did not yield any worthwhile results. The trials were well organised - the Agricultural Hall Company provided free warehousing for the potato samples sent in and a hundredweight of each type of potato was sent to growers in different parts of the country together with a schedule of questions on climate, soils and matters pertaining to growing conditions. Not surprisingly, however, the trials were unsuccessful. [3]

Another question that occupied Carruthers's attention, for the Society, during the 1870s was the Colorado Beetle. It was urged that the Society should investigate the possibility of this pest being imported into the country, a project which was declined on the grounds of expense. [4] The Society urged the Privy Council, however, to distribute information on the Colorado Beetle in all its stages, not just in the final, easily recognisable form, and general information was distributed to members on injurious insects that could be brought into the country in packaging materials. Too often, any strange insect was reported as a Colorado Beetle and in 1877 the Society undertook to supply all members with illustrations.

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[1] W. Carruthers, 'Note on Mr. W.G. Smith's Discovery of the Rest-Spores of the Potato-Fungus', Journal (2), XI, 1875, pp.396-8.

[2] A. de Bary, 'Researches into the Nature of Potato-Fungus - Peronospora [sic] Infestans', Ibid., XII, 1876, pp.239-69.

[3] Monthly Councils 4 February, 1 April, 4 November 1874, F.M.(3), XLV, 1874, pp.223-4, 409-10, XLVI, pp.427-8.

[4] Monthly Council 6 December 1876, F.M.(3), LI, 1877, pp.37-8.

Throughout this period Carruthers continued to furnish reports which related his findings on seed samples sent to him. This work was more limited than that of the Consulting Chemist - Carruthers had to perform only sixty analyses in 1877 which was itself an advance on previous years. Towards the end of the 1870s adulteration of seeds seems to have increased, more particularly in large towns. Cases of defective seed were reported where they were mixed with too many weed seeds or had failed because they had been harvested too early. Experiments were instituted in 1876 on the longevity of seeds (Brandreth Gibbs supplied samples) and there was some attempt to improve strains of barley, oats, and wheat. This had been suggested by T. Bowick at the Annual General Meeting of 1877, but it proved difficult to determine how this should be done. The Society put up prizes for new varieties of wheat in 1878 but nothing came of this particular project. [1]

Carruthers continued as Consulting Botanist until 1909. In the 1880s and 1890s much valuable work was done to improve the seed trade (with guarantees of germination obtained from the leading seed merchants) and investigations carried out, some at Woburn, on the improvement of pasture grass and on plant diseases and parasitism. [2]

Agricultural Education

At the General Meeting of the Society held on 9 December, 1863, J.C. Morton put a direct question as to why nothing had been done by the Society with regard to the seventh of its stated objects viz: 'To take measures

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[1] Monthly Councils 6 December 1876, 12 December 1877, Report of General Meeting 1877, Monthly Council 6 November 1868, November 3 1880, F.M.(3), LI, 1877, pp.37-8, LIII, 1878, pp.54-5, 61, LIV, pp.395-6, LVII, 1880, pp.385-6. See also ' The Royal Agricultural Society and the Improvement of Cereals', Ibid., LIV, 1880, pp.44-5.

[2] 'The Botanist's Work 1871-1909', Journal, 70, 1909, pp.5-12.

as may be deemed advisable to improve the Education of those who may intend to make the cultivation of the soil their means of livelihood'. [1]

This question was not altogether unexpected, for Morton had paved the way in a series of editorials in the Gazette in which he complained that the Society had not encouraged agricultural education over the years. [2] The answer of the Society to this criticism was that the broad education objectives were achieved by means of the annual shows and the publication of the Journal. This was true enough, but Morton was looking for rather more; the 'professional' education of the sons of farmers in a formal, systematic way, and he was certainly correct in his claim that this had never been taken up by the Society.

The topic had often received attention in the agricultural press, particularly during the 1840s. Indeed, in his encouragement of the Farmers' Club movement William Shaw put great importance on raising the intellectual level of the general body of agriculturists, while the maintenance of agricultural libraries and the stress on lecture and discussion meetings was seen as a means of 'self-help' in education in the absence of any formal provision.

It was the perceived need for this that led to the establishment of the Cirencester Agricultural College in 1844, which had been encouraged by the local Farmers' Club. [3] Tenant-farmers had been enthusiastic supporters of the proposal which was brought to fruition through the efforts of such visionaries as Earl Ducie (hence Morton's interest), Edward Holland and

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1 F.M.(3), XXV, 1864, p.5.
2 A.G., 23 February, 29 June, 1861.
3 M.L.E., 29 April 1844.

Philip Pusey, who took the Chair at a meeting which forumlated the plan for the College at Southampton; Lord Bathurst endowed the Cirencester foundation with a farm of four hundred acres and liberal subscriptions were readily received. Although most of the leading supporters of the College were prominent in the Society's affairs, it was entirely independent of the Society from the outset. The Duke of Richmond made it clear that he supported that project as an individual and not as a member of the Royal, as he considered it as being outside the immediate objects of the Society. [1]

It cannot be said that the early years of the Cirencester College altogether fulfilled the expectation of the founders (Pusey had warned against proceeding with the project too readily) and the project soon ran into problems. To begin with, students had been housed in the town where they had been subject to certain 'temptations' and it appeared that these pupils were so badly grounded in general education that they were ill-prepared to receive the specialised courses given at the College. Early in 1847 the feeling was expressed that the College had opened too quickly with insufficient thought as to how it should be run. [2] Changes included the raising of the age of entry to sixteen and an increase in the fees which, at sixty pounds, were too expensive for most tenant farmers, and thus it was the wealthy who sent their sons to the College which was consistently under-subscribed. The importance of Cirencester in its early years was as one of the few independent centres of agricultural investigation and research. In 1863 most of the distinguished academic staff, including Augustus Voelcker and G.T. Brown

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[1] M.L.E., 29 July 1844 (Report of Meeting at Southampton to found the College).

[2] Ibid., 21 December 1846, 11 and 25 January 1847. Part of the problem was inadequate initial finance to the extent that by 1848 the instution had debts of £10,000. It only continued when Holland, Bathurst, Ducie and others guaranteed the College a further £30,000. (C. Lawrence, 'The Royal Agricultural College of Cirencester', Journal (2), I, 1865, pp.4-5.)

resigned over an internal policy difference with the Principal.[1] Cirencester made little overall contribution to agricultural education although it is worth noting that some of its early graduates -such as Hugh Raynbird and Jacob Wilson - had distinguished careers as agriculturists. The most usual way of acquiring agricultural education was for a young man to reside on a farm where the proprietor was prepared to give instruction and a period of practical experience, but only a minority took advantage of these schemes which were sometimes advertised in the agricultural press. Mostly, of course, they could not be spared from the parental holding.

Morton's proposal was taken up at the March Council of 1864 by Edward Holland (a longstanding friend, held in very high regard by Morton)[2] and Dyke Acland who had been interested in education for many years. Acland saw agricultural education as part of the broader question of middle-class education, and he had promoted this view while editor of the Bath & West Journal.[3] They moved for a committee to consider the measures by which the Society could most appropriately pursue its 'seventh national object' and the committee appointed included Acland, Holland, Hoskyns, Thompson, Col. Kingscote, Owen Wallis, and Prof. Wilson.[4] Holland introduced the subject to a 'Wednesday Afternoon' discussion where he closely followed points that had been made by Morton in a lecture at Cirencester stating that the requirements for a young farmer to successfully carry out his occupation were that he should have (i) practical skill, (ii) business tact and (iii) liberal and scientific

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1 M.L.E., 9 February 1863.

2 See A.G., 31 December 1853.

3 His views are set out in T.D. Acland, The Education of the Farmer Viewed in connection with that of the Middle-Classes in General; Its Objects, Principles, and Cost, 1857.

4 Monthly Council 2 March 1864, F.M.(3), XXV, 1864, p.281. Holland was in fact absent from this meeting because of illness.

education. Holland thought that the difficulty was in persuading farmers to send their sons for additional 'scientific' education after their normal schooling and was of the view that the Society could not take up the whole question of general education but offer advice and encouragement for further scientific study, or practical experience on the farm. [1] In the discussion that followed, Sir Edward Kerrison argued in favour of the general middle-class education movement and suggested that the Society should offer prizes of scholarships for pupils in agricultural subjects; the Rev. Prebendary Brereton related his experinece at his own school at West Buckland, Devonshire, where he had tried to combine, not altogether successfully, a practical farm with the school; Augustus Voeclker (lately departed from Cirencester) expressed doubts as to whether the sons of small tenant-farmers could be usefully instructed on a college farm; and Wren Hoskyns stressed the heterogeneity of the 'farming class' and the difficulties involved in educating the poorer sections of that class. [2] The Society put up a prize essay on middle-class education for 1865 and three papers on this topic appeared in the first part of the 1866 volume. W. Holt Beever called for the attendance of farmers' sons at establishments such as Cirencester at the age of sixteen after completion of a general education; this implied capital and pecuniary advantage on the parents' part 'but so did modern farming itself'. [3] On the other hand, a feeling was expressed that Cirencester catered essentially for the sons of gentlemen and was not really fitted to make a contribution to the more general education of the farmer, however valuable its specialised

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1 Journal, XXV, 1864, pp.542-3.

2 Ibid., pp.543-8.

3 'On Middle-Class Education having reference to the Improvement of the Education of those who depend upon the Cultivation of the Soil for their Support', Ibid.(2), 1866, p.39.

mode of instruction may be.[1] Morton in addressing the Council on agricultural education, called for a system of prize examinations conducted by the Society on a regional basis in conjunction with local associations.[2]

The first move of the Education Committee was to consider what instutions were available to co-operate with the Society for the education and examination of agriculturists and negotiations were entered into with the local examination syndicates of Oxford and Cambridge Universities, the University of London, and the College of Preceptors (founded in 1846), and these bodies expressed a willingness to help with the project.[3] In April, 1865, it was agreed that the recommendations of the Education Committee be accepted. This provided for three hundred pounds to be allocated by the Society for prizes for special subjects in the Oxford or Cambridge senior or junior examinations, candidates to be recommended by a member of the Royal Agricultural Society or be in some way dependent on the land for support, or intending to make agriculture a profession. The subjects for prizes were to be related to those needed for work on the farm - mathematics, mechanics, chemistry, zoology, botany, geology. The Society sent a circular letter drawing its education prizes scheme to the attention of local authorities, agricultural associations, and similar bodies.[4]

Morton did not approve of these developments or of the way in which his education proposal had been taken up by the Society, and the whole issue soon became surrounded with considerable controversy. Dyke Acland, a

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[1] R. Vallentine, 'On Middle-Class Education, having Reference to the Improvement of the Education of those who depend on the Cultivation of the Soil for their Support', Journal (2),II, 1866, pp.12-14 (Prize Essay); Lewis Evans, 'Middle-Class Education with Special Reference to our Grammar Schools', Ibid., p.27.

[2] J.C. Morton, 'Agricultural Education', Ibid., p.458.

[3] Monthly Councils 2 November 1864, 1 February 1865, F.M.(3), XXVI, 1864, p.418, XXVII, 1865, pp.197-8.

[4] Monthly Council 6 December 1865, F.M.(3), XXIX, 1866, p.50.

member of the Education Committee took the rather unusual course of circulating his views by way of a pamphlet addressed to the President of the Society, Sir Edward Kerrison. [1] The argument of Acland was that the Society should endeavour to improve general, middle-class education as an essential pre-requisite for more specialised studies in agriculture.

Acland's influence in the Education Committee was strongly resented by Morton and others. In reply to Acland's question as to what should be the position of the Society with regard to the national movement for middle-class education, Morton had no hesitation in replying 'no position at all'. [2] Morton and his supporters envisaged the encouragement by the Society of colleges and schools dedicated to the particular training of young men for agricultural pursuits after the completion of their term in schools for general education - which was not considered to be in the Society's province. In the remit to the Education Committee the term 'professional' - as used by Morton - was dropped. [3] Acland considered it was useless to have an examination scheme to test the knowledge of farmers if they had not been taught systematically first, but he saw a very sharp distinction between education in school which was 'vulgarised' by practical experience, and an apprenticeship for business. [4]

The reply of Acland, Thompson and others to Morton's insistence on 'professional' agricultural education was to the effect that the lack of success of Cirencester - where, according to Thompson, young men idled away time or waited until they got commissions in the army - was proof that

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[1] T.D. Acland, Agricultural Education; What it is, and how to improve it, considered in Two Letters to Sir Edward Kerrison, Bart., M.P., 1865.

[2] A.G., 25, February 1865.

[3] Ibid., 10 December 1864.

[4] Agricultural Education p.10.

any further institutions of that type likely to fail. The Highland Society already had examiners and the 'want of success of others' justified the inactivity of the Society on the ducation question, they maintained. Certainly Holland, as Chairman of the Education Committee, disapproved of the course that was taken while commentators were universal in their condemnation: the 'offering of prizes for a few boys' was 'not what was required on the education question' and 'little or no good' could come of 'the mere plaything' that the Council had made of the matter. By 1868 it was observed that a 'few amiable gentlemen amuse themselves over an education bubble' that had come to 'perhaps the most singular failure ever known'. [1] There was no right to devote funds for general education, as was the effect of the prizes, and the Council it was alleged was being 'led astray' in connection with the agricultural education question.[2]

In the face of these criticisms Holland moved for a re-consideration of the scheme by which the Society offered prizes for examinations conducted by outside bodies, and he headed a committee set up in 1867 to determine how the education grant could best be apportioned. [3] The result was a determination to conduct its own examinations. These were to be for candidates aged between eighteen and twenty-five who could produce a certificate stating that they had received a good general education. There were to be prizes - between five and thirty pounds - for Science and Practice of Agriculture, Book-keeping, Mechanics in their Application to Agriculture, Agricultural Chemistry, Botany, Geology, Veterinary Science, Field Engineering and Surveying. The first examination was

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1 Report of half-yearly meeting 1866, 'Agricultural and Middle-Class Education', 'The Present Position of the Royal Agricultural Society', F.M. (3), XXIX, pp.454, 467; XXXIII, 1868, p.471.

2 A.G., 15 December 1866.

3 Monthly Council 2 April 1867, F.M.(3), XXXI, 1867, pp.424-5.

held at Hanover Square in 1868 and the examiners were appointed by the Council. Where appropriate, these were already connected with the Society, such as Voelcker and Simonds; others were brought in from outside. The examination consisted of written papers and a viva voce. Papers in 'Science and Practice' and Book-keeping were compulsory, and Land-survey, Mechanics, and Chemistry were necessary for the award of a first-class pass which carried with it life-membership of the Society. [1]

Acland - with some justification - questioned whether the results repaid the expenditure, but this scheme continued for some years, although only ten or a dozen was the usual number of candidates. [2] In 1874 there were attempts to try and frame an examination to encourage the study of agriculture at middle-class schools, it being felt by the Duke of Bedford and others that the Society should try and encourage agricultural education at a more elementary level than the relatively advanced examination held up to that time. To this end the Society offered ten annual scholarships of twenty pounds each to be taken up at the Agricultural College Cirencester, or Glasnevin (Dublin) for candidates from a range of middle-class schools including Ardingly, Bedford, the Devon and Dorset County schools, Trent College, and Whitgift; the examination included Land-Surveying, Elementary Mechanics, Chemistry, and the Principles of Agriculture.

The new scheme did not raise very much enthusiasm in the agricultural community and it was commented in the Farmer's Magazine that it was 'curious to see how much quasi-importance' was attached by the Society to the examination of 'a dozen or so moderate lads'. [3] In 1879 there was a further major

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[1] Special Council 2 May 1867, F.M.(3), XXXI, 1867, p.497.

[2] Monthly Councils 3 March 1869, 5 July 1871, F.M.(3), XXXV, 1869, p.327, XL, 1871, p.138.

[3] 'The Body and its Members', F.M.(3), XLV, 1874, p.552.

dissension between the Cirencester staff and the Principal with the result that, as in 1863, there were mass resignations. This led to the foundation of the Wiltshire and Hampshire Agricultural College by Professor John Wrightson, which was also a new independent centre of agricultural research. [1] Many of the lecturers came from Cirencester, including William Fream (Natural History) who was later to have a close connection with the Royal Agricultural Society.

Writing in 1878, H.M. Jenkins had to admit that the Society's efforts for agricultural education had not, by that time, been successful [2] and its substantive contribution in this field remained for the future. During the first 10 years of the scholarship scheme the maximum number of candidates was 40 and the minimum 22, and no more than 6 schools competed each year. In only 2 years were all 10 scholarships awarded. [3] Two hundred and thirty seven candidates presented themselves for the first 22 of the Society's Senior Examinations, of which 61 gained first-class and 30 second-class certificates. [4] The Royal Commission to examine 'technical instruction' in 1881 appointed H.M. Jenkins as a sub-commissioner to enquire into 'Agricultural Education' in France, Germany, Denmark and the British Isles and his report showed that agricultural education was much more developed in those continental countries, with direct government involvement, in contrast to the minimal state of assistance provided at home. [5]

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[1] See 'Agricultural Education', F.M.(3), LVI, 1879, pp.214-5; LVII, 1880, pp.302-3.

[2] 'The Royal Agricultural Society', Journal (2), XIV, 1878, p.890.

[3] Herbert J. Little, 'Report on Agricultural Education: a Summary. Part II', Ibid., XXI, 1885, p.532.

[4] John Dent Dent, 'Notes on Agricultural Education at Home and Abroad', Journal (3), I, 1890, p.38.

[5] Little, 'Report - Part I', pp.126-64.

The areas of work in consultancy and education can, from the preceding discussion, be seen to have had varying degrees of success. On the veterinary side, the Society did not succeed in obtaining a veterinary profession equipped to meet the needs of agriculturists, though it may be noted that much of the blame rested with the agricultural community. It was often said that the veterinarians would do little to help the agriculturist but, as J. Dent Dent pointed out, the average farmer would rather kill a beast than run up a veterinary bill, which was not the case with horses as they had a higher value. [1] Nevertheless, the Society's relations with the Royal Veterinary College, whose work it wanted to support from the time of its foundation, remained extremely strained for some thirty years. The Society redeemed itself in the matter of cattle disease policy during the 1870s after its hesitant beginning, and the acceptance of regulations which led to the eradication of rinderpest and pleuro-pneumonia was a major achievement. J.R. Fisher has argued that the incidence of the various diseases was a major constraint on change in farming systems in the 1870s so that the last fifteen years of the century (practically disease-free) saw a rise in stock numbers at a time of falling prices under American competition. [2] Foot-and-mouth disease was the most difficult to eradicate because of its very infectious nature, the fact

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[1] At General Meeting, May 1868, F.M.(3), XXXIII, 1868, p.477.

[2] J.R. Fisher, 'The Economic Effects of Cattle Disease in Britain and its Containment, 1850-1900', A.H., 54, 1980, pp.291-2.

that it is less damaging than the other complaints, and the virus responsible has a number of different and mutable strains. It was not unreasonable, as Fisher has pointed out, [1] to believe in the 'spontaneous origin' of this disease and although the 'stamping-out' policies that were evolved in the 1870s continue to be the basis of rigid controls that are applied when there have been foot-and-mouth outbreaks in more recent times - as in 1967-8 [2] - there is still a question as to the costs and benefits of these policies [3] with regard to this disease, just as there was in the nineteenth century.

The most unqualified success in the consultancy work of the Society was in the efforts of the Consulting-Chemists, particularly Augustus Voelcker. Here the Society was fortunate in having a figure who gained the confidence of the agricultural community - in contrast to J.B. Simonds - and in his denounciation of adulterated fertilisers and feeding-stuffs provided a much appreciated service. His field experiments (and also those of Lawes and Way) contributed to the gradual build-up of agricultural knowledge with a practical bias, though the Society could reasonably have given consideration to setting up its own experimental station before Woburn in 1875. William Carruthers also had a long and successful association with the Society although his greatest contributions came in the last two decades of the century. Again, it may be a valid criticism of the Society that it did not appoint a Consulting-Botanist at an earlier date: the need was felt, as we have seen, in the 1850s.

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1 Ibid., p.283; the belief persisted until the 1890s.

2 See Ralph Whitlock, The Great Cattle Plague: An Account of the Foot-and-Mouth Epidemic of 1967-8, 1968.

3 A.P. Power and S.A. Harris, 'A Cost-Benefit Evaluation of Alternative Control Policies for Foot-and-Mouth Disease in Great Britain', Journal of Agricultural Economics, 24, 1973, pp.573-600.

Agricultural education remained a problem area. There had been no shortage of enthusiasm for the ideal of agricultural education since the early 1840s, but those who agreed with Morton's call for the 'professional' education of the farmer were in advance of the times. The English experience here in some ways mirrors that in North America where there was an early movement for vocational education for farmers that only a minority were prepared to follow.[1] By 1880, the Society had made only a very limited contribution in this field, and there was still internal dissension over the issue of general versus specific agricultural education for the children of agriculturists. The substantive work of the Society in education was something that remained for the future.

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[1] Paul W. Gates, The Farmer's Age: Agriculture 1815-1860, 1960, pp.358-82.

CHAPTER VI : CONCLUSIONS

The Royal Agricultural Society and Agricultural Progress 1838-1880: Successes and Failures

Writing of the Lewes show of 1852, H.S. Thompson, conscious of the feeling that many visitors to the meeting might well conclude that 'it was a good show, but that they had seen it all before' maintained that the judges' reports of the implements exhibited might be 'briefly but emphatically expressed by the one word - Progress - steady, satisfactory progress...'[1] In this observation, Thompson followed what was to be the opinion of a number of agricultural observers during the 1850s, 1860s,and 1870s and summaries of 'agricultural progress' were not infrequently presented to bodies such as the Royal, the London Farmer's Club, and the Royal Society of Arts. Many commentators thought that the Society had been instrumental in hastening the rate of agricultural change but they recognised the difficulty of measuring its precise contribution to developments. As Morton put it at the conclusion of the Shrewsbury meeting of 1845:

> the progress of agricultural improvement may be carefully watched, and its rapidity noted, but so many causes contribute to urge it on that to eliminate from amongst them the influence of but one would be a hopeless task.[2]

We cannot expect to isolate the influence of the Royal from the various other factors such as the stimulus of increased demand, the improvements in internal communications, and the increased availability of information which were associated with agricultural change and development during the period covered by this thesis. Neither is it realistic to adopt a 'counterfactual'

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1 'Lewes Report', p.302.

2 A.G., 26 July 1845.

approach and ask as to what agricultural progress would have taken place had the Royal not been founded in 1838. Yet some assessment of the achievement of English agriculture between 1838 and 1880 is necessary in order to evaluate how far the aspirations of the founders of the Society were realised.

If we briefly return to part of the argument of the first two chapters of this thesis, it was that the output of English agriculture had just kept pace with the demands put upon it up to the time of the formation of the Society, by expansion of the cultivated area through the reclamation of waste and the adoption of more intensive 'natural' agricultural systems. The promoters of the English Agricultural Society were conscious of agriculture's need to respond to the further demands that were likely to be put upon it if national progress was to be maintained. While William Shaw (unlike some of his contemporaries) was 'not inclined to indulge in any visionary expectation of extraordinary discoveries for carrying on agricultural operations at railway speed',[1] the founders of the Society were much impressed with the potential for raising agricultural productivity by means of the adoption of 'scientific' farming hastened by an improved agricultural information diffusion system. Pusey, Morton, Hoskyns, Spencer and others associated with the 'improvement' party took inspiration from the advances in manufacturing industry made possible by the employment of steam, scale economies, and good communications, and looked to the 'industrialisation' of farming systems. The question is therefore what did the movement for more intensive, 'industrial', 'commercial', or 'scientific' farming of the late 1830s and 1840s (of which the Royal was an integral part) achieve by way of the adoption of new methods? What did the new methods contribute to agricultural output? As Morton observed, 'Agricultural progress, if of any interest or value whatever, simply means more food produced per acre...' [2]

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[1] M.L.E., 27 May 1844.

[2] J.C. Morton, 'Agricultural Progress...', pp.54-5.

The most important changes in agricultural technique between 1840 and 1880 were in the increased utilisation of off-farm inputs for fertilisers - guano, manufactured superphosphates, and cattle foods being the most notable examples - land drainage by means of cheaply manufactured cylindrical drainage pipes, advances in agricultural machinery especially in the field of harvesting techniques and the employment of steam on the farm, and the development of faster maturing breeds of stock. The preceding pages have examined the Society's close association with these developments; the adoption of guano and superphosphates in the 1840s can be linked to the publication of the results of trials published in the Journal; Josiah Parkes was the leading exponent of drainage techniques in the early 1840s and was given particular authority as the Society's Consulting-Engineer while the annual shows provided a focus for the development of pipe-machines. The country meetings had the function of aiding the transition of the agricultural engineering industry to national importance by providing means by which machinery could receive evaluation and trial and recognition. The shows also generated enthusiasm for improved stock which were more efficient food converters despite the shortcomings of the stock-exhibitions.

The degree to which these and other aspects of progress were translated into increased agricultural output is extremely difficult to assess with precision. It was a problem that contemporaries were acutely aware of as, in the absence of reliable yield figures, there was often found to be a difficulty in providing tangible measures of agricultural advance. In outline, however, the position may be summarised as follows.

Between 1829 and 1846 wheat imports accounted for a little over 7 per cent of total consumption in England and Wales - 7.3 per cent between 1829 and 1841 and 7.5 per cent between 1843 and 1846. This constant importation percentage was at a time when the population increased by approximately one and a half

million.[1] It was precisely at the point of the foundation of the Royal Agricultural Society that it was becoming apparent that the methods that had allowed agriculture barely to keep pace with the demands put upon it up to that time - expansion of the cultivated area and the adoption of more intensive 'natural' systems - were unlikely to meet the requirements of a population expanding at a decennial rate of between 14 and 18 per cent, because there was very little suitable uncultivated land remaining and there were limits as to what could be further achieved by 'natural' intensive methods. Hence the interest in 'scientific' agriculture and the movement towards free trade in agricultural produce.

Whatever the sanguine expectations of the founders of the Royal Agricultural Society the food requirements of the increasing population during the period covered by this thesis were largely met by importations paid for by industrial exports. The changing balance is shown in the following table:

Table XV: Estimated Value of Home and Imported Food-Stuffs converted to Basis of Prices from 1867-77

Period	Home Production £ millions	Imports	Estimated Population of England and Wales
1848-50	162.1	35.4	17,500,000
1859-61	166.9	54.5	19,850,000
1872-74	182.1	108.1	23,050,000
1883-85	181.3	156.1	26,900,000

Source: E.C. Snow, Journal of the Royal Statistical Society, 1935 in N.L. Tranter, Population and Industrialisation, 1973, p.151.

Some of the imports were made up of commodities such as tea and coffee which could not be produced at home and for which demand was increasing as a

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[1] Susan Fairlie, 'The Corn Laws and British Wheat Production', E.H.R.(2), XXII, 1969, pp.102-3.

consequence of rising real incomes, but there is a clear indication that only a small proportion of the additional population after 1850 were fed from home production.

Another way of looking at the productivity increment associated with scientific farming is to consider changes in the average yield associated with specific crops. This is immensely difficult because yield statistics were not regularly collected until 1884. Such yield estimates that we have during our period are problematical inasmuch as it is necessary to take into account the varying qualities of land cultivated and deviations associated with short-run climatic variations. On the first point, E.L. Jones has argued for a peak in the wheat acreage in the mid-1850s after which a decline set in. [1] If the poorest wheat land was the first to be given up, then this would have the effect of increasing the average yield of that which remained. On the second point, the weather difficulties of the 1870s are well-known, but particularly poor harvests were recorded in 1850, 1851, 1853 (floods), 1860, 1861, 1864 (drought) 1865, 1866, 1867, 1868 (drought). 1863 was recorded as being the best harvest since 1834, [2] and the run of moderate or deficient years might well have depressed average yields.

With these qualifications in mind we may turn to the scattered estimates of wheat yield that are available to us during the period under consideration. These include estimates by Arthur Young for the late eighteenth century and figures contained in the Board of Agriculture General Views, calculations by J.R. McCulloch and G.R. Porter (who used the method of multiplying the total population by estimates of average annual consumption and deducting a figure for imports[3]) and surveys compiled by Tooke from information supplied by Liverpool corn merchants and presented by Healy and Jones. [4] More reliable

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1 'The Changing Basis of English Agricultural Prosperity', p.111.

2 For a summary , see E.L. Jones, Seasons and Prices, 1964, pp.169-73. See also James Caird, 'On the Agricultural Statistics of the United Kingdom', Statistical Journal, 1868, p.131.

3 Fairlie, 'Corn Laws', p.110.

4 M.J.R. Healy and E.L. Jones, 'Wheat Yields in England, 1815-57', Journal of the Royal Statistical Society, 125, 1962, pp.574-7.

information was given by James Caird in his 1850 survey of English Agriculture and in papers to the Statistical Society in 1868 and 1869, and by Lawes and Gilbert in their papers in the Society's Journal 'On the Home Production, Imports and Consumption of Wheat', in 1868 and 1893. [1] In addition, the Mark Lane Express and Chamber of Agriculture Journal made occasional estimates of yields and these were also given consideration by the Royal Commission on Agriculture in 1880. These various estimates were summarised by P.G. Craigie in a paper to the Statistical Society in 1883, [2] and these are given in the following table:

Table XVI: Trends in wheat yield 1770-1880

Source	Estimated (England, Wales) yield, Bushels per acre
Young, 1770	23
McCulloch, from Board of Agriculture	21
Caird, 1850	26.5
Mark Lane Express, 1861	29
Caird, 1868	28
Lawes and Gilbert, 1868	28.75
Chamber of Agriculture Journal, 1870	30
Agricultural Commission (pre-depression estimate)	29.5
" " " for 1879	19.5
Mark Lane Express, 1876-82	24.7

The figures indicate a rise in average wheat yield from a little over 20 bushels per acre at the start of the nineteenth century to a little under 30 bushels per acre in the 1860s and 1870s with a fall after 1875 associated

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[1] Journal (2), IV, 1868, pp.359-96; 'Home Produce, Imports, Consumption and Price of Wheat, over Forty Harvest Years, 1852-53 to 1891-92', Ibid.(3), IV, 1893, pp.77-132.

[2] P.G. Craigie, 'On the Statistics of Agricultural Production', Journal of the Statistical Society, XLVI, 1883, pp.1-48.

with the very adverse climatic conditions then experienced. Taking wheat as a yardstick, the net productivity increment associated with the more intensive farming of the nineteenth century does not seem to be much more than seven bushels per acre over the base established at the late eighteenth century. In one sense, this seems a very modest result for all the experiment and innovation that we have examined, and even part of this advance was probably only maintained to some inferior land being converted back to grass in the 1860s. The Liverpool corn merchant data reported by Healy and Jones shows a much more spectacular rise, from 25-37 bushels per acre up to 1830, through 45-50 bushels per acre in the 1840s to a peak of 58 bushels in 1857 and 1858, but these figures seem so much higher than all of the various other estimates that there is considerable doubt as to their authenticity. [1]

If the increases in wheat yield discussed here seem less than spectacular we must, nevertheless, be wary of judging the advances that undoubtedly did take place from too much of the late twentieth century vantage point. The Winchester Manor data examined by Beveridge [2] and Titow [3] indicated typical medieval yields of between 7 and 10 bushels per acre so that in the course of 60 years (1800-1860) one could say that there was a productivity increment (7 bushels) which amounted to over 50 per cent of that which it had taken the previous 600 years to achieve. In reality, the Victorian gains in productivity were compressed into a much shorter time span because although it is difficult to distinguish between the different elements that contributed to increased productivity such as drainage, better preparation of the seed-bed, and drilling of seed, the greatest single factor was the employment of fertilisers such as guano which

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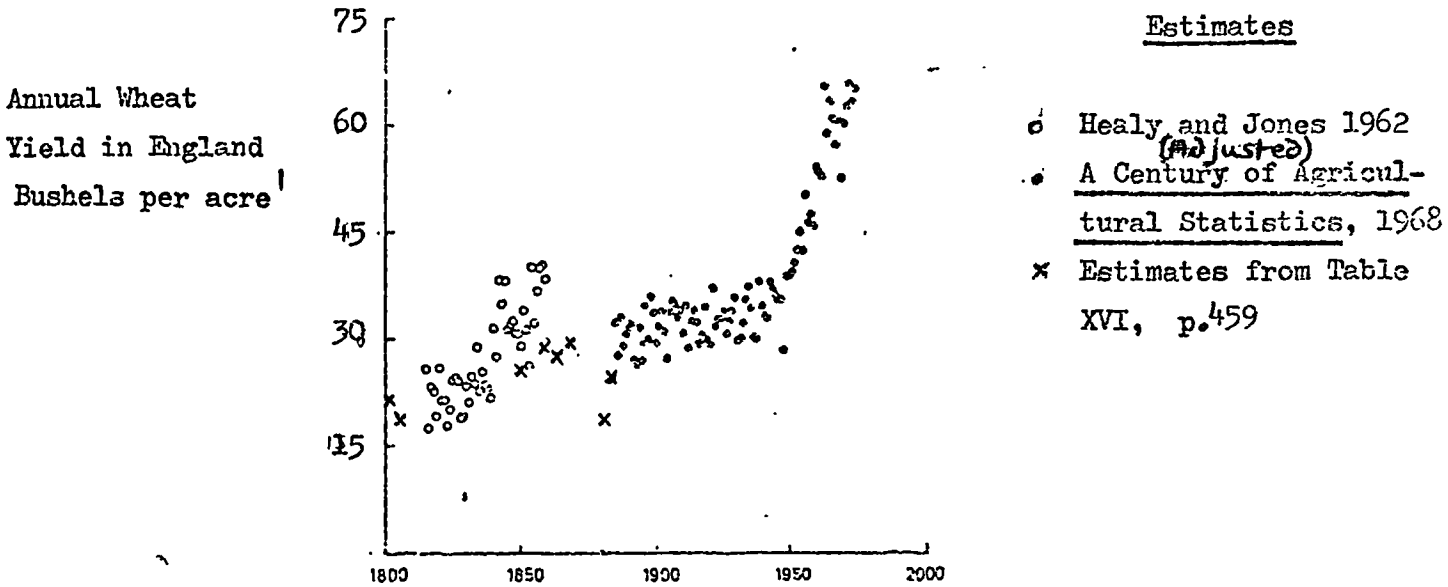
[1] See comment by Orwin and Whetham p.125; Healy and Jones suggest a 50/72 areal adjustment.

[2] Quoted by M.K. Bennett, 'British Wheat Yield per Acre for Seven Centuries', Economic History, III, 1935, pp.12-29

[3] J.Z. Titow, Winchester Yields: A Study in Medieval Agricultural Productivity, 1972.

could produce an instantaneous doubling of yield. It is in this light that we can appreciate some of the enthusiasm for 'scientific' farming in the 1840s, but the gains now seem relatively small because we have become accustomed to much higher average yields during the twentieth century, particularly over the last twenty years or so when yields of 90-100 bushels per acre have become unexceptional. This is put into context by the national yield figures in A Century of Agricultural Statistics (1968) which begin in 1884 and which have been plotted by G. Stanhill. These, together with the estimates presented in Table XVI and the Healy and Jones data demonstrate the advances that have taken place since 1800:

Figure VI : Trends in English Wheat Yields since 1800



Source: Adapted from G. Stanhill, Agro-Ecosystems, 3, 1976, p.5, with additions.

The trend clearly demonstrates the marked progress which has taken place since the early 1950s and the dramatic increases in yields are attributed to such factors as the increased consumption of nitrogenous fertilisers, the

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[1] 1 Bushel wheat has been taken as 60lbs.-

development of high yielding and lodge-resistant cultivars, mechanised cultivation and harvesting, and chemical control of pests, diseases, and weeds,[1] and shows that advances between 1884 and about 1950 were relatively small. Advances which took place during the period particularly considered in this thesis set that standard for the following seventy years, although it is likely that higher average yields were partly maintained by the switch of poorer land to uses other than wheat growing.

While undue importance should not be attached to the wheat crop which constituted a small and decreasing proportion of all land in agricultural use, the yield statistics do at least provide some indication of the sort of productivity increments that were made possible by the adoption of the more intensive methods promoted by the Royal Agricultural Society.

It is now well-established that the balance of advantage swung towards the livestock producer after the Crimean war, for from then until the late 1870s the grain price was relatively static (but with marked fluctuations) and there were substantial and increasing imports. This situation contrasted with that which obtained in livestock products where prices moved inexorably upwards.[2] Between 1849 and 1868 the prices realised for live animals by the producers of ordinary stock advanced from 4½d per lb. to 7d per lb. for beef, and from 5d per lb. to 7½d per lb. for mutton, or 50 to 55 per cent respectively.[3] This was partly a reflection of increased meat consumption - from 82.5 lbs per head 1841-50 to 90 lbs per head 1861-70[4] - made possible by rising real incomes, yet they also indicate that home production was unable to keep pace with the increased demand. It is even more difficult to answer the question as to what more

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1 Stanhill, p.9.

2 Jones, 'Changing Basis of Agricultural Prosperity'.

3 Craigie, p.25.

4 Richard Perren, The Meat Trade in Britain 1840-1914, p.3.

intensive methods - feeding with manufactured food, better housing, and improved stock - contributed to productivity gains in livestock farming than it is with regard to arable farming for statistics on weight gain for specific animals to a given amount of food were very rarely given while estimates of total production obscure the switches from arable to pastoral farming during the period under consideration. Thus in 1878 the Agricultural Economist commented that there was no reliable information available on the meat produced from a given quantity of food for the different breeds of cattle. Comparisons could be made only by considering the weight-for-age of the different breeds. Interestingly, James Caird, in his survey of 'Fifty Years' Progress of British Agriculture' in 1890 thought that the improved systems of livestock husbandry during the period of buoyant prices between 1851 and about 1874 added some 25 per cent to the weight of home-grown meat, [2] which is very close to the sort of productivity increment that has been discussed in relation to wheat production.

If this achievement again appears fairly modest, it may be as well to remember that the productivity gains were compressed into a fairly short period of time and the most important contribution of 'scientific' farming and indirectly of the Royal Agricultural Society was to increase food output between 1840 and 1855 before really large quantities of food imports were available. Beyond this, the techniques available did not - could not - sustain a continuously increasing farm output and additional food requirements were largely made up from imports. This is well illustrated by Perren's meat consumption statistics

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[1] Agricultural Economist, 1 February 1878.

[2] Journal (3), I, 1890, pp.26-7.

which show an increase in per capita consumption from 90 lbs between 1861-70 to 126.9 lbs for the period 1910-1914 by which time the proportion supplied by domestic production had fallen from 89 per cent to 58 per cent. [1]

D.B. Grigg has recently pointed to the 'irony' of early Victorian agriculture which adopted methods which led to a rising yield at the same time as the Repeal of the Corn Laws ended the need for home production of food. [2] Whatever benefits the more intensive farming systems contributed to early Victorian Britain in the longer term scientific farming could not enable the agriculturist to compete with low-cost imports. The English farmer of the 1840s and 1850s was better endowed with agricultural knowledge than ever before, but the great question, as contemporaries pointed out, was whether 'knowledge' would 'pay'. [3] Increasingly, it did not, for after the first substantial productivity increment agriculturists had little in the way of additional techniques to draw on - it was not until the mid-twentieth century that there were further major productivity advances, and, as Gerald Leach has pointed out, as late as the 1920s British agriculture was still only in the early stages of semi-industrialisation. [4] Thus many agriculturists of Victorian times evinced some dissatisfaction with what 'Science' contributed to 'Practice', and in 1886, well into the agricultural depression, C.S. Read denounced 'science' as a 'two-edged weapon' which had helped the overseas competitor but which had done 'nothing' for the British farmer. [5]

The period from the early 1850s to the early 1870s has become indelibly termed the 'Golden Age' of English agriculture although Jones has remarked that accounts of prosperity during the period might be made more explicit and Fairlie

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1 Meat Trade, p.3.

2 Population Growth and Agrarian Change, 1981, p.182.

3 'The Farmer's Newspaper', F.M.(2), VI, 1854, p.486.

4 Energy and Food Production, p.15.

5 In a discussion at the London Farmer's Club, quoted by Fisher, Clare Sewell Read, p.19.

has pointed out that only two out of five hundred pages are devoted to the 'Golden Age' in Ernle's account of English farming. [1] While the 1850s and 1860s cannot be seriously inverted into a period of depression for the English agriculturist it is noticeable that in 1877 when the time of relative agricultural prosperity was coming to a close, J.C. Morton did not look back over the preceding decades as a 'Golden Age' but rather wrote of the agriculturists' 'rough education' since the early 1840s during which many a farm had changed hands and many a tenant-farmer ruined during the often difficult conditions that had been part of the agricultural experience of the times a history of which, Morton thought, would include chapters on 'anticipations' and 'expectations' which had never come to full fruition. [2]

Morton thought that farm profits were not higher while, since the foundation of the Society the difficulties with which the agriculturist had had to contend included the major animal diseases - foot-and-mouth, pleuro-pneumonia, and rinderpest - which were a consequence of free trade in livestock, the labour question, and generally higher expenses. Although the principles of manuring were much better understood, Morton had to admit that a 'study of agricultural chemistry in the bye-hours' had not done much to improve the middle-aged farmer. In 1877 the farmers 'no longer worshipped science so much as they adored manure' and nitrogen was appreciated on its merits: Morton looked forward to the time when nitrogen could be fixed directly from the atmosphere for agricultural applications. In this he took inspiration from a short paper that had been contributed to the Society's Journal in 1871 by James Nasmyth at the initiative of James Caird. [3]

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[1] 'Changing basis...', pp.102-3; 'The Corn Laws and British Wheat Production', p.99.

[2] A.G., 9, 30 July 1877. These reminiscences were prompted by the occasion of the Royal's Liverpool show and the Gazette featured a number of retrospects which reviewed the agricultural changes that had taken place since the Society first visited the town in 1841.

[3] James Nasmyth, 'On the Possibility of separating Nitrogen from the Atmosphere by Percussive Compression and rendering it available for Agricultural Purposes', Journal (2), VII, 1871, pp.436-9; A.G., 30 July 1877.

In following Young's maxim that manure was the 'soul of agriculture' Morton expressed the realisation that it was the increased utilisation of off-farm inputs that had done most to raise agricultural productivity. The rapid adoption of guano and superphosphates was one of the tangible successes of the enthusiasm for 'scientific' agriculture but this posed considerable problems for the farmer because of the high price and varying qualities of the substances available and the widespread adulterations which took place. Thus feeding stock with manufactured cake to obtain enriched manure was more attractive to many, particularly as the advance in meat prices made the system economically viable as the animals were then more than just machines for manure production. Hence the intense interest in the manurial implications of different feeding regimes, extensively explored in the Journal by Lawes and Gilbert. Yet this system was flawed, for there is at least some question as to whether 'high-feeding' of stock produced the sort of meat that changing consumer preference required. As G.T. Brown observed in 1886, the means of producing lean meat on the early maturity system had not by that time been 'discovered' [1] and it may well have been that imported lean meat was more to consumer taste than the home-produced product.

This leads us to the 'successes' and 'failures' of English agriculture between 1838 and 1880, many of which can be linked to the activities of the Royal Agricultural Society. Successes there certainly were, for there was a real productivity increment which, if dwarfed by twentieth century developments, was more substantial within a shorter time-span than anything that had been experienced before. This was a reflection not only of the efficacy of substances such as guano but also the ready acceptance of what was a very curious substance encouraged by the improved information diffusion systems of which the Royal was an integral part.

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[1] G.T. Brown, Life on the Farm, 1886, pp.111-2.

Yet it is difficult to escape the conclusion that the Society led the agricultural community into a number of blind alleys and that many aspects of 'agricultural progress' promoted by the Royal were seriously flawed. A prime example is in agricultural drainage, viewed by contemporaries as the key to agricultural advance on the relatively unproductive 'heavy lands'. Agricultural historians have not infrequently commented that drainage was often less successful than expected and that investment in drainage was rarely very remunerative. Leaving aside the economic constraints, the earlier drainage discussion revealed that the Royal promoted the concept of deep drainage through the insistence of its Consulting Engineer, Josiah Parkes, and these ideas were accepted as the basis of government and much private drainage work. Depths of four feet or more for drains on clayland were often inefficient and wasteful of resources and thus did often not yield the benefits that were expected. Similarly, the types of pipe-making machines which found favour at the Royal shows in the 1840s were the more costly creations which had a capacity far in excess of that which could be utilised. The Society never really succeeded in coming to grips with the problems associated with conducting an adequate implement trial and certainly encouraged some creations which were not practically useful such as 'racing' steam engines. The system of stock shows often seemed to have little connection with ordinary stock-rearing, and some desirable qualities (such as the ability to produce both meat and milk in cattle) found little favour in the Society's show-ring.

This double-edged character of the Society's involvement in the agricultural development of the period is partly a reflection of its ambiguous relationship with the agricultural community. As we have seen, the Society was founded on a wave of enthusiasm for agricultural progress and scientific farming and enjoyed a good deal of popular support in the 1840s. This waned after the initial 'Pusey Period' as a reaction to the excessive expectations of what

'science' could do for agriculture set in and the management of the Society became distanced from the agricultural community at large. The Society enjoyed something of a popular revival during the 1870s as a result of the energetic and talented efforts of the Secretary/Editor, H.M. Jenkins, and a determination to make a stand on such issues as fertiliser fraud and animal disease control. Yet the Society was always in a contradictory position, not being the learned academic society that some would have liked it to be, yet not a 'popular' body able to lobby for the 'agricultural interest'.

It is difficult to counter the feeling that Shaw, Pusey and Spencer would have shared the sense of disappointment with the progress of scientific agriculture that was evident in the 1870s. What 'science' had done for 'practice' by 1880 was relatively small. The potential for the 'industrialisation' of farm practice was limited in the nineteenth century partly because, as P.K. O'Brien has pointed out agricultural operations are more separated in time and space than those in industry. [1] There was never the scope for the massive scale-economies that transformed industry in the nineteenth century and although steam power was successfully harnessed for some farm tasks such as threshing it had, in total, only a marginal impact and much of the agricultural machinery did little, at least initially, to economise on labour. [2] Weed and pest control was extremely limited and some cultivation techniques such as deep-ploughing could, under some circumstances, be harmful, as Mechi and others came to realise.

What the founders of the Society did not anticipate was the growing 'schism'

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[1] P.K. O'Brien, 'Agriculture and the Industrial Revolution', E.H.R.(2), 30, 1977, p.171.

[2] D.B. Grigg, 'The Impact of Industrialisation upon World Agriculture since 1800', Acta Museorum Agriculturae Pragae, XI, 1976, p.28.

between town and country [1] that became increasingly apparent after the mid-century. Shaw, Spencer, and Pusey were wont to talk of the unity of interest between agriculture, commerce and industry and implicit in their thought was a sense of the agriculturists' duty to intensify production and so answer the Ricardian fears of a stagnant agriculture holding up industrial progress. Industrial society accepted the productivity increment made possible by the best endeavours of the agricultural community. When transportation technology enabled really substantial quantities of grain and meat to be imported at low prices the agricultural interest was promptly jettisoned. While the excessive optimism of some of the founders of the Royal never had any firm justification in 1882 Pusey, whose memory was still revered among agriculturists, was viewed by The Times as being little more than an idle dreamer. [2] Three years previously William Bear, Corbet's successor at the Mark Lane Express had bitterly complained of the lack of interest shown in agricultural affairs by the national press which, he claimed, devoted more attention to the Boat Race than it did to 'the finest agriculture in the world' during the whole year, and gave several columns to a 'petty suburban [horse] race - a mere book-makers' meeting' while the problems of agriculturists were virtually ignored. [3]

Postscript : The Royal Agricultural Society 1880-1906

The preceding discussion gives further amplification to the justification for the terminal date of the period examined in this thesis. A cycle of agricultural progress had come to a close and 'scientific' farming could do

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1 See Robert Trow-Smith, Society and the Land, 1953, pp.117-56.

2 18 September 1882, quoted by Linker, thesis, p.499.

3 W.E. Bear, 'The Public Interest in Agricultural Reform', The Nineteenth Century, V, 1879, pp.1079-80.

little to help agriculturists in the position in which they found themselves in 1880. Nevertheless, the Royal Agricultural Society was firmly established as a vital link between research and practice and during the 1880s continued to generate a considerable amount of information that assisted agriculturists to adapt to changing conditions. Since the early 1870s the emphasis on machinery at the shows had firmly been on labour-saving equipment and this focus of interest continued as agricultural labour-costs became a major preoccupation. Other important developments of the 1880s with which the Society was closely connected included the system of ensilage, and improved dairy technology.

The switch toward permanent pasture had gained strength during the 1870s, but an intense controversy as to the best types of grass to employ was initiated by C. De Laune Faunce-De Laune in the Society's Journal for 1882 in an article which attributed the failure of permanent pasture to seeding with rye-grass and which attacked the advice given by leading seed-firms. [1] The Society carried out a number of experiments and trials at Woburn and elsewhere under the direction of William Carruthers (who continued as the Society's Consulting-Botanist until 1909) in conjunction with J.A. Voelcker who succeeded his father as Consulting-Chemist in 1884. This work established the best types of pasture, grasses, which were found to be those which were 'nutritious, palatable, and perennial', such as cocksfoot, meadow fescue, foxtail and certain meadow grasses and clover while experiments at Woburn in 1887-1888 demonstrated the superiority of timothy over rye-grass for short leys. Other important aspects of the Botanist's work included investigations into the quality of farm

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[1] C. De Laune Faunce-De Laune, 'On Laying down Land to Permanent Grass', Journal (2), XVIII, 1882, pp.229-64.

seeds - the Society was able to obtain guarantees of purity and germination from two leading seed-firms in 1883 - and into plant diseases and parasites.[1] The fertilisation of pasture land was much aided by the employment of basic slag, a by-product of the Gilchrist-Thomas process for the utilisation of phosphatic iron-ore for steel making. The fertlising properties of this were the subject of a number of investigations during the 1880s, the results of which were presented in the Society's Journal for 1890.[2]

J. Wrightson picked out ensilage and dairying as being two developments that were particularly characteristic of the 1880s.[3] Both of these areas were the subject of extensive reports by H.M. Jenkins. Ensilage received a good deal of attention in the agricultural press in 1881 and 1882 and it was this that prompted the Journal Committee early in 1883 to persuade Jenkins to undertake a full scale survey of the system as practised at home and on the continent. His findings were published in the Journal the following year together with Augustus Voelcker's last major paper, on the chemistry of ensilage.[4] An International Dairy had been a feature of the Kilburn show of 1879 - where the Laval cream-separator was shown - and the realisation that standard British dairy practice had fallen well behind that commonplace in Denmark led to the publication in the Journal of Jenkins's report on Danish dairying which he had first prepared for the Royal Commission on Agriculture.[5] By 1890 Wrightson could claim that the best systems of making British butter and cheese were equal to those abroad, but that superior dairy practice was far

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1 William Carruthers, 'The Botanist's Work 1871-1909', Journal, 70, 1909, pp.5-1

2 Edward Kinch, 'Basic Cinder as Manure', Ibid.(3), I, 1890, pp.129-38.

3 J. Wrightson, 'The Agricultural Lessons of The Eighties', Ibid., pp.279, 285.

4 H.M. Jenkins, 'Report on the Practice of Ensilage, at Home and Abroad'; Augustus Voelcker, 'On the Chemistry of Ensilage', Ibid.,(2), XX, 1884, pp.126-46 and 482-504.

5 H.M. Jenkins, 'Dairying in Denmark', Ibid.,XIX, 1883, pp.155- 84.

from general. [1]

The dairy report was but one of a number of investigations carried out by Jenkins and the strength of the Society during the difficult conditions of the 1880s - membership exceeded ten thousand at the end of the decade - was in part a reflection of his energy and talent as well as the direct relevance of the work carried out by the Society at this time. Jenkins claimed that he was always unsatisfied with the influence of agricultural societies, the advancement of which had been his chief preoccupation since the time of his controversial appointment as the Society's Secretary/Editor. [2]

Jenkins's early death in 1886 was therefore a particularly unfortunate loss for the Society, and the years which followed were ones in which the Society experienced increasing problems. Ernest Clarke, who had a background which included the Civil Service and the Stock Exchange was appointed as Jenkins's successor from more than one hundred applicants and although he had considerable talents lacked the close interest in the practical problems of agriculture that had contributed to Jenkins's success. As Scott-Watson points out, his interests lay more in the office than on the farm, and was more concerned with the Society's standing as a great national body than with its intimate connection with the grass-roots of the agricultural community. [3] Under him the Journal contained far more historical and biographical articles than had hitherto been the case. It also became a quarterly in 1890, although this arrangement was not long maintained. Some of the yearly volumes of the early 1890s ran to over one thousand pages, and in 1892 William Fream (one of the former Cirencester

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1 'Agricultural Lessons', p.279.

2 See his remarks at the London Farmer's Clubs in discussion of Plowman's paper on agricultural societies, Journal of the Farmer's Club, December, 1885 p.84.

3 History of the Royal Agricultural Society, p.167.

lecturers who had followed Wrightson to Downton in 1879) was appointed as Editor, with Clarke as Secretary. Fream resigned in 1900, possibly because he found Clarke difficult to work with.

There are no shortage of examples of the continuing value of the Society's work in the 1890s. There was that most enduring agricultural textbook, Fream's Elements of Agriculture commissioned by the Society and the activities of the various consultants. Eleanor Ormerod's pioneering work on farm pests was continued on her retirement in 1892 by Cecil Warburton, of the University of Cambridge. The vexed question of agricultural education also made some progress with the foundation of the National Agricultural Examination Board (jointly with the Highland and Agricultural Society) in 1899 which agreed a syllabu and regulation for a National Diploma in Agriculture. The late 1890s saw something of a revival in the appreciation among agriculturists of science and education. [1] If 'science' had not helped the agricultural community much during the depression, there were ever increasing increments of agricultural knowledge to take account of, as in understanding the role of micro-organisms in soil processes and in plant and animal diseases.

The Society's affairs were, however, increasingly dominated by financial constraints. In 1893 there was a move to more spacious headquarters adjoining No.12 Hanover Square which had been occupied since 1840 and this led to a rapid increase in expenditure on rent and maintenance. In addition, general administrative expenses rose from £3,300 in 1884 to £5,700 in 1895, and with a declining membership and losses on some of the shows the financial position of the Society became increasingly precarious.

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[1] Fisher, thesis, p.92.

These expenses of the show and the difficulty of finding suitable sites in provincial localities led to a move to establish a permanent showground and after intense discussion in the Council, Park Royal in West London was purchased by the Society. Results at previous London shows had never come up to expectations and there was very little support for a London permanent showground within the agricultural community. In the event the three shows at Park Royal (1903-5) constituted the greatest misfortune the Society had ever experienced. They generated a loss to the Society of £23,978 and attendances in 1905 were only 25,978 despite the best endeavours of Jacob Wilson who was brought out of retirement to organise the show and who died a week after its conclusion. 1906 therefore saw a complete reorganisation of the Society's affairs. The peripatetic principle for the shows was revived and Ernest Clarke's services, along with the rest of the administrative staff, were dispensed with. Thomas McRow was appointed Secretary and the Journal at this time was but a shadow of its former self. In 1909, however, some financial improvement allowed K.J.J. Mackenzie to be appointed as Editor, in turn succeeded by C.S. Orwin three years later.

The problems of the Society at the turn of the century which led to what was practically a new beginning in 1906 can certainly be attributed in part to bad management - losses on the shows were, for example, obscured by their transference to the general account. The 1890s also saw a widening gulf between the Society and the agricultural community; the decision to establish the permanent London showground was attributed to the influence of the 'clique' who then ran the Society's affairs. [1] At the root of the problem, however,

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[1] A.W. Stanton, 'Decadence of Agricultural Shows', in Agricultural Annual and Mark Lane Express Almanac, 1902, p.82.

was the declining attendances at the annual country meeting which was only 68,393 at Maidstone (1899) and 87,511 at York (1900) - as against 128,117 at the same centre in 1883. [1] The Society had always depended upon its ability to attract substantial numbers of the non-agricultural public in order to maintain the financial viability of the shows and these lower attendances were a result of the changing values of society. As A.W. Stanton (then Editor of the Mark Lane Express) observed:

> the man of today expects a great deal more for a shilling than did his father and grandfather before him. His is so accustomed to cheap excursions, both to seaside and country, that his is apt to laugh at the thought of paying a shilling for the privilege of walking about all day to inspect a lot of stock tied by their heads in sheds. [2]

This was indeed a reflection of the 'contempt' with which the average fin de siècle Englishman regarded practical countrylife. [3]

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[1] See Joseph Darby, 'Reminiscences of Royal Shows', Mark Lane Express and Carlisle Supplement

[2] 'Decadence of Agricultural Shows', p.80.

[3] Cadwallader John Bates, Thomas Bates and the Kirklevington Shorthorns, 1897, p.v.

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These constitute the most important single source and have been reviewed in the body of the thesis. See particularly the discussions pp. 62-8, 249-57 and the list of titles, p. 256. The books and pamphlets are entered in the general bibliography, pp. 482 - 519.

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Session	Volume	
1821	IX	Report from the Select Committee to whom the several Petitions which have been presented to The House in this Session of Parliament, complaining of the depressed state of the Agriculture of the United Kingdom were referred.
1822	V	Report from the Select Committee appointed to inquire into the allegations of several Petitions which have been presented to The House in the last and present Session of Parliament, complaining of the distressed state of the Agriculture of the United Kingdom.
1822	V	Second Report
1836	VIII	First Report from the Select Committee appointed to inquire into the State of Agriculture, and into the causes and extent of the Distress which still presses upon some important branches thereof: Part 2.
1836	VIII	Second Report from same
1836	VIII	Third Report from same
1845	XII	Report from the Lords' Select Committee appointed to inquire into the expediency of an enactment being introduced to enable possessors of Entailed Estates to charge such Estates such a sum for the purpose of Draining and otherwise permanently Improving the same...

1857-58 XXXII Reports of the Commissioners appointed to inquire into the best mode of distributing the sewage of towns, and applying it to beneficial and profitable uses; Preliminary Report.

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1866 XXII First Report of the Commissioners appointed to inquire into the origin and nature etc., of the cattle plague: with the Minutes of Evidence, and Appendix: Second Report, with the Minutes of Evidence, and Appendix; Third Report, with Appendix.

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B VI		Minute Book, fair copy, 26 March 1805 - 20 May 1808
B XIII		Letter Book, September 1793 - 25 December 1800
B XIV		Letter Book, 31 March 1810 - 25 June 1822

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B I	9	Minute Book, Council, fair copy, 1838
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	20	Index Book to Minutes of the English Agricultural Society 1838
B VI	1	Minute Book, Journal Committee, rough copy, 1855-1869
	3	Minute Book, Journal Committee, 1869-1880
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