

Agricultural Science in Higher Education: Problems of Identity in Britain's First Chair of Agriculture, Edinburgh 1790-1831¹

By STEWART RICHARDS

By the last decade of the eighteenth century, the new 'convertible husbandry' had become widely, if unevenly, established throughout England. Improved methods of land cultivation, particularly when they were further extended in acreage by the acceleration of the enclosure movement between 1790 and 1815, and increased in efficiency by a more profit-orientated managerial organization, enabled the production of home-grown food to keep pace of a rapidly expanding population. Although this remained a period of little more than crude empirical investigation, still well before exploitation of the inorganic or 'mineral' fertilizing agents, by the turn of the century work by such men of science as Ingenhousz, Black, Priestley, Cavendish, Scheele and Lavoisier, made it evident that a revolution was under way in chemistry no less than in agriculture, and it was therefore perhaps inevitable that the one should impinge more and more on the other.

Of course, we must remember that the appalling level of general education ensured that despite the gradual accumulation of empirical data which were ultimately to provide a theoretical basis for the improvers' practice, and despite the worthy attempts to propagate this information in the journals of innumerable agricultural societies and farmers' clubs, there was little penetration to

the 'dirty-booted farmer' of the period.² It was, accordingly, not surprising that when there first emerged formal instruction designed specifically for agriculturalists, it should be at the 'upper extremity' of the educational hierarchy rather than at the lower.

Paradoxical as it may seem, it has often happened that the cause of agricultural education has suffered at the hands of successful farming practice. Such was already the case in late-eighteenth-century England, for who, it was asked rhetorically, could expect to benefit from theoretical and scientific tuition, when everywhere were to be seen the fruits of an art of husbandry which long experience showed could be acquired only by traditional forms of apprenticeship on the farm?

Such fruits as were evident in England, however, were hardly to be found north of the border. Until well after 1750, large areas of rural Scotland were blighted by poverty and barrenness. The combination of poor, thin soil, a high proportion of mountain and heath, too much water and too little warmth, presented natural problems for the agriculturalist which were formidable enough. But to these must be added the fact that the 'new farming' was far less widely established than in England. There was nowhere sufficient winter feed for stock and no opportunity to provide it from the late crops that struggled to ripen in undrained and unenclosed fields.

¹ This paper draws substantially on S A Richards, 'Agricultural Science in British Higher Education, 1790-1914', unpublished MSc thesis, University of Kent at Canterbury, 1982. Once again I am grateful to Professor Maurice Crosland, Unit for the History, Philosophy and Social Relations of Science, for his helpful advice and comments.

² G E Fussell, 'Science and Practice in Eighteenth Century British Agriculture', *Ag Hist*, XLIII, 1969, pp 7-18.

When improvements did come, the effects, measured against this depressing picture, were dramatic indeed. Fields were enclosed and drained, new and plentiful crops — notably, as in England, turnips and potatoes — were cultivated on new schemes of rotation and in soil enriched by liming and manure. As a result the stock breeders could produce newly viable strains of cattle, sheep and pigs. As Handley puts it, 'the alacrity with which the new methods were adopted was remarkable. In the short space of ten or fifteen years an agricultural revolution was effected in many places.'³ Of the several factors contributing to this rapid transformation, the most general was that agricultural improvement always represented a crucial element in the so-called Scottish Enlightenment, and that this now found a potent stimulus in the effects of the industrial revolution.⁴ As the wealth of the country rose between 1750 and 1815 with the expansion of manufactures and the iron and steel industries, so too did the demand for agricultural produce which, existing now for the first time as a surplus to local needs, could also be transported to the urban markets on the newly constructed roads. Sir John Sinclair, writing in 1813, could claim with justifiable pride that 'the foundation of improved agriculture is certainly laid in the best cultivated districts of Scotland in as great perfection as it possibly can be in any other country'.⁵

The establishment of agriculture in higher education must be seen, then, as the result of the combined influence of three factors. First, there was in Scotland during the second half of the eighteenth century, an intensity of interest in the awakening of a new farming system which was the more concentrated because of the need to make up

for much time that had already been lost. Activity was centred most notably around the Highland Society, first founded in London in 1778 for the purpose of preserving and developing the Highland culture, and established in Edinburgh itself in 1784. From an early date the Society favoured academic agricultural education, and argued that the 'diffusion of knowledge' and 'mutual communication of ideas and information' with similar bodies in England and Ireland was 'the principal object of such Institutions'.⁶

Second, the Scottish universities — in marked contrast to Oxford and Cambridge — had, during the century, established for themselves a reputation that was second to none in Europe, and Edinburgh was unsurpassed in the teaching of medicine and science. Furthermore, the Philosophical Society of Edinburgh (founded in 1732) was, by the 1780s, in many ways the intellectual centre of British science, numbering among its members several illustrious figures whose interests bordered directly upon agriculture, for example, Adam Smith the economist, Joseph Black the professor of chemistry and medicine in the university, and the geologist James Hutton.

Third, the science which had long been regarded as fundamental to agricultural improvement, namely chemistry, was also the science for which the University of Edinburgh was most renowned.

I

Given this three-fold influence, it is perhaps not surprising that we find the earliest promotion of agriculture as a subject appropriate to a university education in Scotland's dynamic capital city. The University of Edinburgh was, at the close of the eighteenth century, experiencing what has

³ J E Handley, *Scottish Farming in the Eighteenth Century*, 1953, p 213.

⁴ See J R R Christie, 'The Rise and Fall of Scottish Science'. In M P Crosland (ed.), *The Emergence of Science in Western Europe*, 1975, pp 111-26.

⁵ J Sinclair, *An Account of the System of Husbandry adopted in the more Improved Districts of Scotland*, II, 1813, p 68.

⁶ *Trans Highland Soc*, XI, 1807, pp 28-9.

been widely regarded as a golden age.⁷ In addition to Black himself, there were several scientific professors of notable distinction, among them William Cullen and Charles Hope (medicine and chemistry), Alexander Munro (anatomy), John Robinson (natural philosophy), Daniel Rutherford (botany), and John Walker (natural history). These men could enjoy, before the 1820s saw the growth of competition both at home and abroad, a sense of confidence and superiority which was a representative culmination of the wider Enlightenment spirit.

It appears that the move to introduce formal agricultural tuition had originated in mid-century with the secretary of the Society of Improvers, Robert Maxwell. In the *Select Transactions* of the Society of 1743, Maxwell lamented the fact that there was no university professor of agriculture, and argued that such a post should be held by a practical farmer who also understood the scientific principles of his subject. But he was evidently not optimistic, for in his *Practical Husbandman* of 1757 he concluded that 'there perhaps never may be in our Time, a College of Husbandry established by Authority'.⁸

The momentum generated by Maxwell must, however, have encouraged the well-known lawyer Henry Home (Lord Kames), for in 1768 he persuaded William Cullen to give some lectures to a private audience on the science of agriculture at Edinburgh. Cullen was no doubt a good choice, for he had wide interests in the application of chemistry to the arts and manufactures, as well as experience in teaching botany at Glasgow.⁹

There was still nothing more concrete to come of this development until, in 1788,

John Walker, the professor of natural history, commenced a much fuller course on agriculture which was recommended by the Highland Society for attendance by its members.¹⁰ Walker appears also to have been a man with the necessarily wide scientific interests, but while he lectured on botany, geology, hydrography, mineralogy, and zoology, as well as agriculture itself, there appears to be no record of his knowledge of chemistry.¹¹ However, by this time the idea of elevating agriculture to a chair in its own right had occurred to Sir William Pulteney, a Member of Parliament and close acquaintance of Sir John Sinclair, who was, incidentally, to die 'the richest commoner in Britain'.¹² Arthur Young had heard of this idea (if not before, then from the advertisement placed in his *Annals of Agriculture*), asking:

Why not a Professor of Agriculture in every University? that young men might be instructed how to concentrate, to one important object, the knowledge to be gained from other lectures; such as those on botany, chemistry, mineralogy, mechanics etc.¹³

But his position seems to have been ambivalent in a fashion not unknown among present-day agriculturalists. There might, he acknowledged, be some merit in studying:

those branches of chemistry, botany and mineralogy that will afterwards be of use to him. But I must own that I do not recommend the University at all; and for this plain reason; that among the great number of gentlemen I have known who were educated there, I scarcely know a single one that acquired any knowledge which is of the least use or application to the life and pursuits of a country gentleman.¹⁴

Yet it was this very inconsistency which enabled him, in echoing Maxwell, to identify the affliction which has tormented agriculture as a university discipline ever

⁷ See T C Smout, *A History of the Scottish People, 1560-1830*, 1969; N T Phillipson and R Mitchison (eds.), *Scotland in the Age of Improvement*, Edinburgh, 1970; and in particular J B Morrell, 'Science and Scottish University Reform: Edinburgh in 1826', *Brit J Hist Sci*, VI, 1972, pp 39-56.

⁸ R Maxwell, *The Practical Husbandman*, Edinburgh, 1757, p 381.

⁹ J A Cable, 'Early Scottish Science: the Vocational Provision', *Ann Sci*, XXX, 1973, p 188; W P Wightman, 'William Cullen and the Teaching of Chemistry', *Ann Sci*, XII, 1956, p 196; A Grant, *The Story of the University of Edinburgh*, II, 1884, p 394.

¹⁰ A and N L Clow, *The Chemical Revolution. A Contribution to Social Technology*, 1952, p 294.

¹¹ Grant, *op cit*, pp 432-3.

¹² R Mitchison, *Agricultural Sir John. The Life of Sir John Sinclair of Ulbster, 1754-1835*, 1962, p 168.

¹³ A Young, *Ann Ag*, XI, 1789, p 368.

¹⁴ Quoted in G E Mingay, *Arthur Young and his Times*, 1975, pp 13-14.

since. Referring to the founder of the Edinburgh chair, he remarked:

The difficulty to this excellent patriot will be the choice of his Professor; he will meet with men of science, and he will meet with men of practice, but neither separately will do, they must be united.¹⁵

It is an inherent dilemma which agriculture shares with other applied sciences, for example medicine and engineering, in which the Scots also played a pioneering role. Perhaps we should not be surprised, therefore, that two hundred years should have done little to relieve the symptoms.

II

In any event, 1790 has a notable significance for higher agricultural education in Britain, for it was in that year that Pulteney placed the sum of £1250 with the Edinburgh Town Council for the purpose of founding a chair of agriculture, the incumbent to receive, at 4 per cent interest, a salary of £50 per annum. This action created two precedents. It was the first chair in the university to be founded by a private benefactor, all previous ones having been established either by the Crown or the Town Council, and the first in agriculture at any university in the British Isles. It was, furthermore, 'a prime example of professionalisation facilitated by the patronage of landed gentry'.¹⁶

The man duly appointed, Dr Andrew Coventry of Shanwell (1764-1832), had little need of the modest stipend. He was the eldest son of the Minister of Stitchell, but his independent means were enjoyed by virtue of inheritance through his mother of the estates of Shanwell, near Kinross. Coventry had taken an MD degree at Edinburgh in 1783, but devoted himself to progressive farming, becoming in due course acknowledged as 'the first authority on Agriculture in Scotland'.¹⁷ From the beginning, there was controversy over his

appointment. The College Bailie expressed concern that the rights of the Town Council might be prejudiced by a private individual's having founded the chair; the professor of natural history (Walker) protested that the new chair should not be allowed to interfere with his rights to teach 'any branch of Natural Science'; and the professor of botany (Rutherford) reacted to this in turn with the counter-claim that the professor of natural history did not have the right to teach botany. Finally Coventry himself was anxious that he alone should enjoy the privilege of giving 'a separate course of Georgical lectures'.¹⁸

These internecine disputes serve to remind us not only that Edinburgh professors at the time were largely dependent upon students' fees for their remuneration, and consequently felt threatened by the appearance of a rival, but also of the wide-ranging, not to say elusive nature of Coventry's subject. His position appears, indeed, to have been decidedly insecure, even though by modern standards, least of all by those of the time, he seems to have served his university diligently for forty-one years.

We can gain some appreciation of his anxieties from the testimony he gave to the Royal Commission of Inquiry into the Scottish Universities, which took exhaustive evidence during the years 1826 to 1830.¹⁹ The Commission was established by the then Home Secretary, Robert Peel, to investigate 'certain irregularities, disputes, and deficiencies . . . in the Universities of Scotland, calculated to impair the utility of these establishments'.²⁰ It was evidently a reflection of Peel's concern over the academic and administrative problems being experienced at all five universities at the time, and in particular over the power

¹⁵ Young, *op cit.*

¹⁶ S. Shapin, 'The Audience for Science in Eighteenth Century Edinburgh', *Hist Sci*, XII, 1974, p 113.

¹⁷ Grant, *op cit*, II, p 456.

¹⁸ E Shearer, 'Edinburgh University and Edinburgh College of Agriculture', *Ag Progress*, XIV, 1937, pp 173-4.

¹⁹ *Report of the Royal Commission of Inquiry into the State of the Universities of Scotland*, BPP 1831, XII.

²⁰ *Report*, *op cit*, p 1.

struggles at Edinburgh between the Senate and the Town Council.

Coventry produced as the syllabus of his lectures his *Discourses Explanatory of the Object and Plan of the Course of Lectures on Agriculture and Rural Economy* which had been published in Edinburgh in 1808. In other circumstances this, together with the weight of thirty-seven years in the chair, might have been regarded as evidence enough of his impeccable credentials, but the Commission adopted what now looks like an inquisitorial, even a hostile, position, so that Coventry felt obliged to utter a number of defensive rationalizations.

I have given, I believe, more Lectures in one Course than any other Professor in the University. I have had sometimes 140 lectures, having part at double hours . . . [and] . . . give to all the students a pamphlet, containing notes upon some difficult parts of the subject or those too minute in detail for them to follow in a Lecture.²¹

After the better part of a lifetime in office Coventry was still not free of 'demarcation disputes' with his colleagues. Thus he gave:

lectures upon the Structure and Economy of Plants, but only with respect to the application of that subject to Agriculture; I do not take notice of anything that belongs to the Botanical class, but I do of everything that could be turned to use in Practical Agriculture; and so with the observations on the atmosphere and its variations.²²

In their *Report* of October 1831 the Commissioners made little attempt to hide their critical attitude. Choosing to deal with agriculture at the bottom of their comments on the Faculty of Medicine, they remarked somewhat scornfully that 'as there is a peculiarity in the mode of teaching it, it may be subjoined to the account of the different classes connected with the three faculties'.²³ This 'peculiarity' — the enormous breadth of subject matter that must be covered — is of course familiar enough to the modern agriculturalist who not uncommonly finds

himself the poor relation of the 'purer', more established, and more clearly identifiable sciences, while claiming for himself special competence only in an uneasy conglomerate of disciplines among which he is 'master of none'. Coventry himself seems to have felt this, and he was vulnerable in another respect also; at least in public he could afford to pay no more than the customary obeisance to the scientific foundations of his subject, lest he risk alienating the bulk of the farming community by showing his true colours to be 'merely academic'. Thus while chemistry and botany 'would be requisite for any person wishing to understand Agriculture in a full and proper manner', he should also 'know something about practical affairs', for this, at the end of the day, was likely to count for more than 'knowing anything about the finer opinions on the subject of Agricultural Chemistry, delivered by Sir Humphrey [sic] Davy and some others'.²⁴

Coventry's other weakness was ruthlessly exposed by the Royal Commission. The size of his class had fallen from over seventy to about thirty students during his term in office, but the decline, pleaded the professor, was:

owing partly to the circumstances of the time. There are many that [have] spoken to me . . . of their intention to send their sons to the class; but from the change in conditions of the tenantry of late, they put off doing so.²⁵

In view of the devastating slump which had overtaken agriculture since the end of the Napoleonic Wars (the latter having been a stimulus to innovation and productivity), this seems a fair point; a nascent agricultural education could hardly be expected to achieve immunity at a time when not just money (the class fee for agriculture was four guineas) but food itself was in short supply. Moreover, a class which in thirty years had never fallen below thirty in number must surely be taken — more especially in view of

²¹ Evidence taken before the Commissioners of the Universities of Scotland, BPP 1837, XXXV, p. 561.

²² *Ibid.*

²³ *Report*, *op cit.* p. 152.

²⁴ Evidence, *op cit.* pp. 561-3.

²⁵ *Report*, *op cit.*

the fact that its subject was available neither for graduation nor ordination — as evidence of the initiative's considerable success.

III

As to the important matter of the contents of Coventry's course and to the way it was delivered, the *Report's* findings speak for themselves:

The Subject of the Course of Study embraces all that relates to Agriculture and the management of Live Stock, with various discussions relating to Rural Economy . . . No preliminary Course of Study is ordered, or deemed requisite, none having been ever at the class who were not qualified to understand what was delivered. It is, however, generally wished that pupils should previously have attended Chemistry, Botany, Natural History and Mechanical or Natural Philosophy. There are no Examinations of the Students; but they have been asked to write upon any subject which they heard discussed in the Lectures, or which they thought connected with the subject.²⁶

All this seems eminently reasonable. At the time, all Edinburgh professors, not just Coventry, had complete legal monopoly over their subjects and seldom required any entrance qualifications from their students. Furthermore, non-graduating students had complete freedom to study whatever they chose. Thus the hostility to Coventry was not motivated by any dissatisfaction with his own performance, but rather by unresolved doubts as to the academic merits of his subject.

In addition to the volume already mentioned, our first professor of agriculture also brought out a small treatise on *The Succession of Crops and Valuation of Soils*, and it has been suggested that Coventry's influence was perhaps reflected in the early 'soil surveys' of the Edinburgh area.²⁷ More direct evidence of his influence, and an indication that chemistry was more important to him than he felt it politic to reveal, comes from no less an authority than

Humphry Davy himself. In the introduction to his *Agricultural Chemistry* (1813), Davy refers to the *General Report of the Agriculture of Scotland* (edited by Sinclair and first published in 1812), regretting that it had appeared too late for him to use.

Had it been in circulation before, I should have profited by many statements given in it, particularly those of the opinions of the enlightened Professor of Agriculture in the University of Edinburgh; and I should have dwelt with satisfaction on the importance given to some chemical doctrines by his experience.²⁸

Unfortunately, the approval of one who had popularized agricultural science rather than advanced its practical utility, was hardly sufficient to provide for Coventry the succour that he needed in official, not to say in farming, circles. Few agriculturalists believed academic instruction to be either a viable alternative, or even a useful supplement, to prolonged experience on the farm. In any case, such scientific expertise as might conceivably be profitable could be acquired simply by attending the ordinary classes already available in the university on chemistry, natural history, geology, engineering and the like. No agricultural faculty or department *per se* was desirable, for agriculture was a practical art, not a theoretical science, and as such could never lend itself appropriately to study at the university. To make matters worse for Coventry this view was, of course, one which recruited wide support among his own colleagues in the university, although for the quite different reasons of apprehension and disdain.

IV

Given the opposition from all quarters, it was surprising that the Edinburgh chair survived at all. While the prestige of agriculture had stood high in the decades around the turn of the century, it suffered a

²⁶ *Report*, *op cit*, p 152.

²⁷ R Somerville, *General View of the Agriculture of East Lothian*, 1805, p 279.

²⁸ H Davy, *Elements of Agricultural Chemistry*, 1813, p iv.

precipitous fall in the wake of the colossal National Debt which followed 'victory' in the French Wars, a tragic situation which had been documented by several Select Committees before 1840. This depression was now reflected in the state of agricultural science, which in Britain passed through a relatively quiescent period between the seminal publications of Davy (*Elements of Agricultural Chemistry*, 1813) and Liebig (*Organic Chemistry in its Application to Agriculture and Physiology*, 1840). In the absence of a lively atmosphere of discovery

and debate, it was the more difficult to promote a role for agriculture in formal education. Although in the event no action was taken against the Edinburgh chair (David Low succeeding Coventry when the latter retired in 1831), the attitude assumed by the Royal Commission is as revealing as any of the parlous condition into which the rural interest had declined. It required a new generation of teachers and experimentalists, with new energy and new ideas, if a successful rescue operation were to be mounted.