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## James Cossar Ewart and the Origins of the Animal Breeding Research Department in Edinburgh, 1895–1920

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**Abstract.** In 1919 the Animal Breeding Research Department was established in Edinburgh. This Department, later renamed the Institute of Animal Genetics, forged an international reputation, eventually becoming the centrepiece of a cluster of new genetics research units and institutions in Edinburgh after the Second World War. Yet despite its significance for institutionalising animal genetics research in the UK, the origins and development of the Department have not received as much scholarly attention as its importance warrants. This paper sheds new light on Edinburgh's place in early British genetics by drawing upon recently catalogued archival sources including the papers of James Cossar Ewart, Regius Professor of Natural History at the University of Edinburgh between 1882 and 1927. Although presently a marginal figure in genetics historiography, Ewart established two sites for experimental animal breeding work between 1895 and 1911 and played a central role in the founding of Britain's first genetics lectureship, also in 1911. These early efforts helped to secure government funding in 1913. However, a combination of the First World War, bureaucratic problems and Ewart's personal ambitions delayed the creation of the Department and the appointment of its director by another six years. This paper charts the institutionalisation of animal breeding and genetics research in Edinburgh within the wider contexts of British genetics and agriculture in the early twentieth century.

**Keywords:** Edinburgh, History of genetics, Biology, James Cossar Ewart, Animal breeding, Animal genetics, Agriculture

After more than a decade of effort and negotiation, the Animal Breeding Research Department (ABRD) was founded in Edinburgh in 1919, one of a number of government-funded agricultural research institutes around Britain. The Department, renamed the Institute of Animal Genetics in 1930, forged an international reputation that influenced the situating of new genetics research units and institutions in

Edinburgh after the Second World War, including the predecessors of the current Roslin Institute (Robertson, 1983).<sup>1</sup> Despite this importance in the history of European genetics, the ABRD has not received as much scholarly attention as it might, nor certainly as much as archival sources allow.<sup>2</sup> This is surprising given its early origins as well as its exclusive focus on animal breeding (Marie, 2004, p. 86), which makes it a prime institution for comparison and contrast within a historiography that has been somewhat dominated by plants.<sup>3</sup> The recent cataloguing of the papers of James Cossar Ewart (1851–1933) presents an opportunity to shed new light on the origins and development of this expertise in Edinburgh.<sup>4</sup>

Born in the town of Penicuik, Midlothian, Ewart studied medicine at the University of Edinburgh, where he went on to become Regius Professor of Natural History from 1882 until his retirement in 1927. He was a consistent advocate for improvements in the University's provision for science and medicine, and founded new departmental lectureships in embryology and invertebrate zoology, as well as genetics (Marshall, 1934, p. 190).<sup>5</sup> He was also part of a network of individuals who were influential supporters of animal breeding and genetics in Edinburgh, including the agriculturalist Robert Wallace and the phys-

<sup>1</sup> See also Michael McKeen, undated, "A Brief History of the Roslin Institute." From EUA IN23, Records of the Roslin Institute and predecessor institutions, Edinburgh University Library Special Collections (hereafter EUL).

<sup>2</sup> The origins of the ABRD have only been covered in any depth by a number of internalist accounts (Bulfield, 2000; Crew, 1971; Robertson, 1983) and an unpublished study by Deacon (1971), "The Institute of Animal Genetics at Edinburgh – the first twenty years," EUA IN1/ACU/A1/5/5, Records of the Institute of Animal Genetics, EUL. Historians of science have tended to focus on genetics in Edinburgh during the 1920s and 1930s (Marie, 2004; Olszynko-Gryn, 2014) or the post-1970s periods (García-Sancho, 2015; Myelnikov, accepted).

<sup>3</sup> For studies of British genetics in relation to plant breeding see Berry (2014a), Charnley (2011), Olby (2000) and Palladino (1993, 2002).

<sup>4</sup> The papers of James Cossar Ewart and other collections relating to animal genetics in Edinburgh have recently been fully catalogued as part of the Wellcome Trust Research Resources-funded project "Towards Dolly: Edinburgh, Roslin and the Birth of Modern Genetics." There is also a large digitised collection of photographic glass slides, many of which belonged to Ewart (Coll-1434, EUL). See collections.ed.ac.uk/towardsdolly.

<sup>5</sup> Marshall's biographical memoir for the Royal Society remains to date the most comprehensive source of information on Ewart.

iologists F.H.A. Marshall and Edward Sharpey-Schafer.<sup>6</sup> Throughout his career Ewart maintained an international correspondence with a range of contacts, from biologists to breeders, zoologists to big game hunters and small farmers to the landed gentry. He was well connected on personal as well as professional levels; his three marriages related him to Sharpey-Schafer and two Edinburgh University Principals, Sir William Turner and Sir William Muir.

While previous historical assessments of Ewart have focused on his cross-breeding experiments and his cultivation of public audiences for his research (Ritvo, 2004; Burkhardt, 1979), thus far he has remained a marginal figure in the history of genetics. However, recently catalogued archival sources reveal the central role he played in the development of Edinburgh as a site for animal breeding and genetics. At a time when scientists throughout Britain were looking to build infrastructure for the investigation of heredity and variation, Ewart established an independent experimental station to conduct breeding work. He went on to secure institutional affiliation for this work by leasing a farm which later became the University's Scientific Animal Breeding Station. The establishment of a genetics lectureship at the University in 1911, in which Ewart was instrumental, further strengthened the transition of breeding work from private spaces towards an institutionalised academic environment. The decision by government funders to locate the ABRD in Edinburgh in 1919, despite competing claims from Cambridge, reinforced this transition. Yet despite his role in the ABRD's establishment, Ewart was partly responsible for delaying the appointment of its director, and it would be several years before Edinburgh actually began to build an international reputation as a major centre for genetics research.

Ewart's establishment of research sites provides a valuable investigative lens with which to focus on the institutionalisation of genetics in the UK. The spatial shifts of this work, from domestic site to university farm to full department, could be seen to mirror the wider discipline- and institution-building taking place within genetics during the early

<sup>6</sup> Robert Wallace (1853–1939), Professor of Agriculture and Rural Economy, instituted courses in forestry, agricultural entomology and an honours degree in agriculture and established the Edinburgh Incorporated School of Agriculture. Edward Sharpey-Schafer (1850–1935), Professor of Physiology from 1899, played a founding role in the science of endocrinology, discovering adrenalin and helping to coin the term insulin. F.H.A. Marshall (1878–1949) worked as assistant to both Ewart and Sharpey-Schafer and went on to have a pioneering role in reproductive physiology at the University of Cambridge.



Figure 1. The Bungalow, Penicuik, c.1900. Reproduced courtesy of Stenlake Publishing

twentieth century.<sup>7</sup> Other historians focusing on the organisational arrangements and settings for British genetics have demonstrated that, as an emerging scientific discipline, the spaces for genetics research were often domestic and rural rather than metropolitan and institutional (Richmond, 2006; Opitz, 2011). This was partly a result of the fledgling science's *arriviste* intellectual status and partly the unique spatial and technical requirements of plant and animal breeding experiments (Richmond, 2006, p. 597). Ewart's independent research station pre-figured the "country house" arrangement later adopted at sites such as Whittingehame Lodge in Cambridge and the John Innes Horticultural Institution at Merton Park, Surrey (Opitz, 2011, pp. 80, 90). Yet breeding and genetics in Edinburgh would develop in distinctly different ways. While the latter two centres had their origins in private benefaction, the ABRD would emerge as part of a network of state-supported research institutes (Olby, 1991). This government support would be secured despite the concentration of funds and powerful social networks in the capital and the south-east of England. Moreover, Ewart's work as a zoologist and experimental animal breeder steered the direction of genetics in Edinburgh towards an animal breeding context as distinct from the predominant focus on plant breeding and horti-

<sup>7</sup> Building on Richmond's research into the domestic and familial aspects of early genetics (2006), Berris Charnley characterises this as a transition from the "cottage-industry nature of early Mendelism" to "a moderately funded system of research institutes" (Charnley, 2011, p. 28).

culture at other institutions. The ABRD is therefore an important case study for positioning animal breeding within the wider development of British genetics.<sup>8</sup> Furthermore, its status as a government-funded institute must be analysed within the context of the growing institutionalisation of, and state support for, agricultural science in the early twentieth century (Berry, 2015; Charnley, 2011; Kraft, 2004; Smith, 1998).

### 1895–1910: The Quest for a Biological Station

In 1895, after 13 years living in Edinburgh, Ewart moved the ten miles back to his native Penicuik and commissioned a sizeable property which he christened “The Bungalow” (Figure 1). This was to be more than just a home, however. Ewart rented additional land in order to erect extensive stabling to house a number of experimental animals, and also negotiated the use of 25 acres of ground on the Penicuik House estate.<sup>9</sup> This enabled him to embark on what would be his most well-known work breeding zebra-horse hybrids, which he branded the “Penycuik Experiments” (Ewart, 1899).<sup>10</sup> This research, which Ewart chiefly funded himself, aimed to investigate various theories around heredity current at the time such as telegony, reversion, prepotency and the effects of inbreeding.<sup>11</sup> Yet Ewart was also interested in the potential practical benefits of cross-breeding work for agriculture and industry; for example, the use of zebra hybrids for transport and artillery

<sup>8</sup> With the exception of Marie (2006), there are few studies which do this in a comparable way to, for example, German (Harwood, 1993) and American contexts (Rosenberg, 1976; Kimmelman, 2006).

<sup>9</sup> A newspaper report at the time described the Bungalow as “a fine suite of buildings...in the late seventeenth century style of architecture, being composed partly of brick and wood, with rough cast terra cotta and other panels, and roofed with red English tiles. The experimental station is situated immediately behind the main block, forming a square of loose boxes, with ample courtyard accommodation.” “The Hybrid Zebra at Penicuik. Professor Cossar Ewart’s Experiments,” *The Evening Dispatch*, 4 September 1896. From Coll-14/6/4, Papers of James Cossar Ewart, (hereafter JCE), EUL).

<sup>10</sup> Ewart preferred the antiquated spelling “Penycuik” to the modern adoption of “Penicuik.”

<sup>11</sup> In 1898, Ewart recorded spending between three and four thousand pounds of his own money on these experiments, although he did manage to attract small grants from the Royal Society, the University of Edinburgh and individual benefactors. Ewart to the Moray Bequest, 24 November 1898, Coll-14/9/4/25, JCE, EUL. For more on these experiments, see Burkhardt (1979).

throughout the Empire (Ewart, 1899, pp. 18–19). At a time when many scientists were increasingly invested in demonstrating the practical applications of their research, Ewart maintained consistent agro-industrial connections, from his early role as scientific adviser to the Fishery Board of Scotland to his later involvement in government livestock improvement strategies.<sup>12</sup> The “Pencyuik Experiments” are particularly significant as Ewart’s first major foray into animal breeding. Ewart’s focus on animal (particularly livestock) breeding, with close ties to agriculture, would develop over the coming decades and help shape the direction of genetics work in Edinburgh.

More immediately, Ewart’s establishment of an experimental station arose at a time when many biologists were discussing the need for a site upon which to conduct scientific investigations into heredity and variation.<sup>13</sup> This task formed part of the remit of the Royal Society Committee for Conducting Statistical Enquiries into the Measurable Characteristics of Plants and Animals, set up in 1894 with Francis Galton as Chairman.<sup>14</sup> William Bateson, who joined the Committee in 1897, was recorded as saying that:

[t]he primary object of such an institution should be the maintenance of investigations which require to be continued for long periods of time. Of these the most important would certainly be an attempt to determine accurately by experimental breeding the laws of inheritance in animals & plants...Work of the kind contemplated should of course be begun simultaneously in both animals & plants.<sup>15</sup>

However, indecision plagued the Committee’s discussions from start to finish. Location and institutional affiliation were the major questions:

<sup>12</sup> For more on the burgeoning interest in the practical applications of biology during the late nineteenth and early twentieth centuries, see DeJager (1993), Kraft (2004) and Vernon (1997).

<sup>13</sup> For more on the diverse set of theories and hypotheses encompassed by the term “heredity” at the turn of the twentieth century, see Müller-Wille and Brandt (2016).

<sup>14</sup> The scope of the Committee as agreed in 1897 also encompassed the collection of data relating to Heredity, Variation, Hybridism and “other biological phenomena requiring continuous observations” and the establishment of a Sub-Committee to confer with breeders. Inbreeding, prepotency and telegony were also areas of study (Cock and Forsdyke, 2008, pp. 158–159). In 1897, the Committee was reconstituted as the Royal Society Evolution (Animals and Plants) Committee.

<sup>15</sup> “Approx copy of paper sent to E.H. Darwin,” 21 July 1899, Add.8634/H.74, William Bateson: Scientific Correspondence and Papers, Cambridge University Library, Department of Manuscripts and University Archives (hereafter WB, CUL). Quoted with permission from the Syndics of Cambridge University Library.

should the site be based on privately-owned land, or on the grounds of a particular institution?<sup>16</sup> The insistence of Bateson and others that animals and plants must be studied together also imposed practical problems which contributed to the stalemate. This indecision was symptomatic of a general uncertainty as to the nature of the site; was it to be a purely scientific institution, or more of an agricultural station?<sup>17</sup> Hints of this identity crisis can be discerned in proposals for a name for the site. Galton's preference for a "phylometric" station accorded with his quantitative scientific approach while other suggestions that it be an "Evolutionary" or "Darwinian" station implied an overarching focus on evolutionary theory.<sup>18</sup> A "biological farm," meanwhile, had more explicit agricultural connotations. In any case, still no progress had been made by the turn of the century, despite the fillip experienced in studies of variation by the rediscovery and reinterpretation of Mendel's research. In 1902 the American zoologist Charles Otis Whitman called this still hypothetical site "one of the great desiderata of biology." At the same time, Whitman singled out Ewart's station in Penicuik as making the "most notable move in this direction" (Whitman, 1902, p. 214).<sup>19</sup>

This is not to suggest that Ewart was the only scientist independently creating spaces for breeding work. Throughout Britain, the lack of facilities and support within many academic and institutional locations led to a dispersal of research across a "distributed geography of sites"

<sup>16</sup> Potential sites under discussion were Charles Darwin's former house at Down, Kent, the Royal Horticultural Society's site at Wisley, Surrey and the gardens of the Zoological Society of London.

<sup>17</sup> Among the suggestions Galton received for desired facilities were greenhouses, facilities for keeping insects and birds, and proximity to the sea or a lake to facilitate marine investigations. See "Correspondence Regarding a Possible Experimental Farm," GALTON/2/5/4/2, Francis Galton Papers, University College London (hereafter FG, UCL), quoted with permission. Available online at Wellcome Library Digital Collections. <http://wellcomelibrary.org/collections/digital-collections/makers-of-modern-genetics/digitised-archives/francis-galton/#?asi=0&ai=129&z=-0.0001%2C-0.1912%2C1%2C1.1728>. Accessed 15 January 2017.

<sup>18</sup> Francis Darwin to Francis Galton, 8 December 1896, GALTON/2/5/4/2/6, FG, UCL.

<sup>19</sup> Whitman was writing at a time when American universities and state-funded agricultural experimental stations were burgeoning. 1904 saw the establishment of the Carnegie Station for Experimental Evolution at Cold Spring Harbor, New York, which received an annual £4,000 endowment to conduct genetics research with plants and animals. Two years later, the Adams Act provided further state support for the land-grant colleges and agricultural stations first supported by the Hatch Act of 1887 (Rosenberg, 1976, pp. 173–195).



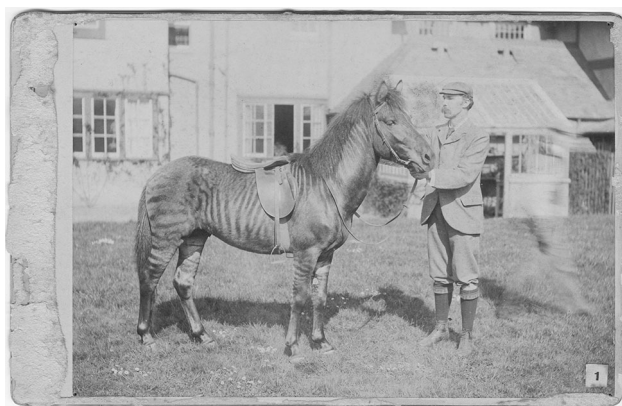


Figure 2. James Cossar Ewart with zebra-horse hybrid at the Bungalow, c.1900. Reproduced courtesy of the University of Edinburgh

(Opitz, 2011, p. 79).<sup>20</sup> At Cambridge for example, Bateson and colleagues utilised domestic spaces to maintain their stocks of plants and animals, as well as negotiating access to University sites.<sup>21</sup> Arthur Dukinfield Darbishire carried out his well-known mice-breeding experiments at facilities in Balliol College, Oxford and later Owen's College, Manchester, as well as keeping rabbits, peas and fowls at his family home in Oxford (Wood, 2015, p. 21). Then there were the breeders who were not academically affiliated but had access to private land. C.C. Hurst, for example, conducted breeding research with plants and animals at his family nurseries in Leicestershire.<sup>22</sup> This use of private space has been characterised as the “domestication of heredity,” which helped to foster “a sense of place and belonging” at a time when genetics was a marginal sub-field of biology struggling for intellectual and institutional legitimacy (Richmond, 2006, p. 597).

Certainly, Ewart's relocation to the Bungalow coincided with his growing dissatisfaction with the University of Edinburgh's support for scientific research. Ewart's professorship placed him in a strong position to advocate for improvements in teaching and facilities. In an 1895

<sup>20</sup> For more on the “limited institutional base of British science” in this period, see Kevles (1980, p. 449).

<sup>21</sup> These sites included at various times the kitchen garden of St John's College, a rented allotment at Cambridge Botanic Garden, breeding cages in the Department of Animal Morphology, Cambridge University's farm at Impington as well as Bateson's own house and land at Grantchester (Opitz, 2011, p. 79).

<sup>22</sup> In 1909 Hurst converted this facility into the Burbage Experimental Station.

document titled “Notes on Research Work at the University of Edinburgh,” he complained that:

it has become almost inexplicable to many that Edinburgh has taken so small a share during recent years in extending the bounds of science, especially in some of the more progressive departments...It is well known that Edinburgh has splendid material to work on, has extensive laboratories, and a number of Professors with a world-wide reputation. Why then has she failed to live up to what might be called the international University standard?<sup>23</sup>

He argued that science teaching at the University had for decades been hampered by a lack of classroom and laboratory space as well as funding. Ewart himself had made efforts to reorganise and improve the teaching and museum facilities in the Natural History Department upon his appointment in 1882 (Marshall, 1934, p. 189). By 1893 progress was made with the institution of a Faculty of Science and, in 1895, the introduction of the DSc degree and creation of Research Fellows (Birse, 1994, p. 88). Yet Ewart still felt that the University focused too closely on efficiency in teaching and neglected research. Although his experimental station afforded him considerable autonomy, Ewart’s continued lobbying of the University over the years to come testifies to his belief in the importance of institutional affiliation for scientific research.

Ewart was also becoming frustrated at the lack of progress made by the Royal Society Committee. In December 1896 he wrote to Galton, proffering his apologies for not being able to attend the next meeting. In his absence, he stated somewhat pointedly, “I sincerely trust it may be decided to proceed in the direction of obtaining a Zoological farm,” making reference to work being conducted elsewhere:

It seems to me that much could be accomplished by organisation. Already various County Councils have started experimental farms and the Glasgow Technical College have enlisted the actual co-operation of some 30 farmers in the west of Scotland. Given an experimental station with an efficient Director or Secretary I believe many would either wish to work at it, have work done on it or have as it were their studs (all of which are more or less experimental)

<sup>23</sup> “Notes on Research Work in the University of Edinburgh,” February 1895, Coll-14/5/3, JCE, EUL.

affiliated to it. If I can be of any use at this great distance I shall be very pleased.<sup>24</sup>

Ewart's reference to a "great distance" suggests that he felt marginalised by not always being able to attend the Committee's meetings in the south of England. More significantly, the organisational models to which Ewart refers – the regional council and the technical college – imply a willingness to localise activity and exploit regional resources, not necessarily within a university context. In February 1897 he suggested to Galton that, "being so far from London," it might be sensible to create a "Scottish Subcommittee" consisting of Royal Society Fellows and representatives from Midlothian County Council and the Highland Agricultural Society. This Subcommittee would, he suggested, be free to draw up a scheme of breeding work for the approval of the main Committee and be in charge of sourcing funding.<sup>25</sup> Galton's reply, if any, appears not to have survived, and research on the subject suggests that nothing came of this proposal.<sup>26</sup>

Ewart's notable efforts to publicise his experimental station can therefore be viewed as a strategic and deliberate localising of animal breeding within a Scottish regional context, just as he had named his "Penicuik Experiments" after their location. The Bungalow's reputation expanded from local notoriety (Penicuik residents affectionately nicknamed Ewart's zebra hybrids "tartan cuddies") to national and international regard, as it began to be visited by a variety of researchers (Marshall, 1934, p. 192).<sup>27</sup> F.H.A. Marshall, who became Ewart's assistant in 1903, later recalled his own "lasting sense of gratitude" to Ewart "for the facilities he enjoyed at the Penicuik experiment station... at a time when such facilities did not exist elsewhere" (Marshall, 1934, p. 194). Yet Ewart went further than appealing purely to the research

<sup>24</sup> Ewart to Francis Galton, 3 December 1896, GALTON/2/5/4/2/10, FG, UCL. Ewart may be referring in part to Cockle Park Experimental Farm, leased by Newcastle County Council from the Duke of Portland in 1896 for use by the newly formed Department of Agriculture at the University of Durham, and Glasgow and West of Scotland Technical College, which was formed in 1887 with an agricultural department which later became part of the Scottish Agricultural College.

<sup>25</sup> Ewart to Galton, 15 February 1897, GALTON/2/5/4/2/10, FG, UCL. Ewart also suggested a similar sub-committee for Ireland.

<sup>26</sup> The issue of Ewart's location remained a persistent one. When invited to serve on the Committee again by Bateson in 1900, Ewart agreed with pleasure, but added the following request: "May I ask you when fixing your meetings to remember Edinburgh is not as near London as Oxford or Cambridge." Ewart to Bateson, 4 May 1900, 318, John Innes Archives, courtesy of the John Innes Foundation.

<sup>27</sup> "Cuddies" is a Scots term for a donkey or horse.

community by launching a “broad-based and promiscuous” publicity campaign (Ritvo, 2004, p. 336). Exploiting the novel incongruity of keeping a menagerie of exotic animals in a small Scottish town, Ewart transformed the Bungalow into a visitor attraction. He offered tickets at two shillings each for up to a hundred visitors at a time, including afternoon tea and a return train ticket to Edinburgh.<sup>28</sup> He was also keen to use new technology in communications, sending photographs of his animals to journalists and inviting them to visit, which often led to favourable press coverage.<sup>29</sup> While Ewart may have felt marginal to discussions taking place elsewhere, he nevertheless capitalised on the opportunity to establish Edinburgh as a distinctive location for animal breeding work (Figure 2).

Publicity also helped attract the funding Ewart needed to support his work. Ewart’s correspondence shows him utilising his network of wealthy and often aristocratic contacts to garner piecemeal support for his projects.<sup>30</sup> One of his regular supporters was Alice Blanche Balfour, of the socially and politically influential Balfour family. Herself a skilled entomologist, Alice regularly donated funds to Ewart for his experiments and enthusiastically recommended his work to prominent personages such as Lord Kitchener and Lord Walter Rothschild.<sup>31</sup> In 1899 her brother Arthur, then leader of the Conservative Party (and who would have an important influence on the development of genetics at Cambridge) donated £500 to support Ewart’s horse breeding experiments.<sup>32</sup>

Yet it was clear that the Bungalow was not a practical or financially sustainable substitute for the “biological station” being discussed on a national scale. Nor could it sustain a varied programme of research which a bigger, more self-sufficient station would allow. Ewart continued to lobby the University of Edinburgh for support whenever the

<sup>28</sup> Bound album of press cuttings for 1896–1899, Coll-14/6/4, JCE, EUL.

<sup>29</sup> See Press Cuttings, 1895–1899, Coll-14/6/3-4, JCE, EUL.

<sup>30</sup> Ewart was by no means alone in this; William Bateson, for example, also relied regularly upon aristocratic beneficiaries to support his work, particularly prior to his appointment to the Chair of Biology at Cambridge in 1908 (Opitz, 2004, pp. 80–81).

<sup>31</sup> Alice Blanche Balfour to Ewart, 1 March 1900, Coll-14/9/6/6; 27 December 1902, Coll-14/9/8/123, JCE, EUL. For more on Alice Balfour, see Opitz (2004).

<sup>32</sup> F.S. Parry to Ewart, 29 June 1899, Coll-14/9/5/28, JCE, EUL. While it is better known that the Balfours’ close Cambridge connections proved influential to the development of genetics in that University, it is also significant that their country seat was at Whittingehame House, East Lothian, Scotland. Isaac Bayley Balfour, brother to Arthur and Alice, was Professor of Botany at the University of Edinburgh between 1888 and 1922 and sat alongside Ewart on the University’s Faculty of Science Committee.

opportunity presented itself. In 1903 he was appointed Convenor of a Research Committee established by the University Senate to investigate potential Carnegie Trust funding for research work in the departments of Science and Medicine.<sup>33</sup> Reporting his findings, Ewart concluded that the present facilities within the University were inadequate for both medical and biological research:

For the study of Heredity and variation...the facilities are quite as inadequate as for the study of the relationships between micro-organisms and disease. To provide facilities for these and other lines of research it is necessary that the University should have at its disposal some open space in the country on which buildings suitable for keeping animals in a state of health might be erected...[W]ithout the facilities of the kind indicated, most important fields of research will remain closed to the University of Edinburgh.<sup>34</sup>

He recommended that the University acquire grounds and buildings on a lease, estimating the initial capital expenditure at £400 with annual salary, rent and upkeep costs of £600. The University Court expressed their willingness to undertake the management of the Station in theory, but only “if sufficient funds for its establishment and maintenance” could be provided by external parties.<sup>35</sup> This attempt to secure both a site and funding was ultimately unsuccessful, despite the favourable intervention of both Alice and Arthur Balfour.<sup>36</sup>

With institutional support not forthcoming, a plea for public benefaction was sounded at a meeting of the Royal Society of Edinburgh on 7 March 1904, and was summarised the following day in the *Scotsman*. This meeting brought together Ewart, F.H.A. Marshall, Sharpey-Schafer and the Liberal politician Sir Thomas Gibson-Carmichael to make a collective case for a “research institute as an aid to biological research” to be established “in the vicinity of Edinburgh.” This insti-

<sup>33</sup> The Carnegie Trust for the Universities of Scotland was established in 1901 by the philanthropist and industrialist Andrew Carnegie to provide funding for Scottish universities, students and staff.

<sup>34</sup> “Extract from Minutes of Senatus Academicus of date 28 March 1903,” Coll-14/5/6, JCE, EUL.

<sup>35</sup> University of Edinburgh Court Minutes, 13 April 1903, EUA IN1/GOV/CRT/MIN, EUL.

<sup>36</sup> Alice Blanche Balfour to Ewart, 6 July 1903, Coll-14/9/9/71, JCE, EUL. Alice evidently persuaded Arthur (who was by then Prime Minister) to recommend the Research Committee’s proposition of a research farm to Lord Elgin of the Carnegie Trust, albeit to no avail.

tute, it was suggested, would investigate Galtonian and Mendelian theory, the physiology of breeding and the effects of inbreeding on domestic animals. Letters of support were read from William Bateson and others, some of which also emphasised the potential benefits of such a farm to pharmacological and pathological research. Reference was made to comparable medical and scientific work being carried out at field laboratories in Europe and the United States and “centres of scientific activity” elsewhere in Britain, such as London, Cambridge, Liverpool and Manchester. Finally, the speakers appealed to private benefactors to support the scientific and “industrial well-being of the country.”

There was little reason to expect that the Government would aid in providing for the requirements that had arisen, and it was therefore to be hoped that private and public-spirited liberality would enable Edinburgh to engage much more effectively [in this research] than had hitherto been possible.<sup>37</sup>

Although this appeal was to meet with little success in Edinburgh, sites for breeding and genetics research did begin to develop elsewhere in Britain over the next few years thanks precisely to such “liberality.”

Arthur Balfour’s private means and substantial political influence made him a powerful ambassador for genetics at the University of Cambridge, with which he had close connections (Opitz, 2011, pp. 74–75).<sup>38</sup> In 1908, he anonymously endowed a Chair in Biology to which Bateson was appointed, and which had a specific remit for the study of heredity and variation. In July 1910 Balfour circulated a petition for contributions towards making the Chair permanent and establishing an “Experimental Station” at Cambridge. This petition left the reader in no doubt as to the pre-eminence of Cambridge’s contributions to the study of heredity: “It was at Cambridge (at least so far as this country is concerned), that this branch of investigation was initiated afresh at the beginning of the present century: it is at Cambridge that it has been

<sup>37</sup> “Edinburgh Royal Society,” *The Scotsman*, 8 March 1904, *The Historical Scotsman*. <http://search.proquest.com.ezproxy.is.ed.ac.uk/docview/487163591?accountid=10673>. Accessed 17 October 2016. This meeting appears to have initiated discussions of forming a “Biological Farm Committee” (F.H.A. Marshall to Ewart, 2 August 1904, Coll-14/9/10/79, JCE, EUL), although this seems not to have materialised.

<sup>38</sup> Opitz states that Arthur Balfour’s advocacy and funding of genetics “fitted within the broader pattern of the Balfour family’s support of biological research in the memory of their late brother Francis” (Opitz, 2011, p. 85).

most actively and successfully pursued.”<sup>39</sup> By 1912, Balfour and his friend Lord Esher had persuaded a wealthy donor, William George Watson, to endow (also anonymously) a permanent Chair in Genetics at Cambridge. Balfour and Esher themselves donated two acres of land on the outskirts of Cambridge which allowed for the construction of a house, Whittingehame Lodge, and laboratory for the newly appointed Professor of Genetics, Reginald Punnett (Olby, 1989; Opitz, 2004). Bateson had left Cambridge two years previously to take up the directorship of the John Innes Horticultural Institution, itself established by the bequest of the businessman John Innes. As with Cambridge, these funds provided a substantial house with land for allotments and laboratories, located at Merton Park, Surrey.<sup>40</sup>

The examples of Cambridge and the John Innes demonstrate the critical role played by private munificence in the securing and designing of sites for breeding and genetics research. In Cambridge’s case, it was critical to the institutionalisation of genetics within the University itself, and not just in terms of the Chair in Genetics. The Department of Agriculture, another influential centre of Mendelian research, relied heavily upon “infrequent endowments and opportunistic alliances” such as Drapers’ Company funds and the private gift of the lease of a farm at Impington (Charnley, 2011, p. 38). Yet as Opitz argues, the particular connection of Whittingehame Lodge with the “aristocratic machine” meant that academic genetics at Cambridge became associated with “an older form of country-house natural history” which was mirrored in its spatial formation (Opitz, 2011, pp. 84, 90).<sup>41</sup> There is also scope to suggest – as does Simon Schaffer in the context of physics – that the patrician associations of such a formation helped to confer an immediate legitimacy to a modern science within the setting of an ancient university (Schaffer, 1998, p. 153). A similar arrangement was implied by the rural manor house setting of the John Innes, which, while not officially affiliated with a university, nevertheless retained a close relationship with Cambridge (Charnley, 2011, pp. 55–56). Ewart’s experimental station may have aligned with a similar “country house” spatial formation, but it operated both outside an institutional remit and without substantial patronage. Rather, financial support and

<sup>39</sup> A.J. Balfour, “Endowment for the Study of Genetics in the University of Cambridge,” July 1910, Add.8634/B.32, WB, CUL.

<sup>40</sup> For more on the establishment of the John Innes, see Olby (1989).

<sup>41</sup> This association was also mirrored in its name, which was taken from the Balfours’ Scottish country residence in East Lothian, Whittingehame House.

academic affiliation for animal breeding in Edinburgh would hinge upon the creation of a state-supported network of research institutes.

### 1910–1913: A University Farm

The impact of the 1910 establishment of the Development Commission on agricultural research in Britain has been readily acknowledged by historians (Berry, 2014a; Brassley, 1995; Charnley, 2011; Kraft, 2004; Olby, 1991; Smith, 1998). While primarily focused on public works such as road reconstruction and harbour drainage, some funds were allocated to encourage the application of scientific knowledge to agricultural problems. These spearheaded the creation of research institutes in areas such as plant and animal physiology, pathology, breeding and nutrition, fruit growing and dairy investigation. Money was also made available for a scheme to investigate the application of Mendelism to breed horses for the military, with Ewart and C.C. Hurst appointed as scientific advisers.<sup>42</sup> However, as Robert Olby notes, the Development Commission were unsure about the creation of a research institute devoted to animal breeding (Olby, 1991, p. 523). Initial discussions mooted the possible establishment of two research centres and allotted the cautious sum of £400 for breeding work in the meantime. By December 1911, this was expanded to an annual amount of £5,000 (*ibid.*, p. 522). In order to decide on the dispersal of these funds, an Animal Breeding Committee was formed under the chairmanship of Bateson. Ewart was invited to become a member, yet soon found himself frustrated at the delays the Committee had in meeting.<sup>43</sup> Eventually, a date was set for 3 April 1912 and Ewart attended along with Bateson, Punnett, F.H.A. Marshall and others. However, no firm decision was reached about how best to allocate the funds and the Committee concluded that “scientific research in animal breeding with a view to economical results can best be promoted by the encouragement

<sup>42</sup> The Commission made £40,000 available for this research, which continued up until the outbreak of the First World War.

<sup>43</sup> H. Dale to Ewart, 2 December 1911, University of Edinburgh Secretary files, EUA IN1/ACA/ADS/SEC/A, EUL. For Ewart’s frustration with the Committee, see Ewart to C.C. Hurst, Add.7955/12/34-37, Charles Chamberlain Hurst: Correspondence and Papers (hereafter CCH), CUL. The chief reason behind these delays was the intervention of Walter Runciman, then President of the Board of Agriculture, who felt the Committee should be meeting under the aegis of the Board, rather than the Development Commission. The Committee eventually met under the Commission’s remit but with a representative from the Board of Agriculture as Secretary.



of individual investigators [and that] it is as yet premature to establish particular institutions at which such investigations should be pursued.”<sup>44</sup> Although Olby (1991, p. 523) states simply that, at this stage, the “circumstance surrounding the decision not to set up an institute for animal breeding at Edinburgh are unclear,” there are in fact some likely key factors. The Commissioners were seeking to fund research in locations or institutions which already boasted relevant expertise, and which were able to provide matched funding. While Edinburgh could certainly claim expertise, the lack of funds, formal university affiliation and an official site for breeding experiments presented significant obstacles. This was, however, shortly about to change. In 1911, Ewart had acquired the lease of Fairslacks farm near Carlops, in what was then Peeblesshire (now Tweeddale) in the Scottish Borders. His motive for taking on a farm was no doubt partly the need for a new research site, as he had by now moved out of the Bungalow following his third marriage. Also, at 200 acres, the farm allowed Ewart the space and facilities he needed to expand his work; in addition to his collaboration with Hurst, he had also recently begun a series of sheep breeding experiments.<sup>45</sup> Most significantly, Fairslacks was to prove critical to securing funding and institutional affiliation for animal breeding in Edinburgh.

The Edinburgh and East of Scotland College of Agriculture (EESCA) had been looking to expand their facilities and to acquire a College farm for a number of years and were duly preparing a case for Development Commission funding through the Board of Agriculture for Scotland (BoAS).<sup>46</sup> Although Olby (1991, p. 523) portrays the EESCA as Ewart’s “rival” in the bid to secure state support, Ewart was in fact keen to collaborate. There were already close links between the University and the EESCA, not least through Robert Wallace, Director of Studies and one of the Board of Governors, out of whose extra-mural lectures the College had been formed in 1901. Ewart lost no time in contacting the College about the £5,000 available for animal breeding work and a meeting was called of the College’s Experiments Subcommittee and Farm Committee on 1 May 1912 to discuss this. Agreeing that “it was necessary to take immediate action if any of this

<sup>44</sup> “The Advisory Committee reported as follows,” 3 April 1912, University of Edinburgh Secretary files, EUL.

<sup>45</sup> This work was in collaboration with, and partly funded by, the naturalist and traveller Henry John Elwes.

<sup>46</sup> “Abstract of schemes proposed for the development of the Edinburgh and East of Scotland College of Agriculture,” 2 November 1910, Development Fund Grants, Agricultural Colleges, AF70/8, Crown copyright, National Records of Scotland (hereafter NRS).

grant was to be obtained for Scotland,” the Committee decided to intensify their search for a suitable farm by placing an advertisement in the *Scotsman* and enquiring with landed estates. In the meantime, however, interim facilities should be considered in co-operation with the University.<sup>47</sup> The Committee then met with Ewart and colleagues to discuss the animal breeding work being carried out on his farm, and it appears that Fairslacks was proposed as just such an interim measure. Indeed, in a diplomatic and persuasive letter written shortly after this meeting to Sir William Turner, the University Principal (and his erstwhile father-in-law), Ewart stated: “I may mention that the Farm Committee of the East of Scotland College of Agriculture has asked me on what conditions I should be prepared to hand over Fairslacks Farm for a year. I shall of course refrain from having any dealings with the College of Agriculture in the meantime.”<sup>48</sup> Ewart emphasised the urgency of securing “a fair share” of funding from the Development Commission as well as money likely to come from the BoAS. Most significantly, he concluded with a pointed reference to the real “rival” in this affair, Cambridge: “Perhaps the [University] Court may see its way to appoint a committee to go into the whole question of providing facilities for animal breeding experiments with a view to the University of Edinburgh like the University of Cambridge participating in the grants provided for research on the recommendations of the Development Commissioners.”<sup>49</sup> Possibly the suggested competition with Cambridge was a stimulus; either way, two months later, the University took the step of appointing a Committee on the Provision of Facilities for Animal Breeding Experiments to investigate Fairslacks as a potential farm.<sup>50</sup>

By referring to Cambridge, Ewart could well have been recalling Arthur Balfour’s recent memorandum to the Development Commission which presented that University as the obvious choice for a research institution in animal breeding. As with his petition in 1910, Balfour

<sup>47</sup> “Joint meeting of the Experiments Sub-Committee and Farm Committee,” 1 May 1912, Edinburgh and East of Scotland College of Agriculture Minutes Volume IV, Scotland’s Rural College Library, Edinburgh.

<sup>48</sup> In making his financial case for Fairslacks, Ewart revised the sum of c. £600 per annum which he had previously presented to the University as necessary for an experimental farm. He now claimed that a sum of less than £100 would cover rent, with wages being all but covered by existing grants and costs paid by investigators and the sale of surplus and commercial stock.

<sup>49</sup> Ewart to Turner, 10 May 1912, Coll-14/9/18/28, JCE, EUL.

<sup>50</sup> “Report of the Committee on the Provision of Facilities for Animal Breeding Experiments,” 8 July 1912, Court Minutes, EUL.

emphasised the primacy of Cambridge's genetics pedigree, as illustrated by its Professorship in Biology (soon to be transformed into the Balfour Chair of Genetics), and cited the University's existing expertise in biology, bacteriology, biochemistry, physiology of reproduction and agriculture.<sup>51</sup> He also suggested that the Development Commission's plans to locate a Plant Breeding Institute in Cambridge offered the opportunity to unite both plant and animal breeding in "mutual co-operation," along the lines originally envisioned by Bateson and others. "In view of these considerations," Balfour concluded, "it is hoped that the Development Commissioners will select Cambridge as the seat of the Institute for Animal Breeding, or will at any rate grant the Cambridge authorities an opportunity of stating their case before a final decision is come to."<sup>52</sup> Ewart was no doubt also aware of what has been called the "cosy" nature of Development Commission funding distribution and the "close network of influence" between the Commissioners, the Board of Agriculture and recipient institutions, many of which had Cambridge connections (Olby, 1991, pp. 523–524).<sup>53</sup> Considering this, and the strength of Cambridge's claims, it seems sensible to agree with Olby's view that the University of Edinburgh's acquisition of Fairslacks was a move calculated to "impress the Commissioners" and "prevent Cambridge University pre-empting Edinburgh" (Olby, 1991, p. 523).

Indeed, by July 1912 it was, according to Robert Wallace, "an open secret [that] Edinburgh is in the running for the main centre to be devoted to animal breeding."<sup>54</sup> However, Wallace felt strongly that Fairslacks was unsatisfactory as a site for the University's farm. He protested at its "inconvenient" distance from Edinburgh (around nine miles by road and two or three miles from the nearest railway station) and declared that the "wild, cold and barren" prospect and "meagre

<sup>51</sup> Areas in which, it must be said, Edinburgh also had considerable strengths as well as some primacy, including the first University Chair in Agriculture (1790).

<sup>52</sup> A.J. Balfour, Memorandum to the Development Commissioners, undated [1911], Add.8634/B.32, WB, CUL.

<sup>53</sup> Cambridge and Rothamsted received a high proportion of the available funding. In addition, Cambridge was the only institution for which the Commissioners' stipulation for matched funding was waived. See also Charnley, 2011, pp. 36–39. Kraft claims the Development and Road Improvement Funds Act of 1909 deepened the "fault-line" between universities in London and the south-east and "the civics" around the rest of the country (Kraft, 2004, p. 235).

<sup>54</sup> "Memorandum by Professor Wallace on the proposal before the University Court that the University should take over the lease of Fairslacks Farm from Professor Cossar Ewart with the object of making it an experimental breeding station for domesticated animals of the farm," 14 October 1912, Secretary Files, EUL.

and inadequate” buildings rendered it unsuitable for keeping livestock and accommodating staff.<sup>55</sup> This opinion was not, however, shared by others in Ewart’s network, who provided favourable letters of support.<sup>56</sup> Ultimately, the University agreed to acquire the lease on an initial one-year basis, providing that suitable repairs were carried out, and recommended the appointment of a station superintendent and grieve (farm foreman).<sup>57</sup>

Ewart’s leasing of Fairslocks was in accordance with his tendency to act independently – and at his own expense – in the face of sluggish bureaucracy. After all, over the last two decades he had served on at least four committees which had got no further than merely discussing a research site.<sup>58</sup> The University’s takeover of the farm (albeit on initially tentative terms) did more than shift Ewart’s animal breeding work from a private to an institutional space. It also represented a growing alignment of the University’s interests with Ewart’s long-held ambitions for a research institute in the vicinity of Edinburgh, which was no doubt prompted by the chance to secure a stake in government funding. Far from seeing the EESCA as a rival, Ewart initiated a collaboration which was in keeping with the Development Commission’s desire to ensure co-operation between different grant-seeking institutes, and which also seems to have spurred the University to take over the lease of Fairslocks. A further investment on the University’s part was signalled by the founding of a genetics lectureship, which inaugurated genetics as applied to animal breeding as an autonomous academic discipline in Edinburgh.

<sup>55</sup> *ibid.*

<sup>56</sup> Among those who provided such letters were Henry John Elwes and the agriculturalist and politician Charles Mackinnon Douglas, who certainly wrote at Ewart’s behest. See Secretary Files, EUL.

<sup>57</sup> “Report of the Committee on the Provision of Facilities for Animal Breeding Experiments,” 8 July 1912, Court Minutes, EUL. It was also stipulated that, in addition to the “experimental study of genetic subjects,” the station should be available to studies in other areas, such as physiology and pathology.

<sup>58</sup> In addition to the Royal Society and Development Commission committees, there was the seemingly abortive “Biological Farm Committee” discussed in 1904 and a University committee formed in 1909 “to consider the advisability of an experimental farm.” See University of Edinburgh Faculty of Science Minutes, 9 October 1909, EUA IN1/ACA/SCI, EUL.

## 1911–1915: From Breeding to Genetics

The Lectureship in Genetics (Evolution and Heredity) instituted in 1911 in the University of Edinburgh's Department of Zoology was the first academic post in the UK named and dedicated to genetics (a year before Cambridge's Balfour Chair).<sup>59</sup> It also brought to the University a prominent and erstwhile controversial geneticist, Arthur Darbishire. Ewart played a key role not only in the institution of the lectureship, but also the choice of candidate.<sup>60</sup> He clearly had Darbishire in mind from at least 1910, as in October of that year the physiologist Walter Heape wrote approvingly to him that "I don't think you would go wrong with Darbishire. He has ideas: he writes well: his schemes appeal to me. I think you would be fortunate if you could get him."<sup>61</sup> Initially, Darbishire was appointed as Ewart's assistant in Natural History in April 1911, with his appointment to the lectureship being confirmed by the University Court the following month.<sup>62</sup>

Darbishire's appointment to Edinburgh has received less historical attention than aspects of his earlier career, such as his mouse breeding experiments under W.F.R. Weldon at Oxford and his involvement in the Mendelian-biometrician debate (Ankeny, 2000). A notable exception is Roger Wood's comprehensive biographical study of Darbishire which describes Edinburgh as "a prestigious career destination" for him (Wood, 2015, p. 22). It was certainly a significant appointment from the University's perspective. Although some genetics theory had been taught as part of the advanced course in agriculture established in 1906 by Robert Wallace, Darbishire's training as a geneticist and experience as a teacher equipped him to deliver a comprehensive series of lectures. Encompassing the theories of Darwin, Lamarck, Butler, De Vries and

<sup>59</sup> C.C. Hurst's wife Rona noted that "Edinburgh had gone one better [than Cambridge] in terming their lectureship as on Genetics instead of using the now somewhat abused title of Heredity covering much more than the new science..." R. Hurst, "Evolution of Genetics," p. 1586, Add.7955/23, CCH, CUL.

<sup>60</sup> "On consideration of a letter on 18 March last from Professor Ewart, the Court appointed Mr A.D. Darbishire, M.A., as Lecturer on Genetics and third Assistant in Natural History for the next academical year." Court Minutes, 18 May 1911, EUL.

<sup>61</sup> Heape to Ewart, 17 October 1910, Coll-14/9/16/21, JCE, EUL. Heape's approval of Darbishire offers an alternative perspective to Rachel Ankeny's claim that "the types of academic posts [Darbishire] was able to get... (outside of England) likely reflect his unpopularity among the British biological establishment" (Ankeny 2000, footnote 23, p. 320).

<sup>62</sup> Court Minutes, 17 April 1911; 18 May 1911, EUL. The slight delay in Darbishire's official appointment appears to be due to the release of funds from the Treasury for the salary. Darbishire commenced duties as Lecturer in October 1911.

Bergson, biometrical and Mendelian theory, the inheritance of sexual and pathological characters and disease immunity, the course bore the hallmarks of Darbshire's diverse interests.<sup>63</sup> In addition, Darbshire brought a new level of expertise to the breeding work initiated by Ewart. Although Ewart's research had been partly dedicated to tackling theories of heredity, and although he had dabbled with Mendelism in his collaboration with Hurst, he would never have described himself as a geneticist (Burkhardt, 1979, p. 15). Darbshire, however, possessed a thorough grounding in statistical approaches to genetics and was also fresh from his recent engagement with Mendelian theory. His book *Breeding and the Mendelian Discovery* was published just as he moved to Edinburgh and "stood out as unconventional...with respect to the emphasis placed on practical breeding" (Wood, 2015, p. 25). The "breeder-friendly aspect" of Darbshire's thinking (*ibid.*, p. 35) did more than ensure the close working relationship which he and Ewart enjoyed; it spearheaded the application of genetics theory to the agricultural and economic aspects of animal breeding in Edinburgh.<sup>64</sup> Fairslocks farm provided Darbshire with his first major opportunity to work on problems such as the improvement of fleece quality in sheep and the inheritance of the milk character in cattle, work which received grants from the Highland and Agricultural Society of Scotland as well as the University's Moray Endowment Fund.<sup>65</sup>

Darbshire's genetics expertise, coupled with the research site at Fairslocks, undoubtedly strengthened Edinburgh's claim as a viable collaborator with the EESCA. In March 1913, Sir Robert Wright, Chairman of the BoAS (who were responsible for brokering Development Commission grants within Scotland), wrote to Sir William Turner that:

the Development Commissioners are prepared to consider the claims of Edinburgh University and the East of Scotland Agricultural College for assistance in organising and maintaining a scheme of experimental work in animal breeding. Edinburgh

<sup>63</sup> The course for undergraduate Pure Science students was segregated into two lecture series on "Evolution" and "Heredity," while the "Heredity" lectures were also provided for students of veterinary medicine. See *Edinburgh University Calendar, 1914–1915*, "Courses in Pure Science: Genetics (Evolution and Heredity)," pp. 311–312, and "Courses in Veterinary Science: Genetics," p. 375.

<sup>64</sup> Darbshire's sister Helen described this post as "the happiest [Darbshire] had held" (Darbshire, 1917, p. ix).

<sup>65</sup> Faculty of Science Minutes, 6 May 1914; 4 November 1914; 4 May 1915, EUL. The Moray fund was established in 1896 from the estate of George Philip Stuart, the 14th Earl of Moray, for the promotion of original research at the University.

University, on account of its large scientific staff, the work which has already been done towards the solution of breeding problems and its interest in the farm of Fairslacks is in a position to further such investigations.<sup>66</sup>

Wright suggested the University should with “as little delay as possible” appoint a Committee in conjunction with the EESCA “to foster and encourage the work and to administer the grants which might be available with the object of building up a great research institute.”<sup>67</sup> While the Commissioners were clearly still cautious in limiting their support to a research scheme, Wright’s reference to potential further funds for a “great research institute” signalled an opportunity for Edinburgh to develop as a centre for animal breeding and genetics and so partially divert the concentration of state funding from the south of England.<sup>68</sup>

In June 1913 the University of Edinburgh and East of Scotland College of Agriculture Joint Committee on Research in Animal Breeding was formed with Sharpey-Schafer as Chairman and members including Ewart, Darbishire and Wallace. By December they had submitted an application for a grant to the Development Commission together with a plan of experiments, but this was rejected due to a lack of detail.<sup>69</sup> Instead, it was proposed that a smaller Executive Committee should formulate a more comprehensive scheme and appoint “a skilled scientist as Director.”<sup>70</sup> It would, however, be another five years until such an appointment was made.

Previous accounts have, justifiably enough, tended to ascribe this delay to the interference of the First World War (Bulfield, 2000, p. 2; Crew, 1971, p. 291). Yet archival sources reveal that the War was by no means the sole issue, as discussions concerning the directorship were not

<sup>66</sup> Robert P. Wright to Sir William Turner, 27 March 1913, Secretary Files, EUL. Prior to this there had been some wrangling between the Development Commission and BoAS about the potential overlaps between their funding remits and who should take responsibility for proposals in Scotland. This was not resolved until February 1913, when it was decided that the Board should have responsibility for land settlement, while capital grants should be provided by the Development Commission (H.E. Dale to Lord Pentland, 26 February 1913, AF43/1. Board of Agriculture, NRS).

<sup>67</sup> Robert P. Wright to Sir William Turner, 27 March 1913, Secretary Files, EUL.

<sup>68</sup> See also Smith (1998) on the granting of Development Commission funds to what became the Rowett Research Institute in Aberdeen.

<sup>69</sup> “Third report of the Board of Agriculture for Scotland, year ending 31 December 1914.” Parliamentary Papers Online. <http://parlipapers.proquest.com/parlipapers/docview/t70.d75.1914-019188?accountid=10673>. Accessed 22 February 2017.

<sup>70</sup> Court Minutes, 20 July 1914, EUL.

officially postponed until December 1915. A letter from Sharpey-Schafer to Ewart in March of that year reveals that in fact Ewart himself was causing an obstruction:

I think we ought to come to a decision about the Directorship as soon as possible: we have been shilly-shallying much too long already...I doubt if the plan you suggested to me in conversation would answer either from the point of view of the University or from that of the Committee. The latter must certainly have a whole time director, and I do not believe the University would consent to relieve you of your duties sufficiently to enable you to run both. I think it would be a very congenial position for you to occupy if you retire from the Chair [emphases in original].<sup>71</sup>

Ewart clearly fostered a wish to both retain his Chair and act as director of the station, a dual position which the Committee didn't think that he could satisfactorily hold. Darbishire had applied for the post the previous month, and his greater expertise in genetics and younger age (Ewart was then 62) certainly made him the obvious candidate (Darbishire, 1917, p. 126).<sup>72</sup> Whether or not Ewart was aware of Darbishire's application is unknown; either way, his unwillingness to make a decision about his own level of involvement created an impasse.

Further evidence that all was far from well within the Joint Committee appears in November 1915 when Sharpey-Schafer attempted to resign, suggesting that all University representatives withdraw also.<sup>73</sup> Although research has not thus far uncovered the details behind this incident, it is possible that the EESCA were insisting on Ewart as director, thereby empowering him to also continue holding out for the retention of his Chair.<sup>74</sup> The following month however, the Committee received word from the Development Commission that all decisions regarding funding and the appointment of a director would be postponed until after the war.<sup>75</sup> Less than two weeks later, Darbishire, who

<sup>71</sup> Sharpey-Schafer to Ewart, 28 March 1915, Coll-14/9/21/7, JCE, EUL. Deacon (1971) also refers to this letter in her unpublished history of the Institute of Animal Genetics.

<sup>72</sup> This volume contains printed extracts from Darbishire's letter of application for the directorship, dated 11 February 1915.

<sup>73</sup> Court Minutes, 15 November 1915, EUL. It appears that Sharpey-Schafer was induced to change his mind however, as he continued to serve on the Committee for another decade.

<sup>74</sup> I am grateful to Steve Sturdy for alerting me to this interpretation.

<sup>75</sup> Court Minutes, 13 December 1915, EUL.





Figure 3. Institute of Animal Genetics building, 1930. Reproduced courtesy of the University of Edinburgh

had enlisted in the army that summer, died of cerebral meningitis at Gailes military training camp, aged 37.<sup>76</sup>

### 1918 and Beyond: The Animal Breeding Research Department

For the duration of the war, Ewart took over Darbishire's genetics lectures and maintained his breeding experiments at Fairslocks, with the help of James Ashworth (Professor of Invertebrate Zoology) and other colleagues.<sup>77</sup> By the time the Committee's discussions resumed, Ewart had clearly accepted that the directorship would not be his; certainly he continued to retain his Chair and apparently willingly participated in the search for a director. In June 1918 the BoAS sought approval from the Secretary of Scotland for the release from the Agriculture (Scotland) Fund of £1,000 per annum for five years to pay the salary of a Director of Research "as a preliminary to the establishment of an Institute."<sup>78</sup>

By February 1919 it looked as though a recipient of this salary had been found. Ewart's former assistant F.H.A. Marshall, then based at

<sup>76</sup> Having initially been pronounced unfit for military service due to health problems, Darbishire's second attempt at enlisting was successful and he was enrolled as a Private in the 14th Argyll and Sutherland Highlanders in July 1915. Three days after his death, he was gazetted Second Lieutenant in the Royal Garrison Artillery (Darbishire 1917, p. x).

<sup>77</sup> Faculty of Science Minutes, 9 January 1917; 8 May 1917, EUL. Ashworth had known Darbishire years before when both were at Owen's College, Manchester.

<sup>78</sup> Board of Agriculture for Scotland Minute Book 1915–1919, 10 June 1918, AF76/1, NRS.

Cambridge as University Lecturer in Agricultural Physiology, was appointed to the lectureship left vacant by Darbishire on the condition that he also accept the post of Director of Animal Breeding Research.<sup>79</sup> It is likely that Marshall's previous association with Ewart and Sharpey-Schafer in Edinburgh, his long-standing advocacy for the establishment of a biological research institute, and his expertise in reproductive physiology in relation to agriculture made him a strong candidate in the eyes of the Committee. By the following month, Marshall had provided the University Court with a scheme of research which was awaiting approval from the Development Commission and the BoAS.<sup>80</sup> However, he was already having serious doubts about the post. In a letter to Sharpey-Schafer marked "very Private" and dated 31 March 1919, Marshall confided that he had actually only "tentatively" accepted the directorship, and outlined a number of obstacles to his full acceptance. These included the offer of a more lucrative Readership post at Cambridge, the reluctance of Edinburgh to make him a professor, and concerns that the involvement of the BoAS would restrict the freedom of the post.<sup>81</sup> With no more lucrative offer forthcoming from Edinburgh, Marshall withdrew his acceptance.<sup>82</sup> Following this further blow, the Committee were under pressure to appoint a replacement swiftly or finally abandon the scheme altogether. They did, in fact, find a replacement in F.A.E. Crew, a medical graduate of the University who had recently begun working both for Ewart in the Natural History Department and for Sharpey-Schafer in Physiology. On 16 October 1919 Crew was appointed Director as well as Lecturer in Genetics.<sup>83</sup>

<sup>79</sup> Court Minutes, 17 February 1919, EUL.

<sup>80</sup> *ibid.*, 17 March 1919.

<sup>81</sup> F.H.A. Marshall to Sharpey-Schafer, 31 March 1919, ESS/B.46/9, Papers of Edward Sharpey-Schafer, Wellcome Collection, London (hereafter ESS, WC). Quoted with permission from the Wellcome Collection and the Sharpey-Schafer family. In an earlier letter dated 4 February 1919, Marshall alluded to the likelihood of the Institute of Animal Nutrition being set up at Cambridge, with access to farm and facilities, and remarked on the "inconvenient" distance of Fairslocks from Edinburgh. He also hinted at the perceived "diffidence" of the University of Edinburgh being noted by the Development Commission, about which "very strong observations" had been made (F.H.A. Marshall to Sharpey-Schafer, 4 February 1919, ESS/B.46/10 ESS, WC).

<sup>82</sup> Marshall was appointed Reader in Agricultural Physiology at the University of Cambridge in 1919, and held the post until his retirement in 1943. He also briefly acted as director of the Institute of Animal Nutrition.

<sup>83</sup> Sharpey-Schafer, Private Diary Book IV, 1 January 1915-10 November 1927, PP/ESS/S.1/4, ESS, WC. Crew's appointment as director is officially approved in the University of Edinburgh Court Minutes on 16 February 1920.

The choice of Crew could be construed as a somewhat unorthodox aberration borne out of the urgency of the situation. This construction can be traced to Crew's own claims that "I can only be explained by the death of my possible competitors" and that he had "no qualifications whatsoever...save a liking for animals and a fondness for that kind of work."<sup>84</sup> Certainly, as a young man fresh from military service and a general medical practice in Devon, he was an inexperienced figure in comparison to Darbishire and Marshall. Yet Crew's self-estimation is a little disingenuous: he was in fact a skilled poultry breeder (having won prizes since boyhood), was well-read in genetics literature and had been profoundly influenced by Darbishire, Ewart, Marshall and Sharpey-Schafer as a medical student at the University.<sup>85</sup> He had returned from military service determined to retrain formally as a geneticist, and his enthusiastic incorporation of the latest genetics theories into his teaching in the Natural History Department apparently impressed Sharpey-Schafer sufficiently to recommend him to the Committee (Hogben, 1974, p. 136).<sup>86</sup> Crew was also an accomplished organiser and leader, as demonstrated by his attaining the rank of Major during the war. With the Committee deciding to develop the Department only gradually, it is likely that Crew's charisma and leadership abilities were of comparable importance to his experience as a breeder and his knowledge of genetics.<sup>87</sup>

Crew would continue, and indeed complete, the institutionalisation of the ABRD throughout the 1920s. It was a slow process: the University terminated the lease of Fairslocks in November 1920 and the Department would not acquire another farm of its own for nine years.<sup>88</sup>

<sup>84</sup> F.A.E. Crew, interview with Margaret Deacon, spring 1969, EUA CA16/1/3 part 1, Science Studies Unit Oral History recordings, EUL.

<sup>85</sup> *ibid.*, part 2.

<sup>86</sup> Crew claimed that Ewart had written expressly to him before he was demobilised to offer him the Lectureship because of his enthusiasm for Darbishire's teaching, although the letter never reached him (*ibid.*, part 1).

<sup>87</sup> "Owing to the unsettled conditions prevailing, the Committee, with the consent of the Development Commission and the Board of Agriculture, decided to begin operations on a relatively small scale and to extend them only gradually." Report of the Edinburgh University and College of Agriculture Joint Committee on Research in Animal Breeding, February 1922, GD1/464/1/29/5, NRS.

<sup>88</sup> This was at Shothed in the Scottish Borders. In the interim period, the Department relied on external parties to accommodate their animals, including the EESCA (who acquired their own farm at Boghall, West Lothian in 1922), the Department of Agriculture at University College of North Wales, a private farm in Perthshire as well as land at the University's King's Buildings campus. Animal Breeding Research Department, Report of the Director, 1924–1925, p. 2, EUA IN1/ACU/A1/2/1, Records of the Institute of Animal Genetics, EUL. The reason for the termination of the Fairslocks lease is unknown.

Formal affiliation to the University beyond Crew's dual appointment did not occur until 1928, and it was 1930 before the Department (now renamed the Institute of Animal Genetics) acquired its own building on the University's King's Buildings campus<sup>89</sup> (Figure 3). While these delays were significant impediments, Crew's ability to attract a diversity of researchers and funders helped to galvanise the Institute into a prominent centre for genetics research, a process which will be the subject of a future paper.

Ewart plays a starring role in the narrative which Crew constructed around the Institute's origins. On 30 June 1930, at the opening ceremony for the Institute's new building, at which Ewart was a guest of honour, Crew is recorded as stating that "It should be well known that that department could never have had its beginning had not Professor Cossar Ewart lived and laboured in that city... [and] if he should so wish, he could regard that department as his own creation, and that occasion as the realisation of his dream."<sup>90</sup>

## Conclusion

This paper has highlighted James Cossar Ewart's role in the development, direction and institutionalisation of animal breeding and genetics research in Edinburgh. Ewart's creation of research sites for animal breeding helped to forge a distinct identity for Edinburgh amidst the competing institutional and individual interests shaping British biology and genetics at the turn of the twentieth century. Although he may have felt geographically marginalised from early discussions about a proposed "biological farm," the publicising of his own experimental station won scientific attention on both a national and international stage. While Ewart's independent work developed Edinburgh's reputation as a regional centre for animal breeding with links to agriculture and industry, he also realised the importance of institutional affiliation. The conversion of Fairslacks from a private farm to a university site, alongside the creation of a genetics lectureship, signalled a shift in the University of Edinburgh's investment in practical breeding together with the discipline of genetics, which proved crucial to securing government funding in the teeth of competition from Cambridge. Nevertheless, by the time the ABRD was officially established in 1919, it was

<sup>89</sup> Court Minutes, 19 July 1920, EUL.

<sup>90</sup> "Department of Animal Genetics," *Scottish Farmer*, 5 July 1930, PP/ESS/E.3/2, ESS, WC. At Crew's invitation, Sharpey-Schafer presided over the ceremony.

on a smaller and more precarious scale than originally envisaged, and it would not be until the late 1920s that it gained the finances, staff and infrastructure to become a secure and prominent research site.

Utilising Ewart as an investigative lens to focus on this process of institutionalisation reveals both the inhibitory and progressive aspects of individual influence. Ewart's independent work as a breeder as well as a zoologist instantiated a distinctive approach to genetics in an animal breeding context which would profoundly influence the future direction of research in Edinburgh. Yet his unwillingness to forgo the directorship of the ABRD created an impasse at a critical time which, together with the death of Darbishire and Marshall's ambivalence towards the directorship, potentially jeopardised the establishment of the Department altogether. The development and histories of institutions, therefore, are inextricably entwined with personal interests and motivations as well as the idiosyncrasies of personality.

While there is value in interrogating this individual viewpoint, this paper also aims to situate Ewart within an intricate network of key actors. His independent work awarded him the relative freedom to cultivate a diversity of projects, collaborators and contacts that may not have been possible under the aegis of an institution or university department. In addition, his long-standing relationships with government advisory bodies and state-supported livestock improvement schemes helped pioneer a "breeder-friendly" scientific practice which differed from that of geneticists such as Bateson, but which Darbishire was eager to adopt. Arguably, this attitude chimed with the University of Edinburgh's own outlook as a civic institution with strong connections to agriculture, despite their sluggishness to institutionalise breeding and genetics. Alongside the University's role, the relationships with commercial and fancying worlds which Ewart, and, later also Crew, took care to cultivate demonstrate the influence of external non-academic and non-professional actors on burgeoning institutions as they began to form networks of influence, support and expertise.<sup>91</sup>

While Ewart and the ABRD are a significant case study for the history of animal breeding, they also have value for understanding wider patterns of institutionalisation in early twentieth-century British genetics (to say nothing of cross-national comparisons). It would be fruitful to interrogate how this study fits with those which look at the consolidation of genetics through the formation and interaction of key communities (Berry, 2014b) and the actions of "system builders"

<sup>91</sup> For more on the importance of animal fanciers, traders and private breeders to the development of British genetics see Marie (2008).

working across disciplinary and institutional boundaries (Charnley, 2011).<sup>92</sup> While the ABRD both intersects with and differs from centres of activity in the south-east of England under discussion here (namely the School of Agriculture and Department of Genetics at Cambridge and the John Innes), it is also a prime candidate for analysis alongside studies of fellow state-funded institutes such as the Plant Breeding Institute, the National Institute of Agricultural Botany (Berry, 2014a; Charnley, 2011) and the Rowett Institute (Smith, 1998). Such a wide-angle study is yet to be written, yet it would be invaluable for presenting a fuller account of the impact of state funding on the development of British genetics after 1912, in conjunction with the broader growth of biology as an applied science during this period.<sup>93</sup> It would also represent a step towards a historiographical synthesis of plant and animal breeding, illuminating overlapping networks of influence such as the roles of agriculturalists and breeders.

Such a parallel overview of plant and animal breeding could also illuminate the impact both of institutional research focus and location on the development of genetics. For example, it has been suggested that the ABRD's animal breeding focus defined, and sometimes limited, the direction of genetics work in Edinburgh. This persistent tension between theoretical genetics and livestock breeding studies, encapsulated in the distinction between "breeders" and "geneticists" (Robertson, 1983, p. 216), may contribute to the claim that animal breeding did not become thoroughly "geneticized" until after the Second World War (Müller-Wille and Brandt, 2016, p. 15). In this context, and particularly given the initial uncertainty over the ABRD's location, it is tempting to speculate how animal breeding and genetics research may have developed differently in Cambridge. Possibly, the presence of animal nutrition and plant breeding institutes there would have led to the closer affiliation between the animal and plant breeding contexts for genetics that Bateson, Balfour and others had initially envisaged. In any case, there is undoubtedly further study to be done of how animal science developed in both Edinburgh and Cambridge throughout the twentieth century, particularly given their pre-eminence in the development of the

<sup>92</sup> Both of these historians adapt existing conceptual frameworks in order to analyse the complex and interconnected infrastructure of British genetics: Berry draws from Bruno Latour's 1988 book *The Pasteurization of France* and Charnley from Thomas P. Hughes' systems approach.

<sup>93</sup> For more on this, see Kraft (2004).

reproductive sciences in agriculture (Clarke, 2007, p. 322) and the close relationship which later existed between the two sites.<sup>94</sup> This study of the ABRD's origins therefore paves the way to better positioning animal breeding within wider developments in genetics and agricultural science in Britain and beyond.

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<sup>94</sup> In 1986, Edinburgh's Animal Breeding Research Organisation and part of the Poultry Research Centre merged with the Babraham Institute of Animal Physiology in Cambridge to form the Edinburgh and Cambridge Research Stations of the Institute of Animal Genetics and Physiology Research. This arrangement lasted until 1993 when the independent Roslin and Babraham Institutes were created.

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