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“A Triumph of Brains over Brute”

Women and Science at the Horticultural College, Swanley, 1890–1910

*By Donald L. Opitz**

ABSTRACT

The founding of Britain's first horticultural college in 1889 advanced a scientific and coeducational response to three troubling national concerns: a major agricultural depression; the economic distress of single, unemployed women; and imperatives to develop the colonies. Buoyed by the technical instruction and women's movements, the Horticultural College and Produce Company, Limited, at Swanley, Kent, crystallized a transformation in the horticultural profession in which new science-based, formalized study threatened an earlier emphasis on practical apprenticeship training, with the effect of opening male-dominated trades to women practitioners. By 1903, the college closed its doors to male students, and new pathways were forged for women students interested in pursuing further scientific study. Resistance to the Horticultural College's model of science-based women's horticultural education positioned science and women as contested subjects throughout this period of horticulture's expansion in the academy.

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AT THE FIFTIETH “JUBILEE” GRADUATION CEREMONY of the Horticultural College, Swanley (or “Swanley Horticultural College,” as it was popularly known), Lord Aberconway, President of the Royal Horticultural Society, expressed his “sympathy with the work of the College” where, thirty-seven years earlier, “all men students had been cast out—a triumph of brains over brute.” Upon its opening in 1889, Swanley admitted male students only; but in 1891, as an experiment, the college admitted five female students and could thus claim to be “the first place [in Britain] to open its doors to women students who wished to obtain a thorough training in horticulture.” In the ensuing years, new female enrollments increased rapidly and, from 1896 onward, annually outnumbered new male enrollments.¹ In 1902 the directors voted to close admissions to men at the end of the academic year, and the last male student completed his coursework in July 1903.

This remarkable feminization of an institution occurred as horticulture acquired widespread attention within two parallel national discourses: those pertaining to Britain’s worsening agricultural depression of the 1880s and to the plight of unemployed single women of the middle and upper classes. In part to help reverse the depression, the British government promoted scientific and technical education and research in agriculture and horticulture through state-sponsored incentives.² In parallel, opportunities in horticulture posed solutions to the so-called redundancy of single women, whose educational and occupational needs were championed by feminist leaders. Moreover, labor requirements in the British colonies broadened the potential for women’s work throughout the empire, and horticulture was seen as a profession to which women might usefully contribute.³ The importance of the imperial context, in addition to the agricultural context, appeared explicitly in the founding rationales of the new colleges. The intersection of these historical developments crystallized in the creation of Britain’s first collegiate coeducational institution providing systematic study in the “science and practice of horticulture,” a popular refrain among the reformers involved.

In this essay I analyze the case of the Horticultural College, Swanley, as a window into the broader scientization of horticulture. Here I will demonstrate how Swanley, as the leading horticultural college accepting women students, contributed to the transformation of British horticulture into a science-based field and, in the process, opened the profession

¹ M. G. Holmes, “Speech Day,” *Horticultural College Magazine*, Nov. 1939, pp. 12–16, on p. 15; The Hon. Frances Wolseley, *Gardening for Women* (London: Cassell, 1908), p. 127; and Department of Science and Art of the Committee of Council on Education, General Register of the Horticulture College, Swanley, Kent, SWAN00007, Hextable Heritage Centre, Swanley (hereafter cited as **HHC**).

² P. R. Sharp, “‘Whisky Money’ and the Development of Technical and Secondary Education in the 1890s,” *Journal of Educational Administration and History*, 1971, 4:31–36; Richard Perren, *Agriculture in Depression, 1870–1940* (Cambridge: Cambridge Univ. Press, 1995); and Joan Thirsk, *Alternative Agriculture: A History from the Black Death to the Present Day* (Oxford: Oxford Univ. Press, 1997). A further national movement propelling the expansion of agricultural and horticultural education was the “Back to the Land” movement, emphasizing a return to the countryside amid a growing population shift toward urban centers. See Jan Marsh, *Back to the Land: The Pastoral Impulse in Victorian England, from 1880 to 1914* (London: Quartet, 1982); and Peter C. Gould, *Early Green Politics: Back to Nature, Back to the Land, and Socialism in Britain, 1880–1900* (Brighton: Harvester, 1988). I thank one of the anonymous referees for drawing my attention to the relevance of this factor.

³ On the problem of single, unemployed British women see esp. Martha Vicinus, *Independent Women: Work and Community for Single Women, 1850–1920* (Chicago: Univ. Chicago Press, 1985); and Ellen Jordan, *The Women’s Movement and Women’s Employment in Nineteenth-Century Britain* (New York: Routledge, 1999). On women’s emigration to the British colonies see James A. Hammerton, *Emigrant Gentlewomen: Genteel Poverty and Female Emigration, 1830–1914* (London: Croom Helm, 1979); and Rita S. Kranidis, *The Victorian Spinster and Colonial Emigration: Contested Subjects* (New York: St. Martin’s, 1999).

to women practitioners.⁴ Occupying an unusual niche in the training and placement of its students, the college’s formalized, scientific curriculum provided a workable substitute for apprenticeship training, which was outwardly hostile toward women, and in the process the college established a new standard of qualification that affected *all* trainees in the profession. This shift in professional standards caused both suspicion and new pressures among proponents of the apprenticeship system. As we will see, the resulting tensions made women and science contested subjects within horticulture well into the first decade of the twentieth century.

PLANTING THE SEED FOR A HORTICULTURAL COLLEGE

A residential college devoted to scientific instruction in horticulture was the brainchild of Arthur Harper Bond (1853–1940), a successful, genteel businessman who saw promise in the application of “scientific principles” to commercial horticulture in an expanding market of consumer demand for fresh produce. Bond explained his idea for the college and the rather serendipitous manner by which he founded it as follows:

It was in the year 1888 that in conversation with a London friend, I mentioned my intention to do something in the way of applying scientific principles to fruit-growing; by a remarkable coincidence, another man had recently been speaking to my friend on the same subject.

I asked to be introduced and found my new acquaintance very enthusiastic; he took me over “his place” at Swanley; it seemed very suitable for the purpose and we quickly arranged that his estate and my capital should be used in carrying out our project. After I had entered into occupation of “the Horticultural College,” as it was named in our prospectus, I only saw my colleague once, and then had to go to a health-resort to interview him, for it transpired that the property did not belong to him; the real owner appeared on the scene and the only way to extricate myself from a difficult position and save my pet scheme from extinction was to purchase the freehold.⁵

The “real owner” was Sir Edward James Reed, a ship engineer known for championing the superiority of iron over wood in hulls. A Fellow of the Royal Society, Reed proved sympathetic to Bond’s proposal; indeed, the placement of scientific instruction at his house would position it within a space that was itself the product of applied science. From 1863 to 1870 Reed served as Chief Contractor of the Royal Navy, and he is credited with the design of Britain’s first steam battleship built without sails. In his 1873 design for the cross-channel ferry S.S. *Bessemer*, as specified by the ship’s namesake, Sir Henry Bessemer, the main saloon hung on “trunnions” (gimbals) to maintain a horizontal position and prevent passengers from becoming seasick. But the design failed, as the ship

⁴ Anne Meredith has analyzed the development and scope of horticultural education for women in Britain, but its significance for women’s advancement in science remains an open question. See Anne M. Meredith, “Middle-Class Women and Horticultural Education, 1890–1939” (Ph.D. diss., Univ. Sussex, 2001) (hereafter cited as **Meredith, “Middle-Class Women and Horticultural Education”**); and Meredith, “Horticultural Education in England, 1900–40: Middle-Class Women and Private Gardening Schools,” *Garden History*, 2003, 31:67–79. In addition, Elizabeth Crawford has analyzed the role of the Horticultural College, Swanley, with respect to the London women’s movement in gardening; see Crawford, *Enterprising Women: The Garretts and Their Circle*, 2nd ed. (London: Boule, 2009), Ch. 5: “The Land.”

⁵ Arthur Harper Bond, “The Horticultural College, I: Its Foundation and Early Years,” *Hort. Coll. Mag.*, Apr. 1914, pp. 11–14, on pp. 11–12. On the market conditions see Raymond Phineas Stearns, “Agricultural Adaptation in England, 1875–1900: Part II,” *Agricultural History*, 1932, 6:130–154, on pp. 143, 145–147. On Bond’s life see R. J. Tabor, “Arthur Harper Bond,” *Hort. Coll. Mag.*, May 1941, pp. 3–5.



Figure 1. *The Horticultural College, Swanley, from a postcard by H. Camburn, date unknown, Hextable Heritage Centre.*

proved too slow and cumbersome to navigate.⁶ After retiring to his forty-three-acre country estate at Hextable, adjacent to the town of Swanley in Kent, Reed installed the saloon adjacent to the manor house as a billiard room. He made seasonal trips to London to sit as a Liberal Member of Parliament (1874–1895, 1900–1905) and, during William Gladstone’s brief ministry in 1886, as a junior Lord of the Treasury. Perhaps encouraged by his work in London, Reed agreed to sell his Hextable estate to Bond for £5,500 in April 1889. The mansion, Bessemer saloon, and surrounding countryside would be home to the horticultural college for the next fifty-five years (see Figure 1 and Cover Illustration).⁷

Alongside negotiations for acquiring the site, in January 1889 Bond applied to have the proposed college listed among the science schools of the Department of Science and Art at South Kensington, London, and he gave it the name “Swanley Horticultural and Technical College, Hextable.” Immediately, however, Bond realized that developing and sustaining the college would require more capital than he could independently muster, and he therefore pursued a different tactic and recruited seven shareholders to form a joint stock company, “The Horticultural College and Produce

⁶ “Mr. Bessemer’s Saloon Steamer for the Channel Passage,” *Nature*, 1872, 7:41–42; and James Dredge, “Henry Bessemer.—1813–1898,” *Transactions of the American Society of Mechanical Engineers*, 1898, 19: 881–964, esp. pp. 949–951. The saloon, which later served as Swanley’s lecture hall, measured 70 feet long, 30 feet wide, and 20 feet high, and it weighed 180 tons. For more on the iron/wood controversy in relation to steamships see A. J. Arnold, *Iron Shipbuilding on the Thames, 1832–1915: An Economic and Business History* (Aldershot: Ashgate, 2000).

⁷ Elsa Morrow, “A History of Swanley Horticultural College,” *Wye: The Journal of the Agricola Club and Swanley Guild*, 1985, 12:59–142 (hereafter cited as **Morrow, “History of Swanley Horticultural College”**), on p. 63; Francis Elgar, “Sir Edward J. Reed, K.C.B., F.R.S.,” *Nature*, 1906, 75:153–155; and “Death of Sir Edward Reed,” *Times* (London), 1 Dec. 1906, p. 6.

Company, Limited,” registered with the Board of Trade on 30 January 1889. Represented by his brother Ernest J. Bond, a London solicitor, the company purchased the college from Arthur Bond and named him the managing director.⁸

In registering the Horticultural College as a joint stock company, the shareholders stated the objectives in the company’s Memorandum of Association. These objectives highlighted both the educational and commercial interests at the forefront of Bond’s planning:

(a) To establish and conduct a College for the training of pupils in agriculture and horticulture, and in all matters connected with the cultivation and utilization of land for horticultural farming, grazing, gardening or other purposes either at home or abroad, and to give such general education together with scientific, technical and mechanical instruction, as may be deemed desirable for colonizing or other purposes whatsoever.

(b) To carry on business as horticulturalists, market gardeners, fruit growers, seed merchants, farmers and graziers, and to buy, sell, manufacture, and deal in implements, machinery and apparatus of all kinds required by customers of the Company, and to buy, sell, grow, improve, preserve and deal in plants, vegetables, shrubs, trees, fruit, and other products of all kinds and to carry on business as analytical chemists, merchants, and brokers and dealers in produce and merchandize of all kinds.⁹

As revealed in this excerpt, at the college’s inception the founders established three trajectories to its future work. First, the curriculum would wed “scientific, technical and mechanical instruction” with practical training to prepare students for remunerative careers. Second, as part of that training, the students would carry on the “business” of the college by growing fruit and vegetable produce to be sold in markets. And third, the college would contribute to British colonization by preparing its students for work on colonial homesteads.

FERTILIZING HORTICULTURE WITH TECHNICAL INSTRUCTION

Although innovative, Bond’s idea to found a horticultural college partook in a widespread expansion of formalized agricultural and horticultural education in Great Britain during the 1890s. His plans nearly coincided with the passing of the Technical Instruction Act of August 1889, which appropriated 1 percent of county council taxes (“whisky money”) for the promotion of scientific and technical instruction.¹⁰ The legislation stimulated nothing less than a transformation in horticultural education, and Swanley emerged as the premier institution embodying it. The alignment of horticulture with state-promoted technical instruction created new standards for horticultural education while democratizing its availability. At the same time, this alignment created tensions in the horticultural trades

⁸ M. Donnelly to P. Boulton, “Allotment of School Number,” Department of Science and Art, London, 14 Jan. 1889, SWAN00056, HHC; “The Horticultural College and Produce Company, Certificate of Registration,” 30 Jan. 1889, BT 31/4333/28142, National Archives, Kew (hereafter cited as **NAK**); and “Agreement: Arthur H. Bond, Esq^{re} to the Horticultural College and Produce Company Limited,” 21 Feb. 1889, BT 31/4333/28142, NAK.

⁹ Richard Jones, Frederick Nicoll, Rupert Hast Vigor, Horace John Bond, Edward Jabez Reynolds, William Frank, and Harry Albermarle Swepstone, “Memorandum of Association of the Horticultural College and Produce Company, Limited,” 30 Jan. 1889, BT 31/4333/28142, NAK.

¹⁰ Sharp, “Whisky Money” (cit. n. 2). See also D. M. Turner, *The History of Science Teaching in England* (London: Chapman & Hall, 1927), pp. 119–121; P. W. Musgrave, “Constant Factors in the Demand for Technical Education, 1860–1960,” in *Sociology, History, and Education: A Reader*, ed. Musgrave (London: Methuen, 1970), pp. 143–157; and W. H. G. Armytage, “Some Sources for the History of Technical Education in England—Part Three,” *British Journal of Educational Studies*, 1957, 6:64–73, esp. pp. 71–73.

and professions, whose practitioners were more accustomed to the traditional modes of training.

Earlier in the century, higher education in horticulture was virtually nonexistent. Relevant courses in the sciences might be taken at the universities and the handful of new agricultural colleges. Such was the tactic of the noted gardener John Claudius Loudon (1783–1843), who attended the University of Edinburgh and afterward directed a short-lived private agricultural college at Great Tew in Oxfordshire. As the century progressed, a variety of agricultural colleges sprang up, including the Royal Agricultural College, Cirencester (founded in 1845); the Agricultural and Commercial School, Aspatria (1874); the Agricultural College, Downton (1880); and Tamworth Agricultural College and Training Farm (1886).¹¹ Expanding beyond the reach of these agricultural institutions for the “classes,” a range of other private and county schools for the “masses” were gradually founded, but the levels of instruction, enrollments, ages of students, and curricular emphases varied widely. Underlining the dearth of formalized agricultural education, Henry Michael Jenkins, Secretary of the Royal Agricultural Society of England, reported to the Royal Commissioners on Technical Instruction in 1881 that only five of the county schools surveyed indicated that they offered agricultural instruction, with Surrey County School at Cranleigh offering the most successful curriculum.¹² On the whole, formalized higher education in agriculture—and its sister, horticulture—remained sparse until the last decade of the century.

Nevertheless, training opportunities did exist. The standard for horticultural education was apprenticeship in gardens and nurseries, supplemented by highly localized and autodidactic modes of study. The Royal Horticultural Society (RHS), founded in 1804, provided an institutional base for an array of emerging means for promoting horticultural learning—through meetings, shows and exhibitions, publications, experimental gardens, and, after 1866, examinations for diplomas. As Abigail Lustig has shown, a range of local horticultural societies followed the RHS’s example and gradually, by the mid-nineteenth century, formed an extensive network promoting horticultural learning throughout Britain.¹³ A burgeoning market in popular gardening and botanical books covering topics in the “science of horticulture”—including subjects considered particularly suitable for ladies—assured a culture of self-improvement where institutionalized educational oppor-

¹¹ J. C. Loudon, *The Utility of Agricultural Knowledge to the Sons of the Landed Proprietors of England, and to Young Men Intended for Estate-Agents* (London: J. Harding, 1809). On Loudon see Brent Elliott, “Loudon, John Claudius (1783–1843),” in *Oxford Dictionary of National Biography*, online ed. (Oxford: Oxford Univ. Press, 2004–2008) (hereafter cited as *DNB*); and Elizabeth B. MacDougall, ed., *John Claudius Loudon and the Early Nineteenth Century in Great Britain* (Washington, D.C.: Dumbarton Oaks, 1980). Regarding the various agricultural colleges see *Eighth Annual Report of the Commissioner of Labor, 1892* (Washington, D.C.: Government Printing Office, 1893), pp. 437–439; Armytage, “Some Sources for the History of Technical Education in England,” pp. 71–72; and Paul Brassey, “Agricultural Science and Education,” in *The Agrarian History of England and Wales*, ed. E. J. T. Collins (Cambridge: Cambridge Univ. Press, 2000), pp. 594–649.

¹² H. M. Jenkins, *Second Report of the Royal Commissioners on Technical Instruction*, 4 vols., Vol. 2 (London: Eyre & Spottiswoode, 1884), p. 214. The distinction between institutions for the “classes” and for the “masses” was suggested by R. Hedger Wallace, “On Agricultural Education,” *Transactions of the Royal Scottish Society of Arts*, 1891, 12:138–162, on p. 150.

¹³ Abigail J. Lustig, “Cultivating Knowledge in Nineteenth-Century English Gardens,” *Science in Context*, 2000, 13:155–181, esp. pp. 156–161; and Brent Elliott, *The Royal Horticultural Society: A History, 1804–2004* (Chichester: Phillimore, 2004). Regarding the standard practices for training see Toby Musgrave, *The Head Gardeners: Forgotten Heroes of Horticulture* (London: Aurum, 2007), pp. 57–78; and J. C. Loudon, *An Encyclopaedia of Gardening*, new ed. (London: Longman, Rees, Orme, Brown, Green & Longman, 1835), pp. 1222–1224.

tunities were lacking.¹⁴ The career of the noted head gardener Sir Joseph Paxton (1803–1865) exemplified what could be achieved through combining these various modes of training.¹⁵

However, by 1889, propelled by concerns about the influx of cheap foreign imports and the state’s deepening agricultural depression, a groundswell of constituencies sought to supplant these heterogeneous opportunities with state-supported programs of study emphasizing more systematic scientific curricula. As a result, two new revenue streams—one appropriated by the newly formed Board of Agriculture, the other by the Technical Instruction Act—catalyzed a massive expansion in agricultural education. As an allied subject, horticultural education was drawn into this expansion as well. As of July 1892, the National Association for the Promotion of Technical and Secondary Education (NAPTSE) found that “of the 124 Counties and County Boroughs [in England], 122 are now carrying out schemes of Technical Education,” owing to the stimuli provided by the Technical Instruction Act. Parallel progress was evident in Wales and Scotland. Similarly, by 1894, more than two-thirds of the Board of Agriculture’s bursaries went to “seven collegiate centres in England and Wales and one in Scotland,” an allocation guided by the board’s “estimate of the value of establishing fully equipped agricultural departments in collegiate institutions.”¹⁶ Commentators noted how this expansion of state-supported agricultural education compared favorably to the progress achieved much earlier in the United States as a result of the Morrill Land Grant Act of 1862.¹⁷

NAPTSE singled out horticulture as a direct beneficiary of this expansion, naming it as “another subject of an eminently practical nature which seems to have engaged the attention of a great many County Councils.”¹⁸ Illustrating this beneficiary relationship, two distinct schemes for horticultural instruction formed as an outgrowth of the new Agricultural Department at the University Extension College, Reading, founded in 1893. The college received both types of annual state support—Board of Agriculture grants to “collegiate centres” and Technical Instruction Act grants from county councils, particularly those of Berkshire, Oxfordshire, and Hampshire. A joint standing committee of members from the Oxford University Extension Delegacy (appointed for the purpose) and the Reading College Council supervised the design and delivery of the Agricultural Department’s curriculum, examinations, certificates, and degrees. The curriculum spanned both theoretical and practical subjects, and the certificates required periods of practical

¹⁴ John Claudius Loudon popularized horticulture as a science in his voluminous publications; see, e.g., Loudon, *Encyclopaedia of Gardening*, p. 365. A rigorous history of horticultural learning in nineteenth-century Britain remains to be written, but see Lustig, “Cultivating Knowledge in Nineteenth-Century English Gardens”; and Charles Quest-Ritson, *The English Garden: A Social History* (Boston: Godine, 2003), pp. 154–183. On the relevant botanical literature for women see Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora’s Daughters and Botany in England, 1760–1860* (Baltimore: Johns Hopkins Univ. Press, 1996).

¹⁵ Kate Colquhoun, *A Thing in Disguise: The Visionary Life of Joseph Paxton* (London: Harper Perennial, 2003), pp. 11–15, 23–27.

¹⁶ “Editorial Notes,” *Record of Technical and Secondary Education*, 1892, 1:533–535, on pp. 533 (quotation), 533–534 (Wales and Scotland); and “Agricultural Education in Great Britain,” *ibid.*, 1894, 3:493–513, on p. 502.

¹⁷ Armytage, “Some Sources for the History of Technical Education in England” (cit. n. 10), p. 72; Sharp, ““Whisky Money”” (cit. n. 2); and Stewart Richards, “The South-Eastern Agricultural College and Public Support for Technical Education, 1894–1914,” *Agricultural Historical Review*, 1988, 36:172–187. By contrast, in 1893 the Commissioner of Labor of the United States Bureau of Labor identified about sixty institutions, distributed among forty-three states, “devoted to agriculture and the mechanical arts”: *Eighth Annual Report of the Commissioner of Labor, 1892* (cit. n. 11), p. 112. On agricultural education in the United States see Alfred Charles True, *A History of Agricultural Education in the United States, 1785–1925*, ed. Lawrence A. Cremin, reprint ed. (New York: Arno, 1969).

¹⁸ “Agricultural Education in Great Britain” (cit. n. 16), p. 503.

work while in residence on farms. In 1895, relocation of the British Dairy Institute from Aylesbury to Reading and its placement under the management of the joint committee established the college as a main center for dairy teaching and research. From the outset, all of the department's classes were open to both men and women students who were at least sixteen years old. A month-long "special course" in "poultry farming, horticulture, and bee-keeping" held in November 1894 piloted the inclusion of horticultural subjects within the Agricultural Department's curriculum. The department director, Douglas Alston Gilchrist, explained the longer-range intent: "This course, if successful, will lead to more lengthened ones of a similar character."¹⁹

In less than a decade, this modest wedge in the Agricultural Department developed into a distinct Horticultural Department. A scheme for promoting women's education provided an impetus for growth. Under the sponsorship and management of Frances Evelyn Greville, Countess of Warwick (1861–1938), an independent hostel was set up in 1898 for women students studying agriculture and horticulture at Reading College (as it was then renamed). Within a few years, further residences, including a site designated for colonial training, and a separate curriculum were added to the "Lady Warwick Hostel." In 1902, Lady Warwick consolidated her patchwork of Reading sites at a private estate in Warwickshire and established Lady Warwick College, Studley Castle (afterward Studley College), effectively introducing a northern competitor to the Horticultural College at Swanley. To continue to meet the demand of the male and female horticultural students who remained in Reading, the Oxford and Reading joint committee launched the new Horticultural Department at the time of Lady Warwick Hostel's separation.²⁰ Thus, in this instance, agriculture at Reading bred two horticultural offspring—one leaving the nest, the other remaining within it.

The effect of the technical instruction movement in transforming professional horticulture was far reaching. It introduced the imperative that quality training required lecture-room scientific study in addition to practical learning in the field. Although this new orientation developed in a variety of venues across the nation, the founders of the Horticultural College at Swanley pioneered its earliest institutional embodiment in 1889. As such, Swanley served as a model but also, as we will see, as a scapegoat for the tensions that science—and women—created for the horticultural profession.

AGENTS RETARDING WOMEN'S EDUCATION IN HORTICULTURAL SCIENCE

Stimulated by the technical instruction movement, ideas for formalizing horticultural study percolated everywhere—county council meeting rooms, entrepreneurs' board-rooms, and columns in magazines like the *Agricultural Gazette* and the *Gardeners' Chronicle*.²¹ But the idea of broadening academic horticulture—and particularly under the rubrics of "science" and "technical instruction"—proved controversial. Debates ensued

¹⁹ On the situation at Reading see Brassey, "Agricultural Science and Education" (cit. n. 11), pp. 641–642; and Douglas A. Gilchrist, "The Agricultural Department of the University Extension College, Reading," *Rec. Tech. Second. Educ.*, 1894, 3:514–525 (Gilchrist's prediction is on p. 525). See also "Preface," in *Reading College Calendar: Seventh Session, 1898–99* (Reading: Joseph Hawkes, 1898), on p. 7.

²⁰ "Report of the Council to the Governors for the Year Ended 30th September, 1902," *Official Gazette* (University College, Reading), 1903, 1:134–139, on p. 136. For more on Lady Warwick and the background to the hostel see Margaret Blunden, *The Countess of Warwick* (London: Cassell, 1967), pp. 114–122, 136–140.

²¹ For more on popular gardening magazines of this period see Ray G. C. Desmond, "Victorian Gardening Magazines," *Garden Hist.*, 1977, 5:47–66.

between defenders of traditional apprenticeship methods in gardens and glasshouses and proponents of scientific learning in the technical schools' lecture rooms. The debates underlined tensions in class dynamics as well as educational philosophies. In late 1891, despite pointing out the merits of scientific subjects for "stimulating and developing [students'] general intelligence," William Turner Thiselton-Dyer, Director of the Royal Botanic Gardens, Kew, offered a lengthy opinion against the adoption of "lecture-room instruction in the art of horticulture" at county schools, emphasizing instead the importance of hands-on training. He explained that Kew provided its students with lectures in botany, elementary physics, and elementary chemistry, but he doubted "whether these advantages add very much to the capacity of our men as gardeners." Along similar lines, Frederick William Burbidge, "Kewite" and Curator of Trinity College Botanic Garden, Dublin, prescribed "a good course of five to seven, or even nine, years' practical training in well-managed gardens," as opposed to additional schooling beyond a public school education, before a student might enter a public garden of Kew's stature.²²

Such expert opinions as Thiselton-Dyer's and Burbidge's, issuing from the national and university botanic gardens, were clearly meant to champion the "opportunities for self-improvement" those institutions offered an elite class of students, while criticizing the new technical schools' curriculum intended for educating broader segments of society. Their prescriptions formed a rear guard against the notion that horticulture could be broadly taught as lecture-room *science*, substituting for the development of specialized, practical know-how gained through years of apprenticeship. To support this view, Thiselton-Dyer cited no less prestigious a scientific authority than Thomas Henry Huxley, biologist and honorary dean of the Normal School of Science, London, who wrote, "There are some general principles which apply to all technical training. The first of these, I think, is that practice is to be learnt only by practice. The farmer must be made by thorough farm work."²³ Although the direct target of such pronouncements was the application of new scientific, technical instruction to agriculture and horticulture, the casualties included the budding collegiate programs for women's study of these subjects. In short, the detractors viewed the new "lecture room" collegiate ventures as ineffective means by which to teach what was traditionally considered an art.²⁴

There were also those detractors, indeed, who more squarely attacked attempts to feminize the field. Speaking at the women's Educational Congress of 1897 commemorating Queen Victoria's Diamond Jubilee, Hugh Macan argued against the idea that women should be educated for participation in certain areas of agricultural and horticultural work. Macan, an Oxford-trained chemist and well-known proponent of technical and agricultural education, claimed that "there is an important difficulty, more or less of a physical character, that women are not suited for some of the most important agricultural pursuits, by reason of the roughness of the life which has to be lived." Underpinning this

²² W. T. Thiselton-Dyer, "Instruction in Horticulture," *Royal Gardens Kew Bulletin of Miscellaneous Information*, 1892, no. 62, pp. 41–43, on p. 42; and F. W. Burbidge, "Kew as a University of Gardening; or, How to Succeed at Kew," *Journal of the Kew Guild*, May 1895, pp. 22–25, on p. 23. I thank Rich Bellon for bringing the latter reference to my attention.

²³ Burbidge, "Kew as a University of Gardening," p. 25; and W. T. Thiselton-Dyer, "Horticultural Education," *Gardeners' Chronicle*, 1891, Ser. 3, 10:646. Huxley originally stated this view in response to an inquiry by the Easingwold Chamber of Agriculture, but it was reprinted in trade farming publications throughout the empire. Thiselton-Dyer's source was "Agricultural Education," *Agricultural Gazette of New South Wales*, 1891, 2:495–496, on p. 495. Huxley was otherwise supportive of theoretical science in technical education; see Adrian Desmond, *Huxley: From Devil's Disciple to Evolution's High Priest* (Reading, Mass.: Perseus, 1997), p. 488.

²⁴ This tension is further elaborated in "Agricultural Education in Great Britain" (cit. n. 16).

view was the idea that women were by nature unfit for physically demanding work, but a further side to the argument was the belief that students could not learn through classroom study what could—and should—be learned only through years of practical labor in the field. In this respect, speaking directly on the question of women's horticultural education, and acknowledging Swanley's unique work in this field, Macan nevertheless argued, "I am absolutely convinced that, no matter how good an education you may give to a young woman up to the age of twenty-two or twenty-four, she will not, without many years of hard apprenticeship and very hard practical labour in the farm or in the garden, be able to take the post which is given to professional gardeners."²⁵

The question of women's fitness for manual labor within gardens, glasshouses, and farm fields occupied the minds of both proponents and detractors. Glimmers of the pervasive image of the gardening "profession" as a male domain appeared within the gendered language of expert advice.²⁶ In addition to criticizing the inclusion of horticulture in schemes for technical instruction, Thiselton-Dyer publicly characterized Kew as a place where "we treat our young men as 'men.' . . . We wish them to be manly, self-respecting, and strenuous." With respect to views such as this, the possibility of admitting women gardeners presented a difficulty in two senses: they might compromise the moral dimension to men's horticultural training, and women's constitutions could not be expected to sustain the same "strenuous" outcomes as men's. Highly publicized medical rhetoric admonishing against the physical dangers of *intellectual* collegiate work for women only exacerbated parallel claims regarding the potential health risks of *physical* farming and gardening work for would-be women practitioners.²⁷ Such concerns seemed to retard the opening of agricultural and horticultural colleges to women until Swanley directly tested the assumptions by admitting its first woman student in 1891. In the ensuing years, the college administrators emphasized the good health of the women students and publicized expert medical testimonies like those of Sir Edward Henry Sieveking and Mrs. Elizabeth Garrett Anderson (both members of Swanley's council), who jointly praised the virtues of horticultural training for women's health. Sieveking, physician-in-ordinary to Queen Victoria, pronounced at the first annual meeting of the Women's Branch in 1893:

A study of the prospectus of the College, as well as a personal inspection of the Women's Branch at Swanley, justifies my saying that there is a large field for suitable development for female taste and female energy, in gardens, in greenhouses, in the management of trees, of flowers, in the poultry-yard, in book-keeping, without entailing undue physical exhaustion of making demand upon their bodily strength, exceeding what may be fairly demanded of a healthy young woman. . . . I believe that the development of Swanley College may prove largely instrumental in promoting one of the most healthful occupations for women, healthful for body and mind.

²⁵ H. Macan, "Education Suitable for Women in Rural Districts," in *Progress in Women's Education in the British Empire*, ed. the Countess of Warwick (London: Longman, Green, 1898), pp. 139–149, on pp. 142, 145; and Richards, "South-Eastern Agricultural College and Public Support for Technical Education" (cit. n. 17), pp. 177–178.

²⁶ On gardening as a "profession" see Macan, "Education Suitable for Women in Rural Districts." "Profession" and "trade" were often used interchangeably in this period, although "profession" usually implied higher qualification. See S. Heaton, "Gardeners—Past, Present, and Future," *Journal of the Royal Horticultural Society*, 1897, 20:40–52, on p. 41; cf. Ada Goodrich Freer, "Horticulture as a Profession for the Educated," *Nineteenth Century*, 1899, 46:769–781.

²⁷ Burbidge, "Kew as a University of Gardening" (cit. n. 22), p. 22 (quoting Thiselton-Dyer); and Joan N. Burstyn, "Education and Sex: The Medical Case against Higher Education for Women in England, 1870–1900," *Proceedings of the American Philosophical Society*, 1973, 117:79–89.

Similarly, Mrs. Garrett Anderson, renowned as a pioneering woman M.D., who was also present at the meeting, concluded, "Horticulture is a healthy and suitable employment for women."²⁸

Health concerns aside, there remained the practical matter of how to accommodate unmarried women residing on the same campus as men. Swanley's founders made no explicit policies prohibiting the enrollment of women, but it is clear that the college was not initially organized to be coeducational. To some degree, this simply reflected how closely Swanley was modeled on the existing private agricultural colleges, which were indeed all male.²⁹ Richard John Tabor (1876–1958), a Swanley alumnus and botany lecturer, suggested that from the outset Bond intended the college to be coeducational: "There is no doubt that Bond had in mind, from the beginning, the possibility of admitting women students, as soon as the opening of a separate building for their accommodation could be justified." At any rate, Bond's earliest documented awareness of the possibility is a letter of inquiry he received in the college's first month. The lady correspondent politely inquired, "Will you favour me with a prospectus of the Horticultural College, & kindly state whether ladies are admitted to its benefits either as residents or non-residents."³⁰ Despite the inquiry, Bond took no decisive measures to open the college to women until more persuasive external parties pressed the issue a couple of years later.

Further contributing to this early reluctance, the college tuition costs were high, scholarship money was scarce, and Technical Instruction Act guidelines initially discriminated against women scholarship applicants. For example, the criteria of the new Kent Technical Education Committee Scholarship stipulated, "*Candidates must be males*, and of not less than 16 nor of more than 20 years of age." Not long after the opening of the college to women in 1891, the new Women's Branch Committee recognized that it was critical to extend scholarships to women to help make the college's high costs affordable to "ladies of small means":

The recent grant of twenty-five scholarships to male students by the County Council of Kent, will much extend the usefulness of the College to men, and we submit that, in common fairness assistance should also be granted to the Ladies' Branch. This, however, we hear that the County Council will not, at present, undertake to do, on which account we are now appealing to the public spirit of individuals, and to Companies, or Societies noted for their generosity in promoting the educational interests of women.

Although private donations trickled in, the committee persisted in lobbying for state support. Helped by Bond's influence, supporters signed a petition to Kent County Council

²⁸ "Women's Branch of the Horticultural College, Swanley, Kent, Second Annual Report," Dec. 1893, in *Reports 1892–1912*, p. 7, SWAN00015, HHC (quoting Sieveking and Garrett Anderson). Anne Meredith has analyzed the wider contemporary literature that circulated ideas concerning the suitability of horticulture for women, and she noted "the emphasis put on women gaining a thorough training and using their brains rather than their brawn, perhaps a device to distance the trained woman gardener from the traditional picture of the poorly educated male gardener": Meredith, "Middle-Class Women and Horticultural Education," p. 64.

²⁹ Macan, "Education Suitable for Women in Rural Districts" (cit. n. 25), p. 141. A similar oversight omitted toilets for women in the original building of the coeducational Finsbury Technical College; see W. H. Brock, "Building England's First Technical College: The Laboratories of the Finsbury Technical College, 1878–1926," in *The Development of the Laboratory: Essays on the Place of Experiment in Industrial Civilisation*, ed. Frank A. J. L. James (New York: American Institute of Physics, 1989), pp. 155–170, on p. 166.

³⁰ Tabor, "Arthur Harper Bond" (cit. n. 5), p. 5; and Miss A. Yates to the Managers of the Horticultural College, 31 Jan. 1889, Student Letters and Inquiries, No. 1, SWANS001, HHC.

requesting “two scholarships in connection with the Ladies’ Branch.”³¹ The council finally conceded and endowed a scholarship for women in August 1893, but building an endowment remained a challenge for many years. As late as 1905, a correspondent to the *Gardeners’ Chronicle* asked whether less expensive training existed: “I am anxious to know if there is any way for a girl to get training in gardening (of such a character as to fit her for obtaining a post as a lady gardener) less expensive than the Horticultural College at Swanley or Lady Warwick’s Hostel [*sic*]?” Although the tuition rates remained fairly stable over this entire period—annual residential rates at Swanley starting at £70—the cost underlined the reality that the typical attendee would be from the upper middle class.³²

The variety of challenges outlined here were symptoms of the more general reluctance to embrace scientific classroom instruction in horticultural education and to acknowledge women’s suitability for gardening work. Nevertheless, pioneering measures to advance these two intertwined causes gradually overcame the various retarding agents.

GERMINATING THE WOMEN’S BRANCH

In view of Bond and his associates’ early indifference, credit must be granted to a handful of lady proponents of women’s work and higher education for marshaling coeducation into the college. Popularized and debated in the press, the problem of redundant women served as the backdrop to this aspect of the broader women’s movement.³³ Its rhetoric pervaded the public discourse, highlighting the new opportunities for women’s training in horticulture and agriculture and justifying those opportunities as parts of an important overall solution. But, given the popular assumption that field and garden labor was unwomanly, London’s first lady alderman took it upon herself to prove otherwise.

Invited by John McDougall, who was London County Councilor, Swanley director, and uncle to a “Swanleyite,” Miss Emma Cons (1838–1912)—the alderman—visited the Swanley campus with her friend, Miss Ethel Gertrude Everest, sometime in 1890. “The autumn two energetic spirits [*sic*]” remained at the college for a few weeks, and they worked alongside the students to “prove” that women had the physical capacity to withstand the rigors of the training. The experiment repeated a similar test that Cons had performed several decades earlier in London, where she and a group of female friends apprenticed themselves to a watch engraver to challenge the notion that only men could perform such work.³⁴ Cons was no stranger to the expansion of education for women: she was a founder of the so-called penny lectures by eminent men of science, held at her Royal Victoria Coffee and Music Hall (“the Old Vic”), and the Morley Memorial College for

³¹ “Scholarship Schemes,” *Rec. Tech. Second. Educ.*, 1892, 1:156–162, on p. 156 (emphasis added); “Meeting on November 27, 1891, held at 55 Drayton Gardens, S.W.,” Women’s Branch of the Horticultural College, Swanley, Minute-Book, May 91 to Nov 93, W00011/1, HHC; and “Meeting on October 15, 1892, held at 55 Drayton Gardens, S.W.,” *ibid*.

³² “Women’s Branch of the Horticultural College, Swanley, Kent, Second Annual Report” (cit. n. 28), p. 9 (scholarship for women); E.C.C. D.’O., “Lady Gardener,” *Gardeners’ Chron.*, 1905, 37:96; and Meredith, “Middle-Class Women and Horticultural Education,” pp. 118–119 (tuition).

³³ On this theme see esp. Jordan, *Women’s Movement and Women’s Employment in Nineteenth-Century Britain* (cit. n. 3).

³⁴ Emmeline Eason Wilkinson, “The History of the College, Part III: Recollections of the Early Days,” *Hort. Coll. Mag.*, Nov. 1916, pp. 8–10, on p. 10; and Morrow, “History of Swanley Horticultural College,” p. 80. On Cons see Judi Leighton, “Cons, Emma (1838–1912),” in *DNB*.

Working Men and Women that developed from those lectures.³⁵ She was convinced of the suitability of the Horticultural College’s training for women, and she recruited a Swanley townswoman, Mrs. Elizabeth Watson (1841–1931), to open a hostel near the college and serve as its Lady Superintendent. In May 1891 Cons called a meeting at the premises of Mrs. Edith Laxon Chamberlain’s newly launched Women’s London Gardening Association, with Everest, Watson, and Miss Fanny Rollo Wilkinson (1855–1951), landscape gardener for the Metropolitan Public Gardens Association, also present. By the end of the meeting, this talented team drew up a “prospectus” for the creation of the Ladies’ Branch (soon afterward, “Women’s Branch”). This beginning under the direction of Miss Cons rightly earned her distinction as “the mother of the College.”³⁶

The earliest female student, Mrs. Benison, entered the college on 13 June 1891, residing at the “South Bank” hostel under Mrs. Watson’s superintendence.³⁷ Within a few months four more women students arrived; three of them completed a full year of instruction, and the fourth continued for a second year. No female students entered in 1892, causing some concern; according to Miss Emmeline Sieveking (1867–1945), daughter of the physician and the honorary treasurer (later secretary), “Then indeed the prospect of the Woman’s Branch seemed at a low ebb.”³⁸ Nevertheless, once scholarship funds became available and the Women’s Branch received wider notice, ten female students entered in 1893 (four on scholarships), and from that point forward the enrollments grew steadily (see Table 1). By 1896 the number of entering female students consistently surpassed the number of entering males, leading the college governing board to its decision in 1902 to close admissions to men and convert the coeducational institution to a women-only college.

Clearly, the dwindling numbers of new male enrollees catalyzed this decision; in Tabor’s opinion, “Under these circumstances it is not surprising to find the balance of power shifting from one side to the other.” Competition introduced by the new state-sponsored technical schools and agricultural colleges like the South-Eastern Agricultural College was likely the key factor behind the enrollment trends. There are hints, too, of growing tensions within the governing body. F. Graham Powell, principal from 1895 to 1898, resigned with these words: “it has for some time been increasingly evident to me that the views of the ladies who hold a prominent position on the board are materially divergent from my own.”³⁹ Nevertheless, a few good men remained—including Tabor, who lectured in botany from 1899 to 1910.

³⁵ On the wider science lecturing movement see Bernard Lightman, *Victorian Popularizers of Science: Designing Nature for New Audiences* (Chicago: Univ. Chicago Press, 2007).

³⁶ “The Ladies’ Branch of the Horticultural College, South Bank, Hextable, Swanley,” n.d., Women’s Branch of the Horticultural College, Swanley, Minute-Book, May 91 to Nov 93, W00011/1, HHC; C. R. Milne, “Mrs. Elizabeth Watson,” *Hort. Coll. Mag.*, Nov. 1931, p. 4; Elizabeth Crawford, “Wilkinson, Fanny Rollo,” in *DNB*; Crawford, *Enterprising Women* (cit. n. 4), pp. 230–231; and “Prize Distribution,” *Hort. Coll. Mag.*, July 1901, pp. 17–18, on p. 17 (“mother of the College”).

³⁷ Enrollment dates and statistics are taken from the General Register of the Horticultural College, Swanley, Kent, SWAN00007, HHC.

³⁸ Wilkinson, “History of the College, Part III” (cit. n. 34), p. 8. In 1908 Emmeline Wood Sieveking married Matthew Eason Wilkinson, brother of Fanny Wilkinson and a principal of the college from 1900 to 1902. On the Sieveking family tree see Frederick Arthur Crisp, ed., *Visitation of England and Wales*, Vol. 2 (London: Privately printed, 1903), pp. 177–181.

³⁹ R. J. Tabor, “Editorial,” *Hort. Coll. Mag.*, Aug. 1902, pp. 1–2, on p. 2; and Morrow, “History of Swanley Horticultural College,” p. 85 (quoting Powell).

Table 1. Distribution of New Student Enrollments by Gender at The Horticultural College, Swanley, 1890–1905

	Females		Males		Total
	<i>N</i>	% of Total	<i>N</i>	% of Total	<i>N</i>
By year:					
1890*	0	0.0	2	100.0	2
1891	5	55.6	4	44.4	9
1892	0	0.0	36	100.0	36
1893	10	38.5	16	61.5	26
1894	21	50.0	21	50.0	42
1895	12	40.0	18	60.0	30
1896	20	52.6	18	47.4	38
1897	22	78.6	6	21.4	28
1898	20	55.6	16	44.4	36
1899	47	70.1	20	29.9	67
1900	37	88.1	5	11.9	42
1901	29	59.2	20	40.8	49
1902	36	90.0	4	10.0	40
1903	41	95.3	2	4.7	43
1904	29	100.0	0	0.0	29
1905	39	100.0	0	0.0	39
Total	368	66.2	188	33.8	556

SOURCE.—Author's calculations using the General Register of the Horticultural College, Swanley, Kent, SWAN00007, Hextable Heritage Centre.

* Because the General Register does not include records for 1889 and only incomplete records for 1890, the male figures for 1890 are incomplete.

CULTIVATING THE SCIENCE OF HORTICULTURE

Swanley's founders placed great emphasis on the centrality of theoretical, scientific instruction in the curriculum. The first college prospectus proclaimed, "Here every facility is given to young men to acquire thorough and practical knowledge of the *latest* and most scientific, and in consequence, the most profitable, systems of Horticulture." The yoking of science with profit borrowed from similar linkages made in agriculture and thus drew on the broader interest in technical instruction as a potential solution to Britain's agricultural depression. From Bond's vantage point, however, this linkage represented a business opportunity—the college, after all, was founded as a "Produce Company, Limited," and remained such in name until 1892. As Jessie Maria Smith (1863–1960), one of the original women students, recalled, "Fruit and flower growing were just being boomed and big profits were to be made from glass house work. We were therefore filled with enthusiasm that goes a long way."⁴⁰ American precedents seem to have propelled the British boom, particularly as notice was taken of Scottish-born Peter Henderson's publications and Luther Burbank's hybridization productions, which were widely publicized as forms of science in both American and British periodicals.⁴¹ More important, the influx of cheap

⁴⁰ "The Horticultural College & Produce Company, (Limited,) Swanley, Kent", Associated with Science and Art Department," quoted in Morrow, "History of Swanley Horticultural College," p. 67 (emphasis in original); License by the Board of Trade, BT 58/128/COS/7471, subfolder 6, NAK; and Jessie M. Smith, "History of the College, IV: Reminiscences of the First Year of College for Women Students," *Hort. Coll. Mag.*, May 1917, pp. 13–14, on p. 13.

⁴¹ Susan Warren Lanman, "'For Profit and Pleasure': Peter Henderson and the Commercialization of Horticulture in Nineteenth-Century America," in *Industrializing Organisms: Introducing Evolutionary History*, ed.

imports from America placed the scientific improvement of British agriculture and market gardening on the national agenda.⁴²

To ensure the “promotion of scientific Horticulture,” Bond advanced several agendas: a scientific curriculum taught by a staff of well-credentialed, academic men, a program of agricultural experimentation in the college’s fields, and a correspondence scheme for disseminating expert horticultural advice. Early leading lights of the instructional and experimental teams included the South Kensington science lecturer and noted apiculturist Frank Richard Cheshire, the St. Andrews naturalist John Pentland Smith, the analytical chemist Herbert Trewby, and the noted pomologist and surveyor Cecil Henry Hooper (see Figure 2).⁴³ The scientific courses listed in an early college syllabus covered topics in zoology, natural history, botany, chemistry, geology, meteorology, heat, light, dynamics, hydrostatics, hydrodynamics, measuring, surveying, and engineering—all as they bore on the practical work of propagating and cultivating plants, stock keeping, glasshouse maintenance, and similar applied work. Confidently specified under “Zoology and General Biology” was the listing “The laws of variation and principles involved in artificial selection,” an important clue to the presence of (post-)Darwinian ideas within the curriculum, for which Pentland Smith, a student of William Carmichael M’Intosh, was likely the conduit.⁴⁴ The relevance of Mendelian principles, after their introduction in England by William Bateson in 1900, did not seem to enter Swanley’s curriculum before 1910, but sometime later “genetics, evolution, variation, mutation, hybridization, and Mendel’s work” did dominate the topics covered in an advanced botany course.⁴⁵

Susan R. Schrepfer and Philip Scranton (London: Routledge, 2004), pp. 19–42; and Jane S. Smith, *The Garden of Invention* (London: Penguin, 2009). For more on the American context see Philip Pauly, *Fruits and Plains: The Horticultural Transformation of America* (Cambridge, Mass.: Harvard Univ. Press, 2007).

⁴² On the expansion of market gardening and other forms of “alternative agriculture” in the context of the agricultural depression see esp. Thirsk, *Alternative Agriculture* (cit. n. 2), pp. 147–219. See also Perren, *Agriculture in Depression* (cit. n. 2); Christopher Aucamp, “The Establishment and Development of the Cape Fresh Fruit Industry, 1886–1910,” *South African Journal of Economic History*, 1986, 2:68–91; Richards, “South-Eastern Agricultural College and Public Support for Technical Education” (cit. n. 17); Robert Olby, “Social Imperialism and State Support for Agricultural Research in Edwardian Britain,” *Annals of Science*, 1991, 48:509–526; and Roy J. Battersby, “The Development of Market Gardening in England” (Ph.D. diss., Univ. London, 1960).

⁴³ “Horticultural College & Produce Company, (Limited,) Swanley, Kent,” quoted in Morrow, “History of Swanley Horticultural College,” p. 67. Cheshire was celebrated for his work on the diseases of bees and his standard text on apiculture; see Frank R. Cheshire, *Bees and Bee-Keeping: Scientific and Practical*, 2 vols. (London: L. Upcott Gill, 1886). Pentland Smith often assisted in his teacher’s celebrated work in marine zoology at the University of St. Andrews; examples of his illustrations appear in William Carmichael M’Intosh and Arthur Thomas Masterman, *The Life Histories of the British Marine Food-Fishes* (London: C. J. Clay, 1897). Hooper was affiliated with the Royal Agricultural College and the Surveyors’ Institute, and in 1894 he was acting principal of Swanley. He later joined the staff of the South-Eastern Agricultural College, Wye, and authored a pomology text: Cecil H. Hooper, *Fruit Farming: Practical and Scientific, for Commercial Fruit Growers and Others* (London: Lockwood, 1912).

⁴⁴ M’Intosh subscribed to the validity of natural selection sufficiently to indicate its relevance to the growth rate of fishes in M’Intosh and Masterman, *Life Histories of the British Marine Food-Fishes*, pp. 104–106. Nevertheless, he was no “hot Darwinian”: Albert E. Gunther, *The Life of William Carmichael M’Intosh, M.D., F.R.S., of St. Andrews, 1838–1911: A Pioneer in Marine Biology* (St. Andrews: Scottish Academic Press, 1977), p. 66.

⁴⁵ Betty Cooper, “Swanley Horticultural College,” *J. Kew Guild*, 1941, 6:63–67, on p. 66. On Bateson’s introduction of Mendelism see Robert C. Olby, “William Bateson’s Introduction of Mendelism in England,” *British Journal for the History of Science*, 1987, 20:399–420. As Marsha Richmond has discussed, the Mendelians, led by Bateson, relied on a wide network of horticulturalists and botanists, including women studying at Newnham College; see Marsha L. Richmond, “Women in the Early History of Genetics: William Bateson and the Newnham College Mendelians, 1900–1910,” *Isis*, 2001, 92:55–90. Although Eleanor Sidgwick, Principal of Newnham College, was a member of Swanley’s council from 1891 onward, I did not discover any matches among the student registers of the two colleges in the period 1891–1905. I thank Alan Opitz for assisting in this comparative analysis.



Figure 2. Staff and students of the Horticultural College, Swanley, in 1890. Seated in the middle row, from left to right, are Cecil Henry Hooper, Arthur Harper Bond, and John Pentland Smith. D1/003 H, Hextable Heritage Centre. By the permission of the College Archives, Imperial College London.

Weekly examinations in a representative range of these subjects, emphasizing both theory and application, prepared students for the Department of Science and Art (DSA) examinations held twice each year, as well as the annual Royal Horticultural Society examinations held each spring. Students receiving qualifying marks in the DSA examinations earned college diplomas and DSA certificates; students with high marks also earned DSA grants for the college.⁴⁶ Every year the RHS published rankings of all examinees from schools across the kingdom in its *Journal* and honored the highest-ranking examinee with the Silver Gilt Medal. The results of the RHS examinations of 1895 created a sensation, as a female Swanleyite, Miss Annie M. Gulvin (afterward Mrs. Allen Turner), placed first and won the medal. In that year, adding to the triumph, six of the twelve students who placed in the first class were also Swanleyites—with four of those six being female. The examiners' analysis of the results suggested the impact of formalized study and hinted at a differential based on social class: "The effect of continuous systematic training is well exemplified in the class lists. . . . Many gardeners and mechanics, who cultivate small gardens and allotments, but who have not had the opportunity of regular tuition and systematic study, have taken a lower place than they otherwise would have done, because they have failed to grasp the significance of the questions."⁴⁷ At this stage, however, commentators drew no direct connection between this elevation of standards and the infiltration of women trainees into the field.

⁴⁶ See, e.g., "Third Annual Report of the Women's Branch of the Horticultural College, Swanley, Kent," Dec. 1894, in *Reports 1892–1912*, SWAN00015, HHC.

⁴⁷ "Examination in Horticulture, 1895," *J. Roy. Hort. Soc.*, 1895, 19:1–8, on p. 2. For an analysis of the examination results by sex from 1893 through 1939 see Meredith, "Middle-Class Women and Horticultural Education," pp. 95–97.

Nevertheless, competition thrived between the Horticultural College's two sex-differentiated "branches." According to Jessie Smith:

When we had been one term at College we heard that about thirty new men students were coming; they proved to be boys to whom scholarships had been granted and they all came together during one week. The women students soon found they had to work harder to keep their place at the top of the lists in the weekly exams . . . for these boys fresh from school were good workers and serious rivals in the lecture rooms.

Yet Jessie's sister, Ellen Mildred Smith (also among the first female cohort), saw things somewhat differently: "I am afraid the men students—mostly boys in their late teens—were, with a few exceptions, rather slack in their work." Despite such different characterizations, comparisons were clearly being drawn. As Jessie perceptively noted, "for after all it was the beginning of women gardeners, and all those anxious to start this work for women were watching with some anxiety to see if we were going to be any good at it." One publicized measure of the women's successes was their consistent placement at the top of the RHS's examinations lists. As the *Englishwoman's Review* highlighted in 1906, "Between the year 1895 and 1903 the medal of the Royal Horticultural Society's Annual Examination was won seven times by Swanley students"; the article failed to note that one of those Swanley medalists was in fact male.⁴⁸

Lectures and examinations constituted only one side of the instructional program, which was designed to be both theoretical and practical. As explained in the college's syllabus, students were "expected to attend the various courses of Lectures," then "give as required time for laboratory practice" (see Figure 3). A variety of tools were needed: "Each Student should be provided with a hand magnifier, pruning knife, bee-veil and a bibbed apron for laboratory practice. . . . A student's microscope is desirable, but it is suggested that the Principal be consulted as to the best method of purchase." In addition to their time in the lecture room and laboratory, "as far as health and other circumstances permit," students were expected to contribute to "the practical and experimental work" in the college's gardens, glasshouses, and workshops. In designing the curriculum in this way, the college directors strove to align theory and practice in the students' training: "That by the acquirement of technical skill and handicraft they may be better prepared to appreciate and subsequently utilize the Scientific Education in which they are engaged."⁴⁹

In the spring of 1892, to bolster the scientific status of the college, Bond convened an Experiments Committee, "urging that it was desirable that the [Kent] Technical Education Committee should encourage the formation of an experimental station for the county," in line with a growing international trend. Kent having "in much public spirit voted a first instalment of £50," Bond's committee swiftly launched experiments to test the efficacy of insecticides and fungicides, the effect of manure applications, and the comparative constitutional strength and productivity of varieties of strawberries after hybridization and selection. By October the Experiments Committee determined that "a 2 per cent. solution of sulphate of copper and lime is efficacious in preventing potato disease, and they

⁴⁸ J. Smith, "History of the College, IV" (cit. n. 40), p. 14; E. Mildred Smith, "Early Swanley," *Wye*, 1960, 4(3):106–107, on p. 106; J. Smith, "History of the College, IV," p. 14; and "The Horticultural College, Swanley," *Englishwoman's Review*, 1906, no. 37, pp. 269–270, on p. 270. The male medalist was H. S. Langford, who afterward won a Chiswick scholarship for a one-year residency in the society's gardens; see "Examination in Horticulture, 1898," *J. Roy. Hort. Soc.*, 1898, 21:122–129, on p. 123.

⁴⁹ "Horticultural College & Produce Company, (Limited.) Swanley, Kent," quoted in Morrow, "History of Swanley Horticultural College," pp. 73, 71.



Figure 3. Students in the botany laboratory of the Horticultural College, Swanley, circa late 1890s. D2/014 H, Hextable Heritage Centre. By permission of the College Archives, Imperial College London.

strongly recommend its general use.”⁵⁰ Over the next few years the Kent County Council continued to approve grants amounting to £150 per year to further the studies.⁵¹ It seems that the committee disbanded after several changeovers in staffing in the late 1890s, but afterward visiting researchers and resident college lecturers continued to use college land for their experiments and demonstrations. Two noteworthy examples are the experiments on insecticides for flies by the noted Imperial College entomologist Harold Maxwell Lefroy and the botanic garden and herbarium developed by Richard Tabor.⁵²

Amid shifts in curricular emphasis and staffing, on the whole the scientific content remained fairly stable during this early period. Noteworthy scientific guest lecturers included Robert Warington, Sibthorpe Professor of Rural Economy at the University of Oxford; Rev. George Henslow, a Cambridge botanist; and Frederick Vincent Theobald, an entomologist affiliated with the British Museum (Natural History) and the South-Eastern Agricultural College, Wye. The external examinations by the Department of Science and Art and the Royal Horticultural Society were mainstays. Students perceived the training

⁵⁰ “Horticultural Experiments in Kent,” *Rec. Tech. Second. Educ.*, 1892, 2:187–194, on pp. 187, 194; and George Grantham, “The Shifting Locus of Agricultural Innovation in Nineteenth-Century Europe: The Case of the Agricultural Experiment Stations,” in *Research in Economic History*, Suppl. 3, ed. Gary Saxonhouse and Gavin Wright (Greenwich, Conn.: JAI Press, 1984), pp. 191–214. Pentland Smith likely directed the experiments concerning the potato fungus; see J. Pentland Smith, “The Potato Fungus,” *Knowledge*, 1891, 14:135–137.

⁵¹ “Comparative Summary of Recent Progress in Various Counties,” *Rec. Tech. Second. Educ.*, 1895, 4:225–295, on pp. 270–271. Members of the Experimental Committee disseminated results in a variety of venues. See, e.g., “The Horticultural College, Swanley,” *Gardeners’ Chron.*, 1893, 13:634; “Field Clubs and Societies,” *Naturalists’ Journal*, 1894, 3:146–148; and “Horticultural Experiments in Kent.”

⁵² Morrow, “History of Swanley Horticultural College,” p. 82; and M. Wilson, “The Botanic Garden,” *Hort. Coll. Mag.*, July 1900, pp. 13–14.

they received as rigorous and scientific. “We were fortunate . . . in having extremely efficient instruction on the theoretical side,” recollected one of the early male students. “This was given for the most part by a resident lecturer, Mr. Pentland Smith, and included elementary chemistry, botany, and physics.” Students gave similar endorsements of Cheshire’s teaching. One of his students, Jessie Smith, summarized, “I think the scientific teaching was quite good and those who took the Exams. of the Science and Arts S. Kensington came through quite decently.” Alice Hutchings (afterward Mrs. Patterson) (1876–1944), who attended from 1894 to 1895, applauded the dual nature of the curriculum: “Practical work is happily blended with the science of horticulture.”⁵³

PROPAGATING COLONIAL SCIENCE

This cross-fertilization of science, horticulture, and women inhabited a geographical space defined by Britain’s expanding global empire. The emergent “horticultural science” of Swanley and its relatives aligned with colonizing missions and schemes for intellectual migration. Advocates for high-brow alternatives to colonial domestic service looked to horticultural science. Their loftier ideals were reified within a new Colonial Training Branch at the Horticultural College, Swanley, shortly after the turn of the century, but the outcomes proved disappointing in a labor market driven by practical homemaking needs rather than the theoretical applications of horticultural science.

As we saw, the idea to apply horticultural training within colonial contexts was an objective stated at the college’s founding. But precedents existed. Most important, in 1887, Robert Johnson founded a model institution for male students, the Colonial College, on a two-thousand-acre country estate at Hollesley Bay, Suffolk, in response to a perceived need to prepare emigrants more effectively for the demands of colonial life. This task involved the moral, intellectual, and physical development of the students: “In a word, while trying to make a man of the young student, we also endeavour to anticipate some of the requirements of colonial life.” Johnson’s approach included immersion, as far as possible, in what was considered to be “a thoroughly Colonial atmosphere”: “The doings in the various Colonies are matters of daily discussion among the students. Maps, plans, sketches, books, letters, pamphlets, prospectuses, and a large variety of other things keep us *au courant* with Colonial affairs. Our habits are in themselves Colonial—including even our costumes!” “Costumes” and all, Johnson designed his curriculum to address both “scientific” and “practical” aspects of a wide range of subjects—agriculture, geology, veterinary science, surveying, forestry, and horticulture—as opposed to offering advanced proficiency in any single subject, “so that the student should not be at a loss when he finds himself confronted with all sorts of emergencies in a new country.”⁵⁴ In attending to the students’ physical development, Johnson encouraged their participation in sports like football and cricket.

By emphasizing a scientific curriculum, Johnson yoked the Colonial College’s efforts to the technical instruction movement, which was fully under way within a few years of the college’s founding. According to Johnson, who believed the college to be “the first and

⁵³ “The History of the College, Part II: Reminiscences of an Old Student,” *Hort. Coll. Mag.*, Nov. 1914, pp. 14–17, on p. 16; J. Smith, “History of the College, IV” (cit. n. 40), p. 14; and Alice Hutchings, “Horticulture for Women,” in *Progress in Women’s Education in the British Empire*, ed. Countess of Warwick (cit. n. 25), pp. 150–152, on p. 151.

⁵⁴ “Robert Johnson, Esq., Director of the Colonial College,” *Education: A Journal for the Scholastic World*, 1891, 2:12–20, on pp. 20, 17, 20.

most absolute *desideratum* for intelligent and high-class colonisation,” scientific teaching “must proceed *pari passu* with practical work”: “the one is being continually tested and proved by the other.” By “scientific instruction,” Johnson seemed to mean universal principles: “Well, the general principles of agriculture are the same all over the world. We therefore give a certain amount of theoretical teaching in the lecture room, and exemplify those theories by our daily practice.” Such an orientation led to tension, in Paul Richards’s terms, between “scientific universals and ecological particularism.”⁵⁵ Johnson’s rhetoric thus suggested how colonial training colleges might institutionalize a linkage between the technical instruction movement, “scientific” agricultural education for colonization, and the universalistic rationalism driving colonial agricultural development.

Although the Swanley Horticultural College’s founding managers identified “colonizing” as an end for its own training, the governing body explicitly added this dimension to the curriculum only after converting the college to a women-only institution between 1902 and 1903. Contrasting with the rationale behind the male-only Colonial College at Hollesley Bay, Swanley’s Colonial Branch was intended to meet the distinctly feminist imperative of alleviating the problems posed by a growing number of unmarried, redundant women.⁵⁶ While building on the older educational schemes for preparing middle-class women for colonial work, Swanley’s emphasis on horticulture advanced a distinctive approach. The British Women’s Emigration Association (BWEA), for example, in 1890 founded the Colonial Training Home at Leaton, Shropshire, to provide instruction primarily in domestic service; however, lessons in dairying, poultry work, beekeeping, and horticulture were also offered while students resided in a manor house under conditions intended to model colonial homesteads. The Hon. Mrs. Ellen Joyce, a Vice President of the BWEA, highlighted this scheme at the 1897 women’s Educational Congress, which was attended by Lady Warwick and Miss Ada Goodrich Freer, then Swanley’s honorary secretary.⁵⁷ It was soon after this conference that Lady Warwick launched her hostel at Reading and, by 1901, pioneered a formalized colonial program focusing on “the lighter branches of agriculture” through a Colonial Training Department. Swanley followed suit when opening its Colonial Branch in January 1903. By then, according to A. James Hammerton, “dozens” of colonial training colleges were operating throughout Britain. Few addressed horticulture with Swanley’s rigor, however. In 1908, the Hon. Frances Wolseley, Principal of the Glynde School for Lady Gardeners in Sussex, identified Swanley’s colonial scheme as “the most important matter that has so far been undertaken.”⁵⁸

In helping to launch Swanley’s efforts, the Hon. Mrs. Evelyn Cecil (née Alicia Margaret

⁵⁵ *Ibid.*, pp. 17, 20, 18; and Paul Richards, *Indigenous Agricultural Revolution: Ecology and Food Production in West Africa* (London: Hutchinson, 1985), p. 10. See also Joseph Morgan Hodge, *Triumph of the Expert: Agrarian Doctrines of Development and the Legacies of British Colonialism* (Athens: Ohio Univ. Press, 2007), esp. pp. 54–116. On the broader alignment of European science with imperialism see Lewis Pyenson, “Cultural Imperialism and Exact Sciences Revisited,” *Isis*, 1993, 84:103–108.

⁵⁶ Hammerton, *Emigrant Gentlewomen* (cit. n. 3); Kranidis, *Victorian Spinster and Colonial Emigration* (cit. n. 3); and Rita S. Kranidis, ed., *Imperial Objects: Essays on Victorian Women’s Emigration and the Unauthorized Imperial Experience* (New York: Twayne, 1998).

⁵⁷ Hammerton, *Emigrant Gentlewomen*, pp. 158–159 (Colonial Training Home); and Countess of Warwick, ed., *Progress in Women’s Education in the British Empire* (cit. n. 25), p. 152. Miss Goodrich Freer (afterward Mrs. Hans Henry Spoer) was better known as a psychical researcher and writer of folklore and travel literature; see Trevor H. Hall, *The Strange Story of Ada Goodrich Freer* (London: Duckworth, 1980).

⁵⁸ D. M. Garstang, “Studley College,” *Agricultural Progress*, 1953, 28:5–14; Hammerton, *Emigrant Gentlewomen*, p. 159; and Wolseley, *Gardening for Women* (cit. n. 1), p. 91. For examples of the “dozens” of colonial training colleges see “Where to Train and How to Train,” *Imperial Colonist*, 1902, 1:92–96.

Amherst, afterward Lady Rockley), a well-known colonial botanist, garden historian, and member of the South African Expansion Committee (SAX) of the BWEA, delivered an address to the college in May 1902—the very month in which the Boer War drew to a close. In her speech, she underlined the labor needs in colonial South Africa and the opportunities these implied for Swanleyites. As examples, she referred to “two girls trained at Reading who have gone out to this land [Rhodesia],” characterizing them as “pioneers indeed.”⁵⁹ Her implicit positioning of Lady Warwick Hostel as the forerunner in such efforts was undoubtedly noticed by Swanley’s administrators. Postwar stability among the South African colonies suggested the possibility of safe passage as well as the need for reconstruction; in the opinion of the ninth Duke of Argyll, Governor-General of Canada, “The ladies of England can do as much for the reconstruction of South Africa as the best civil administration.” As Brian Blakeley has observed, the Colonial Office took particular interest in emigrating great numbers of educated, marriageable ladies to the Cape “to secure the South African colonies to the British Empire in more than name.” A particular emphasis in British colonial land policy toward cultivating land considered to be arable (as opposed to pastoral), especially for fruit production, made women trained in horticulture particularly desirable in the development efforts.⁶⁰

To mobilize efforts at Swanley, a new Colonial Branch Committee was created and Mrs. John Hopkinson, a member of the BWEA and a new addition to Swanley’s governors, was appointed its chair.⁶¹ Emigration stakeholders and agents were brought into the effort through a philanthropic Advisory Council. Gracing the council’s membership list were noteworthy aristocrats like Donald Alexander Smith (Baron Strathcona and Mount Royal), High Commissioner for Canada, and Miss Alice Blanche Balfour, Vice President of the South African Colonisation Society (SACS), which superseded the SAX in 1903.⁶² Balfour’s membership conferred special distinction, as she was also the well-known *châtelaine* of the houses of her brother, Arthur James Balfour (afterward first Earl of Balfour), then the Prime Minister. An experienced traveler in South Africa, she funded a bursary for teachers receiving training at the Colonial Branch and afterward heading to South African colonies, and her name led the signatories on an appeal for funds

⁵⁹ G. M. Godden, “Openings for Women in South Africa,” *Hort. Coll. Mag.*, Aug. 1902, pp. 3–6, on p. 4. On Lady Brockley see Jason Tones, “Amherst [formerly Tyssen-Amherst], Alicia Margaret [married name Alicia Margaret Cecil, Lady Rockley] (1865–1941),” in *DNB*; Joan Percy, “Author by Accident,” *Garden*, 1989, 114:114–117; and Sue Minter, *The Well-Connected Gardener: A Biography of Alicia Amherst, Founder of Garden History* (Brighton: Book Guild, 2010).

⁶⁰ Duke of Argyll, “Child Life in South Africa,” *Imper. Colonist*, 1902, 1:29–30, on p. 29; and Brian L. Blakeley, “Women and Imperialism: The Colonial Office and Female Emigration to South Africa, 1901–1910,” *Albion*, 1981, 13:131–149, on p. 131. For more on the Boer War see John Gooch, ed., *The Boer War: Direction, Experience, and Image* (London: Cass, 2000). Regarding British colonial land policy see A. J. Christopher, “Colonial Land Policy in Natal,” *Annals of the Association of American Geographers*, 1971, 61:560–575; and Aucamp, “Establishment and Development of the Cape Fresh Fruit Industry” (cit. n. 42).

⁶¹ Biographical information on Mrs. John Hopkinson (née Evelyn Oldenbourg) is scant, but see her personal memoirs: Evelyn Hopkinson, *The Story of a Mid-Victorian Girl* (Cambridge: Cambridge Univ. Press, 1928). See also Crawford, *Enterprising Women* (cit. n. 4), p. 303. She visited South Africa during the meeting of the British Association for the Advancement of Science in 1905, providing an opportunity to publicize Swanley’s Colonial Training Branch: “Notes: Swanley Horticultural College,” *Agricultural Journal of the Cape of Good Hope*, 1905, 27:281–282.

⁶² On Strathcona see Donna McDonald, *Lord Strathcona: A Biography of Donald Alexander Smith* (Toronto: Dundurn, 1996); on Balfour see Donald L. Opitz, “‘Behind Folding Shutters in Whittingehame House’: Alice Blanche Balfour (1850–1936) and Amateur Natural History,” *Archives of Natural History*, 2004, 31:330–348.

printed in the *Times* and the “provincial press” in December 1904. In addition to a promising stream of donations, this publicity produced a swell of inquiries.⁶³

Consistent with the arrangements of the other colonial colleges, students who entered Swanley’s Colonial Branch stayed in a designated residence (initially at West Bank but later at North Bank) where, as advertised, they could live “as far as possible under the conditions of colonial life.” Similar to Hollesley Bay, and as distinguished from the other women’s colonial training schools, Swanley aligned its colonial curriculum with scientific instruction to meet its primary aim of educating a class of women who could fill skilled occupations in teaching, gardening, and agriculture in the colonial settlements. This was arguably the branch’s defining feature among so many competing schemes. Thus, the curriculum included lectures in botany, agricultural chemistry, and soils, but “with certain omissions and modifications” to reduce the required length of study to one year.⁶⁴ Nevertheless, great emphasis was placed on practical domestic work, as highlighted in a December 1902 *Horticultural College Magazine* advertisement. The list of subjects to be taught included cooking, housework, laundry work, practical gardening, fruit and vegetable culture, poultry keeping, beekeeping, jam making, and dairy work (see Figure 4); and there was “expert instruction in those first essentials for the country colonist, sanitation, first aid and nursing.” A resident mistress “whose own Colonial experience gives her special qualifications for this work” ensured appropriate mentorship for the students. A “Higher Certificate” was available to students satisfactorily completing a one-year course of study, but a “Certificate” could be earned after a short course of twelve weeks’ duration.⁶⁵

Between its opening in January 1903 and the issue of the 1907 annual report, sixty-five students “passed through the Colonial Branch”; of these, twenty had “sailed for various Colonies.” Press accounts publicized the branch’s progress in placing students in a range of paid colonial appointments and unpaid situations at relatives’ homesteads. The employment of students generally fell within two classes: domestic service and higher-class professions like teaching and gardening management. In both cases, the colonial context of the work (and emigrationists’ propaganda) seemed to blur the class distinctions and elevate the status of the occupations. Illustrating this potential, the Advisory Council’s 1904 letter to the *Times* showcased the success of its first student—“a young, uncertified nursery governess” whose “prospects seemed small.” After “three months of Swanley training,” however, she sailed for an unspecified post in the Cape Colony “with a salary of £120 per annum together with board and residence.”⁶⁶

⁶³ Alice Balfour *et al.*, “Training for Colonial Life,” *Times* (London), 14 Dec. 1904, p. 10; “Report of the Colonial Branch of the Horticultural College, Swanley, Kent,” *Imper. Colonist*, 1907, 6:6–8; Notebook of the Colonial Branch, Jan. 1904–1918, SWAN00025, HHC; “Colonial Training Branch of the Swanley Horticultural College, Report, December 31st 1904,” in *Reports 1892–1912*, SWAN00015, HHC. Balfour was known for her illustrated travelogue, *Twelve Hundred Miles in a Waggon* (London/New York: Arnold, 1895). Later, she hosted the 1907, 1908, and 1909 annual meetings of the college council at her brother’s fashionable townhouse, 4 Carlton Gardens, in London: Horticultural College, Swanley, Minute Book, Shareholders Meetings, SWAN00021, HHC. Balfour’s sister-in-law, Lady Frances Balfour, also served as a college governor (at times stirring controversy) and distributor of prizes in 1903; see “Prize Day,” *Hort. Coll. Mag.*, July 1903, pp. 4–5. I thank Joan Huffman for drawing my attention to Lady Balfour’s controversial involvement.

⁶⁴ “Swanley Horticultural College,” *Englishwoman’s Rev.*, 1903, no. 34, pp. 118–119, on p. 118; and Horticultural College, Swanley, “Syllabus of Work,” Apr. 1907, Royal Horticultural Society Archives, London.

⁶⁵ “The Colonial Branch,” *Hort. Coll. Mag.*, Dec. 1902, p. 20; and Horticultural College, Swanley, “Syllabus of Work,” Apr. 1907.

⁶⁶ “Horticultural College, Swanley, Kent, Report,” Dec. 1907, in *Reports 1892–1912*, SWAN00015, HHC; “The Horticultural College, Swanley,” *Englishwoman’s Rev.*, 1908, no. 38, pp. 187–188; and Balfour *et al.*,



Figure 4. Interior of the Bessemer saloon after installation at Hextable House, here used as the site of dairying lessons, date unknown. Swanley B9 D1/001H, Hextable Heritage Centre. By permission of the College Archives, Imperial College London.

The Advisory Council’s more coveted goal, however, was “to train students in the higher branches of ‘petit culture,’ with a view to establishing colonial co-operative settlements of women engaged in market gardening, poultry keeping, and allied occupations.” In this regard, Swanley’s most promising case was that of Mary Hewetson (1868–1907), a well-educated Scottish farmer’s daughter who was appointed head gardener by Mrs. Piet-Davis, wife of a Natal newspaper editor in Pietermaritzburg. After a year’s training at Swanley (funded by a donor’s scholarship), Hewetson sailed to the Cape Colony in October 1904 under the auspices of the SACS. Within eighteen months she was supervising a staff of one dozen Kaffir “boys” on an estate garden of some thirty-two acres. She reported back to Swanley periodically, conveying recommendations for the curriculum based on her experience. She shared rather vivid (and pejorative) descriptions of her dealings with the Kaffir laborers: “I have a dozen or thirteen ‘boys’ of all kinds, some utterly raw, ignorant, unintelligible and stupid—others with fixed ideas of what they should or should not do—a difficult team to drive, and often at night I wondered how I should get through the next day.”⁶⁷

But according to a report by Louisa Mary, Lady Knightley of Fawsley, President of the Executive Committee of the SACS (which followed Hewetson’s progress closely), “she

“Training for Colonial Life” (cit. n. 63). On types of employment taken up in the colonies see Hammerton, *Emigrant Gentlewomen* (cit. n. 3), pp. 151–153.

⁶⁷ Balfour *et al.*, “Training for Colonial Life”; and Miss Hewetson, [Letter to Miss Kekewich], *Hort. Coll. Mag.*, Sept. 1906, pp. 20–21, on p. 21. For Hewetson’s curricular suggestions see entry for Feb. 1905, Notebook of the Colonial Branch, Jan. 1904–1918, SWAN00025, HHC.

manages them admirably.”⁶⁸ Such testimony constructed Hewetson as a colonial heroine. In due course, Hewetson reported on the broader status of fruit farming at the Cape Colony to the Agriculture Committee of the SACS. Her success at Pietermaritzburg reached readers of the *Times*, the *Imperial Colonist*, the *Horticultural College Magazine*, and Wolseley’s *Gardening for Women*, and her case formed part of the evidence in a 1906 Parliamentary report on the progress of British agricultural settlements in the colonies. Toward the end of that same year, the SACS provided financial assistance enabling Hewetson to acquire an allotment of some forty acres from the Land Board at Winterton, Natal. Here, with her friend Miss Pusey, she hoped to establish a women’s settlement where further SACS émigrés would be trained in market gardening. Unfortunately, Hewetson’s sudden, unexplained death in May 1907 cut short this promising venture.⁶⁹

Despite such exceptional cases, Swanley’s emigration of scientifically trained horticulturalists and teachers remained relatively minor. As in the broader movement, the more common Swanley émigré proved to be middle-class domestic help. By 1909, the change in the branch’s title to “Colonial and Home Domestic Training Branch” acknowledged this reality.⁷⁰ As for “petit culture,” Lady Aberdeen, wife to Ireland’s Lord Lieutenant and a well-known promoter of women’s social work, observed in 1906 that women’s colonial prospects seemed “rather a delusion.” Although coeducational horticultural training was widely available in the Canadian provinces, a professional lady gardener faced few prospects in a context where an extreme shortage of servants (i.e., “the servant problem”) “renders it difficult for her to undertake outdoor work that would occupy a great part of her time.” No successful South African settlement for women’s agricultural or horticultural training appeared until Miss Norah Miller, an émigré from the Edinburgh College of Domestic Service, acquired a farm and began receiving students in 1922—forming the basis for the Boschetto Agricultural College.⁷¹

HARVESTING THE FRUITS OF HORTICULTURAL EDUCATION

A major concern among both the proponents and the detractors of Swanley’s educational scheme was how the graduates would fare within a profession dominated by men. With the public eye focused on Swanley’s “experiment,” the Women’s Branch annual reports and the old students’ magazines regularly disseminated statistics and anecdotes of graduates’ successful placement in paid and voluntary situations in a variety of contexts, including private estates and market gardens and nurseries. The Women’s Branch administrators and students shared a common concern, however, that a short one- or two-year

⁶⁸ Departmental Committee on Agricultural Settlements in British Colonies, *Report of the Departmental Committee Appointed to Consider Mr. Rider Haggard’s Report on Agricultural Settlements in British Colonies*, Vol. 1 (London: Wyman & Sons, 1906), p. 246.

⁶⁹ Balfour *et al.*, “Training for Colonial Life” (cit. n. 63); Wolseley, *Gardening for Women* (cit. n. 1), p. 90; Hewetson, [Letter to Miss Kekewich] (cit. n. 67); “Report of the Colonial Branch of the Horticultural College, Swanley, Kent” (cit. n. 63); and Departmental Committee on Agricultural Settlements in British Colonies, *Report of the Departmental Committee Appointed to Consider Mr. Rider Haggard’s Report on Agricultural Settlements in British Colonies*, pp. 245–248. On Hewetson see Evelyn Hopkinson, “Short Biographical Note of Mary Hewetson,” *Imper. Colonist*, 1907, 6:3.

⁷⁰ This is the branch title as given in “Horticultural College, Swanley, Kent, Report, 1909,” in *Reports 1892–1912*, SWAN00015, HHC. On this trend within the broader movement see Hammerton, *Emigrant Gentlewomen* (cit. n. 3).

⁷¹ Una Monk, *New Horizons: A Hundred Years of Women’s Migration* (London: Her Majesty’s Stationery Office, 1963), p. 137 (quoting Lady Aberdeen); Wolseley, *Gardening for Women* (cit. n. 1), p. 234 (on the Canadian situation); and Monk, *New Horizons*, pp. 144–145 (on Miller).

course of study would prove insufficient to prepare a graduate for the responsibilities of professional gardening positions above the level of “boys.” Compounding this issue—although some exceptional apprenticeship-like opportunities did present themselves—the apprenticeship system on the whole remained closed to women trainees. Swanleyites sought a solution in the public gardens, but even here they encountered sex discrimination. The Royal Horticultural Society offered scholarships for students to work in the Chiswick gardens for a one-year course of study, but the criteria explicitly restricted the scholarship to men.⁷²

Interestingly, the Royal Botanic Gardens, Kew, emerged from such backwaters as the forerunner by opening its gates to women gardeners. Despite the reservations of Thiselton-Dyer (who joined Swanley’s council in 1893), by 1894 the editors of the *Journal of the Kew Guild* “suggested that Kew and Swanley should have an attraction for each other,” and in January 1896 Kew accepted two of Swanley’s graduates, Annie Gulvin and Alice Hutchings, as student gardeners under the supervision of the assistant curator, William Watson.⁷³ This gave Kew the distinction of being Britain’s first national garden to appoint women to the gardening staff. They entered as “improvers,” a designation generally accorded to “young men who after five years training in good private gardens or nurseries enter Kew for a two years’ course.” But, when paid at all, the women commanded the same income as the “boys,” or (typically young) male assistants. Although Gulvin stayed for one year only, Hutchings remained until 1900, being promoted to “fore-man” in 1898.⁷⁴ Nonetheless, given the fears that the presence of women might compromise men’s moral composure, Thiselton-Dyer required the ladies to dress in knickerbockers (see Figure 5). At the same time, the men often worked shirtless, and Sir Joseph Dalton Hooker used that fact as a clinching discouragement against continuing “this experiment”: “[A lady] would have to work with the labouring men, doing all they have to do, digging, manuring, and all the other disagreeable parts of gardening. Then there is the work in the hot houses; the men, I believe, work simply in their trousers, and how could a lady work with them!” Except for one female gardener in 1910, after 1903 no further women entered the Kew staff until the onset of World War I in 1915. It is perhaps no coincidence that the retraction occurred nearly simultaneously with the closure of Swanley to men. Nevertheless, within a few years of Kew’s pioneering effort, the Royal Botanic Gardens at Edinburgh, Scotland, and Glasnevin, Ireland, followed suit and opened their gates to women improvers.⁷⁵

Goodrich Freer’s analysis of the first one hundred women who passed through the Women’s Branch between 1891 and 1898 brought into stark relief the limited successes of Swanley in producing qualified, professional female gardeners in this early period. One

⁷² “Examination in Horticulture,” *Gardeners’ Chron.*, 1898, 24:421.

⁷³ “Lady-Gardeners,” *J. Kew Guild*, May 1896, p. 9; and Gertrude Cope, “Alice Hutchings (Mrs. W. H. Patterson),” *ibid.*, 1944, p. 403. On Watson see Ray Desmond, *The History of the Royal Botanic Gardens, Kew*, 2nd ed. (Kew: Kew Publishing, 2007), p. 432.

⁷⁴ “Appointments from Kew,” *Gardeners’ Chron.*, 1900, 27:152; “Lady-Gardeners”; Goodrich Freer, “Horticulture as a Profession for the Educated” (cit. n. 26), p. 777; and Miss A. Hutchings staff file, Royal Botanic Gardens, Kew, Archives (hereafter cited as **RBGKA**) (promotion to “fore-man”).

⁷⁵ Sarah A. M. Brown to Miss C. Symons, 20 Mar. 1902, The Camp, Sunningdale, in Letters from J. D. Hooker, Vol. 13, JDH/2/3/13/f. 261–262, RBGKA; and Desmond, *History of the Royal Botanic Gardens, Kew* (cit. n. 73), pp. 282–283 (on knickerbockers). On the near-absence of women at Kew before 1915 see Index of Staff Records at Kew Archives, Vol. 1, RBGKA. On Glasnevin see Valerie M. Ingram and Mary Forrest, “From Lady Pupil to Lady Gardener,” *Glasra*, 1997, 3:55–61; on Edinburgh see Meredith, “Middle-Class Women and Horticultural Education,” p. 76.



Figure 5. Early women gardeners at the Royal Botanic Gardens, Kew, 1898. From left to right are Eleanor Morland (Mrs. Sherwell), Gertrude Cope, and Alice Hutchings (Mrs. Patterson). From Kew the Kew Guild Collection, KGU/1/9/3/262. Image reproduced by the kind permission of the Board of Trustees of the Royal Botanic Gardens, Kew.

statistic suggested the disappointing level of education attained by the women: only thirty-six completed two years of courses—"the prescribed period of study." Among this fairly robust group, disappointingly few—eighteen—qualified for the college diploma. A larger group of thirty-eight Swanley women nevertheless "held situations," but only sixteen of those employed in 1899 had received the college diploma and thus, in Goodrich Freer's view, ranked as "qualified gardeners."⁷⁶

The range of "situations" held by the women can be surmised from the anecdotal reports of the old students and their employers, which college officials reconstructed as paradigms in college publications and press releases. Much was made, for example, of Annie Gulvin's achievement in being appointed the world's first female head gardener following her year at Kew.⁷⁷ While noting that "the woman-gardener has, however, certain

⁷⁶ Goodrich Freer, "Horticulture as a Profession for the Educated" (cit. n. 26), p. 778.

⁷⁷ "The First Woman Head Gardener," *American Gardening*, 1898, 19:521. Several further Swanleyites are

openings not adapted for men, such as that of governess-gardener, companion-gardener, school lecturer and gardener," Goodrich Freer nevertheless took a more sober view of Swanleyites' more typical fates:

At the end of the two years' training *he* (the term is used generically) having passed, let us suppose, the Royal Horticultural Society examinations, and gained the College diploma, looks about for employment. He has probably not the years, and most certainly not the experience, to enable him to take command of others, and, except in some villa garden which will add little to his knowledge or experience, he had no choice but to become an under-gardener at a few shillings a week.

Goodrich Freer did confirm, in her position as honorary secretary of the Swanley Women's Branch, that she received many requests from employers seeking suitable candidates, suggesting that the demand for women trainees was high. Yet she noted a bias among the requests: "Nine-tenths, at least, of would-be employers who have applied to me for women-gardeners are themselves women, and in very many cases they have offered as a reason that they thought it right to promote a new opening for women's work."⁷⁸

Despite the close attention given to following the fates of Swanleyites and other women trained in horticulture during this period, the first systematic study of the employment opportunities for them did not appear until 1915. Wartime economic concerns seem to have stimulated the investigation, conducted under the auspices of the Women's Farm and Garden Union by Mrs. Roland Wilkins (née Louisa Jebb), who wrote: "Owing to the war many more educated women than usual are faced with the prospect of having to earn their own living." Census returns from 1911 gave some gross figures concerning the employment of women in agriculture and horticulture; this included 2,449 in market gardening (as compared to 35,818 men). On the basis of a survey of several hundred women horticulturalists, Wilkins identified two major classes of occupations: those self-employed with a variety of horticultural holdings, especially market and nursery gardens (some connected with schools); and those in salaried posts, including head gardeners, single-handed gardeners, companion gardeners, jobbing assistants, and teachers of gardening. Self-employment required an outlay of independent capital, and earnings from salaried posts ranged widely but hardly seemed to produce respectable returns on the original investments required by the college tuition costs.⁷⁹

Of the range of options, independent market gardening—which, Wolseley noted, "requires both brains and capital"—was particularly emphasized. After studying botany at Newnham College, Cambridge, and gardening for two years "with a family who had taken up market gardening in Wales," Anna Bateson (1863–1928) set up her own nursery in Bashley, New Milton, Hampshire, in 1892.⁸⁰ Her pioneering success made her a model for

identified as "head gardeners" in the lists of old students published in the *Horticultural College Magazine*, but typically the women are overlooked in gardener directories and historical works based on them, including Musgrave, *Head Gardeners* (cit. n. 13).

⁷⁸ Goodrich Freer, "Horticulture as a Profession for the Educated" (cit. n. 26), pp. 774–775 (emphasis and parenthetical comment in the original), 776.

⁷⁹ Mrs. Roland Wilkins, *The Work of Educated Women in Horticulture and Agriculture* (London: Truscott, 1915), p. i. For the census figures see *ibid.*, p. 1; and Meredith, "Middle-Class Women and Horticultural Education," p. 175. Regarding Wilkins's survey results see Wilkins, *Work of Educated Women in Horticulture and Agriculture*, pp. 178–180. On Wilkins see John Martin, "Wilkins [née Jebb], Louisa (1873–1929)," in *DNB*.

⁸⁰ Wolseley, *Gardening for Women* (cit. n. 1), p. 70; and Alan Cock, "Anna Bateson of Bashley: Britain's First Professional Woman Gardener," *Hampshire*, 1979, 19:59–62. I thank one of the anonymous referees for bringing the case of Anna Bateson to my attention and Anne Thomson, Newnham College Archivist, for assistance in obtaining Cock's rare publication.

other would-be women proprietors who had the drive (and financial means) to follow her lead, but her story also underlined the value of practical preparation; as she reflected, “I was entirely without knowledge of the horticultural trade, and also, being town-bred, I was led into many errors.” Hailing from a prestigious academic family who had improved their social class ranking, she faced rebuke from her brother William Bateson, soon-to-be-champion of Mendelian genetics: “I think it always a ‘regrettable incident’ when persons whose parents got clean of a trade relapse into it.”⁸¹ The comment perhaps exposes the contradictions that could be created by women’s aspirations for “professional” status within a masculine field traditionally considered a “trade.” Anna Bateson’s career path, which began in the laboratory—she assisted in her brother’s research, as well as that of Francis Darwin—and ended in the garden, suggests how horticulture may have presented opportunities for scientifically educated women of a sort that had not yet fully materialized in academic science. Regarding her decision to pursue market gardening, she explained, “I had not originally intended to go into market gardening, but circumstances seemed to favour it more than any other branch of gardening.”⁸²

Bateson’s comment, made in 1907, likely hit on a more general pattern of limitations among the employment opportunities, however. A telling indicator of the circumscribed employment landscape for women at this time was, perhaps ironically, the absence of under-gardeners and improvers in Wilkins’s 1915 returns—directly refuting Goodrich Freer’s impressionistic forecasting of 1899. Explaining the absence, Wilkins concluded:

From the statistics collected it would appear, however, that more than half the women leaving college have gone straight into posts as head or single-handed gardeners. This undesirable circumstance may be partly due to the fact that posts for women under-gardeners are very limited compared with the higher posts. This scarcity of lower posts is easily explained: employers who keep a small staff naturally prefer to have a man to do the heavy work since he can do such work quicker and better than most women, and for a lower wage. There is also a prejudice amongst men head-gardeners against having women under them; many do not care to give orders to a lady, and feel uncomfortable at having them always about; or it causes discontent among the other men.⁸³

Returning to Swanley, although the college’s objectives emphasized training suitable for entry into a variety of skilled horticultural occupations, the scientific curriculum also provided a boon to a small class of students seeking more advanced scientific studies and careers. One pathway for realizing those aspirations lay between Swanley and the London science colleges. A few of the students, for example, appear in the student registers of both the Horticultural College and the Botany Department of the Royal College of Science (incorporated into Imperial College of Science and Technology in 1907). Between 1901

⁸¹ Wolseley, *Gardening for Women*, p. 74, quoting a letter by Anna Bateson dated 11 Oct. 1907; and W. Bateson to A. Bateson, 31 July 1889, Cambridge University Library, Bateson Papers, Add. 8634, H.1.d.5, quoted in A. G. Cock, “William Bateson’s Rejection and Eventual Acceptance of Chromosomal Theory,” *Ann. Sci.*, 1983, 40:19–59, on p. 30.

⁸² Wolseley, *Gardening for Women*, pp. 74–75, quoting a letter by Anna Bateson dated 11 Oct. 1907. See also Richmond, “Women in the Early History of Genetics” (cit. n. 45), pp. 59–60. On the barriers in the academy to women pursuing science see Suzanne Le-May Sheffield, *Women and Science: Social Impact and Interaction* (Santa Barbara, Calif.: ABC-CLIO, 2004); and Margaret W. Rossiter, *Women Scientists in America: Struggles and Strategies to 1940* (Baltimore: Johns Hopkins Univ. Press, 1982).

⁸³ Wilkins, *Work of Educated Women in Horticulture and Agriculture* (cit. n. 79), pp. 18–19. On the broader context of women’s employment in agriculture and horticulture beyond 1915 see esp. Meredith, “Middle-Class Women and Horticultural Education,” pp. 174–213; and Peter King, *Women Rule the Plot: The Story of the 100-Year Fight to Establish Women’s Place in Farm and Garden* (London: Duckworth, 1999).



Figure 6. Winifred Elsie Brenchley at her desk in the Botany Department, Rothamsted Experimental Station, Harpenden, circa 1916. From the Rothamsted Library. Copyright Lawes Agricultural Trust.

and 1911, former female Swanleyites studying botany at Imperial included Dorothy Shove (attending 1901–1904), Helen Draper (1901–1902), Lilian Gibbs (1901–1904, staying afterward to conduct research), Evelyn Muriel Groome (in summer 1903, for a teachers’ course), and Kate Barratt (1907–1911).⁸⁴

Along a more strictly research path, a contemporary of this Imperial College group, Swanleyite Winifred Elsie Brenchley (1883–1953), matriculated at University College, London, and achieved unparalleled heights. Recipient of a private scholarship, Brenchley completed her two-year study at Swanley in 1903, at which time she reported, “I have given up gardening for the sake of my favourite pursuit—Science.” Having won the RHS Silver Gilt Medal, she immediately pursued a course of study in botany for the B.Sc. degree at University College, where she reported, “There is absolutely no distinction between the men and women students, so there is keen rivalry between us.” Upon receiving her degree in 1906, she obtained the Gilchrist studentship for university women and received permission from Director Alfred Daniel Hall to fulfill it at the Rothamsted Experimental Station at Harpenden. As the first woman ever to work there (and likely at any agricultural research station in Britain), Brenchley attributed her “advent” to “the broadminded attitude of the Director, who was prepared to disregard sex distinctions on condition that research work was adequately carried out.” In the next year, Brenchley joined the permanent staff and headed the Botanical Section (later the Botany Department) until her retirement in 1948 (see Figure 6). She received her D.Sc. from University

⁸⁴ Department of Science and Art of the Committee of Council on Education, General Register of the Horticulture College, Swanley, Kent, SWAN00007, HHC; and [Botany Department], Students Register, 1900–1922/23, KB/19/1, Imperial College Archives, London.

College in 1911 and was appointed a fellow in 1914. Her early investigations concerned the strength of wheat, about which she enthusiastically reported in letters to Swanley. She later completed important scientific monographs on the distribution of British weeds, new herbicides for the control of weeds, and the effect of manure on grassland composition. Nevertheless, her Rothamsted staff file reveals the lower status and pay, compared to male colleagues with less experience and fewer achievements, she received when Rothamsted positions were converted to “graded service” in 1923, an indication of the continued reality of sex discrimination.⁸⁵

To return to the Imperial College group, Kate Barratt’s (1884–1977) career exemplified the advancement possible along a science teaching route. At Swanley, she completed the prescribed two-year course of study and obtained the college diploma. In 1904 she ranked first in the college examinations (and thus held the Silver Salver) and second in the RHS examinations. Afterward she worked as Swanley’s botany demonstrator until 1906, in which year she won a National Scholarship tenable for a three-year course of study at the Royal College of Science. Receiving her B.Sc. with honors, in 1910 she returned to Swanley to assume the lectureship in botany vacated by her former teacher, Richard Tabor. Then, in 1913, she returned to South Kensington to be a demonstrator for the noted botanist John Bretland Farmer (whose botany text was required reading at Swanley). During her tenure, she independently researched topics in the cytology of plant stems and collaboratively investigated a fungal disease of the beech tree with Tabor (who, as B.Sc., also demonstrated for Farmer).⁸⁶ In due course, she was awarded the M.Sc. and D.Sc. degrees. While researching and demonstrating at Imperial College, she edited Swanley’s *Horticultural College Magazine* and joined the governing body. In 1922 she once again returned to Swanley—this time permanently—to become the college’s last principal before its amalgamation with the South-Eastern Agricultural College, the two becoming Wye College in 1945. With the amalgamation, she was appointed a fellow of Wye, but she retired in the following year. In 1950 she married Tabor, who had been her lifelong friend, and the couple spent eight years together before his death. Underlining the limited character of Barratt’s success, however, is the contrast between her career trajectory within a women-only educational sphere and that of Tabor, who rose to the level of assistant professor and university reader at Imperial College, albeit with only the B.Sc. to his credit.⁸⁷

⁸⁵ W. E. Brenchley, “[Letter to ‘Swanleyites’],” *Hort. Coll. Mag.*, 1903, 5(15):24; Brenchley, “Twenty-five Years of Rothamsted Life,” *Records of the Rothamsted Staff, Harpenden*, 1931, no. 3, pp. 34–37, on p. 34; Brenchley, “[Letter],” *Hort. Coll. Mag.*, 1907, 7(20):17 (research on strength of wheat); and Brenchley, Staff File, Rothamsted Research Library and Archives. For a full range of her published articles see the bound *Collected Papers of Winifred E. Brenchley, 1909–1948*, Rothamsted Laboratory, Botany Department, Rothamsted Research Library and Archives; for her books see D. S. Jenkinson, “Brenchley, Winifred Elsie (1883–1953),” in *DNB*.

⁸⁶ “Third Annual Report of the Women’s Branch of the Horticultural College, Swanley, Kent” (cit. n. 46), p. 7 (on the Silver Salver); and Horticultural College, Swanley, “Syllabus of Work,” Apr. 1907 (cit. n. 64) (Farmer’s text). Regarding her research see Kate Barratt, “The Origin of the Endodermis in the Stem of the Hippuris,” *Annals of Botany*, 1916, 30:91–99; Barratt, “A Note on the Abnormality in the Stem of *Helianthus Annuus*,” *ibid.*, pp. 481–484; and R. J. Tabor and Barratt, “On a Disease of the Beech Caused by *Bulgaria Polymorpha* Wett.,” *Annals of Applied Biology*, 1917, 4:20–27.

⁸⁷ A. Beryl Beakbane, “A Brief Historical Account of Some Members of the Governing Body of Swanley Horticultural College,” *Swanley Magazine*, May 1946, 6(97):7–8 (for Tabor’s credentials and career path see p. 8); and Morrow, “History of Swanley Horticultural College,” pp. 83, 108. Barratt and Tabor present a tantalizing case for analysis as male/female collaborators who remained unmarried for most of their careers; on this broader theme see Annette Lykknes, Donald L. Opitz, and Brigitte van Tiggele, eds., *For Better or for Worse? Collaborative Couples in the Sciences* (Basel: Birkhäuser, 2012).

Swanley's launching of scientific careers like Barratt's and Brenchley's took place in a period when the institutions of "high science" varied widely in their receptivity to women and struggled to shake traditional gender conventions.⁸⁸ In a previous generation, the gentlewomanly standing of Eleanor Ormerod (1828–1901) enabled her unprecedented status within the Royal Agricultural Society of England (RASE) as Honorary Consulting Entomologist from 1882 to 1892. She performed critical work for the society on a voluntary basis, as it was understood that a salary would be an insult to her social status, and yet she perceived discrimination when asked to extend her voluntary help to a male RASE contemporary, newly appointed as a *paid* advisor to the Board of Agriculture.⁸⁹ Throughout this period women could be elected to full, equal fellowship in the Botanical Society and the Entomological Society (both of London), but the Linnean Society remained closed to them until Mrs. Marian Sarah Farquharson (1846–1912) "literally battered her way in" and was elected a fellow in 1904, thus enabling her followers, including Brenchley, access to the society's fellowship. Yet women remained barred from fellowship in the Royal Society of London until after World War II.⁹⁰ As for the Royal Horticultural Society, women could be admitted as fellows, but this was to grant them access to the gardens, "not for scientific purposes." As we have seen, the RHS examinations were open to women, but the scholarship was not. Despite winning the society's Silver Gilt Medal in 1895, Annie Gulvin was ineligible for the Chiswick scholarship coveted by her male peers. Despite the persistence of such barriers in the "old-established national societies," as David Allen has noted, the provincial naturalist societies and field clubs "one by one" opened their doors to women.⁹¹ Swanley women with a scientific bent could thus find a variety of outlets for practicing and discussing their interests, but their "high" academic and professional opportunities remained limited.

CONCLUSION: SCIENCE AS A FEMINIZING AGENT, WOMEN AS SCIENTIZING AGENTS

Shifts in the cultural status of "horticultural science" over the course of the nineteenth century paralleled shifts in the status of women's horticultural learning, and yet the two intersected in a most interesting way. The emergence of the Horticultural College, Swanley, embodied a transformation in the horticultural profession at the same time as it advanced women's access to education and professional employment. During this transformation, however, women and science stood as quite unstable subjects. Even so, there

⁸⁸ Barbara T. Gates, *Kindred Nature: Victorian and Edwardian Women Embrace the Living World* (Chicago: Univ. Chicago Press, 1998), p. 34.

⁸⁹ J. F. McDiarmid Clark, "Eleanor Ormerod (1828–1901) as an Economic Entomologist: 'Pioneer of Purity Even More than of Paris Green,'" *Brit. J. Hist. Sci.*, 1992, 25:431–452, esp. pp. 439–440; see also Suzanne Le-May Sheffield, *Revealing New Worlds: Three Victorian Women Naturalists* (London: Routledge, 2001), pp. 152–153. The RASE had admitted women members since its establishment, but it is doubtful whether women attended meetings or served in official capacities prior to Ormerod's post; see "List of the Subscribers to the English Agricultural Society," *Farmer's Magazine*, 1838, 8(6):447–448, which lists three women among more than 250 members. I thank Dr. John L. Wilson, Honorary Librarian, RASE, for his assistance on this question.

⁹⁰ David Elliston Allen, *The Naturalist in Britain: A Social History* (London: Lane, 1976), p. 152; Gina Douglas, "Farquharson [née Ridley], Marian Sarah (1846–1912)," in *DNB*; and Joan Mason, "The Admission of the First Women to the Royal Society of London," *Notes and Records of the Royal Society of London*, 1992, 46:279–300, esp. p. 294. For broader patterns in the exclusion of women from biological professional societies see Toby Appel, "Physiology in Women's Colleges: The Rise and Decline of a Female Subculture," *Isis*, 1994, 85:26–56.

⁹¹ Lydia Ernestine Becker, "On the Study of Science by Women," *Contemporary Review*, 1869, 10:386–404, on p. 392; "Examination in Horticulture, 1898" (cit. n. 48), p. 123 (sex-differentiated eligibility requirements for the RHS scholarship); and Allen, *Naturalist in Britain*, p. 152.

was steady progress toward greater stability; as one Swanley lecturer quipped in 1907, “There can be no doubt whatever that the lady gardener has come to stay.” Indeed, by this time commentators yoked women and science in what had come to be viewed as a threatening new standard for horticultural training. In lamenting the loss of an experimental garden in Edinburgh that same year, the president of the Scottish Horticultural Society, David W. Thomson, explained the threat:

Young gardeners in Scotland are labouring under a great disadvantage in comparison with those of other countries, and they are also labouring under a very real disadvantage when compared with what is being done to educate women gardeners in the science and practice of horticulture. The latter have their lectures to attend, and examinations to pass, and why is it that young journeymen gardeners of the opposite sex cannot enjoy the same privilege? It is simply because they have no college and no experimental garden to attend.⁹²

The shift was dramatic. Early in the nineteenth century, John Loudon promoted a scientific approach in horticultural training and practice, especially through his authoritative and popular *Encyclopaedia of Gardening* (which went through six editions during his lifetime). At that early stage, however, Loudon defined horticultural “science” as an offspring of Enlightenment rationalism, and he prescribed rational thinking as a necessary supplement to the mere “accumulation of facts.” Within an educational context dominated by gardeners’ apprenticing and autodidacticism, Loudon’s advice stressed that “the great object of reading with reference to persons thus circumstanced, ought to be to teach them to think and generalise.” The *Encyclopaedia’s* emphasis on the success of British cultivations and publications positioned scientific horticulture as a means by which to elevate British cultural superiority.⁹³

By the onset of the technical instruction movement of the early 1890s, however, horticultural science assumed new meaning and economic urgency, particularly in a context of foreign competition and a national agricultural depression. Within the new collegiate institutions for agricultural and horticultural education, horticultural science now involved a broad introductory-level grounding in the principles of scientific disciplines—which had themselves come of age in the nineteenth century—as they mattered for practical applications. The larger goals were the recovery and betterment of Britain’s agriculture and market-gardening enterprises.⁹⁴

Women’s education in horticulture similarly shifted from polite learning—albeit “for ladies,” in the style of Mrs. Jane Loudon’s (1807–1858) *Botany for Ladies*—to more professional training intended to enable women to contribute to national and imperial work while also addressing the problem of the “distressed gentlewoman.” In 1849, Mrs. Loudon insisted that her objective was “not to make women usurp the place of men, but to render them rational and intelligent beings.” A half-century later, Alice Hutchings observed a very different context: “it is only of late years that the professional woman gardener has come into existence, and has found a place in the great world of workers for their daily bread.” The proponents now acknowledged sparring between the sexes:

⁹² F. J. Baker, “Horticultural Education,” *J. Roy. Hort. Soc.*, 1907, 32:152–162, on p. 160 (on Baker see *The British Year-Book of Agriculture and Agricultural Who’s Who, 1908–9* [London: Vinton, 1908], p. 474); and D. W. Thomson, “Scottish Horticultural: Address by the President,” *Journal of Horticulture and Home Farmer*, 1907, 54:215, 284–285, on p. 285.

⁹³ Loudon, *Encyclopaedia of Gardening* (cit. n. 13), pp. 364–365, 1242, 362, 365 (the first edition appeared in 1822). Loudon’s scientific approach is noted in Elliott, “Loudon” (cit. n. 11).

⁹⁴ For more on this theme see Thirsk, *Alternative Agriculture* (cit. n. 2), esp. pp. 165–198.

“Whether a woman intends to seek a salaried post as gardener or to set up for herself in a commercial garden, she is entering into competition with men.”⁹⁵ The well-publicized successes of Swanley graduates like Mary Hewetson, Annie Gulvin, Winifred Brenchley, and Kate Barratt demonstrated how the college’s scientific training could be leveraged to open traditionally male spaces and roles to women—though, as we have seen, rarely on equal terms.

The intersection of women and science in horticulture fundamentally served a need while creating an opportunity. Whereas the founders of the Horticultural College, Swanley, viewed science as a means for advancing commercial market gardening through an explicitly masculine model for education, science ironically provided an opening for women to enter the traditionally apprentice-oriented field. As Goodrich Freer astutely summarized, “The art of gardening can only be learnt experimentally and in the garden; the science is an affair, not only of the garden, but of the lecture-hall, of books, and of the chemical laboratory.” Initiated by the small wedge of Miss Emma Cons’s 1890 experiment, the influx of women learning horticultural science contributed to a new standard in which “the modern gardener inevitably desires this hall-mark of modern science.”⁹⁶ Although Swanley’s impact in redressing the economic problems stemming from the agricultural depression and underdeveloped colonies cannot be said to have been singularly significant, when considered within the massive expansions of “alternative agriculture” and women’s emigration schemes, as Joan Thirsk and James Hammerton have respectively argued, we can conclude that Swanley emerged as a leading contributor to the wider efforts.⁹⁷ Becoming permanently women-only in 1903 as the only collegiate center devoted exclusively to instruction in horticultural science, Swanley’s contribution indeed symbolized “a triumph of brains over brute.”⁹⁸

⁹⁵ Shteir, *Cultivating Women, Cultivating Science* (cit. n. 14), pp. 220–227; [Jane Loudon], *The Ladies’ Companion and Monthly Magazine*, 1849, Ser. 2, 1:8 (she is quoted on p. 224); Hutchings, “Horticulture for Women” (cit. n. 53), p. 150; and Wilkins, *Work of Educated Women in Horticulture and Agriculture* (cit. n. 79), p. 3.

⁹⁶ Goodrich Freer, “Horticulture as a Profession for the Educated” (cit. n. 26), pp. 770, 770–771.

⁹⁷ Thirsk, *Alternative Agriculture* (cit. n. 2), p. 174; and Hammerton, *Emigrant Gentlewomen* (cit. n. 3), p. 159.

⁹⁸ Holmes, “Speech Day” (cit. n. 1), p. 15. The opening of Lady Warwick College, Studley, in 1903 further contributed to Swanley’s “wedge,” though Studley addressed more broadly the “lighter branches of agriculture.”