

# ECONOMISING IN PUBLIC



## Publishing History as a Challenge to Scientific Method

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The aim of this paper is to suggest how economics as a discipline was, in part, constituted by the materiality of its production. Economics is invariably a component of book history, but rarely is it the object of book historiography. Conversely, the history of economic theory tends towards content-focused narrations of a history of its ideas—often taught as an arboreal evolution—while ignoring the production, distribution, and reader-demand factors that made economics publishing “events” suddenly economically viable. What is required, therefore, is a print history of the material and economic constitution of economics. Such a history would show that the near-global authority of neo-classical economics was established not only through its claim to provide mathematically verifiable predictions (in 1888 preface William Stanley Jevons foresaw that economics would equal the physical sciences and become as exact as meteorology) but *equally* through the material conditions of its dissemination and consumption. The science of economics was a product not only of scientific thinking but of publishing as well.

This paper will first outline an economic theory known as marginalism; then focus on some production details for one of its key works, Jevons’s *Theory of Political Economy* (1871); and conclude with some remarks on the socialisation of science. It will demonstrate three points: 1) why the ability to use other than lexical semiotic modes, such as mathematical notation, was so important; 2) how the specifics of economics was incorporated into (and overwhelmed by) a professional publishing system that allowed important interpersonal networks to be built, chiefly through scholarly biography, that were constitutive of the discipline; and 3) how historic events coordinated to promote the new discipline via its imbrication in political and social conflict.

Historians of economic theory are familiar with the near simultaneous publication of William Stanley Jevons’s *Theory of Political Economy* (1871), Carl Menger’s *Grundsätze* (1871), and Léon Walras’s *Éléments d’économie*

*politiques* (1870). Although marked by internal disagreements, the “discovery” of marginalism inaugurated by these three authors, and the subsequent “marginal revolution,” enabled economics to invest in mathematics. Jevons claimed it was only by reconstructing economics as a mathematical science “that we can rescue our science from its confused state.”<sup>1</sup> In the preface to his first edition of *Theory*, he wrote that he was surprised at how clearly notions of utility, labor, and capital, “especially that most puzzling of notions *Value*, admit of mathematical analysis and expression.”<sup>2</sup> “Whether the mathematical laws of Economics are stated in words, or in the usual symbols,  $x, y, z, p, q$ , etc., is an accident, or a matter of mere convenience.”<sup>3</sup>

Earlier classical economics understood economic phenomena in terms of national interests and benefits to the nation’s citizens; hence its name, political economy. After marginalism, a cornerstone of today’s neo-classical economics, a conceptual shift occurred whereby demand and the consumer were introduced as a new node to create new mathematical equations of supply and demand. In that equation, producers and consumers, retailers and distributors, could be reduced to indices open to mathematic treatment.<sup>4</sup>

But there is a second reason that marginalism is important. The earlier labor theory of value—that value was derivable from the amounts of disembodied labor required for any given article or service—was replaced by a theory of value based on subjective wants. Using utilitarian metaphors, marginalist theory claimed “to treat economy as a calculus of pleasure and pain,” positing that “human wants are the ultimate subject-matter of economics.”<sup>5</sup> As many a standard introduction to economics explains, since “Everything is useful which is wanted—whether the want is worthy or reprehensible,”<sup>6</sup> a product or service would only be as valuable as the user considered it to be. This was the subjective theory of value. But the trouble with the subjective theory was its apparent chaos of relativity, a concern that Jevons accepted: “Pleasures, in short, are, for the time being, as the mind estimates them”; “there is never, in any single instance, an attempt made to compare the amount of feeling in one mind with that in another.” Such relative chaos would also seem to preclude calculability. “The reader will ask perhaps,” Jevons wrote, “[where] are your numerical data for estimating pleasures and pains.” If every mind is “thus inscrutable to every other mind . . . no common denominator of feeling seems to be possible.”<sup>7</sup> The cliff-hanging phrase is “seems to be.”

If a comparative could not be found between articles, equating  $X$  with  $Y$ —such as how many shoes are equivalent to a house (to use Aristotle’s example)—it could be found in rates of change, in comparisons of how es-

timations of  $X$  and  $Y$  change with more or less of the item. Marginalism is basically the science of “an additional unit of”: marginal production costs are thus the diminishing costs of producing more units of something, marginal revenue is the extra revenue that an additional unit will bring in, and marginal utility refers to the diminishing desire for additional units. I want a car, I want a second car, but my want of a third and fourth diminishes, while for the hundredth car my want will approach zero. This rate of change is not only quantifiable but comparable. My want of more units of, say, apples, socks, sheets of paper, sofas, televisions, and so on will diminish at differing rates and thereby be comparable. The inscrutability of minds, in principle, is thus revealed.<sup>8</sup>

So in combination, these observations are put in mathematical terms, which economists would write in the following way. If  $U$  is utility for an agent and  $x$  the relevant good, the agent’s utility is  $U(x)$ . The principle of diminishing utility (derived from Gossen’s first law) is written  $U''(x) < 0$ , which means that although the utility increments are still positive [ $U'(x) > 0$ ] as the amount of the good  $x$  increases, the increments become smaller and smaller.<sup>9</sup> We can go further, as economists do, and write the idea as in Figure 1 or of marginal revenue, for example, as in Figure 2.

$$\frac{\partial^2 U}{\partial g^2} < 0$$

Figure 1.

$$MR = \frac{dTR}{dQ} = \frac{dP}{dQ} \cdot Q + \frac{dQ}{dQ} \cdot P = Q \cdot \frac{dP}{dQ} + P$$

Figure 2.

A final point needs to be made before this tantalizing drift out of the humanities, and this is a cultural studies point. By bringing desires, pleasure, and pain, into economic thinking, economic theory could account for the behavior of emergent commodity culture, which emerged first in industrialised Britain in the last third of the nineteenth century, at the same time as the marginalist breakthrough.<sup>10</sup> This culture that sought satisfaction in the acquisition of commodities (rather than in, say, religion or other collective action) suddenly was equipped with a science that claimed to compute the value of its wants. Such a happy “coincidence” between science and behavior is the first of my imbrications of science into material history.

So much for neo-classical economics. Now for a closer look at its production and dissemination. The marginalist works of Menger, Walras, and Jevons were distributed widely throughout Europe, spurring a small industry of guides and introductions, such as William Smart, *An Introduction to the Theory of Value: On the Lines of Menger, Wieser, and Bohm-Bawerk* (London: Macmillan, 1891). Toward the end of the century the numbers of marginalist titles exploded. Jevons's *Theory of Political Economy* was first published in 1871, its second edition came in 1879, a third edition was published in 1888 by Harriet Jevons (his wife), and a final fourth edition by their son, Herbert, in 1911: many with UK and US imprints, and an unknown number of other national editions. In simplified form, the three points that the work's publishing history will demonstrate are the importance of 1) the semiotic mode, 2) the professionalization of production, and 3) socialisation.

First: semiotic mode. The spread of marginalism, or the mathematical method as it was known, was remarkable. I believe this was partly because of the dazzling elegance of its mathematical solution. Too dazzling, some might say, since the men, women, and social relations behind the metaphors and indices were obscured. The “dazzling” had a useful political function. But mathematisation, vigorously upheld as a defining feature of the new discipline by Jevons, was also the chief means by which economics could be differentiated from what would become to be known as political and social sciences. Economics was and is patently not like social or political science in its insistence on a mathematical discourse that functions as a guarantor for its veracity: like meteorology (the science that Jevons compared to economics) economics is calculable. Similarly, for print production of the new science, the mathematical feature doubled as neat differentiation strategy in terms of its market: its books would be known by their mathematical formulae. Therefore, this defining characteristic needed to coincide with the technological developments necessary for reproducing such formulae at a viable cost.

Alphabetic typeface could hardly match the succinct complexities of mathematical notation, let alone graphs, both of which posed serious problems for the typesetter. Sixty years earlier (around 1813), Charles Babbage had wished to publish the new Cambridge Analytical School's calculus, but was unable to find a commercial printer, partly from costs incurred from printing the school's reformed notation. Writing to his colleague, John Herschel, about the many problems arising from availability of type for their seminal volume, Babbage reported, “I think they have composed about 12

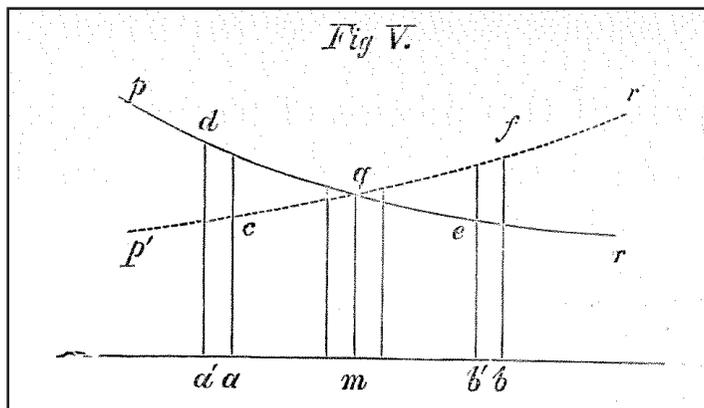


Figure 3.

[pages] but can not print them for want of a particular kind of small numerals which are expected daily.”<sup>11</sup> Of its eventual publication, one commentator said of its “awful brackets” and “small numerals” that “they never saw its equal in typography.”<sup>12</sup> Despite university backing, Babbage’s *Memoirs* of the school appeared as an all but self-financed vanity publication, the costs proving to be so high that the school was obliged to give up its rented accommodation.<sup>13</sup>

By the time Jevons wanted to publish his *Theory of Political Economy*, typographic or reprographic processes had undergone industrialization. By 1836 the first chromolithographic process had been introduced, which successfully reproduced multicolor images; by 1852 the first lithographic power presses were in use; and by the 1870s flatbed presses designed for lithography first became available in time for Jevons’s first edition.<sup>14</sup> Unfortunately the coincidence is just that. As a technical possibility, the mathematical equations set out by Jevons could have been drawn by hand and reproduced by lithography<sup>15</sup> or even photolithography, but that was not the reproduction method for mathematical content of *Theory of Political Economy*.

Looking elsewhere for evidence of typographical technological determination, it might be tempting to turn to graphs. Jevons wrote of his inspiration from Fleeming Jenkin’s *The Graphic Representations of the Laws of Supply and Demand* of 1870: “Partly in consequence of this I was lead to write and publish the *Theory* in 1871.” Not only did the marginalists mathematise economics, they turned to graphs to represent marginal calculation (Figure 3). But again the archives refuse to provide an easy correspondence

between mathematical forms and their reproducibility at advantageous cost. Writing to Macmillans on 31 March 1871, a mere six months before publication, Jevons stated, "I send with the manuscript a drawing for thirteen woodcuts—I should like these to be well cut and on a light ~~or dark~~ ?? ground as you think best."<sup>16</sup> The request was carried out as Jevons intended (including his rejection of a light figure on a dark background) but woodcuts date back to the Middle Ages. They were not a technological advantage available to Jevons but not to his predecessors.

The advantage to Jevons was not technological, but administrative or organisational. Mathematical composition was a specialist area of type composition, but by the end of the nineteenth century compositors had become increasingly proficient at it and a number of procedural agreements had been made that greatly eased the task.<sup>17</sup> In 1916 Legros and Grant (*the* reference work for printing) reported that "changes have been brought about in mathematical notation with a view to facilitating the work of the compositor," starting "some thirty years ago."<sup>18</sup> In 1876 the British Association for the Advancement of Science issued a "Report . . . on mathematical notation and printing, with the view of leading mathematicians to prefer in optional cases such forms as are more easily put into type, and of promoting uniformity of notation." It declared that "The cost of 'composing' mathematical matter may in general be estimated at three times that of ordinary or plain matter," making clear that their subsequent recommendations were made "from the printing, and not from the scientific point of view."<sup>19</sup> Legros and Grant outlined a number of notational conventions that had been adopted by mathematicians to "save loss of time . . . in a printing office where mathematical works are composed."<sup>20</sup> Chief among problems for the compositor was equations of multiple lines, and numerous suggestions were made on how to reduce such equations to single-line expressions by the adoption of alternative formulations. Much of the arithmetic material in *Theory* uses single-line equations, with repeated use of simple fractional expressions such as  $\frac{dx}{dt}$ .<sup>21</sup> Although many fractional expressions can be simplified to a single line—"for example,  $\frac{m^2}{n}$  can be written on one line, thus  $m^2n^{-1}$ , though in so simple a case the solidus [bar or forward slash] is to be preferred"<sup>22</sup>—there is an absence of multiple line formulae of the type used in the Cambridge Analytical School, or in the example given by Legros and Grant of an expression that used 159 pieces of leads, rules, spaces, quads, and type, of which only 58 formed the actual typographical printing surface. As a relief to the compositor, who by the late nineteenth century had cracked many of the technical and therefore financial difficulties aris-

ing from printing arithmetic forms, Jevons's arithmetic notation, although revolutionary in its application, represented nothing more challenging than another simple print job.

Legros and Grant noted that "the progress of machine composition has already made itself felt in the simplification of fractions from a compositor's point of view." They noted too (in contrast to contemporary commercial publishing) how leading mathematicians in Oxford and Cambridge could readily avail themselves of hand composition in print shops "where the exigencies of the modern press-room are as unknown to those who have such access, as they are to their confreres of continental countries like France, where the influence of machine composition has yet scarcely made itself felt."<sup>23</sup> Jevons worked with a leading industrial publisher that became Macmillan and Co. by 1875.

Second point: Professionalization. The wide spread of Macmillan's late-nineteenth century list may seem beyond categorization, since they dealt with "both fiction and non-fiction, never too specialized, but never wholly devoted to the popular best seller while not despising the books which sold well." Despite strongly held political-religious beliefs the Macmillan brothers never let these interfere in their business. As John Feather put it, "in the final analysis, the Macmillans were committed to publishing serious books as a serious business proposition."<sup>24</sup>

In terms of what would become known as STEM publishing (Scientific, Technical, Engineering, and Medical), Macmillan's had a habit of hand-picking the best writers on whatever discipline, then publishing a series of their works, thereby maintaining a strong market position across of wide range of scholarly fields, and it was this was the strategy that brought them to Jevons. Macmillan's target market for Jevons can be tentatively estimated by looking at his publishing profile. Jevons's first important work published by Macmillan's was *The Coal Question*, published in April 1865 at a modest 500 copies for sale at 10s. 6d., which went into a second edition of 500 copies in June 1866.<sup>25</sup> A more successful work was his *Elementary Lessons in Logic* for the student and classroom market. Published in September 1870 with an initial run of 2000 copies, *Elementary Lessons* was consistently reprinted for the next twenty years in runs of mostly 3000–4000, with a final December 1890 reprint of 6000 copies. The rewardingly high sales numbers justified the relatively affordable initial price of 3s. 6d.

However, *Elementary Lessons* was something of an exception. More typical for Macmillan's was a publication such as H.W. Miller, *Descriptive*

*Geometry*, which went through four Macmillan editions over some thirty years, between 1878 and 1909, printed in runs of 1000–2000, priced 6s. A textbook such as Jevons's *Methods of Social Reform* had a similar low level of ambition, printed in two editions: 1000 copies in April 1883 at 10s. 6d., and another 1000 copies in 1904 at 10s. A 1906 edition of Jevons's posthumously published *Principles of Economics* (1905) is listed at 10s. net. Another Macmillan publication, Paul de Rousiers's *Labour Question in Britain*, published March 1896 in a run of 1250 copies at 12s., followed a strategy similar to Jevons's *Methods*. By comparison, an earlier, more universally circulated work such as John Stuart Mill's *Political Economy*, published in 1871 for Longman's in a people's edition, was priced at only 5s.<sup>26</sup>

From the mid 1860s until his death, Jevons steadily produced a stream of publications for academics, students, and the informed general reader, dealing with either political economy and economics or with questions of logic, alongside a number of explanatory treatises and notes for student readers and the classroom. What his books lacked in glamor and sales they made up for in modest reliability. His expectations regarding *Theory* match this financial realism: "I do not anticipate at all a large sale for the *Theory* but should hope to sell one edition beyond doubt."<sup>27</sup>

The successive editions of the marginalist masterpiece *Theory of Political Economy* fell squarely into this pattern: September 1871, 1000 copies, priced 9s.; June 1879, 1250 copies, priced 10s. 6d.; September 1888, 1500 copies, priced 10s. 6d.; November 1911, 1500 copies, priced 10s. net. There were two further Macmillan editions much later: June 1924, at 1500 copies; and August 1931, at 1000 copies. What was remarkable about Jevons's career with Macmillans and about *Theory* in particular was that it was utterly unremarkable—or rather no more remarkable than a dependable entry in a ledger.

Much of Jevons's correspondence to Macmillan's reveals a highly professional author concerned to take advantage of market opportunities and maximize the publishers' revenue. On 19 August 1869, Jevons writes asking for up-to-date sales figures for his *Coal Question*. On 26 April 1870, and again on 15 May, he discusses problems of layout for his *Elementary Lessons*, suggesting solutions for running titles, scaling down drawings, italicization, and heights and positions of titles, and in August 1870 asking that his index "be printed in exactly the same type and style as the index to Lockyer's *Astronomy*."<sup>28</sup> He asks the printers to hurry, too, so as to be ready for "the opening of college in October." By 10 December 1870, following the initial success of *Elementary Lessons*, Jevons's initiative shows again as

he wonders whether Macmillan's should produce an additional "key" to the exercises: "It would be useful both to some teachers and to private students and, if charged at least as much as the book itself, would . . . get into the hands of pupils. As it would I think be the first of its kind, it might help sell the book." Of *Theory*, Jevons's correspondence discusses it more in terms of a footnote than a major project: 28 March 1871, he sends a manuscript that

I have just finished of a small work on Political Economy. I should be glad to have it published without delay, and I daresay it will sell rather better than my little logical books. . . . There is a greater number of readers interested in any economical subject than in a logical and metaphysical one . . . . If you have no objection, I should like to have *Theory of Political Economy* uniform with *The Coal Question*. It will then have a handsome readable type. I think it will not make more than about 240 pages of the same size as the *Coal Question*.

The letter then goes on to propose a further small schoolbook on the same subject, Jevons being inclined to think that an "elementary treatise on Political Economy and Monetary Devices . . . might sell well," comparing the advantages of his plan over a similar Macmillan publication by Professor Henry Fawcett (undoubtedly *Manual of Political Economy*, 1869). The remaining letters to Macmillan's until his death in 1882 are concerned with various publication projects, mostly about other "treatise and logic" books and titles that would fit under the general heading of "educational." When *Theory* is mentioned, it is only to briefly note progress with prefaces and appendices of subsequent editions. From a publishing history perspective, one of the most formative volumes of economics and marginalism was nothing more than a minor addition to a standardized serial output of quietly produced seminal works by one among many Macmillan house specialists.

The professionalization that subsumed Jevons's work into an industrialized corpus of unremarkable outputs, however, was also the same system that allowed economics to flourish in its dissemination. Without the publishing industry, the circulation of Jevons's work would have been much reduced. But its dissemination, in the form of subsequent multiple editions, also provided economics with a unique opportunity to construct its own prehistory.

In the first 1871 edition of *Theory*, Jevons included no bibliography. In preparation for the second edition, Jevons wanted to uncover all existing writings in the mathematical mode. An initial list of seventy works was

published in the *Journal of the Statistical Society* (June 1878), and he sent copies to Walras, who added to it, passing it onto the French *Journal des économistes* (December 1878). Copies were also sent to German and Italian journals. A further bibliographic list was then compiled for the second edition of *Theory*, with additional help from professors in Leiden, Utrecht, Pavia, and elsewhere.<sup>29</sup> On 30 January 1879, Jevons forwarded to Macmillan's the new preface to *Theory*, noting that it might increase the length to around 300 pages. By 22 April, the proofs were returned and Jevons asked for as much haste as possible in the final production.

In his preface to the second edition, Jevons wrote of "a great increase in mathematic-economic writings," and he made pains to highlight the work of Léon Walras, Septime Avigdor, Julius Petersen, Gerolamo Boccardo, and others; the Danish *National-Økonomiske Tidsskrift* (*Journal of National Economics*); and the productive hands of Danish, Dutch, French, and Italian economists. He lamented the paucity of English economists, with the exception of Alfred Marshall, Fleeming Jenkin, George Darwin, and Henry Dunning Macleod. Included too in the second edition was an appendix, a revisionist (or constructivist) bibliography of economics, dating back to 1720.<sup>30</sup> Crucially, though, it scrupulously omitted Adam Smith, François Quesnay, and Thomas Malthus, who did not sufficiently use the "mathematic-economic method." Thus the constitution of economics as a scientific field took place in the publisher's end matter.

After Jevons's death, Harriet Jevons prepared the third edition for 1888, devoting much of her short preface to explaining the few extensions to the bibliographic list: compiled again with the help of international professors (notably Harald Westergaard of Copenhagen). By the fourth edition of 1911, the preface could claim that Jevons's *Theory* was "already in some senses a classic," denoting the establishment of the discipline. The editor, the Jevonses' son Herbert Stanley, was anxious to update his father's bibliographic list to 1910. Of periodical articles, Herbert wrote, he included "all papers dealing with economic theory by the *graphic* or *symbolic* methods, *and those only*" [my italics]. But "although several hundred card entries have been made and classified, . . . the work still seems very far from complete." The task was abandoned, although Herbert still hoped that "an independent book in handy form . . . might eventually emerge."<sup>31</sup>

What this short narrative demonstrates is, given the technologies and economics of printing and circulation around 1900, how crucial it was that a systematic bibliography be compiled and that it be internationally circulated with revisionist (or constructivist) force among practitioners of the method.

Far more than a simple reference list, the bibliography was an act of historiography, reflecting the necessity for each new science to convincingly and authoritatively create its own history. At the same time, the narrative also points to more prosaic details. Herbert (a Professor of Economics at the University of South Wales and Monmouthshire) regretted his failure to compile a complete list: “Living as I do without access to any good library, the work proceeded slowly; and the decision . . . which entailed reading a good many papers, further retarded matters.” Had Herbert a London living and a secretary, or access to better duplication technologies, we might have been overwhelmed with neo-classical economics much sooner. As it was, by June 1924, Macmillan’s were in a position to publish a fifth edition of Jevons’s *Theory* using photolithography, which they also used for the August 1931 edition printed by Lowe and Brydon. By that time economics was a mature discipline in need of multiple copies of its earliest works.

Thirdly and lastly: the socialization of neo-classical economics. Turning to what was available to nonprofessional readers of economics, we can begin to study how those readers may have understood (and therefore helped define or “interpellate”) a professionalized economic science. At one end of the scale we have a newspaper such the *Lady of the House and Domestic Economist*, published in Dublin from 1890, providing articles on “scientific cookery” and full lists of commodity prices, urging its (female) readers to compare list prices “with those you are at present paying.”<sup>32</sup> Its main function was that of a commodity price index, with an occasional article on palatability. At the end of another political scale we have the short lived *Herald of Anarchy*, in one installment, from November 1890, calling itself “an economic adviser.” Its mission was chiefly to deny the rights of capitalists, property owners, state officials, socialists, and communists.<sup>33</sup> Defined in a semiotic system by what it was not, Jevons’s mathematic economics was clearly not the *Herald*.

Impinging more directly on the mathematic method, though, is a public controversy about land ownership from the turn of the century. It is my contention that this controversy helped establish a public identity for mathematical economics, an identity centered on professionalism, the exclusion of amateur discourse, and the exclusion of political radicalism.

In 1879, a severely underfinanced Henry George published his remarkable land-tax polemic *Progress and Poverty* (San Francisco: Appleton and Co.).<sup>34</sup> It was issued in London by Kegan Paul, Trench in 1881, already purporting to be a fifth edition, carrying advertisements for Cadbury’s

Chocolate and Borwick's Baking Powder and an article on land nationalization by socialist convert and evolutionist Alfred Russel Wallace.<sup>35</sup> As Leslie Howsam notes, Kegan Paul purchased copies that had been printed for Appleton: "The firm [then] published a popular edition at sixpence in 1882, and also continued to publish editions at 1s, 1s 6d and 2s 6d, in almost as many formats as Tennyson's poems. They seem to have acted as George's agents in the British Empire, collecting a payment in 1888 for the copyright in Australia."<sup>36</sup> The twenty-fifth anniversary edition for Doubleday (Garden City, New York, 1912) claimed that *Progress and Poverty* in Britain and the United States was instantly "put into cheap paper editions and in that form outsold popular novels of the day. In both countries, too, it ran serially in the columns of the newspapers. Into all the chief tongues of Europe it was translated, there being three translations into German."<sup>37</sup> The anniversary edition's generous estimate was that by 1905 the work had been printed in more than two million copies. A fiftieth anniversary edition (New York: Robert Schalkenbach Foundation, 1935) quotes endorsements of George's work by no less figures than John Dewey and Leo Tolstoy.<sup>38</sup> And following hotly on George's radical trail were rebuttals such as E.G. FitzGibbon's 1884 pamphlet *Essence of Progress and Poverty* and Arthur Crump's *An Exposure of the Pretensions of Mr. Henry George as Set Forth in His Book "Progress and Poverty"* (1884): price one shilling.

Since the tenet of George's work was the abolition of the private ownership of land we can guess who his supporters may have been: certainly not landowners. But what marked off George from the pamphlets that so enthusiastically denigrated or supported George's work is that George still argued from within a discourse of contemporary economic thinking. He may have disagreed with the conclusions derived from the economic model but George never denied the basic veracity of the model itself. Economics, he claimed, "has been degraded and shackled, her truths dislocated, her harmonies ignored . . . Freed, as I have tried to free her, in her own proper symmetry, Political Economy is radiant with hope."<sup>39</sup>

In comparison, George's supporters did not try to restrict their argument to economic scientific discourse, let alone to mathematics. Alfred Russel Wallace, in his popular *Land Nationalism* (1902), which directly endorsed Henry George, deliberately mocked the indices he claimed were used by economic theory.<sup>40</sup> Clearly the idea of stating notions of utility, labor, and capital in the symbols  $x$ ,  $y$ ,  $z$ , was not part of Wallace's project, believing these indices to be dazzling metaphoric concealments of injustice. Conversely, the mathematical method regarded "justice" as simply external to its science. In

the third 1888 edition of *Theory*, Jevons writes of bargaining that “feelings of justice or of kindliness, will also influence the decision . . . [But] these are motives more or less extraneous to a theory of Economics.” There he anticipated John Maynard Keynes’s remark that economics is a science of what is and not what ought to be. But Jevons and not least Macmillan’s, a publishing house that knew how to make money out of impartiality, did share a faith in the neutrality of their mathematics-based science, or more precisely, an erroneous belief that “neutrality” can somehow be politically neutral: a belief not shared by the followers of Henry George.

Thus a discourse on social justice collided with a new mathematical science on the terrain of financial behavior. Wallace went so far as to directly blame economic theory for the problems of landlordism in Ireland. Henry George and one of Carl Menger’s acolytes, Eugen von Böhm-Bawerk, argued over the correct definition of “interest” with similar results. In that power struggle, the contours of the science of economics became further stabilized. Contemporary analogies come readily to hand—climate change, for example, or third world debt—wherein unfortunate collisions between justice and science hinge on science’s capacity to take over the terms of the debate, which in turn redefines the science. By reducing justice to a factor that was largely extraneous to its mathematisation, early economics was able to distance itself from politics (which itself carried political effects).

Around 1900, the discursive boundaries of calls for social justice, and the indifference to it demanded by science, can also be read as the struggle to differentiate readers’ markets. On the one side was the multiply republished large-circulation criticism of scientific economics: *Progress and Poverty* (1879) and its innumerable commentaries. Many of the latter were issued by Swan Sonnenschein, whose business grew out of second-hand bookselling, and who published both Wallace’s *Land Nationalisation* and FitzGibbon’s rebuttal. George’s *Progress* was part of a more general economy of phenomenally popular socialist literature such as Edward Bellamy’s *Looking Backwards 2000–1887* (1887), H.G. Wells’s leftist fiction, or George Griffith’s *Angel of the Revolution* (1893). In the alternative market led by the mighty general trade publisher Macmillan, appearing as apolitical mathematics, were translations, redactions, and introductions to the marginalism of Carl Menger, Léon Walras, and Jevons, with far smaller sales but more academic influence. Science publishing, like any other business, depends on creating and maintaining a distinctive market. It is not simply a transparent conduit of peer-reviewed ideas. Instead, science is the discursive conduit, through which output is supplied in the form of the published page. And, as

with any self-regulating system, the economy created through those bespoke outputs affects both the market and public discourse.

### Notes

1. William Stanley Jevons, *Theory of Political Economy*, 3rd ed. (London: Macmillan, [1871] 1888), 20–21. Also available online at <http://www.econlib.org/library/YPDBooks/Jevons/jvnPE.html>.

2. Jevons, *Theory of Political Economy*, vii [Preface to first edition].

3. *Ibid.*, 4.

4. I would suggest, it is because of this need for a computable index that neo-classical economics elected to operate with the individual *Homo economicus* as its basic unit (often exemplified with Robinson Crusoe), who is driven by self-interest. That is why, in counter-distinction, Marx uses the family, or a “we,” as his basic unit, which also features in current alternative feminist and ecological economic theory, each with its own scholarly journal.

5. Jevons, *Theory of Political Economy*, vi and 40. See also 37.

6. Lindley Macnaghten Fraser, *Economic Thought and Language* (London: A. and C. Black, 1937), 77.

7. Jevons, *Theory of Political Economy*, 13–14.

8. This is the principle of “diminishing utility,” that the more units any individual has of a commodity the less will be the desire for further units: Fraser, *Economic Thought and Language*, 80. By itself—and this is important—the principle of diminishing utility address a feature of consumption (i.e., what happens to value when extra units are consumed), whereas the subjective nature of value is expressed in the thesis that “value depends entirely upon utility.”

9. Many thanks to Claus Thrane at Aarhus University for the explanation.

10. Simon Frost, *The Business of the Novel: Economics, Aesthetics and the Case of Middlemarch* (London: Pickering and Chatto, 2012), 65–78.

11. Cited in Philip Enros, “The Analytical Society (1812–1813): Precursor of the Renewal of Cambridge Mathematics”, *Historica Mathematica* 10 (1983) 24–47, 35.

12. Jonathan Topham, “A Textbook Revolution,” in Marina Frasca-Spada and Nicholas Jardine, eds., *Books and Sciences in History* (Cambridge: Cambridge University Press, 2000), 317–37, 328.

13. Enros, “Analytical Society”, 40.

14. Frederick G Kilgour, *The Evolution of the Book* (Oxford: Oxford University Press, 1998), 108–10.

15. Felix Klein, *Nicht-Euklidische Geometrie, I* (Göttingen: s.n., 1893), used lithography to reproduce handwritten notes.

16. Add.MS.55173 Macmillan Archive, vol. 388. British Library.

17. My appreciation for assistance on these points to Michael Twyman, University of Reading.

18. Lucien Alphonse Legros and John Cameron Grant *Typographical Printing Surfaces* (London: Longmans Green, 1916), 40.

19. William Spotiswoode et al., “Report of the Committee . . . Appointed to Report on Mathematical Notation and Printing,” in *Report of the Forty-Fifth Meeting of the British Association for the Advancement of Science held at Bristol in August 1875* (London: John Murray, 1876), 337–39, 337 and 338.

20. Legros and Grant, *Typographical Printing Surfaces*, 41.

21. Jevons, *Theory of Political Economy*, 184, 185, and 186.

22. Legros and Grant, *Typographical Printing Surfaces*, 42.
23. *Ibid.*, 41.
24. John Feather, *A History of British Publishing* (London: Routledge, 1988), 140–41. For Macmillan's see Charles Morgan, *The House of Macmillan* (London: Macmillan, 1943).
25. This may have been a reprint rather than a new edition. All publication data for Jevons's works for Macmillan's and other Macmillan publications from *Macmillans Editions Book* (up to 1889), BL.
26. English Catalogue of Books, HLR 015.41.
27. All Jevons's correspondence to Macmillans from Add.MS.55173 Macmillan Archive, vol. 388. British Library.
28. Joseph Norman Lockyer, *Elementary Lessons in Astronomy* (London: Macmillan, 1868).
29. Preface to 2nd ed., in Jevons, *Theory of Political Economy*, xx.
30. The first entry is Francis Hutcheson, *An Inquiry into the Original of Our Ideas of Beauty and Virtue* (London: s.n. 1720)
31. William Stanley Jevons and Herbert Stanley Jevons, *Theory of Political Economy*, 4th ed. (London Macmillan, 1911), lvii and lix.
32. *Lady of the House and Domestic Economist*, vol. 1, no. 1, Autumn 1890, Dublin.
33. *The Herald of Anarchy*, November 1890, Ward Davies's Free Press.
34. The British Library copy of the 1879 US edition states San Francisco as the place of printing. According to an edition from New York, Doubleday, Page and Co., 1912, the work was published by New York-based Appleton and Co., but that the author had been required at his own cost to have the type set, which George had done in San Francisco, taking first some 500 copies as an "Author's Proof Edition," before sending the plates east to Appleton in New York.
35. The price of the Kegan Paul edition remains unknown, but a lower purchase-cost market can be assumed from its double-columned newspaper format, similar to the New York Appleton edition.
36. Leslie Howsam, *Kegan Paul: A Victorian Imprint* (Abingdon: Routledge, 1998), 106.
37. Henry George, *Progress and Poverty* (Garden City, NY: Doubleday, Page and Company, [1879] 1912) preface, x.
38. George, *Progress and Poverty* (New York: Robert Schalkenbach Foundation, 1935), vii and viii.
39. Henry George, *Progress and Poverty*, 5th ed. (London: Kegan Paul, [1879] 1882), 86.
40. Alfred Russell Wallace, *Land Nationalisation* (London: Swan Sonnenschein; New York: Scribner's, 1902), 199.