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“The Price is Right”: Léon Walras and Economic Justice¹

Keith Tribe

Résumé

Léon Walras, nommé professeur d'économie politique à Lausanne en 1870, est l'initiateur de la théorie du marché fondée sur la démonstration mathématique de l'apparition d'un prix unique des biens et des services échangés par de multiples agents sur un marché ouvert. Son modèle formel de l'échange n'excluait pas pour autant les questions de justice économique impliquant le respect des parties engagées dans de telles transactions et ce papier rappelle que pour Walras le «vrai prix» était aussi le «juste prix».

Zusammenfassung

Léon Walras, seit 1870 Professor für Wirtschaftspolitik in Lausanne, ist der Begründer der Theorie des Marktes, die auf mathematischen Berechnungen des Phänomens des Einheitspreises der zwischen den zahlreichen Akteuren eines offenen Marktes ausgetauschten Güter und Dienstleistungen beruht. Sein Modell des Austausches schloss die Fragen der wirtschaftlichen Gerechtigkeit nicht aus, implizierte es doch den Respekt der in derartigen Transaktionen engagierten Partner. Gemäss Walras war nämlich der «wirkliche» oder «tatsächliche» Preis der «gerechte» Preis.

What form of appropriation is good and just? What form of appropriation is endorsed by reason as in conformity with the demands of moral personality? That is the problem of property. Property is equitable and rational appropriation, legitimate appropriation. Appropriation is a fact pure and simple; property,

¹ I would like to thank Béla Kapossy for asking me to write this essay, and the railway guard from Birmingham New Street Station who rescued Keele University's copies of Henry George's *Progress and Poverty* and Walras' *Correspondence* from the Glasgow to Poole train on which I had inadvertently left them.

which is a legitimate fact, is a right. Moral theory is placed between fact and right. ... The fact of appropriation is therefore in essence a moral fact, and the theory of property is therefore in essence a moral science. *Jus est suum cuique tribuere*, justice consists in securing to each his own; if ever science had as its object securing to each his own, if ever science had therefore justice for its principle, then it is most assuredly that which concerns the distribution of social wealth, or, as we shall call it, *social economy*.²

During the final quarter of the nineteenth century the system of political economy inaugurated by Smith's *Wealth of Nations*, and then elaborated in England, Germany and France, was displaced by a new formal, subjectivist economics. This neoclassical economics, as it came to be known, was elaborated by William Stanley Jevons, Francis Edgeworth and Alfred Marshall in England, by Menger, von Wieser and Böhm-Bawerk in Austria, together with important contributions from the Netherlands, Sweden, Italy and the United States. The most direct filiation to "modern economics" however, what became the dominating economic paradigm of the latter half of the twentieth century, can be traced from the work of Léon Walras. The conception of prices as signals of scarcity, and of the market in which they are co-ordinated as tending to a system of general equilibrium, was elaborated by Walras and taught to his students in Lausanne every year from 1870 until his retirement in 1892. This new system of "pure political economy" was presented as a series of formal equations, marking out his treatment from that of Jevons, or Marshall, both of whom used mathematical notation but neither of whom sought to characterise the process by which markets arrived at equilibrium in terms of the solution to a set of simultaneous equations³.

This linear descent of general equilibrium theory from the writings of Walras has, paradoxically, obscured the scope and complexity of his work to a greater extent than is otherwise normal in the history of economic thought⁴. Not that the work of Léon Walras is without special problems for the historian – as is evident from the new French critical edition, Walras in his later years constantly tinkered with a corpus of work that was for all intents and purposes intellectually complete by the mid 1870s, added to which many items were published more than once before being republished yet again in his own collections of essays. On examination,

2 L. Walras: *Eléments d'économie politique pure ou Théorie de la richesse sociale*, Auguste et Léon Walras, Œuvres Economiques Complètes VIII, ed. P. Dockès et al., Economica, Paris 1988, pp. 63, 64.

3 That is, both Jevons and Marshall treated the aggregate outcome of economic exchange in an economy as homologous with the outcome of individual exchange.

4 Albert Jolink offers a typology of different treatments of Walras in the literature in the "Introduction" to his *The Evolutionist Economics of Léon Walras*, Routledge, London 1996, pp. 1–5.

most of the revisions made to such writing by Walras were not in any respect substantive; and while it is important to take account of textual variation, one can too easily be diverted in this way from a recognition that his views of taxation, for example, remained entirely untouched by developments in fiscal theory after the later 1850s⁵. Given the not inconsiderable problems of contextual interpretation presented by such writing, the situation has been aggravated by the manner in which economic theorists with little interest in historical argument and evidence have built upon some elements of this work. The exact features of Walras' economics have long since disappeared beneath the accumulated patina of "Walrasian economics"⁶. Two economists, William Jaffé and Donald Walker, have sought to rectify this state of affairs, the former translating *Éléments d'économie politique pure*⁷ and editing his correspondence⁸, the latter publishing numerous articles and a monograph whose ruthless dedication to the cause of correcting a series of misunderstandings eventually obscures, rather than illuminates, an admittedly difficult subject⁹. Much of Walker's critical prose is turned upon Jaffé, whom for example he rightly criticises for translating "à la criée" as "by auction"¹⁰, but then again wrongly for arguing that Walras' pure system involved a conception of commutative justice – which it does, for on this point Jaffé has read Walras correctly¹¹.

The formal development of Walras' market models should not be allowed to obscure exactly that which is obscure in modern economic theory – the relationship between a theory of economic exchanges and its moral foundations. Typically, contemporary economists would argue that a proposal to link the analysis of economic exchange to a moral order represents a confusion between positive and normative statements. According to this line of reasoning, economic analysis is "posi-

5 There is unfortunately not the space here to explore this issue, but it can be safely asserted that Henry George's proposals for a single tax have a more sophisticated foundation in economic principles than Walras' own views on land and the single tax.

6 Claude Ménard provides a useful overview of the process by which Walrasian economics was constructed by later theorists in his "The Lausanne Tradition: Walras and Pareto", in K. Hennings, W. J. Samuels (eds.): *Neoclassical Economic Theory, 1870 to 1930*, Kluwer, Dordrecht 1990, pp. 95–136. Donald Walker, who has written extensively on Walras, demonstrates conclusively in his commentary to this essay (pp. 137–150) that it is not enough to be an economist to understand Walras.

7 Published as *Elements of Pure Economics*, George Allen and Unwin, London 1954.

8 W. Jaffé: *Correspondence of Léon Walras and Related Papers*, 3 vols., North-Holland Publishing Company, Amsterdam 1965.

9 D. A. Walker: *Walras's Market Models*, Cambridge University Press, Cambridge 1996.

10 Walker: *Walras's Market Models*, pp. 84–85 – the "Walrasian auctioneer" is a later invention and represents a serious misunderstanding of the manner in which Walras envisaged market transactions.

11 Walker: *Walras's Market Models*, Ch. 2 "The Mature Models: Not a Normative Scheme". Walker also reproves Ménard on the same point, "Commentary", p. 147.

tive” in the sense that its results are endogenous to the system; and “normative” judgements are excluded on the grounds that they are imposed on the system from outside. A good economic theory, in short, is one which argues axiomatically from fully-specified principles, such that the validity of the conclusions reached can be directly linked to initial conditions and the structure created upon them. “Normative” judgements destroy this symmetry, and if inserted into the initial conditions simply short-circuit the purpose of economic reasoning. It is for this reason that Walker so strenuously insists that Jaffé’s reading of Walras’ pure system as one designed to satisfy the demand of social justice is mistaken. Social justice must, for Walker, involve value judgements and therefore their invocation introduces exogenous factors into the analysis of the market mechanism.

But for Walras it was evident that for a system of exchanges to function in perpetuity, the parties to the exchange had to be satisfied of the propriety, of the “justness”, of the transaction. In any transaction not only are material needs satisfied through the acquisition of goods and services, the transaction must itself be underwritten by a belief that it is equitable. The problem with which classical political economy had unsuccessfully wrestled was to explain quite how agents could be consistently induced to part with exactly that amount of an asset they possessed to obtain a desired quantity of one they did not. Conceiving the currency of transactions as ultimately embodiments of labour resolved the problem at one level, but failed to account for the fact that fluctuations in the market price of goods and services bore no clear relationship to variations in the price of their various inputs. It was this problem that Karl Marx thought he had resolved when he sought in the first volume of *Capital* to demonstrate quite how surplus value could be extracted from a process of equal exchange between capital and labour – only to become shipwrecked later in what became Volume III where he sought to transform values into prices.

Walras’ great achievement was to demonstrate how this circle might be squared: how the volume of social wealth might be augmented while at the same time the proportion of objects produced was appropriate to scale of needs on the part of buyers and sellers, of producers and consumers. He endogenised “fairness” in exchange by relating the emergent market price to the utility schedules of all participating agents. Production is regulated by the fact that each consumes no more than he produces, and produces no more than he consumes. Adjustments of purchasers’ judgements of need and scarcity according to movements in the observed prices offered by sellers lead through mutual adjustments to a

prevailing market price which ensures that, in a free market and with many buyers and sellers, each supplies and demands quantities of goods and services such that the marginal utility of the goods and services exchanged is for each party proportional to their price¹². It is at this point that a purchaser will obtain the greatest possible satisfaction, and it is this quality of each party to the transaction securing a maximum of satisfaction which renders the transaction equitable: each receives “his own”. As Jevons noted in the 1879 Preface to his *Theory of Political Economy*, where marginal utility determines the price of all products, it also determines the prices of all factors of production; and he went on to observe that this insight was the deathknell of a classical political economy which, instead of deriving factor prices from the prevailing market prices for the product, insisted on deriving the market price of the product from pre-existing factor prices¹³.

As noted above, Walras continually revised his writings, but by doing so mostly obscured the main points he wished to make. Jolink, for example, expounding the development of Walras’ understanding of scarcity, utility and demand in the early 1870s, turns to an unpublished note from 1898 in order to express the point at issue “in a nutshell”. It transpires that the mathematics in this note, however, date back to 1871, when a mathematical colleague converted Walras’ argument into appropriate notation¹⁴. Coupled with this process of revision of existing writing, Walras energetically corresponded with contemporary economists, seeking to overcome his physical and intellectual isolation by sending copies of his writings all over Europe. Not especially well-paid in Lausanne, the cost of this practice led to debts that were only wiped out by his second marriage in 1884 and an inheritance from his mother in 1892. As can sometimes happen, in his strenuous efforts to make himself understood, he eventually became more difficult to understand.

There is a solution to this problem, but first some biographical and institutional context is called for. Léon Walras was born in December 1834 in Evreux, his father Antoine-Auguste, a school administrator with a

12 “Exchange according to the mechanism of free competition is an operation in which all exchanging parties obtain the greatest satisfaction of their needs compatible with the condition of giving the good which they sell and receiving the good which they buy in a common and identical proportion. By reuniting the second condition with the first I completed the principle of the mathematical theory of exchange.” L. Walras: “Un économiste inconnu: Hermann-Henri Gossen”, *Etudes d’économie sociale (théorie de la répartition de la richesse sociale)*, Auguste et Léon Walras, Œuvres Economiques Complètes IX, ed. P. Dockès et al., Economica, Paris 1990, p. 320.

13 W. S. Jevons: “Preface to the Second Edition”, *The Theory of Political Economy*, Second edition, Macmillan, London 1879, pp. 1–lvii.

14 Jolink: *Evolutionist Economics*, p. 87 and note 25 p. 167.

keen interest in political economy, having published three years previously *De la nature de la richesse et de l'origine de la valeur* in which *rarété* is identified as the source of value. From 1844 to 1850 Léon attended college in Caen, after which he entered the lycée in Douai, being awarded a bachelor of letters in 1851 and a bachelor of sciences in 1853. In 1854 he entered the School of Mines but found himself drawn more to literary and philosophical pursuits, eventually publishing a novel in 1858. He was however in that year persuaded by his father to abandon literature in favour of political economy, and in 1859 he started working for the *Journal des Economistes*, the established French economic periodical devoted to the promulgation of liberal economic ideas. During the 1860s he worked variously for a railway company, as the editor alongside Léon Say of the journal *Le Travail*, became the managing director of a co-operative bank in 1865 and, after its failure in 1868, found employment in a private bank. In this period he developed his thinking with respect to political economy, gave public courses of lectures, but had no formal responsibilities as a teacher.

In 1860 Walras attended an international congress in Lausanne dedicated to the question of taxation, presenting a paper which included his views that the taxation of rent should be treated as a single tax, proclaiming himself a “neo-Physiocrat” in this respect¹⁵. Joseph Garnier, one of the French representatives, published an account of the meeting in the October 1860 issue of the *Journal des Economistes*, in the course of which it was suggested that Walras’ proposals had led subsequent discussion into a dead-end. Irritated by this imputation, Walras wrote up his own account of the Congress, in the process marking out clearly his differences with Garnier over the question of the state and taxation. Garnier, argued Walras, was in favour of minimal government, intervening as little as possible in the economic life of the nation. Such a position lacked coherence, suggested Walras: it was not a matter of simplicity, complexity or frequency, but rather a question of the nature of the general interest, the relationship between individual activity and communal activity, the latter being the province of the state. Responding to the assertion that the taxation was nothing more than a price paid by a citizen for the supply of particular services, especially security, Walras countered that security was only one of several matters of general interest, and that the state neither sells its services, nor could justice be bought in the same way one bought a book or a length of cloth¹⁶. The dis-

15 L. Walras: “Souvenirs du Congrès de Lausanne”, *Etudes d'économie sociale*, p. 348.

16 Walras: “Souvenirs du Congrès de Lausanne”, pp. 341–342.

inction that Walras makes here was later elaborated into a general argument concerning the relation of the state to free markets, but his differences with contemporary economic liberalism had already been registered. The following year he entered his essay *De l'impôt dans le Canton de Vaud* in a competition initiated by the Canton, making more explicit his support for the nationalisation of land, although at this point he had still not resolved the problem of how this could be done without violating the rights of landed proprietors. The prize was not awarded, five commendations being made instead, the first to Proudhon and the fourth to Walras. Nevertheless, Walras' presentation had made an impression on local politicians and administrators, and when at the end of the 1860s the local government determined on a reorganisation of the teaching in the Academy of Lausanne, the head of the Department of Public Instruction, Louis Ruchonnet, approached Walras as a candidate for the chair of political economy in the Faculty of Law.

At this time there were no clear qualifications for appointment to such positions, either in France or in Switzerland. In the early 1860s there were only two chairs for political economy in France: at the Collège de France (occupied by Michel Chevalier) and at the Ecole des Ponts et Chaussées (occupied by Joseph Garnier). Then in 1864 the Ministry of Public Instruction and Culture in Paris determined to create a new chair in the Paris Faculty of Law, a significant step since it might be expected to be the first of a series of similar appointments in provincial faculties¹⁷. The appointee, Anselme-Polycarpe Batbie, was himself a specialist in administrative law, presumably thought suitable for the post, as Walras caustically observed, because the Ministry had been authoritatively advised that political economy was a complete science whose principles had been proved in over a century of debate¹⁸. Writing a critical response in September 1864, Walras pointed out that individual economists might well believe that the correct principles of political economy were well-established, but collectively they signally failed to agree on what those principles were. He then set out his own views: that political economy was the study of social wealth, or the sum of objects possessing "venal value" and capable of being exchanged one for

17 A decree requiring all Faculties of Law to teach political economy followed in 1877 – see L. Levan-Lemesle: "De la société d'économie politique aux Facultés de Droit: caractères et paradoxes de l'institutionnalisation de l'économie politique en France au XIX^e siècle", in *Les problèmes de l'institutionnalisation de l'économie politique en France aux XIX^e siècle*, special issue of *Economies et Sociétés*, Paris 1986, pp. 224, 228.

18 L. Walras: "De l'enseignement de l'économie politique dans les facultés de droit", *Mélanges d'économie politique et sociale*, Auguste et Léon Walras, Œuvres Economiques Complètes VII, ed. P. Dockès et al., Economica, Paris 1987, p. 350.

another; and that utility and scarcity, combined with labour as the effort of acquiring wealth was the “nature of wealth and the origin of value”. Following on from this, he divided the domain of political economy into three parts: the pure theory of political economy, social economy, and applied political economy¹⁹. These were the heads under which he would teach in Lausanne and which remained organising principles of his writing until his death in 1910.

There had been occasional courses in political economy in Lausanne before 1870, dating back to 1821 when Charles Comte, a liberal refugee from France, taught for about three years in the Faculty of Law before the French government stripped him of his nationality and in 1823 persuaded the Swiss authorities to expel him. In 1837 the Academy was formally required to create a chair in political economy, and this was conferred in 1839 on Antoine-Elisée Cherbuliez, whose teaching appears to have commended the benefits of the established political order, the disadvantages of democracy, and the need for the state to refrain from all intervention in economic activity²⁰. Cherbuliez only taught in Lausanne for two brief periods (1838–40, 1852–55) before being appointed to the chair of political economy at the Federal Polytechnic, Zürich. Following Cherbuliez’s departure in 1840, teaching in the subject was assigned another political refugee, Luigi-Amedeo Melegari, who by 1843 had been promoted to the Ordinary Professorship and was therefore the first regular appointee to the chair of political economy in Lausanne. Charles Secrétan, who later translated Gossen’s *Entwicklung* for Walras, attended the first course of lectures and his resumé shows that Melegari, besides presenting a history of human labour and civilisation, provided a workable account of the distribution of wealth between labourer, capitalist and landowner²¹. The radical Vaudoise revolution of 1845 stripped Melegari of his post along with other liberals, and after Cherbuliez’s final departure in 1855 such teaching of political economy as was done was entrusted to Edouard Secrétan, Professor of Penal Law at the Academy and brother of Charles.

In 1869 Edouard Secrétan died, as a result of which Ruchonnet decided upon a reorganisation of the Faculty of Law, in which a new candidate would be sought for the chair of political economy. Advised by Jules Ferry, Ruchonnet sought out Walras and suggested that he apply

19 Walras: “De l’enseignement de l’économie politique dans les facultés de droit”, pp. 351–352.

20 “Introduction Générale. L’Enseignement de Léon Walras à Lausanne”, in L. Walras: *Cours*, Auguste et Léon Walras, Œuvres Economiques Complètes XII, ed. P. Dockès et al., Economica, Paris 1996, p. 12.

21 G. Ferretti: *Melegari à l’Académie de Lausanne*, F. Rouge, Lausanne 1949, pp. 49ff.

for the post. He did so in September, and after an open lecture in October he was appointed in preference to two other candidates in November. The terms of his appointment were however initially disappointing: the committee had voted only narrowly in his favour, and instead of being appointed as full professor, he was offered an extraordinary professorship for one year only. He began teaching on 16 December 1870.

Throughout his tenure of the chair²² he taught three courses, corresponding to the organisation of the subject he had outlined in 1864: pure political economy was taught every year to the first year students; and applied political economy alternated annually with social economy for the second and third years²³. He lectured to around twelve students from each year of the Academy, dictating his notes to them – both numbers and style of teaching being quite usual for the period. Owing to the difficulty that the first year students found in absorbing the elements of general equilibrium theory, Walras also prevailed upon the Department of Public Instruction to purchase copies of the *Eléments* so that he might be able to elaborate his lectures a little, and about one hundred copies were eventually acquired for student use.

In the later 1870s, in the wake of the decree requiring French Faculties of Law to teach political economy, Walras entertained hopes of returning to France, and he corresponded with Ferry, now Minister of Public Instruction and Culture in Paris, concerning this and other projects, such as the formation of a new faculty of moral and political sciences in Paris. Nothing came of this, nor of later efforts to be considered as a successor to Chevalier at the Collège de France when the latter died in November 1879. His hopes of appointment to the new post in Montpellier were dashed when Charles Gide was appointed in late 1880, but in any case Walras had neither a law degree, nor a doctorate, both of which had by now become necessary for such appointments. The teaching of political economy had moved on from the being the province of dilettantes and ideologues, and was emerging as a regular academic occupation for which acceptable qualifications were required. Having contributed so much to the creation of the new academic economics, Walras now gave up any hope of gaining a suitable post in France, where he might reasonably have expected to play a significant role in intellectual and cultural life.

²² He was promoted to Ordinary Professor in July 1871.

²³ “L’Enseignement de Léon Walras à Lausanne”, p. 17. From the autumn of 1875 pure political economy was taught for three hours a week in the first semester of 16 or 17 weeks, and the other two courses in the second semester for five hours a week over a semester of 12 weeks.

He resorted, therefore, to revision and refinement of his original vision of the market system of exchanges, corresponding intensively with leading economists, and seeking to establish his legitimate claims to priority in the elaboration of the new economics. It has long been acknowledged that each of the three leading proponents of the “marginalist revolution” – Jevons, Menger and Walras – worked in ignorance of the existence of the others, Walras first coming across Jevons’ *Theory of Political Economy* in May 1874 while drafting the preface to the first part of *Eléments d’économie politique pure*. Walras here acknowledged that Jevons’ “equation of exchange” was identical to his own “condition of maximum satisfaction”, an argument which he had first exposed publicly in a paper read to the Académie des sciences morales et politiques in August 1873. Jevons had of course first aired his new mathematical approach to political economy at a meeting of the British Association in 1862, which knowledge he must have found comforting until Robert Adamson, who succeeded Jevons in 1876 as Manchester’s Professor of Political Economy and Mental and Moral Science, showed him in 1878 a copy of Gossen’s *Entwicklung der Gesetze des menschlichen Verkehrs*, a work which had been published in Brunswick as long ago as 1854. As Jevons noted,

I cannot claim to be totally indifferent to the rights of priority; and from the year 1862, when my theory was first published in brief outline, I have often pleased myself with the thought that it was at once a novel and an important theory. From what I have now stated in this preface it is evident that novelty can no longer be attributed to the leading features of the theory. Much is clearly due to Dupuit, and of the rest a great share must be assigned to Gossen. Regret may easily be swallowed up in satisfaction if I succeed eventually in making that understood and valued which has been so sadly neglected.²⁴

Walras reacted in a similar manner, except that most of the space in the article he devoted to Gossen is primarily given over to an account of exactly in what respects Walras’ own work was novel.

Walras did not read German; the first copy of Gossen that he had in his hands came from the Staatsbibliothek in Munich, where Charles Secrétan’s brother-in-law worked, and it was translated and dictated to him by Secrétan in early 1879²⁵. There were plans to publish a translation, and Walras sought to find out more about Gossen, who had never held an academic post and who might, for all Walras knew, still be alive. By the following year Walras had established contact with relatives, ascertaining

24 Jevons: “Preface to the Second Edition”, p. xli.

25 Jevons likewise relied upon Adamson as a translator; his knowledge of German was too slight to permit him to read a book in the language – p. xl.

that Gossen had died in 1858, and that his nephew, Hermann Kortum, taught mathematics at the University of Bonn. Walras asked Kortum if he might investigate any remaining papers, which he agreed to do; but it was not until July 1881 that Kortum produced the memorandum²⁶ upon which is based everything that anyone today knows of Gossen, besides what one might surmise from his book. Walras was, on his own admission²⁷, by now tiring of his obsessive concern with priority over predecessors, and laid the paper to one side; but then in 1882 Jevons died, and Walras read that Adamson and Foxwell had subscribed to a memorial describing Jevons' *Theory of Political Economy* as the most original work done in economics of its time. What, then, of Gossen, thought Walras? And so he drafted an article on Gossen, which he submitted to the editor of the *Journal des Economistes* in November 1884.

Gossen is important to an understanding of Walras because, in seeking to disentangle the legitimate claims of Jevons, Gossen and himself, he was driven to clarify what he considered his own innovations to be. Furthermore, Gossen formulated in a more direct manner the problem of the equality of exchanges under conditions of many sellers and many buyers, which Jevons had not done. In the relation of Walras to Gossen, therefore, we can trace the degree to which Walras' new system of economics was in fact novel.

Walras opens his essay on Gossen by reminding his readers of the main points of the paper he had presented in August 1873, and published (twice) the following year²⁸. He concludes this section by noting that there are two separate problems to be resolved, the first relating to the current price, and the second to the elements of this price, the latter forming the basis for the former. As he goes on, this

... *theorem of maximal satisfaction* is the cornerstone of the application of mathematics to political economy.²⁹

Having outlined his own understanding of the matter as it stood in the mid-1870s, he then summarised his collaboration with Jevons on the bibliography of mathematical economic writings³⁰, following this with an

26 "Annexe I. La notice d'Hermann Kortum" in Walras: *Etudes d'économie sociale*, pp. 473–478.

27 Walras: "Un économiste inconnu: Hermann-Henri Gossen", p. 329 – this essay was eventually published in the *Journal des Economistes* in the spring of 1885.

28 In January 1874 in *Séances et travaux de l'Académie des sciences morales et politiques*, and in April 1874 in the *Journal des Economistes*.

29 Walras: "Un économiste inconnu: Hermann-Henri Gossen", p. 312.

30 Published as "Appendix I. List of Mathematico-Economic Books, Memoirs, and other published writings", in Jevons: *Theory of Political Economy*, second edition, pp. 301–310; and, with additions by Walras, in *Journal des Economistes*, 4th series, Vol. IV, No. 12 (December 1878), pp. 470–477.

account of Adamson's discovery of Gossen's book drawn from Jevons' preface to the second edition of his *Theory of Political Economy*. Endorsing Jevons' description of Gossen, and noting that the style was "very German, which is to say rather diffuse and superfluous"³¹, he agreed with Jevons that Gossen's treatment of the basic theorem was both more general and fundamental than that of Jevons. Walras, on the other hand, considered that he had gone beyond Gossen, and he listed the relevant points:

1. Both Gossen and Jevons discovered, before Walras, the mathematical expression of utility, and formulated the condition of a maximum of utility in exchange, for one individual, of one good against another; there was no disputing this.
2. Jevons appeared disposed to concede to Gossen a degree of superiority on the first point and attribute the second to himself. He was right to do so, for Gossen only formulated the condition of an absolute maximum, while it was Jevons who formulated the condition of relative maximum consistent with the equality of supply and demand.
3. Both of them stopped at the point concerning the barter of two goods for one another. Neither Gossen nor Jevons dealt with the question of the current price of these two goods in respect of an indefinite number of agents. But this is exactly one of the issues resolved in Walras' *Principe d'une théorie mathématique de l'échange* (August 1873), from which one can derive the current price from the excess of effective demand over the deficit of effective supply.

It is this last condition which Walras considered necessary to complete a theory of exchange, which he then summarised as follows:

Exchange according to the mechanism of free competition is an operation in which all exchangers obtain the greatest satisfaction of their needs compatible with the condition of surrendering the good which they sell and accepting the good which they buy in a common and identical proportion. By reuniting the second condition with the first I have completed the principle of the mathematical theory of exchange. In pursuit of this dual condition in the case of the mutual exchange of any number of goods mediated by a *numéraire*, as I showed in my second memoir, entitled *Equations of exchange* (December 1875), I completed the mathematical theory of exchange itself. I stated, besides the law of the determination, that of the variation of prices. That done, I believe that I have not only formulated, but demonstrated, the law of supply and demand.³²

He then describes how in a third memoir he had demonstrated the role of an entrepreneur as an agent distinct to the worker, and in a fourth dis-

31 Walras: "Un économiste inconnu: Hermann-Henri Gossen", p. 318.

32 Walras: "Un économiste inconnu: Hermann-Henri Gossen", p. 320.

tinguished natural from artificial capitals. Finally, in the closing few pages, he summarises Kortum's memorandum concerning the life and work of Gossen, having therefore devoted the bulk of the essay to an outline of those discoveries which, he believed, he could rightfully call his own. These related to the manner in which, among many agents, each received "his due" as determined by the utility schedules of all other agents. A "fair" exchange became equitable once a market price had formed, not before; justice inhered in this market process, not in an allocation determined in advance by some given notion of just rewards, nor even according to the value an individual might attribute to his own faculties and capacities. Instead, it was the utility schedules of all other agents which determined the value of any one agent's services and needs.

What Walras found in Gossen was a clear statement of this idea couched in a form that coincided with his own socialist ideals – that is, critical on the one side of the more reactionary aspects of contemporary economic liberalism, and on the other of socialist and communistic projects which sought to impose ideal forms of distribution upon society. Gossen, like Walras, adhered to the view that the greatest good was achieved at the point where the enjoyment of each was equal, not the amount consumed, nor their revenue:

*In order that the greatest amount of value be created through exchange, it is necessary that after its completion each object be distributed among all individuals in such way that the last atom accruing to each from those objects will create for him pleasure in the same measure as that created by the last atom of the same object for every other individual.*³³

Where this maximum is achieved, Gossen continued, "each individual receives exactly that share of the total to which he can justly lay claim"³⁴. For where each strives to maximise their own pleasure, all will direct their effort to that kind of work most profitable to them, given the prevailing price ratios. Hence each receives a portion of the social product corresponding to the burden they assume in the productive process. The outcome, argues Gossen, is to attain the ideals of the communists without however need of any external intervention at all:

What is therefore regarded by socialists and communists as the ultimate aim of their exertions is here realised through the combined action of natural forces in such a degree of perfection that we only experience with respect to the works of the Creator. For it is not here, as socialists and communists would wish, one per-

33 H. H. Gossen: *Entwicklung der Gesetze des menschlichen Verkehrs und der daraus fliessenden Regeln für menschliches Handeln*, 3rd ed., R. L. Prager, Berlin 1927, p. 85.

34 Gossen: *Entwicklung der Gesetze*, p. 90.

son, or a majority of persons, who sit in judgement on the merit of an individual – since their limited human knowledge would as a rule bring about an unfitting judgement – instead, mankind in its entirety here passes judgement.³⁵

Thanks to the benevolence of the Creator, “this true paradise”³⁶ is achieved entirely by our own activities.

Later, writing in the *Revue socialiste* in the 1890s, Walras contrasted the models of exchange to be found in Jevons and Gossen in terms of simple barter. He describes the first as the author of an “individualist” model, in which the agent is free to pursue his own interest, but where the inequality of wealth existing before an exchange, in which the individual acquires a quantity of a useful good, is preserved³⁷. Gossen’s system, argues Walras, abstracts from the property rights of the barterers with respect to the goods, it is

... communistic barter, only occurring with certainty because of the authority of the State, and it will bring about an *equality* which will follow from the equality of needs and their means of satisfaction. It operates upon the terrain of *fraternity*³⁸.

Walras illustrates the problem by a story from his schooldays at Caen College where, every day at 4 pm., the boys were all given a piece of bread. Some of the boys had butter or jam which their parents had sent; and there was a custom that those lacking jam or butter should pass their piece of dry bread along to others, who would return it to them spread with butter or jam. However, argued Walras, although this was a practice that should be encouraged among children, and was acceptable as voluntary behaviour on the part of adults, it was obnoxious if made obligatory, for “society is not a picnic”³⁹.

Which is true; but this assimilation of Gossen’s model of barter to a picnic, where each contributes and, by this token, has a right to help themselves from the total amount of food and drink without reference to the quality of their own contribution, does Gossen a profound disservice. Nor is it the case that the system proposed by Gossen required an external authority to enforce equality in the distribution of goods, given that for Walras the State was the guardian of a public interest distinct from a private interest⁴⁰. Perhaps it might be that the contrast that

35 Gossen: *Entwicklung der Gesetze*, p. 99.

36 Gossen: *Entwicklung der Gesetze*, p. 102.

37 Walras: *Etudes d’économie sociale*, p. 180.

38 Walras: *Etudes d’économie sociale*, p. 181.

39 The phrase which P. Dockès picks up for the title of his book on this issue: *La société n’est pas un pique-nique. Léon Walras et l’économie sociale*, Economica, Paris 1996, espec., pp. 119ff.

40 The relation of the state to competitive markets is best exposed in Walras’ essay “L’état et les chemins de fer”, completed in July 1875 but not published until 1897. It has been translated as “The State and the Railways”, *Journal of Public Economics*, Vol. 13 (1980), pp. 81–100.

Walras drew between the “relative maximum” identified by Jevons, and the “absolute maximum” identified by Gossen, rested upon a misunderstanding of a text which he had, after all, not read. Alternatively, it could be that he was led astray by problems in Gossen’s mathematical development, for as Jevons pointed out, Gossen’s functions are all linear⁴¹. Perhaps it was simply that, by the mid 1890s, Walras had lost track of the relation of his own achievements to those of his predecessors; for Jevons, writing in the late 1870s, after devoting several pages to an exposition of Gossen, devotes little over a page to Walras, speculating on the degree to which he had developed his father’s work, and without commenting directly on his theoretical work, which Jevons would of course have been able to read. On the other hand, it was in writing about the relation of his own theory to that of Gossen and Jevons that Walras was brought to express himself most clearly.

41 Jevons: “Preface to the Second Edition”, p. xxxix.