

Marking Time: Marshall's Search for Narrative Explanatory Coherence

Harro Maas

It is well known that Marshall had great difficulty in organizing his work after the *Principles*. The promised second volume never came, and for the books that eventually were published, *Industry and Trade* (1919) and *Money, Credit, and Commerce* (1923), Marshall was at pains to find the right mode of expression for his research (Whitaker 1990). In the introduction to the *Principles*, Marshall had explained his reliance on partial equilibrium analysis and, more generally, *ceteris paribus* reasoning as the natural method of the economist, for which his method of diagrams was an excellent fit. But already while working on his *Principles* Marshall had moved closer to economic history. In a letter of June 1879 to Jevons, he had praised Jevons's statistical work as an important step in "real-ising" the abstract theories of economists, in which he promised to follow suit (Whitaker 2010: 110). However, while Jevons tried to flesh out mathematical relations that captured the economic causalities hidden in statistical data, Marshall started to explore a different strategy, a strategy that

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explains his criticism of “mathematico-statistics” and the waning away of his initial enthusiasm for the method of diagrams as an engine of discovery. Instead of relying on the *ceteris paribus* method, which would examine one causal factor at a time, Marshall searched for an approach that captured the causalities in the economy as an encompassing whole. A shorthand for this approach is his famous epigraph to *Industry and Trade*: “The many in the one, the one in the many.”

Moving away from the opposition between abstract theory and economic facts, Marshall tried to develop a strategy that mediates between the generic categories of the economist and the specific events of history that are the domain of the economic historian. In contrast with the *ceteris paribus* strategy Marshall embraced in his *Principles*, in which an incomplete analysis is improved by adding causal factors, Marshall explored what I will call a narrative strategy, in which he tried to work out how to integrate a manifold of heterogeneous causal factors into a unified whole, thus providing causal coherence to a complete chronology of events. The purpose of my contribution to this issue is to explore the development and substance of this narrative strategy. I will use Jevons’s and Marshall’s different cartographies of time as an entry point to understand Marshall’s narrative take on the causal explanation of the facts of history.

These different cartographies can be traced to two important predecessors of the graphical representation of history, Joseph Priestley and William Playfair (Rosenberg and Grafton 2010: chap. 4). Priestley is of course best known as the chemist who defended his phlogiston theory of combustion against Lavoisier’s discovery of oxygen. Here, he is important for the two wildly successful timeline charts he constructed in dedication to his friend Benjamin Franklin, one a chart of biography that comprised over two thousand historical figures of importance, divided over six (in fact seven) categories and running from 1200 BC to his own days. The second chart visualized the rise and fall of empires over the same period. William Playfair is best known as an important innovator of the graphical representation of statistical data through his *Political Atlas and Breviary* and many other publications. Playfair acknowledged his own indebtedness to Priestley, but an important difference between the two was that Playfair represented statistical data along two dimensions, while Priestley visualized the lives of individuals or the sequence of empires as a one-dimensional chronology. This difference is important, because Playfair’s mode of representation enabled Jevons to think about the causal relations between statistical data in mathematical functional form. This was not the

road that Marshall would take. Explicitly dismissing the correlational analysis developed by his former student Arthur Bowley (a dismissal that includes his famous, or notorious, “burn the mathematics” advice), Marshall was explicitly critical of such a “mathematico-statistical” method, which he considered too mechanical and unable to do justice to the organic changes of an economy through time.¹ Instead, Marshall developed a representation of different classes of historical events that builds on Priestley’s timeline charts.

Marshall’s search for a strategy that *differed* from Jevons originates from his early engagement with empirical economic data, or what Marshall on a scrap of paper that Mary Paley saved from the waste bin called the “land of dry facts.” Elsewhere, I have explored at length Marshall’s struggles as a “wanderer” in this land of dry facts, a struggle that gained pace after his travels through the United States in 1878 (Maas 2019, 2021, 2022).² In the early 1870s, Marshall started a collection of tables, graphs, and diagrams in his *Red Book*, a book that would enable an economist, as he argued in his contribution to the jubilee issue of the journal of the London Statistical Society, to identify unexpected causal connections between different statistical time series (Marshall 1885). A modern reader might take Marshall’s recommendation as support for a program of mathematico-statistical analysis, but Marshall used his *Red Book* to develop the narrative strategy that is the subject of this essay. Instead of searching for functional form, as Jevons would have done, Marshall added verbal chronological sequences of events on the empirical statistical curves as shorthand causal narratives.³ In a second move, probably by the end of the nineteenth century, Marshall developed a timeline chart that is strongly reminiscent of Priestley’s chart of biography but differs in that Marshall made his graphical representations of economic data convergent with events from other categories, political, social, legal, and military, by transforming them in chronological sequences of events. Convergence was achieved by thinking about data in terms of events instead of statistical numbers. That is, instead of packaging historical events as statistical data, as Jevons had done, Marshall repackaged data as

1. There is a large literature on Marshall’s use of biological metaphors that is concerned with their importance for the substance of Marshall’s theories. In this essay I will focus only on Marshall’s research strategies and will leave these substantive discussions aside.

2. In terms of the contrast between an inductive and deductive research strategy, see also Maas 2011. Neil De Marchi (2002) examines a similar problem situation for John Stuart Mill.

3. Note that for these narratives, Marshall used words, not mathematics, as a shorthand.

events that he chronologically co-related with other events.⁴ Marshall then used this timeline chart to sort out the causal ordering of events while working on different versions of manuscripts that would result in, among others, *Industry and Trade*. The timeline chart helped Marshall to grasp, in John Maynard Keynes's terms, the complete logic of the situation. By comparing Marshall's chart with a textual example from *Industry and Trade*, I will show how Marshall used the logic of the situation that was embedded in the representation of his timeline chart to structure a narrative that connected the causal categories of the economist with the concrete facts of history.

In his beautiful memoir of Alfred Marshall, Keynes described Marshall's way of working in terms of Marshall's many-sided skills and character traits—character traits Keynes considered essential to be a good economist. Marshall's “mixed training and divided nature furnished him with the most essential and fundamental of the economist's necessary gifts—he was conspicuously historian and mathematician, a dealer in the particular and the general, the temporal and the eternal, at the same time” (Keynes 1924: 322). But Marshall's way of working was not just a matter of character. It was a tooled research strategy in which Marshall in private and in class conversations with his students worked out a chronology of events that could be turned into causal narratives that mediated between the generic and the specific. It was a method of analysis Marshall had practiced himself and shared with his students in class. If anything, this method exemplifies Keynes's own stated preference in his criticism of Tinbergen's business cycle study for the League of Nations for the “mazes of logic” over statistical inductive inference to which I, in conclusion, will briefly turn.

Plotting Data in Search of Causal Mechanisms

Let me discuss Jevons's early statistical work to introduce the difference between chronologically marking historical events on a timeline and registering the development of a variable over time. On his return from Australia in 1859, Stanley Jevons started working on a collection of about thirty charts that in their ensemble aimed to visualize the history of Britain in its many respects, which he in clear tribute to Playfair referred

4. On the importance of data packaging in relation to graphical representations, see Maas and Morgan 2002.

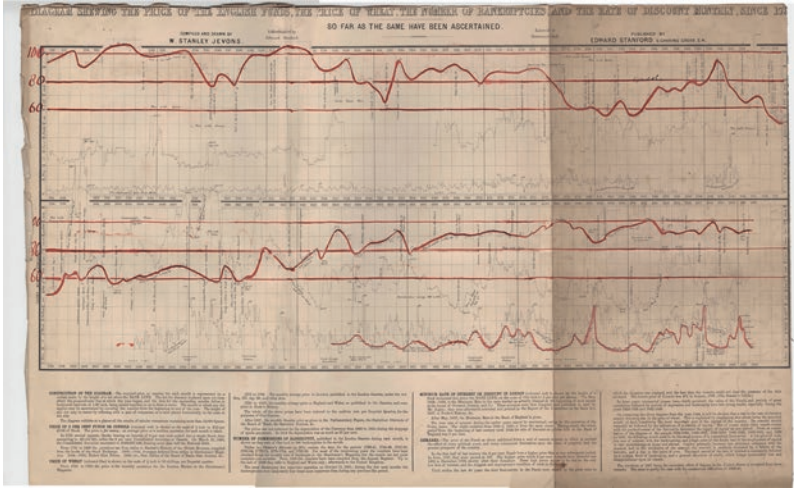


Figure 1 Chart showing the price of English funds (consols), the price of wheat, the number of bankruptcies, and the rate of discount monthly since 1731 using Jevons's *Statistical Atlas* published in 1862 on which Marshall drew stylized graphs. Marshall used the diagram in teaching at University College, Bristol, in 1881–82. Marshall Archives identity code Marshall 7/3/1. Reproduced by kind permission of the Marshall Library of Economics, University of Cambridge.

to as his *Statistical Atlas* project. Jevons never finished this project, and only two charts were printed with Stanford, at his own cost because he failed to get the ear of the important statisticians of his day (most notably William Newmarch) and probably also because of its insuperable printing costs.⁵ From the early 1870s and perhaps even earlier, Marshall possessed at least one of these two charts, here reproduced as figure 1, which he used in his classes as wall charts to discuss with his students. Marshall also drew large wall charts himself, which he equally used for class discussions (Groenewegen 1995).

Figure 1 shows this large chart, in which Jevons had meticulously (and literally) pinned down each data point after which he made the pencil dots, which he then connected. The chart shows average monthly data on the price of British government funds (“consols”), the price of wheat, the number of bankruptcies, and the rate of discount from 1731 until 1861, a

5. On Jevons's *Statistical Atlas* project, see White 1995, 2022; see also Maas and Morgan 2002.

period that Jevons had divided into two parts that were superposed upon one another, the first running from 1731 until 1797, the second (below the first) from 1798 until 1861. The chart thus registered the course of four economic variables (the price of wheat, government funds, the number of bankruptcies, and the discount rate) over time. The explanatory text promised that the graph of the price of government funds (consols) and of the discount rate would be printed in red, and the price of wheat in blue, but the chart was printed in black and white, perhaps because of the additional printing costs involved. The promised color washes that are so typical for Jevons can be found on the large foldout chart in Jevons's posthumous *Investigation in Currency and Finance* (1884) that no longer divided the timeline into two separate parts and, as Foxwell explains in the introduction, was updated to 1883 and redrawn by Richard Rous Mabson, managing editor of the *Statist*.⁶

The black and white print of the different curves on the chart is faint against the thick red lines drawn on the printed chart, which are not Jevons's but Marshall's. For one data series, the price of government funds, Marshall drew three thick, red horizontal lines at prices of 100, 80, and 60, which indicated, more or less, the average and upper and lower bounds on Jevons's graph of the price of government funds. Marshall smoothed the original graph, but not with mathematical smoothing techniques, as Jevons did in his later work. Instead, he drew the curve as William Whewell had recommended in his *Philosophy of the Inductive Sciences*, "with a bold but careful hand" to highlight a movement in the data that was, according to Whewell ([1840] 1967: 399), "more true than the individual facts themselves." He did the same for the much shorter curve of the discount rate in the lower part of the chart.⁷ The importance of these different styles of graphical representation, and of Marshall's class conversations to get a grip on the economy in the concrete, should not be underestimated.

Jevons also added specific historical information on the chart, a fragment of which I reproduce as figure 2, which also shows Jevons's own graphs more clearly than the complete chart in figure 1. Figure 2 shows on a

6. I would like to thank Mary Morgan for pushing me on the details of Jevons's chart and Marco Dardi and especially Michael White for helping me to sort out the mysteries of both charts.

7. Much shorter, because as Jevons explained in the caption to the chart, before 1824 no accurate value of the discount rate could be ascertained because of the usury laws that were then still in place.

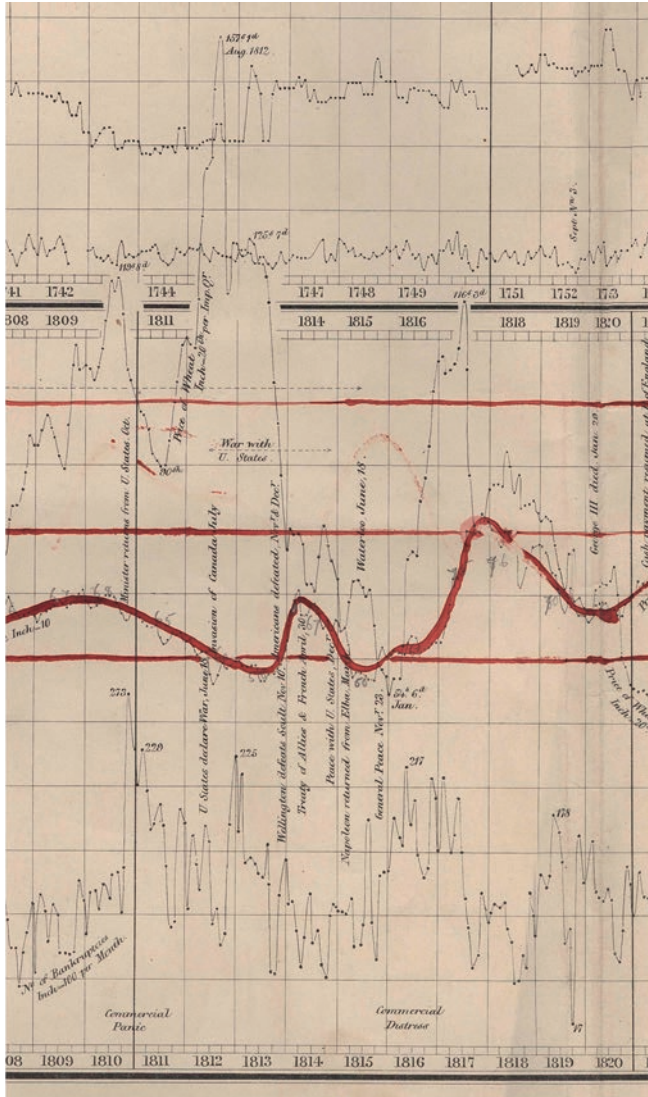


Figure 2 Fragment of Jevons's chart (reproduced here as fig. 1) showing the price of English funds (consols), the price of wheat, the number of bankruptcies, and the rate of discount monthly since 1731. Marshall Archives identity code Marshall 7/3/1. Reproduced by kind permission of the Marshall Library of Economics, University of Cambridge.

timeline from 1809 to 1820 the number of bankruptcies (the lowest curve), the price of government funds (the middle curve), and the price of wheat (the upper curve). Jevons indicated several extremes, for example the price of wheat in August 1812, which reached 157 shillings and one dime for an Imperial Quarter of wheat, and the number of bankruptcies (273 and 229) per month at the end of 1810 and in early 1811. The price of wheat in August 1812, in the midst of the Napoleonic Wars, is so high that the curve runs into the upper part of the chart, which covers the timeline from 1731 until 1797. Horizontally, Jevons indicated significant historical events, such as England's war with the United States from 1812 until 1814. Jevons also added horizontally economic indicators such as "commercial panic" below the two peaks in bankruptcies in 1810 and 1811, and "commercial distress" below another peak in bankruptcies for the year 1816. Vertically, Jevons noted important point events. For example, in 1815: Napoleon returns from Elba, March; Waterloo, June 18; general peace, November 23. Also Marshall's thick red line representing the price of government funds can be seen here more clearly than in figure 1, and we can see that Marshall added in black pencil specific values of the price of government funds that indicate upper and lower values (e.g., 50 for 1815, 76 for 1818).

From the graph it is not clear how Jevons interpreted specific historical events such as the return of Napoleon: as causal factors influencing economic phenomena or merely as chronological markers. Probably the latter, because Jevons eliminated references to specific historical events in his subsequent work or he repackaged them as statistical data. Jevons was interested in the causal mechanisms behind statistical data, and he concentrated on the natural, that is, mechanical causes governing economic phenomena, which he tried to flesh out from the statistical data (Maas 2005). Jevons expressed causal relations in functional form. For example, in his famous sunspot studies, Jevons tried to uncover the mechanism that would explain from the statistical data how the cyclical movements in grain prices and hence of commerce followed the cyclical movements in the activity of the sun (White 2022).

Instead, as will be seen in the next section, Marshall converted such chronological markers into text-based causal explanatory events in short-hand narratives. Marshall moved away from graphical, curvilinear representations of economic phenomena to embrace a different strategy in a search for causal coherence, a strategy that I will here investigate as a narrative strategy. In this strategy Marshall moves from a chronology of events that covers a heterogenous range of categories of phenomena, to an

account that links the events in these categories to a verbal causal ordering. The available archival material suggests that Marshall developed this strategy in a sequence of steps in which he identified different categories of phenomena, exchanging the imaging of individual statistical data in graphs for the imaging of events. That is, Marshall did not repackage historical events as statistical data but regrouped statistical data as events. In a timeline chart that he probably started by the end of the 1890s, Marshall spatially and chronologically arranged these events against events in other categories. Marshall then used this timeline chart to turn a chronology of events into a causally ordered narrative.

Turning Historical Events into Shorthand Causal Narratives

Marshall took an important step in this direction when he started working on his *Red Book* in the early 1870s. The *Red Book* was a large folio blank book in which Marshall collected “historical tables and diagrams” of various kinds. The different lists of contents he included show how the emphasis shifted from a book collecting facts over such standard categories as general history, the arts, social and religious history, and economic history and statistics, to a book that concentrated on economic and political facts about the United States, Britain, and to a lesser extent Germany and France.

Marshall originally envisioned the book to cover the time span from 1700 BC to his own day, but notes are only sparse for the history of antiquity and the Chinese and Mughal empires; they become denser when he draws tables and diagrams for the eighteenth and nineteenth century. It is important to note that Marshall did not use or develop a consistent way of organizing his materials. Some of the data are visualized as in Joseph Priestley's *Chart of Biography*, a mode of visualization that Jevons had also used in an (unpublished) chart of his Statistical Atlas project on invention, but we also find tables that are filled with text, as for example in his table summary of Stephen Dowell's 1888 history of taxation in England (Dowell 2013). He included clippings from diagrams in Jevons's and other publications (such as the autumnal pressure in the money market [Jevons 1866; reprinted in Jevons 1884]) and added comments to them. For example, on a diagram of the already mentioned Mabson, managing editor of the *Statist*, designed for W. G. Fossick's history of iron production in Britain and that showed the production, weight, and prices of pig iron from 1830 until 1879, Marshall noted at the bottom of the diagram that stocks of pig iron “always begin to diminish a year or two before a

crisis, & go on diminishing for a year or two after. Then pick up again.”⁸ The note clearly made an inference from the shape of the curves in the diagram to a generic causal explanation of the relation between stocks and flows in the production of pig iron and the occurrence of economic crises (Maas 2022).

To be able to compare different graphs, Marshall marked time vertically, per century, and cut off a small slice of paper from subsequent pages. He thus could turn pages backwards and forwards and measure them against the same timeline, as he had recommended in his contribution to the jubilee issue of the London (and shortly afterward Royal) Statistical Society (Marshall 1885). However, while Jevons had added vertical markers to his horizontal graphs, markers that could be read as chronological or causal, Marshall added horizontal markers to his vertical graphs that he gave a distinctive causal meaning. An example is a fragment of the graph on government funds Marshall redrew from Jevons’s published chart I discussed in the previous section (see figure 1 and figure 2), which is here reproduced as figure 3.

Marshall’s rendering of Jevons’s graph differed from the fluent curve he had drawn on Jevons’s chart (see figures 1 and 2). Marshall’s curve now connects the turning points of Jevons’s original, with little detail in between. Marshall noted the values of these turning points to the left, between the timeline and the comments Marshall added to these values and that run through the curve, sometimes over several lines. Some of these comments are nearly identical to the chronological markers Jevons had included in his chart, such as the return of Napoleon from Elba in early 1815 or the general peace of November that same year. However, while Jevons had been specific in the dating of these events—he wrote “Napoleon returned from Elba March” and printed that text vertically against the first quarter of 1815 on the horizontal axis—Marshall simply wrote “Napoleon’s return” horizontally, and when read against the now vertical time axis, this could be anywhere between 1815 and 1817. It was even worse for the “general peace” that in figure 3 seems to be situated in 1819 instead of on November 23, 1815.

The difference is that Jevons marked these specific historical events against the timeline. In contrast, Marshall was not interested in the exact date of both events as chronological markers but in their function as causal, explanatory factors for price movements of government bonds in the

8. Marshall Archives, *Red Book 7/7*, plate inserted at pp. 85–86.

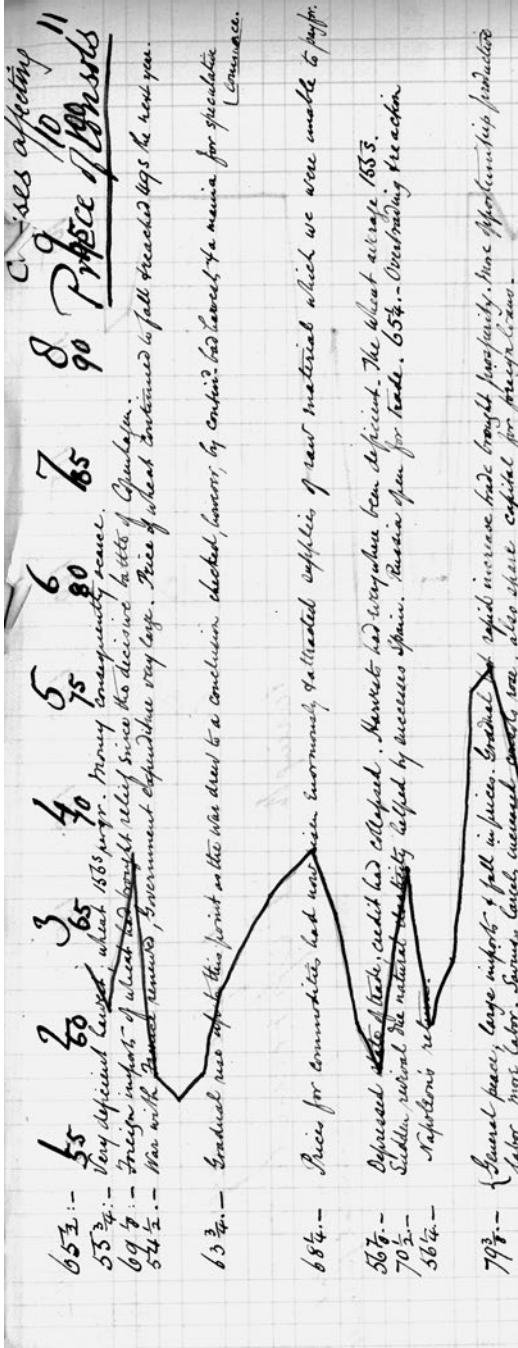


Figure 3 Fragment of page from Marshall's *Red Book* showing the “causes affecting the price of consols” (government bonds). The curve shows the price of consols Marshall had copied from Jevons's published chart. Marshall inserted shorthand narratives that suggested causal sequences of events. Reproduced by kind permission of the Marshall Librarian, Marshall Library, Cambridge. Marshall Archives identity code Marshall 7/5.

market. Marshall labeled the diagram not simply as a historical, descriptive graph of the price of government consols but as “Causes affecting the Price of Consols,” and he consequently linked these specific events not to the timeline but to the prices of consols, that is, to specific statistical numbers. Marshall thus transformed Jevons’s diagram into an explanatory research tool that did not try, as Jevons did in subsequent research, to *suppress* the specific events of history but to incorporate them into a detailed, abridged causal account of events. What counted for Marshall was the sequence of events. This meant that statistical data were not so much important for their specific values or for their exact historical dates—which were essential for Jevons’s mathematico-statistical manipulations—but for their relation to the other events of history, that is, as markers for the shorthand causal narrative that Marshall was in the process of developing. Instead of being interested in causal structures hidden in the statistical *data*, as Jevons was, Marshall was interested in the sequence of *events* that could help explain the movement in the data. A partial transcript of the text Marshall added to the fragment of figure 3 brings this out.

- 65½: –
- 55¾: – Very deficient harvest: wheat 156^s per gr. Money consequently scarce &c
- 69⅞: – Foreign imports of wheat had brought relief since the decisive battle of Copenhagen
- 54½: – War with France renewed, Government expenditure very large. Price of wheat continued to fall & reached 49s the next year.
- 63¾: – Gradual rise after this point as the War drew to a conclusion checked, however, by contin^d bad harvests & a mania for speculative commerce.
- 68¼: – Prices for commodities had now risen Enormously & attracted supplies of raw materials which we were unable to pay for.
- 56⅞: – Depressed state of trade; credit had collapsed. Harvests had everywhere been deficient. The wheat average 155s.
- 70½: – Sudden revival The natural elasticity helped by successes Spain. Russia open for trade. 65¼.—Overtrading & reaction
- 56¼: – Napoleon’s return.
- 79¾: – General Peace, large imports & fall in prices. Gradual but rapid increase trade brought prosperity. More opportunities productive labor, more labor. Savings largely inversed. Consols rose, also spare capital for foreign loans.

Instead of the exact dates on the timeline, Marshall used the prices of the peaks and troughs of the graph as markers for his comments. These comments do not just list a chronology, as one might think in the case of Napoleon's return, but function as shorthand causal explanations for the price movements from peak to trough (e.g. "gradual rise after this point . . . checked . . . by contin^d bad harvests & a mania for speculative commerce"). Marshall thus inserted the empirical movement of the price of government funds into a range of explanatory factors that included generic and specific causal considerations about the quality of the harvests, the effects of wars, the "natural elasticity" of markets, and the return of Napoleon from Elba. Especially when they comprise a sequence of factors, they read as shorthand narratives: "War with France renewed, Government expenditure very large. Price of wheat continued to fall & reached 49s the next year." There is no causal language used in this sequence, yet the sequence invokes a causal order between the war with France, British government expenditures, and the fall in the price of wheat to a specific value. These are shorthand narratives of sequences of events, which need to be spelled out to add up to a coherent narrative that explains the fluctuations in the price of government funds.

The avalanche of shorthand narratives Marshall added to the graph made it virtually impossible to see the forest for the trees. Indeed, it was exactly for this reason that Marshall had *limited* the economist's field of vision in his *ceteris paribus* strategy to a select set of causal factors, a strategy that fitted remarkably well with Jevons's pioneering work in correlating statistical time series, further developed by Udny Yule and Marshall's own student, Alfred Bowley. Given the turn empirical research in economics took in the twentieth century, it is thus unsurprising that much of the philosophical literature on causation in economics has concentrated on how to deal with causation *in statistics* with Yule's menace of spurious correlation backstage. But there is nothing in the nature of economics that obliges someone to make causal inferences on the basis of quantitative statistical data instead of narrative sequences of events. Indeed, for a political economy number as the price of government funds, it makes perfect sense to focus on the sequence of events as essential for an explanatory narrative.⁹ In his search for "real'-ising" economics, Marshall clearly preferred this second route.

9. As recently witnessed in the Bank of England's remarkable pushback against the narrative the Truss administration was putting forward to explain the meltdown of the British exchange

To put his shorthand narratives into perspective, that is, to not lose himself in a bewildering set of disconnected causal narratives but to find overall causal coherence, Marshall “zoomed out” to see the temporal sequence of not just a selection but the complete range of events of interest. That is, to “real-ise” economics, the causal meaning of heterogenous events should be made specific by putting them in relation with other contributing factors. For this purpose, Marshall developed a large time chart that repackaged the data of the graphs as events that co-related them spatially and sequentially with other events.

History on a Plate

In the previous section we have seen that Marshall *reversed* Jevons’s handling of the relation between data and events. Jevons used events, such as the return of Napoleon from Elba, as chronological markers in his time-series graphs. His emphasis and further research was on the graphs, on the statistical data, not on the events. If historical events came into the picture, Jevons’s reflex was to homogenize them by finding a quantitative measure. Jevons visualized the graphs horizontally and the chronological markers vertically. Even though he included references to commercial panics and crises, these remained spatially isolated. In his *Red Book*, Marshall literally reversed the axes, drawing the graphs vertically, and fundamentally altered the meaning of the chronological markers. Individual statistical data, referring to the tops and troughs of the time-series curves, now became the markers to which Marshall added

rate against the dollar and the Euro as a general problem due to high energy prices across the world. In a pointed reaction, the Bank of England produced a chart in which the presentation of the minibudget by the chancellor of the exchequer, Kwasi Kwarteng, marked the moment the discount rates on government debt in Britain against the United States and the European Union substantially started to diverge and the exchange rate started to decline. See the letter of October 5, 2022, from Sir John Cuncliffe, deputy governor of the Bank of England, to the chair of the Treasury Committee, the Right Honorable Mel Stride MP (<https://committees.parliament.uk/publications/30136/documents/174584/default/>). The relevant diagram on p. 2 visualizes the cumulative change in long-term government bond yields over September 2022, marking with vertical lines *on the graph* the moment the monetary policy decision of the Monetary Policy Committee was publicized, on September 22, and the presentation of the minibudget (“Fiscal Event”), on September 23. And it was after this presentation that the government bond yield rose sharply until the intervention of the Bank of England (on the basis of received “market intelligence of increasing severity” [p. 3]) on September 27, after which yields dropped dramatically. What counts is not so much the exact dates but the exact sequence of events that are marked on the graph.

shorthand causal narratives that Jevons had conceived as chronological markers in time. Instead, “general peace, large imports & fall in prices” was for Marshall a sequence of events that should be read as “causes affecting the prices of consols.” The weight shifted from the correlation of statistical curves to the co-relation of a sequence of events.

Statistical curves vanished completely in a large, padded timeline chart that dealt not only with one economic variable, such as the price of consols, but with a collection of different categories of social, political, and economic phenomena that is reproduced here as figure 4. Marshall organized these different categories vertically, in red ink, with historical time on the abscissa. These categories were revolutions, wars, and tariffs, followed by English general history, which was placed close to agricultural price-quantity data (the only numerical information on the chart) and agricultural events. Then followed mining, manufacture, and transport. Then, at a slight distance, foreign trade, which he kept separate from credit and commercial fluctuations. Then followed money, public borrowings, and lastly three categories relating to labor and labor conditions: labor conflicts, factory acts, and other labor legislation.

The red category labels referred to different kinds of events that Marshall considered to causally affect the economy, a fragment of which is reproduced as figure 5. Marshall noted in black the specific, actual events that belonged to each category (except for the “harvest year prices,” which run horizontally in red) against a timeline that started just after 1820 and stopped in 1903. The prices of wheat were no longer represented as a curve but as a numerical data series that took up far less space and attention. Instead of making a crisis or upturn visible graphically, he summarized a sequence of data as a “crisis” or a “large,” “good,” “bad,” or “small harvest,” that is, as generic historical events. Marshall thus captured in one view (in the fragment of fig. 5) such diverse phenomena as the rise in US tariffs shortly before 1825, the July 1830 revolution in France that brought Louis Philippe to the throne, the abolition of slavery in 1833, the invention of the telegraph and of lucifer matches, crises caused by panics and building manias, the rise of the Chartist and Luddite movements (power loom riots around 1825), coal mine strikes, the Poor Law of 1834, the shortening of the work day for women and children, the factory acts, the famine in India, the Afghan war, and so forth.

Thus, the visual predominance of numerical time-series data represented graphically in space was exchanged for the events of history that were labeled and represented in spatial relation to each another. The

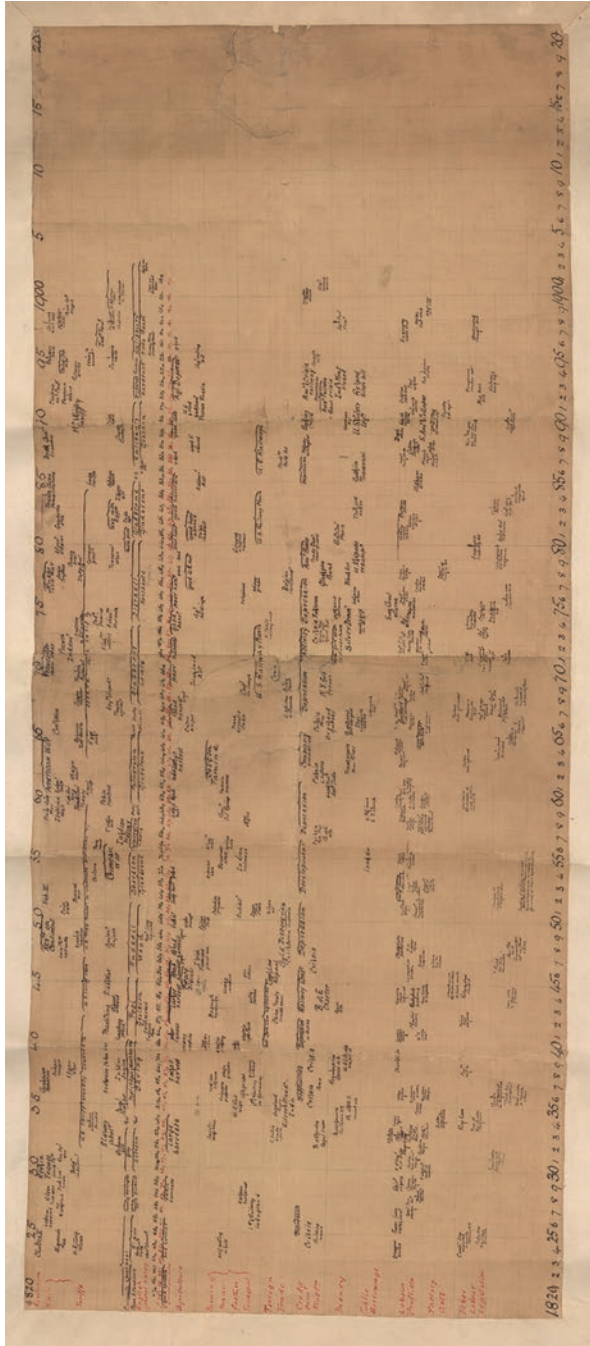


Figure 4 Time chart Marshall designed to organize historical facts and events from 1820 to 1903. The full plate measures a rough 45x110 cm. Marshall's last entries are for 1903. Reproduced by kind permission of the Marshall Librarian, Cambridge University Library. Marshall Archives identity code 7-7.

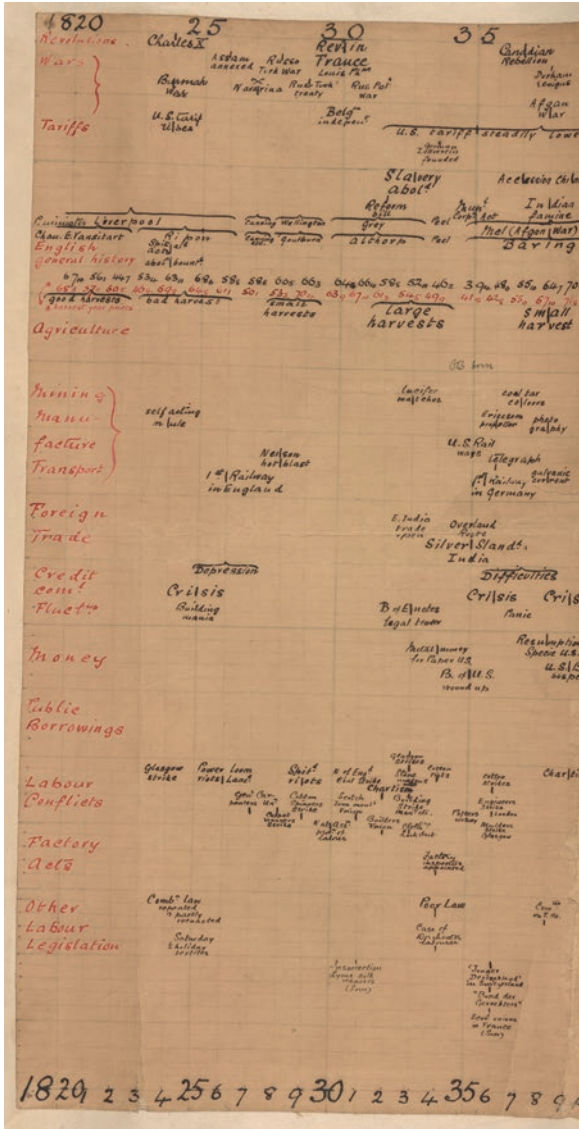


Figure 5 Fragment of Marshall's large chronological plate of events, showing Marshall's categories in red and a sequence of events in black, such as the first railway in England, the Poor Law, or the invention of lucifer matches, but also generic and recurring labels as "crisis."

spatial representation he thus constructed provided Marshall with a complete overview of the different kinds of causal categories that he used to construct a temporal sequence of events that would enable him to write a coherent historical narrative. In correspondence, Marshall emphasized that such a historical narrative should not be a merely descriptive affair, as in much of the economic history of his day, but should combine analysis (not theory) with description. This is an important reason he did not really warm up to Neville Keynes's opposition between theory and facts and the longstanding, and always problematic, distinction between the inductive and deductive method in economics. The work of the economist, economic analysis, should mediate between abstract economic concepts and the concrete facts of history.

Marshall's Narrative Strategy

The tools I discussed in the previous paragraphs, the *Red Book*, the wall charts, the timeline chart, were all enabling devices of Marshall's narrative strategy. It would be wrong to think of this strategy as the application of pure theory to concrete cases by successively integrating disturbing causes. For Marshall, economic analysis was more complex than that. Instead, Marshall used these enabling devices to write the works after the *Principles*. They were research tools that helped him sort out the economic causalities that were playing out in history. In the introduction, I mentioned Marshall's great difficulties in organizing his writing. This resulted in different proposals to his publisher Macmillan, which faltered one after the other. At the end of the day, Marshall published his *Industry and Trade* and *Money, Credit, and Commerce*, which economists and historians of economics generally consider to lack the acuteness of the *Principles*. But they lack acuteness only if one is obsessed with the mathematics and diagrams of the *Principles*. Instead, in these other books, we can see Marshall's narrative research strategy at work.

To further illustrate Marshall's narrative strategy, I will concentrate on one example from *Industry and Trade* for which Marshall relied on his timeline chart. The example is taken from appendix E, in which Marshall (1923) discussed the "British movement towards free trade." In this appendix he provides an explanation for why the repeal of the Corn Laws did not immediately lead to a fall in the price of wheat in Britain but rather to its stabilization, while the price of wheat "in neighboring countries" rose. Marshall explains that on the basis of the ordinary working of the law of

supply and demand, one might have expected that the repeal of the Corn Laws would have caused a fall in the price of wheat in Britain. Yet this did not happen. What then follows is a narrative in which Marshall sorted out the effect of different causes such as bad harvests, wars, and other “disturbances” which “in many years . . . exerted a much greater influence on the price of wheat than had been exerted by the rather low import duties levied in England after 1843” (Marshall 1923: 755). Marshall then goes “into particulars” and shows in detail why “exceptional causes” led to this unexpected result.

To go into particulars:—Bad harvests had been exceptionally frequent during the great war; but they were exceptionally rare during the next twenty years. In each of the six years 1832–7 the home crops were sufficient for the people’s consumption: the import duty was practically inoperative; and prices were relatively low in spite of it.

After two bad and several moderate harvests, the rains of 1845 together with the potato disease caused such distress that Peel committed himself in 1846 to complete repeal (save for the Registration duty) in 1849. The harvest of 1849 was good: but, except in that year, the price of wheat was kept low in the years 1847–52 by abundant, almost untaxed, supplies from parts of the Continent in which the harvests had been good, though those in England had been bad: it has been estimated that under the old régime English prices would have been 20*s.* higher than they actually were. (755–56)

He then raised the importance of the improvement of the railway system on the Continent, whose full effect became visible only with the outbreak of the Crimean War.

And it was not till the Crimean War had shown the supreme military importance of railways running to the frontiers, that many of them were driven through the large wheat-fields of Central and Eastern Europe.

The Crimean War was accompanied by general bad harvests; freights were for a time very high, and the Russian trade was of course interrupted. To these powerful causes of high prices another was added. For before the repeal of the Corn Laws the world’s stock of gold had been shrinking relatively to the work it had to do; and, in consequence, general prices had been falling: but the new supplies of gold, coming suddenly from California and Australia, upset men’s cool judgment and forced general prices up to a temporarily inflated level.

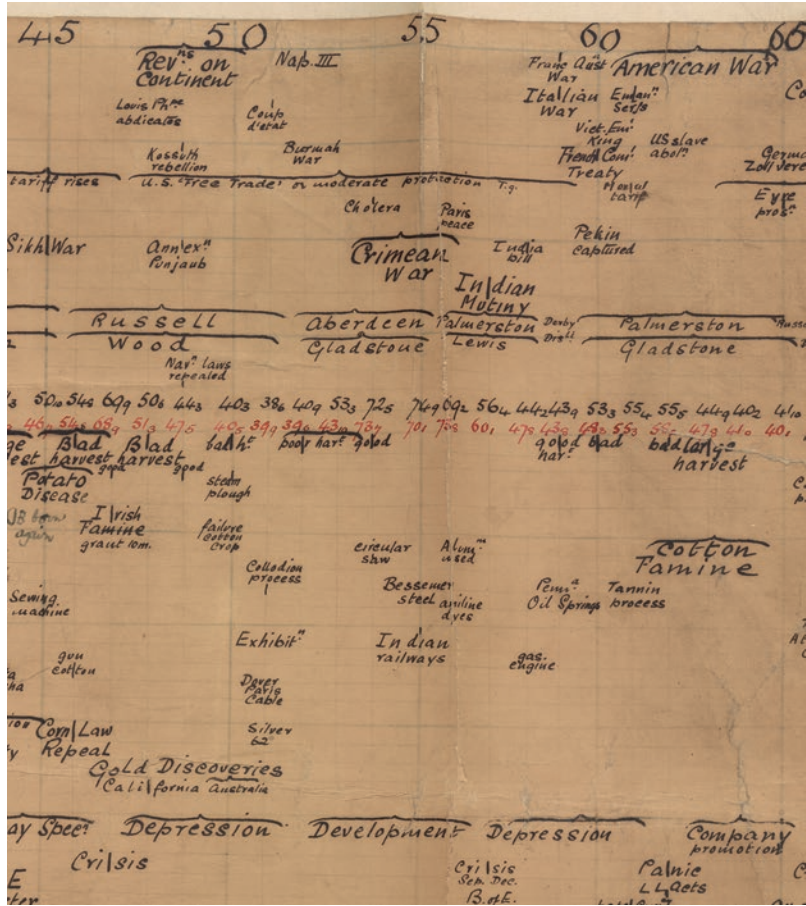


Figure 6 Fragment of Marshall’s large chronological plate of events (here fig. 5), showing several of the events (Corn Law repeal, gold discoveries, poor, bad, and good harvests, the Crimean War) that Marshall in *Industry and Trade* connects in a detailed causal narrative to explain why the repeal of the Corn Laws did not lead to a lowering of the price of wheat in Britain.

It was just when all these exceptional causes were working together that that rise of wheat to a little over 70s. occurred, which has been urged as a chief reason for doubting the influence of free importation in lowering the price of wheat. (756–57)

Marshall had organized all these “exceptional causes” on his large plate (see fig. 4). I reproduce a second fragment as figure 6 that shows in

the lower left corner the Corn Law repeal and the gold discoveries in California and Australia and, from the left and moving across the middle of the figure, the exceptional potato disease, the Crimean War, good, bad, and poor harvests, and the rise in the price of wheat to a little over 70s.

Marshall used this sequence of events to create a coherent narrative that captured the causal logic of the situation, thus satisfying the analytical needs of the economist and the descriptive desires of the economic historian.¹⁰ Before he entered into his detailed explanation, he had summarized his analysis in a narrative that combined the generic terms of the economist with the specific events of history of the economic historian:

Therefore the full effect, which the opening of England's ports to wheat exerted on the available supply of wheat, would not be likely to show itself for many years; and meanwhile prices in the world's market for wheat were disturbed by the new gold supplies beginning about 1850, by a series of wars and by some exceptional harvests. In many years indeed these disturbances exerted a much greater influence on the price of wheat than had been exerted by the rather low import duties levied in England after 1843. (755)

Marshall's Narrative Strategy: Understanding the Logic of the Situation

In this essay I distinguished two research strategies Marshall pursued to find causal coherence in a complex world. In the first, Marshall relied on the *ceteris paribus* clause to slowly add explanatory variables to a simplified analysis to do increasing justice to this complexity. In the second, Marshall searched for explanations that incorporated history's manifold of contributing causes, which he investigated in terms of historical events instead of quantitative time-series statistics. I examined this second strategy, which I labeled Marshall's narrative strategy, in detail. Using Jevons's investigations into time-series statistics as a foil for comparison, I examined how Marshall developed various tools to chart historical events that he then transformed from visual chronologies of events into narrative explanations. Instead of narrowing his field of vision to quantitative statistics, Marshall included a wide variety of social and political events that he

10. For other examples of narrative evidence used to help understand an economic phenomenon, see Biddle (this volume), Anand (this volume), and Kuehn (this volume).

considered as contributing to a complete explanation of economic history's complexity.

We have seen how Marshall rebranded Jevons's historical time markers as causal factors that could be sequenced in shorthand narratives. I then zoomed in on one tool Marshall used to obtain an overview of *all* relevant explanatory factors: a large plate on which Marshall organized different categories of events sequentially and spatially. I examined how Marshall used this timeline chart to construct narrative explanations, using his discussion of the effects of the repeal of the Corn Laws in *Industry and Trade* as an example. I showed how Marshall's chart enabled him to sort out the facts of history in sequential order that enabled him to provide an explanation for the delayed rise in the price of corn, in which Marshall combined generic and specific causal factors. Marshall's historical chart provided him with the completeness of vision necessary to turn a disjointed set of contributing causes into a coherent causal explanatory narrative. In their widely acclaimed book on the cartography of time, Rosenberg and Grafton quote Priestley, who wrote that in his charts "the whole is before us. We see men and things at their full length, as we may say; and we likewise generally see them through a medium which is less partial than that of experience" (Rosenberg and Grafton 2010: 122). Marshall's famous epigraph to *Industry and Trade*, "The many in the one, the one in the many," affirms Priestley's words. Marshall gradually came to consider that the work of an economist was to provide a complete analysis of contributing causes, read from the charts of history, instead of the partial analyses he favored in the *Principles* but that risked remaining empty boxes.¹¹

Was this method of working in economics a sheer Marshallian idiosyncrasy? I think not. As Anand and Kuehn show in their contributions to this volume, the mid-twentieth-century economists Evsey Domar and Warren Nutter also turned to narrative histories for their economic analyses of the Soviet Union, although Domar saw more ambiguity in history than either Marshall or Nutter. Elsewhere, I analyzed how an earlier generation of economists used comparable tools to help them sort things out (Maas 2011). But it is certainly the case that Marshall's correspondence with Arthur Bowley bears witness of his awareness that this approach to the work of an economist was waning. He admitted his inability to grasp the specifics of the correlation analysis Bowley was developing but that he

11. I take the expression "empty economic boxes" not from Marshall but from Clapham (1922). I thank Mary Morgan for pointing me to Clapham's article.

opposed nevertheless. Charting the events of history instead of mathematically manipulating statistical data sets seems to make Marshall an economist of the past. But am I wrong in thinking that Marshall's most important student, John Maynard Keynes, shared some of the tools, if not all of Marshall's intentions? Keynes's blast against Tinbergen's statistical business cycle study for the League of Nations is motivated not only by his assessment of the futility of Tinbergen's statistical efforts in the light of the coming war but also by what he called the mind of someone who preferred the "mazes of logic" over Tinbergen's statistical inductions (Hendry and Morgan 1997: 382–89). It would be wrong to understand these mazes as merely formal—as the word *logic* seems to imply. These mazes are about grasping the logic of the situation, which is shown in an economist's ability to put the events of history in a convincing causal ordering—that is, to construct a convincing causal narrative. A merely quantitative, statistical approach that scorns the events of history will of necessity miss the point. Marshall understood this, and he developed a narrative strategy instead.

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