

## Reforming Vision: The Engineer Le Play Learns to Observe Society Sagely

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In an 1840 inquiry into abuses of child labor, a committee of the British parliament voted four to two against requiring their expert witness to answer the question: “Have you seen the work of Mrs. Trollope, ‘The Factory Boy,’ and by your means as an Inspector, have you formed any opinion as to the correctness of her statements?”<sup>1</sup> The members of the committee clearly had formed opinions, for they treated her novel as commensurable with the eyewitness testimonies and statistical tables provided to them by factory inspectors. As free and responsible men, they did not limit themselves to evidence that would stand up in court, but recognized that the most crucial facts would often be concealed from them. Such assumptions regarding observation and social knowledge were typical of social science in its nineteenth-century form, which did not fear to infer from the results of local experience, often transmitted in stories.

Frédéric Le Play, whose career in social science began at just this time, shared their sense of the fluidity of social observation. He was, indeed, a particular admirer of British parliamentary inquiries, which he commended as more direct and more probing than statistics, yet, like statistics, resolutely empirical. Le Play’s family budgets, the foundation of his monographic method of social science, embodied an intensely personal mode of observation, rooted in what he construed as traditional ties of seigneurs and *patrons* to the laboring poor. During the course of his career, he gave increasing preference to the inherited wisdom of the sage over methodical, cosmopolitan science as the ideal form of social observation. In this way, he unshackled truth from well-attested facts and upheld the epistemic validity of narrative.

In his maturity, then, Le Play claimed his rights as the modern founder of a scheme of observation at odds with the social doctrines and methods of

liberal Europe. Yet to us it is clear that he could not stand outside the nineteenth century. His celebrated *méthode d'observation*, while steeped in archaism, drew from diverse observational practices of administration and reform. It began with travel, an indispensable practice in the engineering profession for which he was trained.<sup>2</sup> His investigations of new technologies of mining opened out into the examination of the skills and knowledge of craftsmen and the statistics of trade. The economy of mines included workers and their families as well as machinery, forests, and mineral deposits. He modeled his family budgets on statistical tables of trade, and he compared his interviews with miners and factory laborers to the work of parliamentary committees.

For a decade beginning about 1840, Le Play observed the economy of labor and markets through the lens of socialist politics. Later, he worked to refashion social science as profoundly conservative in its consecration of an imagined social order—which he worked tirelessly to establish as reality—anchored in paternalism, moral faith, and personal bonds of loyalty rather than in labor markets and bureaucratic rationality. The recovery of this kind of society demanded a new mode of observation, the study of cases as the basis for a tradition of inquiry, like those of law and medicine examined in this volume by Gianna Pomata and J. Andrew Mendelsohn. In his maturity, Le Play's "social science" looked outward in order to look backward, preferring oral traditions and personal engagement to detached inquiry.

### Engineering Roots

Le Play was one of those early practitioners of social science—their name is legion—who folded his own path to intellectual enlightenment into the rationale for his science. The hero of his reminiscences was a young engineer, highly successful in his schooling but dissatisfied with the Saint-Simonian ideas that had seduced his fellow Polytechnicians, who benefited from the guidance of revered teachers in 1829 as he prepared to set off on his mining investigations. In the Harz Mountains in Germany, where they sent him, mining officials opened his eyes to a society organized on unfamiliar principles. His epiphany came in the form of a complex observation: that in the Harz mines the purpose of production was not wealth, but the maintenance of a God-fearing population. "Il n'y a rien à inventer," he declared much later; nothing new is required to fashion a social science that can relieve the terrible suffering of the present. We have only to observe, or, more precisely, to observe as of olde—not from a distance, but with the personal concern and charity of traditional elites. At their feet he had learned social science.<sup>3</sup>

By telling his story this way, Le Play accented a profound social conser-

vatism as the polestar of his entire career. He also sharply distinguished his vaunted *méthode d'observation* from other modes of social science. He epitomized his career from the vantage point of its end as a series of voyages across eastern and northern Europe as well as industrialized Britain, in pursuit, we may say, of *temps perdus*, of all the old customs and unregulated relationships among unequals that stimulated men to observe God's commandments and assured them of their daily bread. A proper reverence for social observation, he held, undergirded the benevolent authority of fathers in the home and of *patrons* in the workplace. The best observers could be found in societies that had preserved the ancient virtues and had no need of reform. But France had sacrificed its traditions on the altar of revolution. Now, he wrote in 1864, the moment had arrived "to replace the conflicting theories that since 1789 have agitated it with opinions founded on methodical observation of social facts."<sup>4</sup>

Le Play spent his career in the Corps des Mines, the most elite of French engineering corps. As graduates of the École Polytechnique, he and his comrades were highly trained in mathematics, yet their ethos was more professional and administrative than scientific. At the School of Mines, where the cream of Polytechnique engineers received three years of advanced instruction, they spent just half of each year attending lectures. The remainder of their training was specifically practical, including two long journeys to observe and record the functioning of diverse mines and factories.

Le Play, a prodigy, completed his formal studies after just two years, then spent six months in 1829 touring the mines of Germany with his friend and comrade the Saint-Simonian Jean Reynaud. Their itinerary, covering four thousand miles, included a visit to the Harz Mountains. Le Play's diary from these travels is silent on labor conditions but is filled with technical descriptions and drawings of mines and machines. A few years later, he commented on the admirable efficiency with which the administration of the Harz mines managed its competition against Spanish mines, which knocked the bottom out of the lead market in the very year of his visit. The Harz mine officials had sent the Göttingen professor of mineralogy, J. F. L. Haussmann, to Spain to check out the competition—a tour Le Play reproduced a few years later. Haussmann concluded that current levels of production by the wasteful Spanish were unsustainable. The economies imposed by the Harz mining administration to preserve for workers the necessities of life during this unavoidable moment of hardship, a starstruck Le Play wrote in 1832, "could not be too much praised."<sup>5</sup> Evidently these wise and virtuous men had come a long ways since the years of French revolutionary occupation, referred to by a patriotic local historian as the *Matzhammelzeit*, the era of embezzlement.<sup>6</sup>

Le Play's first social investigations assumed an economic and statistical form. During the 1830s and 1840s, he applauded statistics for its undogmatic empiricism, and he collaborated with some of its best-known practitioners, such as the medical statistician Louis-René Villermé. By 1855, when he published the first edition of his study of European workers, his methods had evolved away from those of the census, which he now regarded as indiscriminately inclusive. Yet his family budgets were an outgrowth of his statistical work, and they even gained him the Montyon Prize for statistics in 1856 from the Académie des Sciences.<sup>7</sup>

At the Corps des Mines, statistics served as an administrative tool. The *Annales des mines* was concerned above all with the location and extraction of minerals, printing brief chemical excerpts along with much longer, original pieces on mining technology and on the geography and geology of regions rich in ores. Initially, the corps treated statistics as merely a form of bookkeeping, but in 1832, the neophyte Le Play introduced a more scientific commitment to statistics into the *Annales*. His study had been ordered by his superiors, one of whom, De Cheppe, issued a statistical proclamation to accompany it. In pursuing its mission to protect the interests at play in mining, De Cheppe explained, the administration of the corps could not rely exclusively on general principles, for many important choices hinge on statistics. "Theories and narrowly based systems can be deadly if no account is taken of the power of facts. . . . The language of figures has its own authority." Engineers supplied the Corps des Mines with numbers of the highest exactitude, gathered with admirable care, and these, he announced, deserved a place in the journal.<sup>8</sup>

That, we may infer, was the task assigned to Le Play, whose title spoke of "observations" on international commerce in minerals. For this young engineer, as for the postwar economists discussed in this volume by Mary S. Morgan, economic observation meant measurement. He laid out the quantities and values of production according to mineral substances (metals, salts, combustibles, construction materials), and subdivided them by categories of production such as goldsmith work and jewelry. French mineral exports, which were highly processed, incorporated much labor, the "first element" of wealth and the "first gauge" of prosperity. Le Play was not content with factual nuggets but looked for patterns to size up the competitive position of French mines and of the trades that depended on them. He summarized his results in a set of comprehensive import-export tables, for him the essential contribution of the memoir. Their bookkeeping form, a balance of income and expenditure, provided a template for his subsequent worker budgets.<sup>9</sup>

Le Play alluded in his memoir to the "admirable organization" of the Harz

mines, which demonstrated the advantages of association (*l'état d'associations*) in the mineral industry. What exactly did he mean? Two decades later, in a note to the tables of his monograph on the Harz, he supplied the complicated details, giving some credit to the collective efforts of workers as well as to their bosses. The mineral rights in the Harz, he explained, belonged to companies that held shares as investments. They sold minerals to a foundry, operated for the profit of the sovereign, who also owned the forests. A commercial administration, organized by the state, managed the sale and purchase of materials. Factory profits were not distributed immediately to shareholders but were deposited into reserve funds, on which the workers could draw during natural disasters, wars, and revolutions. The *patrons* sold wheat to the workers at a fixed, government-subsidized price and provided free medical care as well as insurance against injury and sickness. The workers themselves organized pensions for the permanently disabled, funded by contributions from several sources. It was, Le Play argued, an exemplary system of foresight and protection against misfortune and market fluctuations. By the late 1840s, the Harz mining organization was gaining a reputation for wise social policy, and a delegate to the Frankfurt parliament of 1848 proclaimed that it had solved the worker question (*Arbeiterfrage*). Le Play spoke of a wise administration, looking after the needs of a laboring population that he characterized as “mediocre in energy and intelligence.”<sup>10</sup>

In 1840, he published an essay on statistics for an encyclopedia edited by his friend Reynaud and the humanitarian socialist Pierre Leroux. He referred to statistical collection as one of the vital roles of government and an index of political enlightenment. To discuss the theory of government without statistics is like discoursing on combustion in ignorance of the composition of the atmosphere. It would be better to train statesmen in statistics rather than the literature of small towns in ancient Greece. Perhaps in a stable political order, administered by men of inherited wisdom and practical experience, statistics would be dispensable, but for France, which had overturned all the old structures in 1789, nothing could contribute more to good government.<sup>11</sup>

Le Play's growing faith in the wisdom of the ages was, as he understood it, fully compatible with the spirit of science, physical as well as social. In autobiographical moments, he liked to say that his method of social observation was merely the extension to a new field of natural-scientific observation. That resemblance, however, depended on a distinctive interpretation of science. In his metallurgical lectures and writings of the 1840s, as in the statistical essay of 1840, Le Play exalted intuition and skill over systematic learning. He was profoundly skeptical of abstract reason, the kind of thinking that, as he would later claim, had made a mess of French politics. The sympathetic, involved

observer who puts his faith in experience is a far better guide than the abstract theorist. Even chemistry, he thought, suffered by being detached from real processes of mineral extraction. It has as much to learn from metallurgy as it can teach, because mines depend on a host of techniques unknown to theoretical science.

Le Play's unusual self-positioning with respect to scientific practice is nicely epitomized in a short paper of 1847 by Reynaud, who united Saint-Simonian technocracy with Swedenborgian vision. "De la métallurgie du fer par Swedenborg" begins by celebrating iron as the basis for economic prosperity and military might. Unfortunately, so long as workers shroud their methods in secrecy, the improvement of iron technologies must be abandoned to chance. But Swedenborg, a Swedish mining administrator, had held up a lamp in the darkness, and his 1734 treatise on iron could be ranked with the illustrations of the trades in Diderot's *Encyclopédie*. Swedenborg's contribution owed less to laboratory chemistry than to the immense knowledge of metalworkers, until then a variety of alchemy, requiring only to be systematized. The proper starting point of metallurgy, Reynaud concluded, is not the formal learning of chemists but the craft knowledge of workers. That insight was the starting point for "our excellent metallurgist M. Le Play," who had founded his brilliant school at the *École des Mines* on the principles of Swedenborg.<sup>12</sup>

Le Play, in turn, praised Reynaud's article in his book-length memoir on metallurgy in Wales for the *Annales des mines*. Swedenborg, he explained, had understood that the despised race of miners, working in obscurity, commanded knowledge as good as that of many sciences. Metallurgy involves distinct principles and modes of action, most of which are understood at the foundry and not in the laboratory. While he had undertaken to investigate and systematize this knowledge, he denied that it could be reduced to chemistry on a large scale. "As yet, no savant has put himself in a position to study the connection between these facts, typically so complex, and the elementary laws of the physical sciences." We cannot say whether the limits of rational science are a matter of principle or merely provisional, arising from a social divide between practical mining and theoretical science. Le Play spoke of the workers as coordinating thousands of phenomena with great precision and deploying "grandes lois naturelles" that science had barely glimpsed. Sometimes their methods, such as forcing hot air into furnaces, had proved themselves despite the unanimous skepticism of savants. "La pratique vaut mieux que la théorie" (Practice beats theory). These workers are a "repository of experience accumulated since the origin of civilization," able to direct "with exquisite tact the subtlest nuances in phenomena whose existence has not even been suspected by science." They were like nature itself, and science

might learn more readily by studying their work than by examining the natural world directly.<sup>13</sup>

### Location and Detachment

Even in his maturity, Le Play assigned reason an important role in the effort to apprehend nature, but it was a blunt instrument by comparison to skills and techniques, even those of humble workers. In the social domain, an overconfident rationalism presented dangers still greater than in chemistry and mineralogy. In the 1860s he spoke of Socrates as the founder of social science, articulating wisdom as old as civilization. Nevertheless, he insisted on the epochal significance of his method of observation, which he linked to modern economic change and social dislocation. That method reflected, in a distinctive way, the conundrums of the age. Social science as a nineteenth-century project was unmistakably anchored in practices of observation and recording, especially statistical ones.<sup>14</sup> Although closely engaged with concrete problems of administration and reform, it also aimed to detach knowledge from the limits of locality. Statistics meant surveying society from above in order to transcend the limits of direct inspection, capturing states, economies, and societies in a net of numbers.<sup>15</sup>

Around 1848, Le Play began to be skeptical of statistics, criticizing them as secondhand observations. If numbers derive their authority from the machinery of government, the statistician cannot be a proper observer. In the place of official statistics, Le Play now exalted official inquiries or *enquêtes* such as English parliamentary reports. These, in contrast to the work of faceless census takers, relied on “direct investigation.” He did not mind that the parliamentary Blue Books were full of numbers, for his own budget studies were no less quantitative.<sup>16</sup>

Direct observation, in the form idealized by Le Play, renounced neutrality and detachment, preferring an encounter between persons whose lives were joined hierarchically. The best observer is a man with responsibility for the observed, as when a *patron* knows and looks out for his laborers or a landlord for his tenants. In his own investigations, Le Play was of necessity a cosmopolitan, coming in from outside, but he conspicuously allied himself with local elites, who in a way were party to the observation. He sometimes intervened in the lives of his informants, as in the case of a day laborer’s wife in Vienna who, he noticed, always bought food for one meal at a time. Larger purchases, he advised the woman, could save the family up to 17 percent, and he offered to advance her the funds to begin buying for the future. (She at first seized the opportunity, but then repented, remarking that the fam-

ily could deal with unavoidable hardship but that she could not hold back food she already possessed from her hungry children.)<sup>17</sup> Le Play celebrated the traditional economies of eastern and northern Europe for maintaining such personal ties even as they disintegrated in France. Yet in practice he did not turn away in despair from French industrial politics but campaigned on behalf of a specific managerial ideal, the supremacy of the benevolent *patron*.<sup>18</sup>

The independence of observer and observed is one typical criterion of objectivity. Nineteenth-century social science was rarely concerned with such objectivity, either in name or in substance. To be sure, increasing ease of travel as well as the relative anonymity of urban life offered new opportunities and incentives for impersonal observation, which might be defined in terms of the displacement of a peripatetic observer. The *flâneur*, who strolls about in order to experience an alien world, is, like the census taker, neutral and detached. Most nineteenth-century social observation, though, was of a different sort. Henry Mayhew, who wrote on the London poor in the mid-nineteenth century, studied people and places he knew well, and Friedrich Engels was guided into the streets and habitations of poor Irish laborers in Manchester by his lover Mary Burns, who knew them well. Urban statistical societies, as in Manchester, were made up mainly of local physicians and factory owners, working to clean up bad neighborhoods. In Paris, Alexandre Parent-Duchâtelet read archives, conducted interviews, and visited prisons and brothels in his study of prostitution. These were typical sources for social and medical reformers as they explored the strange urban world of disease, poverty, and vice. Rarely did numbers stand by themselves.

Le Play's own observing was almost global, extending from ragpickers in Paris to Muslim herders in Siberia. His goal was always to make these strange locales familiar by befriending elites and conversing with laborers. For social surveys, whether quantitative or not, the site of observation was most often the city, and in particular those spaces created by an industrializing economy in which working people were more or less sequestered from polite society. The explosion of statistical activity in France and Britain around 1830 was driven by anxieties about disease and moral disorder in these working-class populations. Their hovels and garrets and the streets where they gathered, though described by reformers and novelists, were barely accessible to respectable people, who experienced a frisson of danger when entering these alien spaces.<sup>19</sup> Statistics, with its depersonalizing tendencies, was a way of keeping the poor at a distance, and yet the enumerators went from door to door in their effort to penetrate the darkness.

Le Play, too, was moved by the modern condition of cities, but he sought

remedy by escaping the modern metropolis to the towns and villages of distant lands. There he labored to recover a sense of the more integrated community, where *patrons* had close contact with working people and knew them individually. His *méthode d'observation* used family budgets to trace personal and economic relationships within villages or regions whose ancient customs had not yet been too much disrupted by modern life. Among the virtues of close observation was the respect it automatically conferred on traditional structures of society. Statisticians, by contrast, were typically liberal by disposition, and looked to promote progress by cleaning up houses and streets and by educating the poor to raise their moral and intellectual character.

### Sites of Personal Knowledge

As a mode of observation, statistics meant classifying, counting, and averaging. It seemed, as Balzac complained in *Le curé au village*, to depict society as a heap of atomic individuals. According to a common assumption, statistics was most appropriate for persons deficient in individuality.

The presumed opposition of statistics to direct observation, which would be more personal and more humane, is engagingly caricatured in Charles Dickens's *Hard Times* (1854). Encouraged by his "deadly statistical recorder," the utilitarian schoolteacher Thomas Gradgrind performs social observations from the blue interior of an observatory that has no windows, only shelves packed with parliamentary reports. The novelist's voice condemns Gradgrind and his clan for their ignorance of the persons summed up in these documents. So, when his daughter Louisa escapes the pretentious estate of her husband Mr. Bounderby, a factory owner, to the little cabin of a worker, Stephen Blackpool, it comes as a revelation to her. "For the first time in her life, Louisa had come into one of the dwellings of one of the Coketown Hands; for the first time in her life, she was face to face with anything like individuality in connexion with them."

Dickens, who began his writing career as a parliamentary reporter, was familiar with official Blue Books. He must have understood that an observatory lined with committee reports admitted as much light as one filled with novels. At times, to be sure, these reports appear profoundly bureaucratic:

The tabular forms have been filled up, and the queries answered by employers, in sufficient numbers and with sufficient completeness to permit of our stating, with a fair approximation to the truth, the number of children and young persons employed in the branches of manufacture in question, at all ages under 18, and their relative proportion to the adult workpeople; the usual hours of work; in what cases, and to what extent, over-hours or night work

prevail; and what amount of time is allowed for meals, and whether they are taken regularly or irregularly.<sup>20</sup>

At other times they used vivid language and emphasized direct experience in much the same fashion as did Dickens. In a way they were his rivals.

Frances Trollope's novel, *Life and Adventures of Michael Armstrong, the Factory Boy*, which provoked such consternation in the 1840 select committee, was understood by everyone as an exposé of actual factory conditions. Her avowed purpose was "to drag into the light of day, and place before the eyes of Englishmen, the hideous mass of injustice and suffering to which thousands of infant labourers are subjected, who toil in our monstrous spinning-mills. . . . The true but most painful picture has been drawn faithfully and conscientiously." Like *Hard Times*, *Michael Armstrong* is concerned less with laborers as such than with the enlightenment of middle-class people, in Trollope's case of ladies who, like the author herself, should be moved to escape their sheltered enclaves and experience with their own eyes, ears, and noses the suffering inflicted on the poor by their fathers and husbands, the managers and owners. Her most poignant passages cast the ladies in a role recalling parliamentary inquirers.

"What is the billy-roller, Sophy?" inquired Miss Brotherton, in an accent denoting considerable curiosity.

"It's a long stout stick, ma'am, that's used often and often to beat the little ones employed in the mills when their strength fails—when they fall asleep, or stand still for a minute."

"Do you mean, that the children work till they are so tired as to fall asleep standing?"

"Yes ma'am. Dozens of 'em every day in the year except Sundays, is strapped, and kicked, and banged by the billy-roller, because they falls asleep."<sup>21</sup>

Dickens notwithstanding, the Blue Books overflowed with personal experiences and hardships as well as impersonal statistics, and the committees did not disdain theater. Here is an item from the questioning of factory inspector Charles Trimmer in 1840:

2848. Do you think that little children are exposed to very great hazard, particularly female children, with their flowing garments, in going round from one part of the mill to another?—I think they are; there was a case occurred very recently at Stockport, where a girl was carried by her clothing round an upright shaft; her thighs were broken, her ankles dislocated, and she will be a cripple for life.

2849. What do you think would have been the expense of boxing off that upright shaft?—A few shillings.<sup>22</sup>

A committee report of 1863 added the voices of the children to those of officials. Although the document implies quotation, their words, reported by factory inspectors, are as stylized as those of children in Dickens. Typical is James Barnacle (no relative, surely, of Tite Barnacle of the circumlocution office in *Little Dorrit*), transmitted in staccato rhythms from the pottery works by Mr. F. D. Longe. "I am 12 years old. There are nine other boys here. They would be from 12 to 14. I have worked three years in the dipping house. My father is a sagger maker. I cannot read. I go to school on Sundays. We get 3s. or 4s. a week each."<sup>23</sup>

The parliamentary members of these committees knew that nothing could replace firsthand knowledge, because they understood the forms of deception and concealment to which factory inspectors—such as Leonard Hoerner (here)—were exposed.

428. Have there been any instances in which attempts have been made to conceal the children during your visits at the mill?—Yes, they have been concealed in wool bags.

429. And in what other places?—I have never detected it, but I was told that in a mill that I visited, believing children to be improperly employed there, after I had gone I was told, "If you had looked into the necessaries you would have found them full."<sup>24</sup>

This select committee, aware as it was of the limits of what could be learned officially, never challenged hearsay reports like this one, but welcomed the glimpse they offered behind the scenes. The really crucial observations, invisible to the eyes, depended on the stories of concerned neighbors.

Le Play, like Dickens, looked to patronal benevolence and paternalism for a solution to the social question. British parliamentary examiners were less credulous. Perhaps, one insinuated, the unreasonably modest fines assessed by courts for flagrant violations of child labor standards owe something to the financial interest of magistrates in the very mills where the violations occurred. And if mill owners appoint schoolmasters who teach on their premises, doesn't that make the schoolmaster [Gradgrind?] "the servant of the mill owner?" [Bounderby?]<sup>25</sup> Le Play, to be sure, was thinking of what could be, or had been, and the yawning gap between ideal and reality was why *la réforme sociale* was so urgent. As in former times, he dreamed, *patrons* should live beside their employees or tenants and deal with them humanely. The desiccation of personal ties owing to Louis XIV's policy of drawing the nobles to Versailles, he argued, had been responsible for the angry attacks of peasants on their chateaux during the French Revolution.

Karl Marx, whose analysis of capitalism relied as much on empirical in-

vestigations in Blue Books as on theoretical traditions deriving from G. W. F. Hegel, Henri de Saint-Simon, and David Ricardo, was resolutely impersonal. His focus on the capitalist system and on categories of analysis such as “abstract labor power” contrasts with a study he cited repeatedly for empirical information by his collaborator Engels. *The Condition of the Working Class in England*, published in 1845, is more like a guidebook to the rapacity and the suffering characteristic of industrial manufacturing. Engels wrote in a personal voice, and so it is significant that he mixed anecdotes from Blue Books with what he had seen and heard with his own senses. Idle dilettantes, sentimental novelists, dutiful civil servants, and scientific socialists join hands in works like this, collaborating in a project of social observation that has supplied our most persistent images of the human impact of industrialization.

For Le Play, the official inquiry was the secret of good government in Britain. In contrast to Continental bureaucracy, which “combines the reality of power with an absence of responsibility,” administration in Britain delegated authority to officials on the ground and embraced the activity of local elites. Official inquiries gave these men the opportunity to demonstrate their good and conscientious work to Parliament. They filled the role of *sages*, men of wisdom and experience, the eyes and ears of the nation.<sup>26</sup> No better observatory could be devised than the chambers wherein they communicated their observations directly to representatives of the supreme legislative authority in response to probing questions, and which were recorded in Blue Books and diffused by the press.

Their vivid reports were much valued by opponents of the capitalist order. Le Play himself condemned free markets, and he applauded government actions against the terrible abuses of workers, especially children, in unregulated steam-powered factories.<sup>27</sup> Marx gave fulsome praise to the officials who supplied his data, explaining to the German readers of *Capital* that its gruesome statistics (and occasional anecdotes) did not mean laboring conditions in England were worse than across the Channel. It was rather that the English alone uncovered the truth about factory life.<sup>28</sup> Parliamentary reports of 1863 and 1864 on the employment of children, heavily cited in *Capital*, are full of dark, satanic images, as of “a number of human beings pent up together, breathing over and over the same polluted atmosphere.” At the Lucifer Match Company, the fumes cause necrosis of the jaw, as explained by John Pegge of the Royal College of Surgeons. “The sufferings of a patient in the earlier stages of the disease, and until it has run itself out, leaving the jaw quite dead and exposed, are intolerable. He will take almost any amount of narcotics with comparatively little effect.” Factory inspector Scriven introduced a committee to young boys in the pottery trade who worked from 6 a.m. to 9 p.m.,

often in closely confined, windowless hothouses, with a cast-iron stove in the center, "heated to redness, increasing the temperature often to 130 degrees. I have burst two thermometers at that point."<sup>29</sup>

That bursting betokens the transformation of quantity into quality, as winged mercury unites furnace, instrument, and inspector.

### The Ancient Wisdom

Le Play appealed to attractive images of what once was and might again be, an alternative to huddled masses in an indifferent world. Not until his last years did he merely revere the past, nor did he condemn industrialization as such. Until about 1850, mining techniques defined his profession, and for two decades after that he contributed to the planning and judging of international exhibitions, those showcases of new technology. Material progress was good in itself, even if it often had moral disorder as a by-product. In 1879 he wrote of the great promise of James Watt's steam engine and Richard Arkwright's spinning jenny, which could have benefited all classes of society were it not for one other terrible invention of the same era, Adam Smith's political economy, which dissolved customary obligations in a free, competitive market, depriving the poor of their economic security.<sup>30</sup> More and more, commercialism sapped the spirit of generosity of the English upper classes, which had been inculcated by liberal education and by travel abroad. Even so, he praised the English for maintaining loyalties across class lines that had decayed in France, and for preserving an alliance of religious faith with belief in science.<sup>31</sup>

The great French engineering corps were never disposed to favor free-market economics.<sup>32</sup> State engineers, including the young Le Play, embraced their own mission as expert planners who could protect a society against the hazards of unregulated exchange. During 1848, his correspondence with the liberal statistician George Richardson Porter provided occasion to express his low regard for English economic doctrines and his support of socialism and of working-class activism.<sup>33</sup> Dispirited by the excesses and then the failure of revolution, he began to look instead to owners and managers to create a better society. They should be modern, like engineers, in their exploitation of technology, but traditional in their acceptance of paternal responsibility for their workers. As an organizer of international exhibitions, Le Play backed prizes not only for technologically advanced production techniques but also for innovative arrangements to secure a decent life for workers.

Under the empire of Louis Napoleon, Le Play moved beyond his function as state engineer to become a confidant of the emperor and a member of the

Conseil d'état. The first edition of his monographs, appearing in 1855 in a folio volume from the Imprimerie Impériale, "par autorisation de l'Empereur," has the scent of an imperial blessing. This collection looks back to old times with a feeling of loss, yet is structured into a narrative of progress. The most primitive societies, such as he had observed in Siberia, depend on forced labor. Herdsmen and farmers have no free will but entrust all decisions to the *patron*, to whom they are passionately loyal. Le Play found them insurmountably opposed to change, even when it would benefit them. This system was not to be condemned out of hand, but its static character was a shortcoming. A better system would allow the development of individual liberty, as indeed was to be found at the next stage in social progress, typified by Sweden, which made employment relations permanent but voluntary. The spread of democracy, diffusing the authority of the superior classes, led ineluctably to further improvement, though also to heightened danger. Temporary labor contracts offer more freedom to workers while placing more responsibility on the father as head of family. Such a system, he declared, can raise moral character, as in Norway, certain Swiss cantons, and parts of Spain, and especially where a tradition of communal lands persists. But in England, Belgium, and France, where electoral politics and new industrial technologies have undermined the patronal role, rootless workers are degraded into "nomads of a new type" and become vulnerable to demagogues.<sup>34</sup>

And yet, with care, these flaws can be remedied. There is no solution to be had through individual discovery, "un seul jet d'eau du cerveau d'un penseur" (one jet of water in the brain of a thinker), but only through meticulous observation of social reality. His dismissal of the a priori theoretical insight was a rejection also of revolution, while systematized social observation implied a politics without polarization. Le Play's social science meant proceeding collectively and letting experience rather than dogma determine, for example, whether free exchange or state intervention leads to greater morality in an economic system. The path of observation would allow social science to advance through the same progressive phases as astronomy, physics, chemistry, and natural history. Since social facts are readily visible, requiring no great feats of instrumental precision, observation can support a public form of science.<sup>35</sup>

By 1864, Le Play was less optimistic about the progress of society. The social conflicts of the 1860s reminded him of the uncertainties of 1830, with turbulence everywhere and his friends declaring fealty to Saint-Simon. He remembered now that he had adopted then the strategy of René Descartes, doubting all but what he could personally demonstrate. Since real knowledge

arises from observation, this Cartesian move had brought Le Play directly to his methodological goal. Immediately, however, he had realized (he now claimed) that his own eyes could not be the final authority. Like Descartes, he must hold his conclusions suspect until they had been verified by the most eminent men with the most universally recognized qualities. Indeed, by 1864 Le Play was coming to identify such authorities as uniquely privileged social observers.

### The Sage as Observer

Thus, as Le Play distanced himself from the liberal traditions of personal freedom, direct observation assumed a new, diminished role. Social science became less a matter of empirical verification, and more of recognizing the timeless centrality of the human soul and its relations with God. The eternal truths of man and society would be revealed by looking within. In 1864, he identified Jean-Jacques Rousseau's theory of perfectibility and the modern faith in revolution as the two most deadly doctrines. Social problems were a consequence of original sin, which must be suppressed by fathers in each successive generation. The proper direction of reform was mainly to recover what had been lost.<sup>36</sup>

The second and most widely influential edition of *Les ouvriers européens*, published in six volumes from 1877 to 1879, aimed to reconcile a still more profound conservatism with the empirical methods he cherished. Horrified by the Paris Commune in 1871, he began to repeat unceasingly and with tedious prolixity his moral doctrine, that man needed nothing more in the world than to heed the Ten Commandments and to be assured of receiving his daily bread. The twin institutions of the patriarchal family and the patronal employer were perfectly suited to provide the basic human necessities, and with them "social peace."<sup>37</sup> Individuality as a positive force now disappeared from his social analysis. There are vast catalogs of plants and animals, he explained in 1879, and in chemistry an unlimited number of combinations can be produced in the laboratory, but moral science has witnessed nothing really new since the Decalogue. While the conditions of human life are, in their details, various, all families, and not only happy ones, participate in a shared human condition.

Le Play continued to sponsor systematic social observation, and the Société d'économie sociale that he had formed in 1856 moved toward the identification of monographs with a moderate politics of social reform. Emile Cheysson, his most prominent disciple, allied the monographic method with

statistics and struggled to reconcile *patronage* with social engineering.<sup>38</sup> For Le Play, however, observation was becoming more and more an instinct rather than a set of techniques. Also, he found less and less variability to justify further studies. "In what concerns the two supreme laws of happiness and the two fundamental elements of the [social] constitution, scrupulous observers will be convinced by the study of a single monograph."<sup>39</sup>

Under the Third Republic, Le Play discovered in economically less advanced societies the key elements of a solution to the problems of France. Their remoteness from the modern economy and modern ideas was the very reason for their success. Paradoxically, the method of observation now required a French reformer to be cosmopolitan, to study economic life in remote locations rather than merely observing at home.<sup>40</sup> By contrast, men of the East and North had no need even to look outside themselves for understanding, because they had direct access to the wisdom of the ages. This ancient wisdom, for Le Play, was fundamental. It was possessed above all by *sages*, who persisted wherever a society had been insulated from the corruptions of the Occident. It is a blessing for them to understand no languages but their own. Although the monographic studies in his second edition became longer and more detailed as well as more numerous, his introductions to the volumes tended to drain the *méthode d'observation* of its purpose. They took a dim view of technological progress and of science. Le Play specifically condemned the new English "évolutionisme," calling it a preconceived idea and a threat to the observed truths of religion. Going beyond his longstanding view that wise men of the East understood by instinct all that social science could hope to discover in its more laborious fashion, he now claimed that real knowledge had to be passed along through an uninterrupted oral tradition. Codifying the ancient wisdom and writing it down as law was the beginning of the fall from grace.<sup>41</sup>

The West had fallen very far, and Le Play's introductions offered little hope that formal study, even of his own monographs, could bring redemption. Social science presents no possibility of a true experiment, as in natural science, hence no alternative but to reason from solutions that have worked in analogous circumstances. In practice, the empirical results available to a modern European cannot match the experience of listening to the sage as he interprets his own traditions, traditions that work.<sup>42</sup> These could not be passed along straightforwardly, like pencils or bits of information, but had to be assimilated, slowly. Wisdom was the key ingredient as well as the desired outcome of this form of observation, which presumed a reverence for tradition and a distrust of dogmatic assertions.

Still, Le Play proceeded quantitatively, as in 1833 and 1855.

### Wisdom Congealed into Tables

Le Play's quantifying took the form not of counting persons but of assembling family budgets. When, as a mining engineer, he began this work, he conceived them as analogous to the chemical analysis of ores. In both cases there is a conservation principle, the principle of double-entry bookkeeping, that income equals outgo or expenditures. This requirement provided an automatic check to the figures. He wanted as complete an analysis as possible, and he insisted on assigning money values to items that were not traded in the marketplace, including labor, in-kind obligations between worker and *patron*, and some (but not most) unpaid services of the wife.

Le Play's budgets provided the basis for a microsociology in which the whole is made visible by a close analysis of a part.<sup>43</sup> He always sought the advice of the eminent in selecting a typical or representative family. An itemization of the family budget allowed him to form a picture of relationships spanning a whole community (fig. 11.1). Le Play put particular emphasis on items that were governed by custom rather than by direct market forces. These would include, for example, the right of a peasant to graze his cow or to haul firewood with the *patron's* cart. They demonstrated the persistence of traditional relationships, of personal bonds of loyalty and responsibility, in much of the world. Patronal benevolence was far more prevalent among Scandinavian factory workers or Harz miners than in urban France. His monograph on a *maître-blanchisseur* (master laundry worker) in the Paris suburbs, for example, showed no subventions of this kind at all.<sup>44</sup>

Equally revealing were the means for insuring the poor against unexpected hardship. Worker cooperatives, which gather contributions and make payments as need requires rather than accumulating funds, are adequate when probabilities are known, but where experience is inadequate to estimate the probabilities, as for example with loss of employment, such funds will inevitably run dry when times are bad. A cooperative could never enforce the level of abstinence and morality required to assure adequate resources in the worst of times, such as he had witnessed in the Harz in 1829. For this reason, the old system, in which the seigneur takes responsibility for cases of misfortune, was a better one, and Le Play took it as a model for relations between the *patron* and the worker. These studies consistently stressed the advantages of communities held together by bonds of affection between owners and workers, the poor and the rich. Bureaucratic solutions only interfere with the spirit of initiative, he thought, and any "corporate" response to poverty must lack the needed subtlety and sensitivity. A corporation, after all, can know nothing of the private world or *vie intime* of a needful family. It cannot substitute for

RECETTES.	MONTANT DES RECETTES.	
	VALEUR des objets reçus en nature.	montant en argent.
<b>REVENUS DES PROPRIÉTÉS.</b>		
ART. 1 <sup>er</sup> . REVENUS DES PROPRIÉTÉS IMMOBILIÈRES.		
Intérêt (5 p. 100) de la valeur de cette maison.....	61 <sup>fr</sup> 33	30 <sup>fr</sup> 67
Intérêt (5 p. 100) de la valeur de ce jardin.....	1 60	„
ART. 2. REVENUS DES VALEURS MOBILIÈRES.		
Intérêt (5 p. 100) de la valeur de ces outils.....	0 25	„
Intérêt (5 p. 100) de la valeur de ces objets.....	0 35	„
ART. 3. ALLOCATIONS DE CAISSES D'ASSURANCES MUTUELLES.		
(Ce droit ne donne actuellement aucun revenu.).....	„	„
(Idem.).....	„	„
Valeur de l'allocation supposée égale à la contribution annuelle de la famille..... 4 <sup>fr</sup> 80. Cette recette, n'étant que la rentrée d'une somme égale versée à la caisse d'assurances, est omise ici, comme la dépense qui la balance (D. 5 <sup>fr</sup> 5 <sup>cs</sup> ).....	„	„
TOTALS des revenus des propriétés.....	63 53	30 67
<b>PRODUITS DES SUBVENTIONS.</b>		
ART. 1 <sup>er</sup> . PRODUITS DES PROPRIÉTÉS REÇUES EN USUFRUIT.		
(La famille ne jouit d'aucun produit de cette nature.).....	„	„
ART. 2. PRODUITS DES DROITS D'USAGE.		
Bois (2,000 kil.) évalué sur pied à..... (5).	0 <sup>fr</sup> 21	„
ART. 3. OBJETS ET SERVICES ALLOUÉS.		
Remise (0 <sup>fr</sup> 065 par kil.) sur le prix marchand de 729 kil. de seigle achetés aux magasins domaniaux.....	47 38	„
Remise d'intérêt (1 p. 100) sur la somme de 2,300 <sup>fr</sup> 00 due à l'administration, pour l'acquisition de la maison..... (3).	15 34	7 <sup>fr</sup> 66
Remise (0 <sup>fr</sup> 30 par 100 kil.) sur le prix marchand de 1,900 kil. de bois achetés aux magasins domaniaux.....	5 70	„
Dépense faite par l'administration pour l'école des garçons : par famille d'ouvriers.....	9 00	„
Contribution de l'administration aux caisses qui allouent des secours médicaux et des subsides en argent aux malades : par famille d'ouvriers.....	4 20	6 75
Remise d'intérêt (1 p. 100) sur la somme de 40 <sup>fr</sup> 00 due à l'administration pour l'acquisition du jardin.....	0 40	„
Remise d'intérêt sur une somme de 2,340 <sup>fr</sup> due à l'administration pour l'acquisition de la maison et du jardin : voir ci-dessus.....	„	„
Dépense annuelle de l'administration pour secours médicaux et subsides en argent alloués aux malades : voir ci-dessus.....	„	„
Contribution annuelle de l'administration à la caisse qui alloue des pensions aux ouvriers vieux ou infirmes, aux veuves, aux orphelins jusqu'à l'âge de travail : par famille d'ouvriers.....	13 20	„
TOTALS des produits des subventions.....	101 43	14 41

FIGURE 11.1. The upper right-hand quarter of Le Play's family budget for a family in the Harz Mountains, from the 1855 folio first edition of his *Ouvriers européens*. The tables, which include capital and income accounts, assign money values whenever possible. The list calls attention to services governed by custom rather than contract, demonstrating the persistence of a traditional economy.

a *patron* exercising personal charity for families attached to the same house and to the rigors of the same workshop.<sup>45</sup> Le Play's monographs, particularly in their revised form, do not present society statistically as a mass of individuals, but as families great and small, enmeshed in a web of mutual obligations. The truths that emerged from such study, he held, were deeper than those of the census.

### Conclusion

Although the history of social science has usually been written with an emphasis on social theory, it was from the beginning a project of making and collecting observations. Much of this work was performed by government agencies and was bound up with systematic administrative interventions. Much of the rest—and this would include all of Le Play's later works of social observation—aimed to investigate and promote reform. Until very late in the nineteenth century, few proponents of social science were troubled that embracing the structures of social and institutional power might compromise its objectivity. They worried much more about the subordination of social science to theoretical prejudices, to radical doctrines of free-market liberalism or socialism.

The basic task of social science, as Le Play and many of his contemporaries conceived it, was to work out a form of observation appropriate to the new social and economic conditions of the nineteenth century. For him, this was also about identifying the kind of authorities who could accommodate and redirect the forces of social change. Through the 1860s and especially after 1871, he became disaffected with the modern world, and he argued with increasing conviction that the way forward was to recover what was valuable in the past. He proposed to study that past as something living, to be found not mainly in old books but in societies that had been insulated from the disruption and anonymity—that “modern nomadism”—of industrial society.

In this, the period of his greatest influence, he worked to reconstruct social observation in a way that would recognize and reinforce paternalistic authority. He put more and more emphasis on implicit, unarticulated forms of knowledge, the wisdom contained in parables passed down by tradition. He continued to proselytize on behalf of monographs, but what could they now contribute? We should look to social science not for original discoveries but for a glimpse of reflected light. Le Play now rewrote his own history to emphasize a wide gulf that separated his method of observation from other efforts in empirical social science, thereby refashioning himself as a revolutionary practitioner of social science—revolutionary in the antique sense of

returning to ancient roots. Yet the trajectory of his life reveals him as very much a man of the nineteenth century. His paradoxical achievement was to reconstruct the tools of modern economic and statistical observation so as to reinvigorate an organic social order based on the implicit wisdom of sage elites who knew by instinct rather than through detached investigation and conveyed this wisdom in stories.

#### Notes

1. *Second Report from the Select Committee on the Act for the Regulation of Mills and Factories (13 April 1840)*, iv. The inspector was R. J. Saunders. On literature and social science, see Wolf Lepenies, *Between Literature and Science: The Rise of Sociology*, trans. R. J. Hollingdale (Cambridge: Cambridge University Press, 1988).

2. Harry Liebersohn, "Scientific Ethnography and Travel, 1750–1850," in Theodore M. Porter and Dorothy Ross, eds., *The Cambridge History of Science*, vol. 7, *Modern Social Sciences* (Cambridge: Cambridge University Press, 2003), 100–13.

3. Frédéric Le Play, *Les ouvriers européens (2e édition), tome premier, la méthode d'observation appliquée de 1829 à 1879, à l'étude des familles ouvrières* (Tours: Alfred Mame et fils, 1879), 110, 13–16; Fabien Cardoni, "Précis de la formation d'un ingénieur des mines, Frédéric Le Play de 1806 à 1830," in Antoine Savoye and Fabien Cardoni, coord., *Frédéric Le Play: Parcours, audience, heritage* (Paris: École des Mines, 2007), 12–41.

4. Frédéric Le Play, *La réforme sociale en France déduite de l'observation comparée des peuples européens*, 2 vols. (Paris: Henri Plon, 1864), vol. 1, avertissement, v.

5. Le Play, "Observations sur le mouvement commercial des principales substances minérales, entre la France et les puissances étrangères," *Annales des ponts et chaussées*, 2nd ser., 2 (1832): 501–45, 517–18; Michael Z. Brooke, *Le Play: Engineer and Social Scientist* (London: Longman, 1970), 7–9, 42–44; Françoise Arnault, *Frédéric Le Play: De la métallurgie à la science sociale* (Nancy: Presses Universitaires de Nancy, 1993), 21.

6. Friedrich Günther, *Der Harz in Geschichts-, Kultur- und Landschaftsbildern* (Hannover: Verlag von Carl Meyer, 1888), 622. *Matzhammel*, Günther explains, is miner's slang—not restricted to the Harz—for *Veruntreuung* (embezzlement).

7. Guy Thuillier, "Economie et société dans la pensée de Le Play en 1844," *Revue administrative* 15 (1962): 481–86, 482.

8. De Cheppe, "Statistique," *Annales des mines*, 2nd ser., 2 (1832): 547–48. In *Réforme sociale*, 1: 41, Le play recalled that his early memoirs on commercial economy had been requested by his superiors.

9. Le Play, "Observations"; De Cheppe, "Statistique," *Annales des mines*, 2nd ser., 3 (1833): 693–702.

10. Le Play, *Les ouvriers européens. Études sur les travaux, la vie domestique et la condition morale des populations ouvrières de l'Europe, précédées d'un exposé de la méthode d'observation* (Paris: Imprimerie Impériale, 1855), 145, *Réforme sociale*, 1: 296. See also Christoph Bartels, *Vom Frühneuzeitlichen Montanegewerbe zur Bergbauindustrie: Erzbergbau im Oberharz, 1635–1866* (Bochum: Deutsches Bergbau-Museum, 1992), 414–15.

11. Le Play, "Statistique," in Pierre Leroux and Jean Reynaud, eds., *L'Encyclopédie nouvelle*, 8 vols. (Paris, 1840), 8: 275–77.

12. Reynaud, "De la métallurgie du fer par Swedenborg," *Magasin pittoresque* (1847): 14–15, 26–27.
13. Le Play, "Des procédés métallurgiques employés dans le pays de Galles pour la fabrication du cuivre et recherches sur l'état actuel et l'avenir probable de la production et du commerce de ce métal," *Annales des mines* 3rd ser., 13 (1848): 3–224, 389–666, 11–23.
14. Porter and Ross, eds., *Cambridge History*, preface and introduction to part 1; Porter, "The Social Sciences," in *From Natural Philosophy to the Sciences: Writing the History of Nineteenth-Century Science*, ed. David Cahan (Chicago: University of Chicago Press, 2003), 254–290.
15. Eileen Janes Yeo, "Social Surveys in the Eighteenth and Nineteenth Centuries," in Porter and Ross, *Cambridge History*, 83–99.
16. Le Play, *Ouvriers européens* (1855 ed.), 3–4; "Frédéric Le Play: Anthologie et correspondance," ed. Stéphane Baciocchi and Jérôme David, special issue, *Les études sociales* 142–44, no. 2 (2005–6): 119–47.
17. Le Play, *Ouvriers européens* (1855 ed.), 128.
18. See Alain Desrosières, "L'ingénieur d'état ou le père de famille: Émile Cheysson et la statistique," in Desrosières, *Pour une sociologie historique de la quantification* (Paris: Presses de l'École des Mines, 2008), 257–87.
19. Andrew Mendelsohn, "The Microscopist of Modern Life," in *Science and the City*, ed. Sven Dierig, Jens Lachmund, and Andrew Mendelsohn, Osiris, 18 (Chicago: University of Chicago Press, 2003), 150–70.
20. Royal Commission on the Employment of Children in Trades and Manufactures not regulated by Law, *First Report* (1863), chair, Hugh Seymour Trementheere, viii.
21. Frances Trollope, *Life and Adventures of Michael Armstrong, the Factory Boy*, 3 vols. (London: Henry Colburn, 1840), preface, chap. 14.
22. *Second Report* (note 1), 41.
23. Royal Commission on the Employment of Children *First Report*, (1863).
24. *First Report from the Select Committee on the Act for the Regulation of Mills and Factories* (1840), 27.
25. *Ibid.*, 27, 77.
26. Le Play, *Réforme sociale*, 2: 237, 272. Chapter 64 is called "La réforme par l'enquête."
27. Le Play, *Réforme sociale*, 1: 310–11.
28. Karl Marx, *Capital* (1867), trans. Ben Fowkes (London: Penguin Classics, 1990), preface, 91.
29. Royal Commission on the Employment of Children, *First Report* (1863), xiv, xxviii, xlvi.
30. Le Play, *Ouvriers européens* (1879 ed.), 1: 123.
31. Alan Pitt, "Frédéric Le Play and the Family: Paternalism and Freedom in the French Debates of the 1870s," *French History* 12 (1998): 67–89; Le Play, *Réforme sociale*, 1: 35.
32. Theodore M. Porter, *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life* (Princeton: Princeton University Press, 1995), chap. 6.
33. Brooke, *Le Play*, 14.
34. Le Play, *Ouvriers européens* (1855 ed.), 9–10, 292–94.
35. *Ibid.*, 10–11.
36. Le Play, *Réforme sociale*, 1: 9, 11–12, 30–34. On Le Play's paternalism and French population politics, see Theodore Zeldin, *France, 1848–1945*, vol. 2, *Intellect, Taste, and Anxiety* (Oxford: Clarendon Press, 1977), 953–59.

37. Le Play, *La paix sociale après le désastre, selon la pratique des peuples prospères. Réponse du 1er Juin 1871*, 2nd ed. (Tours: Alfred Mame et fils, 1875).

38. Sanford Elwitt, *The Third Republic Defended: Bourgeois Reform in France, 1880–1914* (Baton Rouge: Louisiana State University Press, 1986), chaps.1–2; Porter, *Trust in Numbers*, 63–65.

39. Le Play, *Ouvriers européens* (1879 ed.), 1: 218.

40. Amanda Anderson, *The Powers of Distance: Cosmopolitanism and the Cultivation of Detachment* (Princeton: Princeton University Press, 2001).

41. See introductions to Le Play, *Les ouvriers européens*, 2nd ed., vol. 2, *Les ouvriers de l'Orient*, vol. 3, *Les ouvriers du Nord*, and vol. 4, *Les ouvriers d'Occident* (1877). On evolutionism, see Le Play, epilogue, *Les ouvriers européens* (1877 ed.), 3: 495–96.

42. Le Play, *Les ouvriers européens*, 2nd ed., vol. 6, *Les ouvriers de l'Occident* (1878), xlv.

43. On statistics and social policy in France, see Alain Desrosières, *La politique des grands nombres: histoire de la raison statistique* (Paris: La Découverte, 1993); François Ewald, *L'état providence* (Paris: Bernard Grasset, 1986), chap. 3.

44. Le Play, *Ouvriers européens* (1855 ed.), 268–69.

45. Le Play, *Réforme sociale*, 1: 390; 2: 25–28.