

Sir Edwin Chadwick on competition and the
social control of industry: railroadsRobert B. Ekelund, Jr., Auburn University
Edward O. Price III, Texas A&M University

I. Introduction

For the historian of economic theory, the pre-1870 literature on railway economics and engineering is practically an embarrassment of riches. Most of the major propositions of neoclassical demand, utility, and price discrimination theory are present in the writings of Jules Dupuit, Charles Ellet, Dionysius Lardner, Emile Cheysson, and many others.¹ These ideas, moreover, were often presented succinctly and clearly, owing perhaps to the mathematical training necessary in engineering studies. It may well be that the marginalist upsurge of the 1870's owes much to a burgeoning interest in railway problems by practitioner and professional economist alike.²

The present article investigates an interesting and well-developed contribution to the analysis of railway economics made by Sir Edwin Chadwick, a lawyer and civil servant rather than an engineer.³ Chad-

1. A small sample of the literature would include Charles Ellet, Jr., *An Essay on the Laws of Trade in Reference to the Works of Internal Improvement in the United States* (Richmond, 1839); Jules Dupuit, "On the Measurement of the Utility of Public Works," *Annales des Ponts et Chaussées*, 2d ser. (1844); Dionysius Lardner, *Railway Economy* (London, 1850); Emile Cheysson, "La statistique géométrique: ses applications industrielles," *Le Génie Civil* (29 Jan. and 5 Feb. 1887).

2. Jevons' interest in railway economics may be partly responsible for his interest in marginalism. See Craufurd Goodwin, "Economists and Railways in Colonial Australia," *Journal of Transport History*, Nov. 1963, p. 79. Jevons acknowledged his debt to Lardner's *Railway Economy* in the preface to his second edition of the *Theory of Political Economy* (1st ed., 1871; 2d ed., 1879; New York, 1965), p. xviii. Lardner's analysis of equilibrium price (or "supply and demand" in Jevons' reference) is not to be found in Jevons' writings, however.

3. We cannot maintain that the principle of "competition for the field" originated with Chadwick although he was its clearest and most forceful exponent. The intellectual lineage of the principle is uncertain, but as a practical matter it has been utilized for hundreds of years. A plan very close but not identical to that of Chadwick was instituted for the provision of postal service by Cromwell in 1653, though it lasted only a short time. On seventeenth-century postal organizations, see George L. Priest, "The History of the Postal Monopoly in the United States," *Journal of Law and Economics*, April 1975, pp. 33-80, esp. pp. 36-37 and n.24. The "Chadwick principle" is most likely of French origin, however, and the clearest early written expres-

wick (1800-1890), whose analytical contributions to "competitive theory" were only rediscovered in 1968,⁴ is best known for his contributions to public administration and public policy. In fact, Chadwick's name is instantly recognizable in the history of economic policy.⁵ But we argue that Chadwick's proposed theoretical solution to the British railway "problem" has a very general applicability and should earn him recognition in the history of economic analysis.⁶ Specifically, we seek (i) to explicate and critically evaluate Chadwick's unorthodox theory of competition and industrial organization;

tion of it dates to 1729 in the writings of the engineer Bernard F. de Belidor in his *La Science des ingénieurs dans la conduite des travaux de fortification et d'architecture civile* (Paris, 1729). It is likely that public goods, such as roads, bridges, harbors, and fortifications, were supplied under similar arrangements from the dawn of a secularized society in the early Middle Ages. Indeed, the earliest interpretations of the term *entrepreneur* were as "contractor" and "contractor of public works at a certain price"; see Bert Hoselitz, "The Early History of Entrepreneurial Theory," *Explorations in Entrepreneurial History* 3 (April 1951): 193-220, especially 193-202. Chadwick's priority with the principle in nineteenth-century English policy is also doubtful (see n.46 below).

4. Harold Demsetz, in "Why Regulate Utilities?," *Journal of Law and Economics*, Oct. 1968, pp. 55-65, explicated a principle of competition whose origin he attributed to Edwin Chadwick. Demsetz provided only a footnote reference to one of Chadwick's papers, however, and neglected many crucial implications of Chadwick's principle. See William Mark Crain and Robert B. Ekelund, Jr., "Chadwick and Demsetz on Competition and Regulation," *Journal of Law and Economics*, April 1976, pp. 149-62.

5. Chadwick's early and deep involvement with economic policy and his close personal association with Jeremy Bentham led to his selection by Nassau Senior in 1832 as an assistant commissioner on the Royal Commission investigating poor law reform. Chadwick ended up writing most of the investigative report, however, for which he was ultimately "rewarded" with the post of Secretary to the three-man administrative Poor Law Commission. Much to the embarrassment of the appointed commissioners, Chadwick at times was in full control. Chadwick's stormy bureaucratic career, as well as his direct involvement in a phenomenal range of social causes, is ably chronicled by S. E. Finer in *The Life and Times of Sir Edwin Chadwick* (London, 1952). Also see R. A. Lewis, *Edwin Chadwick and the Public Health Movement, 1832-1854* (London, 1952); R. A. Lewis, "Edwin Chadwick and the Railway Labourers," *Economic History Review*, 2d ser. 3, no. 3 (1950): 107-18, and R. F. Hébert, "Edwin Chadwick and the Economics of Crime," *Economic Inquiry* 16 (Oct. 1977): 539-50.

6. It is unfortunate that historians of economic thought when they mention Chadwick at all, only mention him in connection with Senior and the poor laws; for example, see Schumpeter, *History of Economic Analysis* (New York, 1954), p. 401. Economic historians (e.g., R. A. Lewis, op. cit.) have focused almost exclusively upon Chadwick's policy involvements, whereas the "new economic historians" concerned with railway development have apparently neglected him altogether. G. R. Hawke, in his otherwise excellent *Railways and Economic Growth in England and Wales* (Oxford, 1970) devotes a great deal of attention to Lardner and William Galt, but does not mention Chadwick. Pedro Schwartz in *The New Political Economy of J. S. Mill* (Durham, N.C. 1972) mentions several of Chadwick's policy involvements, as well as Mill's support of his friend, but does not explore the possible filiations between the two on the question of the theory of regulation and public goods supply. This issue is discussed in the Appendix below.

(ii) to demonstrate that his solution to the railway natural monopoly problem encompassed to a large extent those of his most innovative contemporaries in England and Europe interested in railway economics (not only was Chadwick aware of Dupuit's studies, for instance, but it was Chadwick, not Jevons, who provided English readers with the first synopsis of Dupuit's work); (iii) to evaluate the theoretical merits and deficiencies respecting the consolidation of the British railroads under Chadwick's principle, an evaluation which applies to *any* implementation of Chadwick's plan; and (iv) to examine (in an Appendix) the filiations between Chadwick and John Stuart Mill on the question of railroads and social control.

First, in order to familiarize readers with the Chadwick principle, we present a brief discussion of contract management and "competition for the field" as expressed in the recent rediscovery of Chadwick's ideas. Next we look at Chadwick's application of the principle to the railway situation in mid-nineteenth-century England. Finally, we critically analyze Chadwick's proposal from both theoretical and practical points of view and present an evaluation of Chadwick's place in the history of regulation and unorthodox competitive thought. We believe that a review of these issues seems especially timely, given the precarious position of privately owned rail lines in the United States, and we conclude that Chadwick's principle should be given serious consideration if nationalization of railroads (or any other industry for that matter) becomes the choice of society.

II. The Chadwick Principle

By 1859, Edwin Chadwick had been involved in the design and implementation of English social and economic legislation for over thirty years. The depth and breadth of his participation is truly remarkable. For example, he is credited with being the driving force behind English developments in poor law reform, water supply, drainage, sewage treatment, army sanitation, tropical hygiene, interments in urban areas, school architecture, and the education of pauper children (among other causes!). But in 1859 Chadwick consolidated his views on the proper mode of government interventions and he presented them in a "position paper" in the *Journal of the Royal Statistical Society*.⁷

Citing the coexistence of "sound and unsound" principles of competition, Chadwick contrasted orthodox competition (competition

7. Chadwick, "Results of Different Principles of Legislation and Administration in Europe: of Competition for the Field, as compared with Competition within the Field of Service," *Journal of the Royal Statistical Society* 22 (1859): 381-420.

within the field) with his new concept of competition *for* the whole field of service, which means, in Chadwick's words,

that is to say, that the whole field of service should be put up on behalf of the public for competition,—on the only condition on which efficiency, as well as the utmost cheapness, was practicable, namely, the possession, by one capital or by one establishment, of the entire field, which could be most efficiently and economically administered, by one, with full securities towards the public for performance of the requisite service during a given period.⁸

Thus, in Chadwick's notion of "public goods" supply, principally those productions subject to conditions of natural monopoly, the attempt to implement a decentralized competitive system (or to enforce one through regulation) was futile. Instead, an alternative system of property rights and provision was proposed. Government, representing society, would buy out competing suppliers and let out contracts, through a bidding process, for the exclusive right to supply the public good. Chadwick himself called it the principle of "contract management."

In a modern formulation, the Chadwick principle might be described as in Figure 1. The negatively sloped cost curves of Figure 1 are those of a natural monopoly, utility, or transportation firm. The profit-maximizing monopolist would produce a quantity Q_m and sell it at price P_m . Chadwick's point is that given certain conditions and alternative property rights assignment, the existence of natural monopoly need not imply monopoly price and profits. Specifically, given that an elastic supply of competitive bidders exists and that the costs of bidder collusion are high enough, the government could purchase the small number of competing firms and let out for bid the exclusive right to supply the good or service in question.

Obviously, a number of institutional and contractual arrangements can be imagined. The government may or may not provide fixed plant and capital equipment. The contract period may be of fixed duration or it may be reopened at the discretion of the government. Certainty and/or perfect information may or may not be assumed on the part of all or some parties. For example, treatment of windfall gains and losses may be made part of the model.⁹ Solutions will, of course, vary according to the nature of the assumptions made.

8. *Ibid.*, p. 385.

9. Demsetz, in fact, attempts to treat windfalls and uncertainty in his modern discussion, "Why Regulate Utilities?" pp. 63-64.

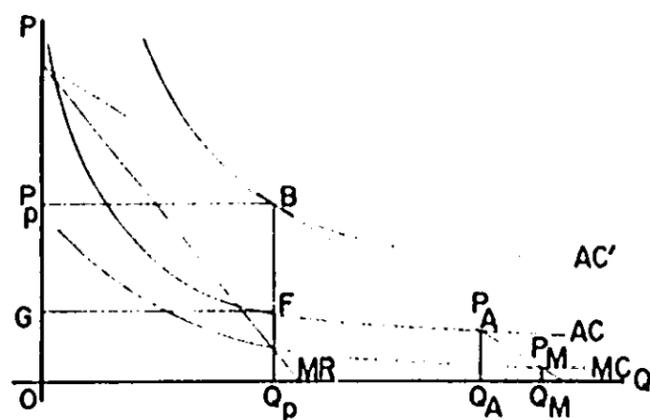


FIGURE 1

Some possible solutions may be shown with the aid of Figure 1. Here we assume certainty and perfect information on the part of government and the bidders and that the government supplies the fixed capital. The question, then, is to investigate how the nature of the contract specifications alters the solution. Clearly, if the maximum bid is made by suppliers to the government in the *absence* of price and/or quantity-contract specifications, the solution remains unaltered, except for a transfer of welfare from the monopolist to society. Such a transfer is depicted in Figure 1 by the amount GP_pBF . It would, in effect, raise the average cost to the successful supplier to AC' resulting in a Chamberlinian "tangency solution" between AC' and the demand curve at price P_p .

The more usual case—the one which Chadwick featured in the example of railroads—is the situation in which the government contractually specified some minimum quantity (or quantity and quality) to be offered and let potential suppliers engage in a Bertrand-like bidding process. If it is assumed that the government contractually specifies some quantity Q_A to be supplied, bidding will proceed to price P_A at which only normal profits are being earned. We skirt the question of whether or not an "efficient" solution, i.e., a marginal cost pricing solution, can be obtained under this system, although the issue has been discussed relative to Demsetz's recent reformulation of Chadwick's principle.¹⁰ The important point is that use of Chadwick's

10. Lester Telser argued, in a comment on Demsetz's work, that the competitive process of Chadwick and Demsetz would not yield an efficient, marginal-cost pricing solution; see L. G. Telser, "On the Regulation of Industry: A Note," *Journal of Political Economy*, Nov./Dec. 1969, pp. 937-52. But Demsetz, in a reply, provided several examples of situations where the marginal cost solution could be reached (one can occur, for instance, if $MC = AVC = 0$, i.e., where all costs are fixed costs to the

principle makes the attainment of a "competitive" solution (a zero economic profit, $AR = AC$ solution) a possibility through public ownership and private operation.

All this implies that the competition bidding *process*, given altered property rights assignment, might approximate at least some of the results of the orthodox model of competition defined as a market structure or situation. Whether or not this is possible, as Chadwick well knew, depends upon numerous institutional factors, including the mode of consolidation, the design of contracts, information costs, etc. But Chadwick believed that "competitive" results could be obtained in numerous cases, chief of which was railway transportation. Thus, we turn to Chadwick's proposals to nationalize the British railroads under this "principle." We believe that the example provides a case study of the potential use of Chadwick's principle in the natural monopoly case (which is regarded by some as a foundation for an alternative to cost-plus regulation today). An examination of Chadwick's plan to nationalize railroads further reveals difficulties in the practical application of the principle of "contract management" to public goods supply. An understanding of these difficulties, moreover, is important to modern writers seeking to apply Chadwick's principle to natural monopolies.

III. Chadwick and the English Railway System

The introduction of rail service between Liverpool and Manchester marked the beginning of railroad history in England. The industry expanded rapidly by 1849 (Parliament had passed 866 acts authorizing railway construction; by 1880 over 6625 miles of track had been laid and over 50,000 men were permanently employed by the companies), but not without some growing pains. The railroads were harmed by periodic credit crunches (sources of funds dried up) which caused temporary slowdowns in construction. As traffic (which was unorganized at the time) and speeds increased, accident rates varied directly, causing much loss of life, capital, and revenue. (Statistics on the large number of maimings and deaths on rail lines in the pre-1850 period are reported by Lardner in his *Railway Economy*). Adding to the disorganization was the tendency of the companies toward autonomy. As early as the late 1830's, rail managers made it clear to Parliament that "their" track was not to be regarded as a public thoroughfare like state-built roadways. There had been some organization but this consisted of the acquisition of "feeder" lines by the

successful bidder). See Harold Demsetz, "On the Regulation of Industry: A Reply," *Journal of Political Economy*, March/April 1971, pp. 356-63. Telser remained unconvinced, however, and issued a rejoinder in the same issue.

Ekelund and Price · Chadwick on railroads 219

main trunk lines. These combinations left the large trunk lines to compete with each other, resulting in a fragmented system consisting of non-interconnected lines, many of different gauges. A long-distance traveler was frequently required to change trains, lines, and even depots. The first move towards consolidation of the companies into a single network occurred when Parliament passed an act standardizing the gauges of tracks to be constructed. Final monopolization was completed with the passage of the Railway Clearing Act in 1850 which allowed the pooling of accounts and provided for the exchange of rolling stock at junctions.

It was this system that Chadwick and observers from other nations with similar problems placed under attack. He attributed three major faults to the railroads:

The chief defaults are first, those against unity of management for efficiency as well as economy;—secondly, exactions on necessities, by means of monopolies, instead of payments, merely for service, without profits;—thirdly, charges in disregard of an economical principle of increasing ratios of consumption with diminishing ratios of price by means of monopolies.¹¹

Though Chadwick utilized these criticisms to support nationalization in 1866, he founded them upon an empirical study of costs, fares, and profits which he conducted using his famous 1859 paper on "competition for the field." As evidence for the inefficiency of the British system when compared with railroad transport organization on the Continent, Chadwick presented the statistics which we have abbreviated and reproduced as Table 1.¹²

As one of the foremost empirical investigators of the day,¹³ Chadwick urged "analyses of the facts" concerning British railroad supply as an absolute prerequisite to public policy. These "laboriously prepared statistical tables," moreover, were to illumine certain economic

11. Edwin Chadwick, "On the Proposal That the Railways Should Be Purchased by the Government," *Journal of the Society of Arts*, 9 Feb. 1866, p. 203.

12. Chadwick, "Results of Different Principles," pp. 381-82.

13. Chadwick belonged to the "school of facts," which utilized induction from facts, rather than to the Ricardian "hypothesisists." Chadwick also confided to a friend that "John Stuart Mill always deferred to me on any questions I had examined because as he said, I always got my information first hand, whilst he could only get it second hand or from books." Edwin Chadwick to Lord Bromwell, 3 March 1885, quoted in Lewis, *Edwin Chadwick and the Public Health Movement*, p. 15. Though Mill disagreed with Chadwick on numerous policy issues, his copious and lifetime correspondence with Chadwick displays a frank admiration for Chadwick's abilities. See, for example, Mill's assessment of Chadwick as poor law investigator. Mill to Thomas Carlyle, 18 May 1833, *The Earlier Letters of John Stuart Mill, 1812-1843*, ed. F. E. Mineka, *Collected Works*, vol. 12 (Toronto, 1963), p. 156.

220 *History of Political Economy* 11:2 (1979)

Table 1. Comparison of British and Continental railways

	England 1857	France 1854	Belgium 1856	Prussia 1857	Austria 1857	Germany 1857
Population per statute sq. mi.	304	168	337	138	143	—
Aver. cost of railways per mi. (£)	39,275	25,668	16,391	14,486	18,465	13,232
Aver. working expenses per mi. (£)	1,564	1,191	1,259	1,248	1,239	898
Aver. earnings per mi. (£)	3,161	2,706	2,158	1,983	2,686	1,417
Aver. fares per mi.:						
1st class (d.)	2.01	1.55	1.33	1.4	1.4	—
2d class (d.)	1.41	1.16	1.0	1.15	1.1	—
3d class (d.)	.87	.84	.65	.77	.83	—
Aver. payment (percent) to original shareholders	{ 3.88 4.20	6.58	5.48	7.44	6.75	5.52

principles as "sound or unsound." Clearly, the facts of the table revealed some of the "defaults" which bothered him later. Average capital costs (presumably average fixed costs) and average operating costs were indeed higher on British rails than those of five European countries. Fares, in addition, were higher in all classes of passage in England, and price discrimination was practiced consistently. Though the data revealed that price discrimination was also practiced in other rail systems, it is interesting that the degree of discrimination was greater in England and that the most elastic group—third class—in all countries had roughly the same charge. Percentage proportions of net receipts to total capital expenditure were also lower under the "English system."

Chadwick offered several other criticisms which were bases for the three serious problems which he observed in British railway management. For instance, the lack of unity is the direct cause of duplication of capital (when two lines compete for the same traffic), scheduling problems (i.e., having to change depots when changing trains), and the high search costs from having to acquire the fare schedules of several companies. Price discrimination and monopoly, i.e., a "disregard" of the law of demand, is the cause of low load factors (percentage of available seats occupied) on the trains.

One of Chadwick's most fascinating arguments is an outgrowth of the third criticism (the monopolists' quantity restriction). Chadwick

practically equates monopoly pricing with treason, since it hinders the economic progress of the nation. He argues that since transportation costs were such a high percentage of the total cost of goods, lower fares would lower the costs of many goods and open up new markets for the rest of industry. Not only did the economic organization of the British rail system thwart industrial progress; the English companies failed to accept and use new technology to improve the quality and comfort of railway travel. This last is attributed to the indifference of railroad directors and the unwillingness of the managers to accept responsibility for the new technology.

Chadwick had no faith whatsoever that the government could operate the railroads, and it should be obvious that he believed that all railway problems could be solved by the application of his principle of "contract management" and "competition for the field": As he put it, "the best plan would be to let the railways to farmers, . . . who should pay a certain fixed or variable rent to the shareholders, and retain the surplus rents," with the result that "the shareholders would be secure of their dividends, and the public of good accommodation."¹⁴ The details of how this plan was to be implemented are a bit sketchy, however. Chadwick clearly argued for the benefits of amalgamation and consolidation: "purchase of the railways by the State would be beneficial to all parties, and . . . if the Government were to incur for a time an extra expense of two or three millions, until the net income were replaced, the loss would be amply repaid by the great improvements it might be the means of attaining."¹⁵ Demand elasticity estimates and underutilized capital on private lines, moreover, justified these benefits:

The extensive collateral as well as direct services obtainable from the separate establishments which I have brought under notice will be of importance, as showing the greater value of these means of communication to the public at large than to any private company, and consequently suggesting the means for a part purchase of existing interest, or for compensation to the shareholders.¹⁶

The government would not run the lines, and it would not be necessary that it be responsible for maintenance or for *actual* construction associated with new investment:

I have seen no reason to alter the opinion . . . that it was not

14. Chadwick, "On the Proposal," p. 200.

15. *Address on Railway Reform* (1865), p. 100.

16. *Address*, p. 104.

necessary that what is usually understood as the Government should undertake either the maintenance of the old, or the construction of new works; that it might constitute a responsible department to put them up for competition, to construct them, and form them on conditions of direct public responsibility.¹⁷

Thus, along with the application of "contract management" the governmentally constituted board would have to (1) take control of part or all railroad capital, though not manage it; (2) modify it so that it would be a completely interlocking system; and (3) determine optimal investment and the introduction of innovations in railways and let out these activities to private entrepreneurs.

Therefore, given that there is a large number of bidders and high collusion costs among them, the outcome would be to lower fares substantially, such as in the average cost solution of Figure 1, a guaranteed return to investors, and the most modern and the best service possible *without* government operation.

IV. *Chadwick's Contemporaries on the Railway Question:* *William Galt*

Before turning to a critique of Chadwick's plan for the railroads, it might be well to look briefly at two major influences upon Chadwick in the matter of railroads.¹⁸ Other writers of the period, to be sure, urged regulation and/or nationalization and consolidation as well as government operation of the railroads. Several of them were well known to Chadwick. Though thorough investigation of these writers' views of railway problems is beyond the scope of the present article, it is important to briefly note the work of two writers who clearly influenced Chadwick: William Galt and Jules Dupuit.

Comparatively little is known of William Galt, except that he published (anonymously, one might add) an incredibly sophisticated treatise on railway economy in 1843.¹⁹ In it, Galt presents a most

17. *Address*, p. 107.

18. Lardner, who was Chadwick's contemporary and perhaps one of the most brilliant empirical investigators of railroads, is not mentioned by Chadwick, nor is the latter mentioned by Lardner in his *Railway Economy*. Hawke relies extensively on statistics collected in Lardner's *Railway Economy* and presents a flattering evaluation of him and his work in "The Reputation of Dr. Lardner," *Railways and Economic Growth*, App. B, ch. 3, pp. 93-99.

19. [William Galt], *Railway Reform, Its Expediency and Practicability Considered*, with a copious Appendix containing a description of all the railways in Great Britain and Ireland; fluctuations in the prices of shares, statistical and parliamentary returns, etc. (London, 1843). Schumpeter does not mention Galt, but he is footnoted in connection with consolidation economies in J. J. Spengler, "Evolution of Public Utility Industry Regulation: Economists and Other Determinants," *South African Journal of Economics*, March 1969, p. 19, n.81. D. Phillip Locklin in "The Literature on Railway

appealing proposal for nationalization and supports his case with clear and plentiful statistics. Among other advances, Galt (i) documents (with supporting data) the practice of third-degree discrimination on 26 English lines for 1842;²⁰ (ii) shows that experiments with lowered rates on one British line reveal that owing to a *universal* law of demand and decreasing costs, nationalization and declining marginal costs would produce great social utility for travelers and consumers at one-third of then-current transport rates; (iii) demonstrates statistically, that the government purchase of rail property would be feasible (and even profitable) to stockholders (by 1845, almost one-half of the railroads in Great Britain were operating below a competitive rate of return).²¹

In 1843, Galt apparently had great faith in a government board possessed of "expertise" to manage the railroads. "Under what system would the railways be managed?" he asked:

I believe the best system would be that which would approach nearest to that of our own Post Office. One individual of rank and

Rate Theory," *Quarterly Journal of Economics*, Feb. 1933, p. 181, cites Galt's "recognition of the significance of overhead expenses on railroads" with no other mention. Hawke provides a more substantial discussion of Galt's ideas in his *Railways and Economic Growth*, pp. 336-39 and *passim*, though we believe his assessment overcritical and somewhat inaccurate (see n. 23 below).

20. Galt, *Railway Reform*, p. 59. Chadwick vehemently opposed price discrimination and championed cost-based (presumably average cost) pricing as a *specification* in government contracts, but not Galt. Though the *degree* of discrimination would be sharply curtailed and the level of rates lowered after consolidation, rate discrimination would not be eliminated entirely. In comparing his plan to that of Rowland Hill's plan to nationalize the postal service, Galt remarked: "It is on this ground that my plan differs widely from that of Mr. Hill's: his calculation is founded *solely* on the cost to the seller, in mine *the value received by the purchaser* is taken equally into consideration" (*Railway Reform*, p. 60). The drive for government sponsorship and/or ownership and operation spread to the colonies in the 1840's and 1850's; see Goodwin, "Economists and Railways in Colonial Australia," or the able critique of unrestrained railway construction by government in Morris Birkbeck Pell, "On the Application of Certain Principles of Political Economy to the Question of Railways," *Sydney Magazine of Science and Art* 1 (1858). The close intellectual affiliations which existed between England and Australia make it likely that Chadwick's (or Galt's) plan at least received an airing in the colony. Hawke reports that the plan was partially implemented in Australia in the present century (Hawke, *Railways and Economic Growth*, p. 338).

21. Galt collected and presented very valuable data on virtually all of the railroads of Great Britain for the early 1840's in the text of and in a large appendix to *Railway Reform*, pp. 77-106. His performance in the collection, assimilation and use of railway data to illustrate economic conditions should earn him regard, alongside Fardner, Ellet, and the French engineers of the Ecole des Ponts et Chaussées, as one of the first great students of empirically oriented transportation economics; see Spengler, "Evolution of Public Utility," p. 19; R. B. Ekelund, "Economic Empiricism in the Writing of Early Railway Engineers," *Explorations in Economic History* 9 (Winter, 1971): 179-96; Hawke, pp. 93-99.

talent, and a member of the cabinet, to have the sole management, responsible of course to the government and the country for the due performance of his duty; or perhaps, what would be better as the Board of Trade was lately constituted, the President in the House of Peers, and the Vice-President in the House of Commons.²²

Government management would be accomplished by outright purchase of the lines from existing stockholders "at the high rate" of £106 3 percent consols for each £100 worth of railway property.

Cost economies (sharply falling marginal cost due to high fixed investment) coupled with a lesser fall in total receipts (accompanying a reduction in fares by 70 percent) would produce sufficient revenue to cover the interest on consols. In fact, Galt's estimates, reproduced as Table 2, make the government a net creditor after purchase in the amount of £25,450. Clearly, Galt's case (that the government would end up a net creditor) hinges entirely on the empirical adequacy of his cost and revenue estimations, and they have been questioned.²³

22. Galt, *Railway Reform*, p. 57.

23. Table 2 is a slight modification of Galt's Table IX, *Railway Reform*, p. 56. Hawke badly misinterprets Galt when he questions Galt's views on price elasticities under nationalized rates and when he states that "Galt's reorganization scheme was to be compatible with his belief that railways were maximizing profits [before nationalization] and were to cover their costs after reorganization, the low level of railway profits in the 1860's implies that the reorganization was to be accompanied by considerable economies in costs and Galt was unable to specify where these would occur," *Railways and Economic Growth*, p. 338. Though Hawke's interpretation may hinge on the fact that he uses the 1865 edition of Galt's *Railway Reform* (we have used the 1843 version, which Hawke only mentions as an early "pamphlet"), it is clear that Galt was very careful in his statements about costs and elasticities. He admits that "it would be absurd to attempt forming anything like an estimate of the profit and loss on each railway, that would result from a reduction of 70 percent on their average scale of charges," although he provides empirical examples of lines which have experimented with raising and lowering rates; see *Railway Reform*, pp. 55 and 44. As Table 2 shows, Galt counted on gross receipts *declining* by one million pounds after nationalization, giving wide latitude for error. The economies represented by "net receipts" were the result of cost economies which Galt treated in great detail. An empirical study of the London and Birmingham Railway for 1842 convinced Galt of the tremendous cost economies of increased loads, due to high overhead costs (operating costs would increase only by 25 percent). Translating these estimates into the cost and revenue estimates for all lines of the kingdom provided Galt with the estimates of Table 2; see Galt, pp. 28-44 and *passim*. Most private managers were solely interested in profits and did not, in any case, conduct rate experiments, because of demand uncertainty. The latter inhibited progress and social utility, even though lower rates might provide higher returns to private stockholders. In any case, Galt urged governmental experimentation with costs and returns on a limited number of railroads before complete nationalization; Galt, pp. 67-71. In short, Galt held a healthy skepticism concerning the empirical support and validity of his proposal, along with careful support and clear presentation of the facts as he knew them. For these reasons, it seems to us, Hawke has not provided a balanced assessment of Galt's proposal for nationalization.

Table 2. Estimates by William Galt of costs of railway takeover

Creditor, £	Government Account	Debtor, £	
By amount of net receipts	2,946,450	To interest on £66,311,000 stock, at 3 percent	2,051,000
By reduction in annual expenditure by the consolidation of 48 establishments into one	300,000	To amount paid by Post Office	120,000
By gain to revenue through the Post Office, by increased facilities for the conveyance of mails	150,000	To increased expenditure in carrying department, and other charges	200,000
		To reduction in gross amount of receipts	1,000,000
	<u>3,396,450</u>	To balance	<u>25,450</u>
By balance	25,450		<u>3,396,450</u>

Though Chadwick was much impressed by Galt's arguments and quotes him, approvingly, on the matter of consolidation, nationalization, and the proposed benefits of lower rates, Chadwick did not support Galt's view that government should operate the roads. Indeed, Galt may have been "won over" to a Chadwick type proposal, either independently or under Chadwick's influence by 1867.²⁴ But

24. In 1867, according to Hawke, Galt provided testimony for the Royal Commission investigating the railways advocating government purchase of railways and the leasing of them to companies with specified conditions of operation. *Royal Commission on Railways, Minutes of Evidence* (1867) pp. 7340 and 7359-60. Galt only drew the limited support of two commissioners, Hon. W. Monsell and Sir Rowland Hill; see Hawke, p. 337, n.8. Two years earlier, Galt apparently opposed Chadwick's administrative arrangement, since, according to Chadwick, Galt was advocating a managing board "elected by the railway companies from amongst their own directors, with the addition of Government representatives." Chadwick, *Address on Railway Reform* (1865), p. 106. Chadwick, of course, took strong exception and made the argument similar to Professor Stigler's modern version, that an identity of interest must develop between the governors and the governed. Indeed, it is difficult to envision any sort of administrative body as immune from such influences, unless some kind of incentive system could be designed unlinking administrative rewards from industry interests. But additional evidence indicates that Galt may have adopted a bidding proposal in 1867. In Chadwick's "What Action, If Any, Ought the Government to Take with Regard to Railways?" *Transactions of the National Association for the Promotion of Social Science, Annual Conference of April 1866* (1867), Chadwick quotes a dialogue between Commissioner Lowe and Mr. Galt on the matter of railway organization. When questioned by Lowe on the exact objection raised by Chadwick to Galt's earlier version of nationalization, viz., that an identity of interest would build up between M.P.'s and railway directors, Galt replied, "If you give no option, if you make it binding that you shall let the contract to whosoever gives the most money, there is no option left in the power of Government." Chadwick, "What Action," p. 596. Probably, then, Chadwick's plan would have been (at least) an acceptable alternative to Galt.

Galt's important essay of 1843 clearly supports nationalization and price, output, and capital management by a constituted board.

V. Chadwick and Dupuit

A second clear influence upon Chadwick was that of the French engineer Dupuit.²⁵ Chadwick was also probably the first English writer to mention Dupuit's work,²⁶ though there are inconsistencies in Chadwick's interpretation. He cites, with many compliments, Dupuit's works in discussing the effect of railroad companies' pricing policies on the level of traffic, and he implies that Dupuit advocated government ownership or regulation of the railroads in order to promote maximum welfare. Though it is correct that Dupuit discussed the total utility provided by railroads under alternative institutional arrangements, including government ownership and/or regulation, it is by no means clear that Dupuit believed that government was the only redress for the welfare loss created by railway monopoly. In fact, Dupuit vehemently attacked the effects of government regulations of railroads then existing (1853) in France, concluding that competition (which he correctly understood as the absence of entry control), while not perfect, was infinitely superior to government ownership or control over private monopoly.²⁷

25. Chadwick, *Address*, pp. 87-90.

26. Chadwick probably read Dupuit's essay "On Tolls and Transport Charges," in the *Annales des Ponts et Chaussées*, 2d ser. (1849) or "On Utility and Its Measure," *Journal des Economistes*, 1st ser. (1853), since he reproduced demand and revenue functions which appeared in both of these essays. Chadwick eschews Dupuit's discussion of utility and price discrimination while simply utilizing Dupuit's "law of demand."

27. Dupuit, "Lines of Transportation," in *Dictionnaire de l'Economie Politique*, ed. Coquelin and Guillaumin, 2 vols. (Paris, 1852, 1853). Dupuit was reacting to the shifting sands of public/private roles in railroad constitution and operation up to the time (1853). The state had originally planned to undertake the construction of an entire system of railroads under the aegis of the Corps des Ponts et Chaussées. When this proved impractical, and far beyond the resources of the state, the state sought private cooperation (in which both French and English capital participated) by granting short-term concessions. In 1851, after the coup d'état and the installation of Louis-Napoléon Bonaparte, the French state openly encouraged mergers of French railroads into six networks and granted long-term "concessions" with entry restrictions and minimal state control. Dupuit recognized these "concessions" for what they were—cartelized monopolies sponsored and sanctioned by the state. As he concluded in the article, "Lines of Transportation," "all limited industry by franchises and entry control becomes a monopoly, and the right to exploit it becomes a capital for sale; and the public, far from profiting from the reduction in costs of production is obliged to pay the annuity of this artificial capital as it pays the annuity of the capital which represents the cost value of solicitor clerks, and truthfully, the value of the postmaster's certificate." "Lines of Transportation," *Dictionnaire* (1853), p. 854 (our translation). Dupuit's view on the competitive provision of public utilities was in the minority in his day, but it certainly foreshadows the views of increasing numbers of modern economists concerned with public utility/public goods problems.

Chadwick's attention to Dupuit contains an interesting inconsistency. One of the factors bothering Chadwick was the practice of price discrimination under private ownership. As he put it:

The common railway administration, under erroneous legislation, goes beyond payments for services to systematic and pernicious exactions on necessities. There is . . . a large and wide economic distinction . . . between charges which have relation solely to services rendered, and charges which are founded . . . on the view and estimate of the necessities, and on the power of exaction under monopolies.²⁸

However, since Chadwick was interested in promoting the economy of the country, and since he was a reader of Dupuit, he might have made some comment on Dupuit's discussion of the price-discriminating monopolist. While Dupuit championed a competitive system of railway supply (with no entry restrictions) he established the fact that certain types of monopoly pricing systems could approximate competitive results. Specifically, he noted that the price-discriminating monopolist could increase both output and total utility of the industry by using price discrimination. It was "aggregate welfare" that was the maximand, and it should not have mattered whether or not the railroads were price discriminating in either public or private monopoly cases, since, as Dupuit had shown, discrimination can result in an expansion of both producers' and consumers' surplus. That is to say that given monopoly, it should not matter who reaped the gain in utility of the expanded service (i.e., either the company gaining additional producers' surplus through price discrimination or the people gaining extra consumers' surplus from a low uniform rate).

Chadwick, unable or unwilling to view the problem in this manner, chose to interpret Dupuit as requiring government intervention, whereas it did not appear to be the preferred or even the second-best solution of the railway problem to the French writer. Thus, Chadwick's focus upon governmental consolidation of the British lines probably owes much to the influence of Galt, whereas a superficial reading of Dupuit's writings merely served to support his belief that a uniform cost-based rate could be instituted or imposed by government so as to maximize consumers' welfare in the entire railway system. (Dupuit, of course, pointed out that the same thing might be approximated for a *single* railroad with first-degree price discrimination under

28. *Address*, p. 78.

private management,²⁹ with unrestricted entry and cost-based pricing his preferred alternatives.)

VI. A Critique of the Chadwick Proposal

The unique feature which Chadwick added to the theory of public goods supply generally, and railway economics specifically, was the observation that ownership and administrative control could be divorced in such a manner as to produce an optimal allocation of resources to the public good. Chadwick's mechanism requires actual competitive bidding rather than special pleading or *sub rosa* dealings for franchises or licenses such as we observe in modern-day transportation, communications, or banking regulation. Service and rates are fixed by contract in his system rather than on an *ad hoc* basis as in the "adversary system" of cost-plus regulation. Theoretically, Chadwick's proposal is not only correct but is an interesting and important alternative to orthodox commission regulation or nationalization of ownership and control. In this section we investigate some actual and potential difficulties with the application of the proposal to railroads. (We do not question the validity of the idea as theory or its potential usefulness in other areas.)

There are five parts of Chadwick's argument which we examine critically. They are (i) his statements on innovations within the railroad industry; (ii) his statements concerning the stockholders' returns; (iii) inconsistencies in his arguments about the duplication of capital and the monopoly prices; (iv) his failure to recognize the relationships between the load factor and the quality of service; and (v) his omission of the costs of unifying the system. Upon closer examination of these areas, it will become apparent that Chadwick's proposals would probably not have been sufficient to solve the railroad's difficulties³⁰ (many of these problems apply in varying degrees to

29. As Dupuit pointed out in his dictionary entry "Tolls," "the principle that should serve as guide in the matter of these taxes [railway tariffs] is not to ask a price proportional to the weight or distance, it is not to favor such and such an industry or such and such a class of travelers, but to impose on each traveler, on each merchandise, only a price inferior to the one which would prevent them from using the road. The methodical classing of these travelers and of this merchandise demands, it is true, a talent of particular invention, a profound knowledge of local circumstances; but a sound theory can much facilitate this work." Our translation from the *Dictionnaire de l'Economie Politique* (Paris, 1853), pp. 343-44.

30. Mill was also unconvinced of the practical question. Mill wrote to Chadwick four days before the latter delivered his address on "railway reform" to the Political Economy Club. Mill wrote that "I have received . . . the slips of part of your intended address [*Address on Railway Reform*], which I have read with great edification, though I do not think the practical question so completely decided by it as you seem to think." J. S. Mill to Edwin Chadwick, 31 Jan. 1865, *The Later Letters of*

other applications of Chadwick's scheme).

One of Chadwick's complaints against the railroads was that they did not innovate in order to improve the quality of their service. He says that the cause of this is the "directors, who give only occasional attention to the work." They "must necessarily leave [innovation decisions] to the subordinate executive officers, who have rarely any interest in making any change or trying any improvement. If it fails in execution, these officers are blamed for want of judgment, if it succeeds they get nothing for their trouble."³¹ Lack of incentive, then, is the cause of the lack of innovation. Suppose that Chadwick's "contract management" is instituted. In this case "the Government should stand in the position of a landlord of the railways, and leave the details of executive management to the working tenants."³² Under this system, it would be the government's responsibility as "landlord" to make the decisions pertaining to innovation. Here the government might own fixed capital and be responsible for maintaining and enlarging it, or direct responsibilities for innovation via contract to successful bidders. Under either method Chadwick's statement about the private joint stock company manager's unwillingness to accept the responsibility for innovation can be applied, *mutatis mutandis*, to civil servants and politicians (if, for instance, the railroad contract management were to be put under an elected commission). The civil servants would be in the same position as the hired manager; neither is able to reap the rewards of successful innovation but both are responsible for failure. The politician is in a slightly different position. He can reap the rewards of innovation (if successful) in that the reports on those successes would make good campaign material. (The changes would probably take place shortly before elections so as to minimize the effect of a failure and prove to the voting public that the person is doing his job.) In sum, it does not matter whether the innovation decisions are made by a civil servant or politician, the application of "contract management" might produce sporadic changes in investment at best, especially since the long-run "competitive" solution (Q_A , P_A in Figure 1) is enforced via contract.

Another problem area in Chadwick's discussion is the rate of return to stockholders. He writes:

John Stuart Mill, 1849-1873, ed. F. E. Mineka and Dwight Lindley, *Collected Works*, vol. 16 (Toronto, 1967), pp. 988-89. Mill was eager to attend the meeting where he hoped to hear the matter "fully discussed." Though we can only imagine the nature of Mill's practical objections, his own proposals appear to be very close to those of Chadwick.

31. *Address*, p. 95.

32. *Address*, p. 101.

In England, the net receipts, less interest on preference shares and loans, is even now under 4 percent on the ordinary share capital, and the shareholders would have gained largely if they could have kept their money in Government securities. In Belgium, the net profits on the Government and private capital expended average nearly 5½ percent; in France more than 6½; in Prussia nearly 7½, with fuel and iron much dearer.³³

Chadwick used the relatively low rate of return to the stockholders in England as proof that the Continental railroads, which were run under the concept of "contract management," are the better of the two, and he advances empirical evidence to support his point. However, when referring to the low return of the English companies he notes: "Any government which had presented such a failure, such a contrast of performance with promise as has been done by the majority of the railway directors, must have been irretrievably driven from power, amidst general indignation."³⁴ Chadwick seems to have forgotten that the railway directors are indeed elected officials, that is, elected by the stockholders. If the stockholders were not satisfied with the return on their investments, they could hire someone with more ability who could have given them a better return. The fact that the return is under 4 percent, and that there apparently was not a rapid turnover of railway directors, would tend to make one think that they were satisfied with their return. Chadwick was in effect arguing that the return is too low and unstable and that the stockholders should be protected from their own folly in accepting that return. (Chadwick, of course, agreed with Galt that government purchase could be effected by trade of stable consols at 3 percent for unstable stockholder interests.) It does seem strange, however, to observe one of the promoters of the poor law reform calling for a guaranteed return to railway investments.

Still another problem with Chadwick's argument is that he fails to mention a railroad problem which received much attention in the United States during the nineteenth century. We refer to the so-called predatory price policies observed when two railroads competed for the same traffic and each company tried to drive the other out of business. Chadwick notes that this was not the case in England: "It is most important to observe, however, in this and other such examples, that they are examples of traffic divided between two competitors, neither running under the best conditions for a productive result. . . ."

33. *Address*, p. 75.

34. "On the Proposal That the Railroads Should be Purchased by the Government," p. 200.

It is further to be noted from such instances how many more are hindered from travelling by high fares than would be anticipated."³⁵ From observation, Chadwick asserted that monopoly prices exist even though there is not a pure monopoly over the traffic. In order for this to occur, the competing lines must be colluding, and their agreement must be enforceable or at least ignored by the courts to prevent a collapse of the agreement and the competitors lowering their fares. Thus, in the case of the competing railroad companies, the government was at fault for ignoring tacit collusive agreements.

The fact that collusive agreements were effectively ignored has a serious implication for the downfall of the application of "contract management" to the English railroad industry. Demsetz, in his modern formulation of the principle, shows that collusion on the part of the *potential bidders* must be impossible in order for the system to reach a non-monopoly price.³⁶ With collusive agreements enforceable in the courts it seems likely that some agreement could be worked out between the bidders, since there are higher potential returns to collusion. Any such agreement would serve to keep fares high and defeat the purpose of implementing the Chadwick principle.

Another aspect of the railroad system to which Chadwick objected was the excess capacity that existed on trains: "I have myself been assured, by railway officers in the more populous districts, to whom I have spoken, that they would have no difficulty in carrying regularly a three or four-fold traffic, with little additional expense."³⁷ However, to say that such passengers can be carried and that they should be carried are two different things. In this respect, Chadwick failed to recognize the relationship between excess capacity and the quality of the rail service.³⁸

One aspect of Chadwick's argument is particularly puzzling to the modern observer. Chadwick quoted Sir Rowland Hill, approvingly, that if in the process of unifying "the Government were to incur for a

35. *Address*, p. 85.

36. Demsetz, "Why Regulate Utilities?" p. 58, and *passim*.

37. *Address*, p. 91.

38. This relationship has been explored recently in a theoretical study of taxi markets; see A. DeVany, "An Analysis of Taxi Markets," *Journal of Political Economy*, Feb. 1975, pp. 83-94. The full price of a service may be defined as the fare plus the value of the time waiting for that service. Thus, excess capacity has a value in that it reduces the waiting time (i.e., although there may not be a train leaving exactly when the traveler wishes to go, the traveler can be assured a seat on the train of his choice without having to show up hours before departure). Thus, if the trains were filled as Chadwick wanted, the effect would be to raise the full price of train service and therefore to reduce the demand for the service. Chadwick also failed to realize that by filling up the trains, the extra crowding in depots and on the train serves to alter the quality of the service, and thus the demand for the service is affected.

time an extra expense of two or three millions, until the net income were replaced, the loss would be amply repaid by the great improvements."³⁹ If the unification of the railroad was as profitable as Chadwick claimed, why did the many railroad companies remain independent? It might seem highly improbable that Chadwick and his followers were the only ones capable of perceiving the great benefits of unification. Surely one of the railway directors would have recognized that the railroad was the ideal industry for amalgamation. Railroads could then be run on the basis of a multiple-plant monopolist (so as to minimize marginal cost.)⁴⁰ However, multiple-plant monopoly was not the result. Chadwick notes that

For the most part, they have been aggregations of defective sectional management to defective sectional management, which are almost as expensively independent and jarring as before, without the system, and efficiency, and economies of general unity of direction.⁴¹

If the mergers that did occur failed, and if the railroads were not unified by the market mechanism, then the merger costs must be prohibitive. That is, the costs of effecting the merger must be greater than the present value of the benefits to be gained. At first blush, Chadwick's failure to recognize prohibitive merger costs would appear fatal to his argument. In calling for the unification of the railroads, in other words, Chadwick expected the government to achieve the merger within the market, but in order for this to be possible, the government must be possessed of some special quality that enables it to lower the merger costs, otherwise the project would not be profitable. This modern criticism cannot bear scrutiny, however, given Chadwick's maximand, which was not profitability in an objective sense, but rather the maximization of societal benefit, of which consumers' surplus was a part. With reference to Figure 1, Chadwick's proposal was that society capture the "benefit" under the demand curve subject to an average cost constraint. In addition, the social benefits associated with reduced cost of the transport inputs could be obtained. But clearly the maximand is subjective in that these "benefits" (including those captured under any demand curve) can only be estimated. Chadwick's investigations led him to believe that the benefits of government amalgamation with cost-based pricing exceeded all merger costs (and system average costs). Thus, Chadwick's argument

39. *Address*, p. 100.

40. See Don Patinkin, "Multiple Plant Firms, Cartels, and Imperfect Competition," *Quarterly Journal of Economics*, Feb. 1947, pp. 173-205.

41. *Address*, p. 107.

rests upon an empirical judgment of subjective benefit. Chadwick (and Galt's) arguments are persuasive, but they nowhere present a conclusive case for nationalization. The reliance on subjective estimates of benefits and the likelihood of collusion, coupled with the problem of innovation, which inure to the proposal certainly cast some doubt on the practicability of nationalization of railroads or any other large-scale enterprise under contract management.

VII. Conclusions

Clearly, Chadwick's proposal for the railroads contained practical difficulties.⁴² His solution seems to call for ideal conditions in the sense that not only must collusion of competing firms be impossible but the government agency directing the railroads (or any other public good) must also be free from *ex parte* dealings with industry. One of the most popular criticisms of modern *commission* regulation is precisely that there is an identity of interest between the regulated and regulators resulting in umbrella rate making, cross subsidies, excess capacity, and the like.⁴³ It is not likely that the institution of a "Chadwick plan" by itself would eliminate the source of these institutional inefficiencies. If constraints facing "contract managers" could be altered in such a way that rewards were independent of industry interests, however, the Chadwick plan for public goods supply utilizing a modified "market competition" could be very appealing. Certainly it has already been implemented, successfully, in national defense contracting in the United States. The municipal supply of gas, water, and electricity might also provide a field for applications, though use of the Chadwick plan in integrated national industries such as the railroads may be premature for some of the reasons discussed in the preceding section.

Although Chadwick's plan (or Galt's version of it) to nationalize railroads was largely ignored by the British Parliament in 1867, as it

42. It is important to note that practical implementation of the "Chadwick plan" may engender many more problems than those outlined with respect to mid-nineteenth-century English railroads in the present article. The Chadwick proposal, in its most recent guise as the Chicago theory of regulation, has been proffered as an alternative to traditional cost-plus regulation. Critics, however, dispute this claim and argue that the design and implementation of optimal contracts may present as many (or more) difficulties as those found in more traditional forms of regulation. See, for example, Victor P. Goldberg, "Regulation and Administered Contracts," *Bell Journal of Economics*, Autumn 1976, pp. 426-48. The problems of contract management vary with the technical and competitive characteristics of the industry or utility and must be developed in the context of case study. For an interesting example of the latter, see O. E. Williamson, "Franchise Bidding for Natural Monopolies—in General and with Respect to CATV," *Bell Journal of Economics*, Spring 1976, pp. 73-104.

43. See George Stigler, "The Economic Theory of Regulation," *ibid.*, Spring 1971, pp. 3-21.

probably would be ignored today in the United States,⁴⁴ the form of regulation he proposed is the most interesting and innovative alternative to cost-plus commission regulations or government nationalization and operation in the literature. Society, of course, may well be forced to make future choices between inefficient and expensive commission regulation and an alternative property-rights structure (government ownership). If the latter is chosen, the institution of Chadwick's plan of nationalization without government control may well prove to be the most efficient of the alternatives.

APPENDIX: CHADWICK AND MILL ON MARKET FAILURE, INTERVENTION, AND RAILROADS

With common roots in Benthamism (Chadwick, in fact, was Bentham's last secretary), it seems clear that some of Mill's ideas on economic and social reform were influenced by Chadwick. Mill, who had a high regard for Chadwick's abilities, never missed an opportunity to advance his friend's career. Mill read and "corrected" practically all of Chadwick's papers, moreover, and it is in the role of "friendly critic" that Mill probably was introduced to Chadwick's ideas. In April of 1842, Chadwick sent Mill a draft of a *Report of the Poor Law Commissioners to the Secretary of State, on an inquiry into the sanitary condition of the labouring population of Great Britain*. Though complaining of Chadwick's lack of compositional skills and poor grammar, Mill wrote to Chadwick: "I have read through your report slowly and carefully. I do not find a single erroneous or questionable position in it, while there is the strength and largeness of practical views which are characteristic of all you do."⁴⁵ It was probably at this point (or possibly earlier) that Mill was introduced to Chadwick's view of competition.⁴⁶ In any case, Mill's

44. Deregulation in transportation and other industries has gained a great deal of momentum of late. See the *Economic Report of the President* (Washington: U.S. Government Printing Office, 1975), pp. 147-59.

45. Mill to Chadwick, April 1842, *Earlier Letters of John Stuart Mill, 1812-1843, Collected Works*, 13:516.

46. Mill, and possibly Chadwick himself, may have first learned of "contract management" from Bentham or from their active intellectual intercourse with French savants and practitioners. Bentham used a similar idea in 1789 in the *Panopticon*, related to prison reform; see Elie Halévy, *The Growth of Philosophical Radicalism* (New York, 1928), pp. 84-85. To be sure Chadwick appealed to Bentham's authority at many points in his writings, and even to Bentham's advocacy of "unity of management" for efficiency (see Chadwick, "On the Proposal"), but he claimed to have proposed the principle himself when examining the sanitary conditions of town populations in 1838; see Chadwick, "Results of Different Principles" (1859), pp. 384-85. We are grateful to an anonymous referee for having called our attention to a pre-1838 report of Messrs. Drummond and Barlow, Commissioners for Railways in Ireland, and printed with the Sessional Papers of 1837-38 (*British Parliamentary Papers*, 1837-38, 145, XXXV, pp. 95-96). The report, which Chadwick noted approvingly in his 1859 paper, briefly discusses the principle of contract management. Chadwick's suggestion of priority in having proposed the principle in 1838 is thus made dubious by the earlier statement of Drummond and Barlow. Many of Chadwick's applications

views on public goods supply and regulation expressed in the first (1848) edition of the *Principles* reflect—at least to some extent—Chadwick's principle.

Pedro Schwartz in his *New Political Economy of J. S. Mill*, it seems to us, has made a very good case for his conclusion that Cairnes', Sidgwick's, Marshall's and Pigou's critiques of the laissez-faire system would have been unthinkable without Mill's earlier efforts. "From Mill," concludes Schwartz, "stemmed the neo-classical (one might say, the Cambridge) tradition of critical evaluation of the working of the market."⁴⁷ Interventions, Mill argued more than once, were necessary in the case of natural monopoly. An advocate of government ownership of waterworks (production and distribution) and gas companies, Mill urged *municipal* purchase and administration of these companies where possible. As Schwartz has shown with respect to Mill's views on the regulation of the London water supply,⁴⁸ Mill was very concerned that a centralized board not be given power to consolidate water services. Chadwick, a strict centrist, had urged that water distribution, drainage, and interment systems be consolidated under a board of health (consisting of a board of commissioners) which would utilize a competition for the field. Mill, in this case, not only rejected Chadwick's proposal for giving ultimate power to a centralized board but he considered and then rejected the *form* of the regulation proposed by Chadwick, choosing municipal ownership and operation as his ideal solution instead. A distrust of joint-stock companies seems to have been at the base of Mill's objection to the use of Chadwick's principle in the case of London water, as Schwartz has suggested.⁴⁹ Certainly Mill distrusted centralization.⁵⁰

and his careful explication of the principle are clearly unique, however, in spite of the possible influence of Bentham and others.

47. Schwartz, *New Political Economy of J. S. Mill*, p. 151.

48. Schwartz, "John Stuart Mill and Laissez Faire: London Water," *Economica*, n.s., Feb. 1966, pp. 71-83.

49. Though Mill's "ideal" solution to the London water problem was municipal ownership and operation, he advocated that the work be entrusted to a commissioner, appointed by the government and answerable to Parliament; see Schwartz, "John Stuart Mill and Laissez Faire," p. 81. A portion of Mill's "Letter to the Committee of the Metropolitan Sanitation Association" is reprinted in Abram L. Harris, "J. S. Mill on Monopoly and Socialism: A Note," *Journal of Political Economy*, Dec. 1959, pp. 604-11.

50. Mill underwent a metamorphosis of thought on the issue of administrative centralization, and his evolution is best shown in his policy position on the poor laws. Though he favored centralization in the original law of 1834, his views were (later) substantially altered, probably under the influence of de Tocqueville. Mill came to believe that increased legislation was required for social progress but that laws were best administered by local authorities who, ideally, would be possessed of expertise and would act as a vehicle for "educating" the public. The change in Mill's view of the proper level of administration of the poor laws is illustrated in a letter of 6 April 1860 to Charles Dupont-White respecting the latter's book *La Centralisation* (Paris, 1860), which Mill later reviewed. Mill wrote: Vous croyez peut-être que l'administration de la charité publique est réellement centralisée chez nous depuis la loi de 1834. Eh bien, il n'en est rien. L'immense abus qu'on avait fait du pouvoir local avait tellement effarouché le public qu'il est devenu possible de faire cette loi; mais il n'est pas été possible de l'exécuter: le pouvoir local a fini par regagner sa prédominance sur le pouvoir central; et celui-ci n'a pu conserver ses attributions qu'en les exerçant avec une réserve si excessive qu'elles sont restées plutôt une ressource pour des cas

The interesting aspect of all this, however, is that Mill's views as to both the level and the form of regulation may have changed when he considered the question of railroads. Though it was possible to place ownership of public goods such as waterworks or gas companies at the local or municipal level, the same was not true of the railroads. Discussing the railroad's natural monopoly at two points in the *Principles*, Mill offered the following comments:

It is much better to treat [the services of a natural monopoly] at once as a public function, and if it be not such as the government itself could beneficially undertake, it should be made over entire to the company or association which will perform it on the best terms for the public. In the case of railways, for example, no one can desire to see the enormous waste of capital and land (not to speak of increased nuisance) involved in the construction of a second railway to connect the same places already united by an existing one. . . . Only one line ought to be permitted, but the control over that line never ought to be parted with by the State, unless on a temporary concession, as in France; and the vested right which Parliament has allowed to be acquired by the existing companies, like all other proprietary rights which are opposed to public utility, is morally valid only as a claim to compensation.⁵¹

The quotation may imply that Mill was an advocate of government nationalization (but not operation) of railroads. Again, this might be suggested in Book V of the *Principles* where Mill notes: "It is perhaps necessary to remark, that the state may be the proprietor of canals or railways without itself working them; and that they will almost always be better worked by means of a company, renting the railway or canal for a limited period from the state."⁵² These statements certainly appear to indicate approval of Chadwick's proposed arrangements. But careful scrutiny of other remarks made by Mill appears to cast government as less of a nationalizer and provider of capital (and consolidator), which is at the heart of Chadwick's vision, and more of a traditional franchise-issuer and cost-plus rate regulator. Mill argues that the government should subject a natural monopoly

to reasonable conditions for the general advantage, or to retain such power over it, that the profits of the monopoly may at least be obtained

extrêmes qu'un ressort régulier d'administration. Il en sera ainsi pour longtemps de tout ce qu'on tentera chez nous dans le sens de la centralisation. On admettra bien l'intervention du pouvoir central comme remède héroïque et passager: on ne l'admettra pas comme régime." *The Later Letters, Collected Works*, 15:691-92. Contrast these remarks with the authoritarian tone of the advocacy of centralized administration of the poor law in "The Proposed Reform of the Poor Laws," from "Notes on Newspapers," *Monthly Repository*, 18 April 1834, *Collected Works*, 8:362. Mill expressed similar views on the proper level of administration in his review of Dupont-White's book, and in his support of the local administration of the London water supply. See Pedro Schwartz, "John Stuart Mill and Laissez Faire: London Water." It is difficult to disagree with Schwartz's conclusions that "the role granted to municipal government appears to be the distinguishing characteristic of Mill's special brand of laissez faire," p. 75.

51. Mill, *Principles of Political Economy*, ed. J. M. Robson, *Collected Works*, vol. 2 (Toronto, 1965), p. 142.

52. Mill, *Principles, Collected Works*, 3:956.

for the public. This applies to the case of a road, a canal, or a railway. . . . To make the concession for a limited time is generally justifiable, on the principle which justifies patents for inventions: but the state should either reserve to itself a reversionary property in such public works, or should retain, and freely exercise, the right of fixing a maximum of fares and charges, and, from time to time, varying that maximum.⁵³

It might appear, then, that Mill was espousing nothing more than the system of rail regulation which the United States adopted in 1887 and one only slightly more stringent than the legislative restrictions imposed on British lines in the 1840's and 1850's.⁵⁴

The truth is, however, that Mill could never quite make up his mind about the railroad question. Mill, as Schwartz has pointed out, was extremely distrustful of centralization, believing that the ideal was the greatest dissemination of power consistent with efficiency. But effective and efficient control of the railroads could hardly be obtained without centralization. Two of Mill's later views are relevant here. In 1864 Mill wrote to Chadwick concerning centralization and railways: "About the economical advantage, touched upon in your letter, of a consolidation of railways, you are not likely to find any help in the French economists. They are, nearly all of them, much more hostile to consolidation and to government action than I am; and I am more so than you."⁵⁵ But in 1869 Mill was suggesting a guarded, experimental approach to the question of nationalization.⁵⁶ In 1868 a movement to nationalize the telegraph system and the railroads was still active. The Electric Telegraph Bill, introduced in Parliament in 1868 and adopted in July of that year, authorized the Postmaster General to acquire, maintain, and operate the telegraph system. Mill's opinions on these matters were expressed in a letter to A. M. Francis:

I took no part in the discussion about the purchase of the Telegraphs because it was a mere experiment of which I do not foresee the result. I should object to the purchase of the railways until the smaller measure shall have approved its policy by its success. And in no case does it seem to me advisable that the Government should work the railways. If it became proprietor of them it ought to lease them to private companies.⁵⁷

Mill, it seems, would have approved railway nationalization under general government contingent upon successful government operation of a smaller industry.⁵⁸ The important point is that Mill clearly adopted the Chadwick

53. Ibid.

54. The railroads faced maximum rate regulation imposed upon them by parliamentary legislation. But as Galt pointed out, these maximum rates were so high that actual rates were consistently below them even in the less elastic markets.

55. Mill to Chadwick, 28 Oct. 1864, *Later Letters, Collected Works*, 15:961.

56. Mill's shift in view coincided with sharply increased public criticism of railway operators around 1867. In 1868, according to Parris, the tendency for greater state intervention resumed. Henry W. Parris, *Government and Railways in Nineteenth-Century Britain* (Toronto, 1965), p. 212.

57. Mill to A. M. Francis, 8 May 1869, *Later Letters, Collected Works*, 17:1598.

58. This view in no way conflicts with Schwartz's belief that the general direction of Mill's thought was towards decentralized public provision of social goods. Mill probably viewed the railway case as an instance where efficiency demanded a more centralized control. Henry Sidgwick later agreed, arguing that legislative profit and

principle of "competition for the field" as the most efficient form of regulation, given that nationalization took place. In the case of railroads, moreover, unlike the case of the London water supply, Mill did not raise the issue of inefficiency of the joint-stock company.⁵⁹

Chadwick's principle of "competition for the field," then, probably influenced Mill's view on the proper form of railway regulation, one which sought to integrate incentives with public assurances of cheap and efficient service. Mill was far more wary of the abuses of centralized power than Chadwick, whose litany of market failures demanding authoritative interventions was a long one indeed.⁶⁰ It seems clear, however, that Mill was at-

price ceiling regulation would not work without incentives to efficiency. He further argued that the formative stages of railway enterprise be left to joint stock companies with government purchase with compensation, at maturity; Sidgwick, *Principles of Political Economy* (1883; London, 1924), pp. 443-44.

59. Mill's opinions on the joint stock company are interesting in connection with Chadwick's plan. Mill, as indicated earlier, rejected implementation of Chadwick's proposal in the case of London water on ground of inefficiencies in the joint stock organization. In this case, Mill argued that Chadwick's plan (government ownership combined with contract management) would not have any advantage over (for example) a board elected by ratepayers. "Individuals," said Mill, "acting for their own pecuniary interests are likely to be in general more careful and economical than a public board; but the Directors of a Joint Stock Company are not acting for their own pecuniary interests, but for those of their constituents. The management of a company is representative management, as much as that of an elected public board, and experience shows that it is quite as liable to be corrupt or negligent." from J. S. Mill's "Letter to the Committee of the Metropolitan Sanitary Association," partly reproduced in A. L. Harris, "J. S. Mill on Monopoly," pp. 606-7. In the *Principles*, however, Mill was defending the joint stock principle for reducing the need for government in certain enterprises such as the railroad "from London to Liverpool." *Principles, Collected Works*, 2:136. The biggest disadvantage of the joint stock principle was that management was by "hired servants" who lacked the fidelity and zeal found in those with a direct, pecuniary stake in the enterprise. But, Mill indicated that these problems could be sharply curtailed, if not completely eliminated, by the establishment of "fixed rules" and by built-in incentives based on performance; see *Principles*, 2:139-40. Perhaps Mill came to realize that Chadwick's "contracting process" was a very useful format for establishment of "fixed rules" and incentives to zeal and performance. In the case of railway nationalizations proposed by Chadwick, the government (until complete purchase was achieved) would guarantee a return to "stockholders," thereby shifting ultimate control from a "board of directors" to a governmental contracting board. This latter board would be essentially charged with designing the contract which instituted incentives for successful bidders and optimal and efficient performance for society. This sort of plan was tailor-made to meet most of the objections which Mill had to joint stock organizations.

60. Chadwick proposed nationalization (with application of contract management) of funeral supply, taxi cabs (cabriolets), police and fire prevention, bread and beer production and distribution, etc.(!) in addition to natural monopolies such as municipal gas, water, and railway systems. Upon reading (and laboriously correcting) Chadwick's proofs of the 1859 paper, in which Chadwick gave the principle a very wide interpretation, Mill was suitably skeptical if not totally aghast. He wrote to Chadwick, "your facts are very striking and the view of the subject [competition for the field] one which is of great importance to exhibit. But I do not well see where your principle is to stop, or at what place you would draw the line between it and conflicting principles." Mill to Chadwick, 26 Jan. 1859, *Later Letters, Collected Works*, 15:591-92. Chadwick had apparently wished to enlist the socialists' criticisms of competition

Ekelund and Price · Chadwick on railroads 239

tracted to the "market features" of the Chadwick plan in the special case of railroads, features which would make the interventions of general government more palatable and more efficient.

We are indebted to Professor Alfred Chalk, Bob Hebert, and Mark Cram and especially to Robert Tollison, Bob Hansen, and Raymond Battalio for helpful comments on the many earlier drafts of this article. Two anonymous referees also made valuable suggestions.

as added fuel for his case, but Mill cautioned Chadwick against this move, noting that: "It is much better that your results should be seen to come, as they do, from your own thoughts and observations" (ibid., p. 592). Mill, unlike Chadwick, perceived great benefits from privately owned and operated large-scale productions. See Mill, "Chapters on Socialism," *Essays on Economics and Society*, ed. J. M. Robson, *Collected Works*, vol. 5 (Toronto, 1967), pp. 730-31.

[3]

RIVISTA INTERNAZIONALE
DI
SCIENZE ECONOMICHE
E
COMMERCIALI

Anno XXIX

Agosto 1982

N. 8

COMPETITION, MONOPOLY, AND DIFFERENTIAL
PROFIT RATES – A RECONSIDERATION OF
THE CLASSICAL AND MARXIAN THEORIES

by
WILLI SEMMLER (*)

Many Marxist political economists, like Rudolf Hilferding, Maurice Dobb, Paul Sweezy, Josef Steindl, Paul Baran, et al., distinguish between two stages of capitalist development: one, of competitive capitalism, and the other, of monopoly capitalism.

These writers maintain that competitive capitalism at the end of the nineteenth century revealed an inherent tendency toward monopolization. An increasing proportion of fixed capital, the concentration and centralization of capital, an increasing average size of production units, cartels, mergers, the rise of multi-unit corporations, and the rise of financial capital resulted in oligopolized or monopolized industries and a monopolistic stage of capitalism. In monopolized industries, market prices of commodities were raised and the «equal profit rates of competitive capitalism (were) turned into a hierarchy of profit rates, highest in the most completely monopolized industries, lowest in the most competitive» (Sweezy 1968:258). Thus, differentials in profit rates were considered as a sign for the monopolization of the markets.

However, recent discussion about the classical and Marxian theories has raised doubts about the correctness of this description of the two stages in the development of capitalism. The underlying notion of competition in the theory of monopoly capitalism also has been questioned (see Clifton 1977; Weeks 1978; Shaikh 1978, 1979). The theory of

(*) Department of Economics, Graduate Faculty, New School for Social Research, New York. I would like to thank A. Shaikh, P. Garegnani, J. Clifton, I. Steedman, G. Deleplace, and J. Weeks for helpful discussions and suggestions. The Study was made possible by a grant from ACLS.