Henry George, the Classical Model and Technological Change:*

The Ignored Alternative to the Single Tax in Progress and Poverty

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ABSTRACT. *Henry George's* vision of *land monopolization* as the source of growing rentier income was compatible with all elements in the predominant *Ricardian-Millian classical distribution* model except the rent-reducing effects of *technological change* and *Malthusian population growth* as the catalyst underlying *income distribution.* Since George also rejected *Malthusianism* on ethical and philosophical grounds, his analysis focused on the autonomous nature of *rent income* with respect to population and technological change. George analyzed the distributive consequences of both increasing technology with constant population, and constant technology with increasing population. In the latter case, George, in an ultimate rejection of Malthusianism, demonstrated an optimistic *increasing returns to scale* of population growth. However, although capable, George never considered a logical extension of his analysis, namely, the dynamic case of changing population, technology, and increasing returns. This analysis would have contradicted his predictions of the trend in relative income shares and the uniqueness of the *single tax* as the solution to social and economic distress.

I

INTRODUCTION

IT HAS BEEN ONE HUNDRED YEARS since the publication of Henry George's *Progress and Poverty.* In that period of time, both the man and his work have continued to generate interest among scholars from various disciplines (1). Even though George's idea of taxing the unearned increment to land values survives, still, scholarly interest in Henry George can not be explained solely by his contributions to economic theory and policy. For example, George's single-tax was the Physiocratic *"l'impot unique,"* although George believed, "Without knowing anything of Quesnay or his doctrines, I have reached the

* An essay presented in commemoration of the centenary of the publication of Henry George's *Progress and Poverty.*

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American Journal of Economics and Sociology, Vol. 40, No. 2 (April, 1981).
0002-9246/81/020191-16$00.75/0

same practical conclusion by a route which cannot be disputed . . ." (2). Moreover, the heart of George's analysis, that ground rent as a return to a nonreproducible natural resource was ideally suited to site value taxation, was also borrowed from classical Ricardian theory. Yet, in many ways, Henry George remains greater than the validity or the sum of all the parts of his work. By his influence on the public conscience, George gave hope to many in the possibilities of sound economic reform based on economic principles. Many, like George Bernard Shaw, were "converted" after hearing George speak or after reading *Progress and Poverty* (3).

Henry George's success in influencing men and events was derived from several sources. Foremost, was George's belief in his mission, and the truth of his vision concerning the cause of "poverty amid advancing wealth"—a vision whose essentials changed very little from "Our Land and Land Policy" written by George in 1871 through the posthumous publication of his *The Science of Political Economy*. Barker eloquently recounts the origins of the Georgist vision, first developed in the streets of New York, then embellished one day in a walk through the Oakland foothills: "Like a flash it came upon me . . . the reason of advancing poverty with advancing wealth. With the growth of population, land grows in value, and the men who work it must pay for the privilege" (4). In addition, George's influence on men was rooted in a benevolent view of the contemporary condition of man. In the tradition of Condorcet and the 18th century optimism concerning the "moral constitution of man," George believed that ". . . the moral nature of man is essentially good"; moreover, the essential goodness of man was nurtured and perpetuated by George's willingness to translate the economic causes of man's despair, "low wages and pauperism . . . into terms of ethics, and as the source of social evils show a wrong" (5). Finally, when coupled with George and his followers' very adept use of "rhetorical strategies" (6) to communicate their analysis of the original Georgist vision, the end result of *Progress and Poverty* was, as Barker shows,

> . . . a moral Mount Whitney in American protest. It is a signal, good for any place and any time where freedom and equality have meaning, against monopolism in any form . . . *Progress and Poverty*'s fusion of economics and ethics, its passionate blend of love of God with comprehension of the entrenchment of selfishness, give it . . . an intensity which places it at once high in letters, and yet at the threshold of the common man (7).

But in the success of the Georgist vision on the public conscience

there was a flaw. As this paper will show, George's vision of the monopolization of land as the root of social and economic decay prevented him from fully exploring alternative solutions to economic distress and the maldistribution of income, namely the beneficial influence on income of improvements in worker productivity, particularly through technological change. George's analysis involved a selective use of the classical "stationary state" model, that is, George accepted Ricardian differential rent, but rejected Malthusianism and its corollaries in the model. The consequence was George's linking of any improvement in productivity with increases in rent income at the expense of wages and interest.

II

MALTHUS AND THE GEORGIST VISION

THE MAJOR OBSTACLE confronting George's adaptation of classical economics to his vision of the source of poverty was Malthusian population theory. Thus, as Barker notes, George's ". . . grand strategy of *Progress and Poverty* . . ." was "to drive Malthus from the temple of accepted ideas . . ." (8). Frequently, George's rejection of Malthusianism was polemical. He could be excessively critical of Malthus, for example, when he notes parenthetically that "Malthus' other works, . . . made no mark, and are treated with contempt even by those who find in the Essay a great discovery" (9). Also indicative of the polemics in George's assault on Malthusianism was his continual reference to the pessimistic first edition of the *Essay on Population* (1798), rather than the more moderate and optimistic second edition (1803) (10) which served as the basis for all subsequent editions (11).

To some degree, George's polemical rejection of Malthusian population theory stemmed from deeply held religious and ethical convictions:

> It is difficult to reconcile the idea of human immortality with the idea that nature wastes men by constantly bringing them into being where there is no room for them. It is impossible to reconcile the idea of an intelligent and beneficent Creator with the belief that the wretchedness and degradation which are the lot of such a large proportion of human kind result from his enactments . . . (12).

In George's eyes, Malthusianism was ethically even more repugnant when linked with contemporary Social Darwinism to provide justification for man's inability to influence, let alone improve, the human condition (13).

Ultimately, however, Malthusian population theory as perceived by

George was objectionable because it reinforced an absolute notion of private property at odds with George's argument for the socialization of rent through the single-tax. In a lengthy footnote, George revealed his concern:

In saying that private property in land can, in the ultimate analysis, be justified only on the theory that some men have a better right to existence than others, I am stating only what the advocates of the existing system have themselves perceived. What gave to Malthus his popularity among the ruling classes . . . was the fact that he furnished a plausible reason for the assumption that some have a better right to existence than others—an assumption which is necessary for the justification of private property in land, and which Malthus clearly states in the declaration that the tendency of population is constantly to bring into the world human beings for whom nature refused to provide, and who consequently "have not the slightest right to any share in the existing store of the necessaries of life" . . . And to-day this Malthusian doctrine is the ultimate defense upon which those who justify private property in land fall back. In no other way can it be logically defended (14).

III

GEORGE, MALTHUS AND THE CLASSICAL STATIONARY STATE

ALTHOUGH HENRY GEORGE's fundamental objections to Malthusianism were philosophical in character, he also perceived correctly the centrality of Malthusianism to the economic operation of the "stationary state" growth and distributive model predominant in classical economics during the first half of the 19th century. Thus, early and important sections of *Progress and Poverty* were devoted to expunging Malthus and making the classical model compatible with George's own vision of rent income and social misery as a consequence of land monopolization.

In the dominant Ricardian version of the classical stationary state model, Malthusian population growth was the catalyst which forced the growth and distribution of output among landowners, capitalists, and wage earners. Although the basic Ricardian model was concerned with agriculture, its behavior also determined the absolute and relative distribution of output in the manufacturing sector (15). In the model, capital and labor used in fixed proportions and subject to diminishing returns are applied to a fixed supply of land. Total capital and labor income are determined by their joint marginal product with capital receiving profits as the difference between the prevailing Malthusian subsistence wage and the joint marginal product. The remainder of output is rent. Thus, since the demand for wheat

depends upon the size of the population (or labor force), growth in the labor force increases the absolute and relative rent share of output and decreases both the absolute and relative share of profits. Per capita wages remain constant at the prevailing subsistence wage rate. Economic growth ceases, or the "stationary state" occurs at that point of labor force growth where the subsistence wage is equal to the joint marginal product of capital and labor. Since profits disappear, there is no incentive for additional accumulation of capital (16). Thus, the dominance of rent income in the classical model was a consequence of Malthusian population growth and occurred, as George himself was well aware, whether rent accrued at the *extensive margin:* ". . . as the necessities of increasing population forced cultivation to less and less productive lands, . . .", or at the *intensive margin* where cultivation is forced to ". . . less and less productive points on the same lands, . ." (17).

Although convinced that the classical law of rent had the ". . . self-evident character of a geometric axiom," George, nevertheless, was compelled to displace its Malthusian basis. Even in the absence of philosophical scruples about Malthusianism, George had to confront the Malthusian core of the classical model in order to assert the primacy of his own analysis of economic misery and its attendant solution, the Single Tax. Tolerance of Malthus to any degree might have implied acquiescence to the "hopeful fatalism" of Social Darwinism which rationalized current want and misery as a necessary way station on the road to race and social improvement (18). Even worse, it might have implied acceptance of varied population policies as alternatives in the elimination of social distress. Consequently, as George reveals in his refutation of a passage in Mill's *Principles,* he had to contend with Malthus: "I assert that the injustice of society, not the niggardliness of nature, is the cause of the want and misery which the current theory attributes to over-population" (19).

However, to dethrone Malthus, George had to deal with the realities of the existing classical model. He had to demonstrate that whether population is considered as a variable or a constant, and whether or not it is subjected to the beneficial influences of productivity and technological change, ground rent would continue its inexorable growth. However, George's adaptation of the classical model suppressed the potential of technological change not only as a means of avoiding the "stationary state" economy, but also as a means of maintaining and perhaps improving non-rent income in society.

In the Ricardian version of the classical model, technological change benefited the relatively abundant factors of production, capital and labor, at the expense of the relatively scarce factor, land. Resource saving (capital and labor) technological change increased the marginal productivity of capital and labor used in fixed proportions; consequently, the profit share of income is increased while the rent share is reduced. Whether the wage share or per capita income increases depends upon the behavior of population. At worst, population would increase apace with technological change; consequently, profits would eventually disappear, capital accumulation cease, wages per capita would remain at subsistence levels, and rent payments would confiscate most of national income. On the other hand, increases in population less than the rate of change in technology may benefit the income of both capital and labor at the expense of the rentier class (20).

John Stuart Mill, the last major classical writer and expositor of the Ricardian model, had an optimistic view of technology. Each edition of Mill's *Principles of Political Economy* had borne witness to a succession of resource-saving technical developments in agriculture which either alone or in concert kept agricultural prices down and profits up (21). In addition, Mill affirmed what Ricardo had denied, that is, that increasing returns in the manufacturing sector had the power to offset diminishing returns in agriculture primarily because agricultural raw materials costs were a ". . . very small portion of the entire cost of the manufacture" (22). Consequently, the Ricardian linking of manufacturing and agricultural profits was severed by Mill.

The only flaw in Mill's optimistic view of technological change was a latent Malthusianism which questioned the ability of the working classes to limit their numbers so as not to offset the benefits of rising productivity (23). Nevertheless, Mill was able to recognize empirical evidence which contradicted his fears: "Subsistence and employment in England have never increased more rapidly than in the last forty years (1862), but every census since 1821 showed a smaller proportional increase of population than that of the period preceeding . . ." (24).

IV

HENRY GEORGE AND TECHNOLOGICAL CHANGE: THE RICARDIAN CASE

EVEN THOUGH IT WAS MILL'S *Principles* which introduced George to political economy and even though they corresponded on economic

issues (25), George's analysis of technological change did not begin with Mill's optimism concerning the favorable influence of technology on non-rent shares of income. Instead, George begins with the Ricardian model. Although it cannot be demonstrated conclusively that George had full knowledge of the theory and details surrounding the famous Ricardo-Malthus controversy over the influence of technology on the rent share of income, nevertheless, George appears to have modeled his analysis and refutation of the benefits of technology around the essential difference between the Ricardian and Malthusian views.

While Ricardo thought technological change reduced the rent share, Malthus believed productivity improvements caused increases in rent income. As Paglin has demonstrated, Ricardo's analysis of technological change was shortrun in character. Innovation was cost-reducing but not output-increasing; consequently, *with population implicitly assumed constant,* the withdrawal of marginal agricultural land from use reduced rent income absolutely and relatively with respect to the other shares of income. In contrast, Malthus' analysis of technological change was longrun in character. Innovation was considered output-increasing; but, with *population increasing,* the subsequent cultivation of increasingly inferior land continued to increase rent income (26).

George's refutation of the Ricardian variant of the classical controversy over technological change occurred in Book IV, Chapter 3 of *Progress and Poverty.* Here George assumes, like Ricardo: *"Eliminating increase of population,* let us now see what effect improvements in the arts of production have upon distribution" (27). The results of George's analysis must have been gratifying. He denies the Ricardian conclusion, yet affirms the Malthusian results of improved technology increasing rent at the expense of wages and interest without the crucial Malthusian assumption of ". . . recourse to the theory of increasing pressures against the means of subsistence" (28).

George's analysis of the Ricardian argument was both straightforward and novel in its observations on the nature and characteristics of the demand for commodities with a given population. First, George assumed correctly that "Demand is not a fixed quantity, that increases only as population increases. In each individual it rises with *his* power of getting the things demanded" (29). Consequently,

> . . . an improvement which effects a saving in the labor required to produce one of the things desired, is, in effect, an increase in the power of producing all the other things. If it take half a man's labor to keep him in food, and the other half to provide him clothing and

shelter, an improvement which would increase his power of producing food would also increase his power of providing clothing and shelter (30).

George's ultimate demonstration of this point suggests an intuitive understanding not only of the income elasticity of demand (31), but also of the evolution of consumer preferences towards forms of commodities with higher income elasticities even among basic foodstuffs:

> The man who now uses coarse food, and lives in a small house, will, as a rule, if his income be increased, use more costly food, and move to a larger house. If he grows richer and richer he will procure horses, servants, gardens and lawns, his demand for the use of land constantly increasing with his wealth (32).

Nevertheless, to George, the distributional consequences of factor-saving technological change were inevitable. *Without any increase of population*, demand growth extended the margin of cultivation and ". . . rent will increase both in proportion and amount . . ." (33). In all cases associated with technological change, George believed the relative and absolute share of rent income increased while the relative share of wages and interest declined. However, the effect on the "quantity" of wages and interest, George's term for the absolute share, was uncertain. Initially, the lost earnings of labor and capital displaced by technological change were offset by the increased efficiency and earnings of the employed capital and labor so that ". . . wages and interest, in quantity, would be no more than before . . ." (34). On the other hand, if what George termed the "area of productiveness" (35) was ". . . sufficient to employ all the labor and capital displaced from the cultivation of the superior lands," then absolute wages and interest may increase. If the "area of productiveness" is insufficient, absolute wages and interest would also decline (36).

But, given the steady "march of invention" and inexorable extension of the margin of cultivation coupled with land speculation in anticipation of higher rents further reducing the "area of productiveness," the inevitable distributional effect of technological change, as George saw it, was to produce both an absolute and relative decline of non-rent shares of income, especially wages (37).

Henry George's refutation of the Ricardian-Millian tradition concerning the benefits of technological change accruing to the relatively abundant factors, capital and labor, was a significant element in George's analysis of socio-economic distress in late 19th century America. Therefore, it is not surprising that this area of George's work was carefully examined by both his British and American critics (38).

However, the most notable opportunity for refuting George's analysis of technological change within the context of the original Ricardo-Malthus controversy came during the three Bristol lectures (1883) on *Progress and Poverty* delivered by the eminent neo-classicist, Alfred Marshall. Marshall, who was disturbed by the influence of George on the English radical movements, intended to "avoid talking very much about George but to discuss his subject" (39). The first lecture documented the rise in the standard of living of the English workingmen while the final lecture argued forcefully against the nationalization of land. In the second lecture, the one which is relevant to George's refutation of the technological consequences in the Ricardian model, Marshall surprisingly confines himself to giving George a lesson in marginal productivity theory, pointing out, for example, that factor income depends both upon the productivity of resources and the relative factor supply. At only three points in the Lectures does he indicate that productivity increases improve factor returns (40). However, nowhere does Marshall present in detail the form of analysis contained in Appendix L of his *Principles* which supports the Ricardian-Millian case of technological change benefiting the more abundant factors of production, capital and labor, by reducing both the absolute and relative share of rent income (41).

V

HENRY GEORGE AND TECHNOLOGICAL CHANGE: THE MALTHUSIAN CASE

USING AS CRITERIA George's assumptions and the detailed reasoning of his position, his refutation of the Ricardian case on technological change was more effective than his attempted refutation of the Malthusian version in the Ricardo-Malthus controversy. George's analysis was defective because he failed to consider the Malthusian argument within the context of all its assumptions, that is, a dynamic long-run model in which technological change occurred simultaneously with increases in output and population. Guided by his desire to refute the quintessential importance of Malthusian population theory to the classical model, George chose instead, especially in Book IV, Chapter 2 of *Progress and Poverty,* to consider the case of an increased population ". . . without any advance in the arts. . . ." George's first objective, therefore, was to show that ". . . the natural increase of population does not produce want . . ." and social distress (42). He achieved this by introducing his version of "increasing returns to scale":

For increased population, of itself, and without any advance in the arts, implies an increase in the productive power of labor. The labor

of 100 men, other things being equal, will produce much more than one hundred times as much as the labor of one man . . . so, with every additional pair of hands which increasing population brings, there is a more than proportionate addition to the productive power of labor (43).

Nevertheless, George believed rent income, absolutely and relatively, will increase, but for non-Malthusian reasons. The economies associated with population growth, increasing civilization and urbanization eventually were constrained by the core of George's vision in *Progress and Poverty,* the growing monopolization of land and rising land values (44). But George's introduction of the "increasing returns" argument as a rebuttal to Malthusian population theory was akin to opening a Pandora's box which ultimately jeopardized his solution to the social problem.

First, George's increasing returns analysis introduced a more optimistic view concerning the distribution of income in society (45). This became evident when George postulated three cases which compared the relative strength of increasing returns to the "diminishing productiveness of the land." In case III, the "diminishing productiveness of land" was stronger, thus the absolute and relative *wage* share declined while the absolute and relative *rent* share increased. In case II, increasing returns and rising labor efficiency just offset the "diminishing productiveness" of land. Thus, although the wage share of income declined, wages ". . . as a quantity would remain constant (46). Finally, Case I was the most favorable:

If the relations of quantity and quality were such that increasing population added to the effectiveness of labor faster than it compelled a resort to less productive qualities of land, though the margin of cultivation would fall and rent would rise, the minimum return to labor would increase. That is to say, though wages as a proportion would fall, wages as a quantity would rise (47).

Moreover, compared to the model he used to analyze the distributional impact of technological change *in the absence of population growth,* George's increasing returns analysis was still more optimistic. Recall, only in the case of a favorable "area of productiveness," which George considered temporary, would technological change produce a rise in the absolute wage share. Eventually, and in all other cases, technological change caused a decline in both the absolute and relative share of wages and interest. By definition, Case I and II of his increasing returns analysis yielded more favorable results on the distribution of income, at least from the wage earner's point of view.

Finally, George's consideration of "increasing returns" and its optimistic consequence of potential rising per capita income as a counterpoise to his pessimistic vision of land monopolization yielding confiscatory rent income, pointed to a serious void in his analysis of the "increase of want with increase of wealth," namely, his failure to consider a model which analyzed simultaneously "increasing returns" with increasing population and technological change. Such a model, which appeared within George's analytical grasp, would have had the virtue of not only combining all the disputed elements in the Ricardo-Malthus controversy over the distributional impact of technological change, but also the added feature of increasing returns to scale.

However, had George pursued this line of analysis, it would have been difficult to show that economic progress was inevitably associated with rising absolute and relative shares of rent income. At the least, a combined model would have suggested a steadily rising per capita income and some stability or moderate fluctuations in the relative shares of national income. Actually, with evidence provided by the research of contemporary economic historians, evidence clearly unavailable to Henry George, per capita income did rise during the period 1840–1880 which is relevant to George's experience culminating in the publication of *Progress and Poverty* in 1879. Per capita Net National Product grew at an annual rate of 1.44 p.c. (48). Moreover, during the same period, the relative shares of labor income and property income (capital and land) fluctuated moderately around an average 66.6 p.c. labor share and 33.4 p.c. property share (49).

Although the rent share of income is hidden in the aggregate property share, nevertheless, estimated factor output elasticities for the periods 1840–1900 and 1900–1960 suggest slowly rising labor and capital shares of income (from .68 to .71 for labor and .19 to .23 for capital) and declining rent shares for land (from .13 to .06) (50). Since capital was the more rapidly growing factor (5.29 p.c. per year versus 2.89 p.c. and 2.84 p.c. for labor and land respectively), the price and share of income going to capital should have declined. It did not, for several reasons. For one, technological change, which accounted for nearly 21 p.c. of the annual growth rate of Net National Product (4.21 p.c.), protected the relative share of the "abundant" factor of production. This result is consistent with the Ricardian-Millian case of technological change. For another, the dominant role of capital and accompanying technological change not only enhanced capital's income, but also that of labor through improved productivity.

For example, in explaining the per capita growth of Net National Product during this period (1.44 p.c. per year), increases in the capital stock alone account for 33 p.c. of per capita growth, while accompanying technological change and increases in factor productivity account for an additional 60 p.c. of per capita growth. In short, the rapid increase of capital in a growing manufacturing economy was more significant for labor rather than land income (51).

VI

CONCLUSION

THE INEVITABLE AND DIFFICULT QUESTION remains—why did George avoid the next logical extension of the analysis already contained in *Progress and Poverty,* that is, the blending of technological change and increasing returns? It is clear that the results of such an analysis would have seriously weakened both his predictions of the trend in relative income shares and the uniqueness of his "single-tax" as *the* solution to social and economic distress. Although definitive answers concerning George's behavior are difficult to establish, certain questions can be raised. For example, if Oser is correct in his observation that George confused the law of diminishing returns with the law of increasing returns (52), then George might have been incapable of producing a model combining increasing returns and technological change. The law of diminishing returns and that of increasing returns to scale involve different aspects of a production function, that is, that relationship between inputs and output at a given level of technology. The former involves diminishing marginal output of one input varied with respect to a fixed amount of the other input; the latter involves the greater proportionate increase in output resulting from varying given amounts of both inputs in the long-run. Technological change would enlarge the value of output in both cases.

Although George never defined the short and long run nature of a given production function, the individual elements of production theory were clearly present in his economic thought. First, he knew the difference between increasing returns and growing labor efficiency and technological change (53). Second, George strongly implied that factor-saving technological change increased the value of capital's and labor's marginal product: "Now, either one-tenth of the labor and capital may be freed, and production remain the same as before; or the same amount of labor and capital may be employed, and production be correspondingly increased" (54). Finally, contrary to Oser's view, George gave evidence of knowing the difference between in-

creasing returns to scale and diminishing returns. As E. H. Johnson pointed out years ago in a dated yet still interesting commentary on *Progress and Poverty,* the law of diminishing returns is embodied in George's notion of "the diminishing productiveness of the land," that is, where capital and labor are applied to existing land or new parcels of relatively inferior land (55). In his later work, *The Science of Political Economy,* George also revealed his understanding of the law of diminishing returns:

> That is to say, there is a law governing and limiting the concentration of labor in time, as there is a law governing and limiting the concentration of labor in space. Thus there is in all forms of production a point at which the concentration of labor in time gives the largest proportionate result: after which the further concentration of labor in time tends to a diminution of proportionate result, and finally to prevent result (56).

Therefore, if George were capable of economic analysis combining increasing returns and technological change, there remain only several factors which might explain his reluctance (57). Foremost, and for reasons noted early in this paper, there was George's persistent attempts to remove Malthusian population theory as the centerpiece of classical analysis. This was the immediate occasion of George's development of increasing returns analysis; however, in his eagerness to eliminate Malthusianism, George introduced a concept whose ultimate implications he was unwilling to explore. In the final analysis, however, a combined model of technological change and increasing returns created results in sharp conflict with George's original and persisting vision divined on the occasion of a late afternoon walk through the Oakland foothills, namely, that land monopolization is *the* cause of rising rentier income and the impoverishment of the vast majority of mankind. Even though George believed that ". . . political economy is not a set of dogmas. It is the explanation of a certain set of facts" (58), still, the evidence suggests that his background, temperament, deeply felt religious and moral convictions (59) were capable of allowing his vision as ideology to block alternative lines of economic inquiry in *Progress and Poverty.*

1. To cite only a few: Will Lissner, "On the Centenary of *Progress and Poverty*," *American Journal of Economics and Sociology,* 38 (January, 1979); Stuart Bruchey, "The Twice Forgotten Man: Henry George," *ibid.,* 31 (April, 1972); Bernard Newton, "The Impact of Henry George on British Economists," *ibid.,* Part I, 30 (April, 1971); Part II, 30 (July, 1971); Part III, 31 (January, 1972); and Charles Collier, "Henry George's System of Political Economy," *History of Political Economy,* 11 (Spring, 1979), pp. 64–93.

2. Henry George, *Progress and Poverty: An Inquiry Into the Cause of Industrial Depressions and of Increase of Want with Increase of Wealth* (New York: Modern Library edition, 1929), p. 424. Hereafter cited as *Progress and Poverty*.

3. Charles A. Barker, *Henry George* (New York: Oxford Univ. Press, 1955), p. 376. For a cogent summary of George's influence, see Stuart Bruchey, *op. cit.*, pp. 113–15.

4. Barker, *op. cit.*, p. 136. Also, p. 121.

5. Albert J. Nock, *Henry George: An Essay* (New York: William Morrow & Co., 1939), p. 56; *Progress and Poverty*, p. 333.

6. See Jerry K. Frye, "Rhetorical Strategies Employed by Henry George and His Followers," *American Journal of Economics and Sociology*, 32 (October, 1973), pp. 405–19.

7. Barker, *op. cit.*, p. 302.

8. *Ibid.*, p. 273.

9. *Progress and Poverty*, p. 105 *fn.*

10. For an excellent account of the dramatic revision of the first edition, see, Thomas Malthus, *On Population*, Gertrude Himmelfarb, ed., (New York: Random House, 1960), pp. xiii–xxxvi. It is clear that by the time his *Principles of Political Economy* was published, Malthus was even more explicit in his statement of moral restraint as a preventive check to population increase. For example, an increase in wages did not necessarily imply an increase in population, but possibly an ". . . improvement in the modes of subsistence, and the conveniences and comforts enjoyed . . ." Thomas Malthus, *Principles of Political Economy* (Boston: Wells & Lilly, 1821), p. 195.

11. MacDowell notes that George's suspicion of Malthusian population theory is premised on its use as a rationale against social action. He also notes Malthus' eventual modification of his population theory, and thus concludes that both George and Malthus ". . . were to question this basic tenet of the 'dismal science'." Since it is likely, however, that George read or examined in part the later edition of Malthus' *Essay*, what MacDowell fails to note is why George continued to use and refute the original and more naive edition of the *Essay* Michael A. MacDowell, "Malthus and George on the Irish Question: The Single Tax, Empiricism, and Other Positions Shared by the 19th Century Economists," *American Journal of Economics and Sociology*, 36 (October, 1977), pp. 407–08.

12. *Progress and Poverty*, p. 558.

13. *Ibid.*, pp. 478–80, 558.

14. *Ibid.*, pp. 338–39.

15. In the Smithian tradition, the growth of population or, more specifically, the growth of productive labor serves as a catalyst insofar as it *translates* the accumulation of capital into vendible commodities. Adam Smith, *An Inquiry Into the Nature and Causes of the Wealth of Nations* (Edwin Cannan, ed.), (New York: Random House, 1937), pp. 314–15; 321. Also, Ricardo believed the price of wheat regulated manufacturing profits through its influence on money wages and manufacturer's raw materials supplied by the agricultural sector. See Piero Sraffa, ed., *The Works and Correspondence of David Ricardo* (10 vols., Cambridge: Cambridge Univ. Press, 1953) I, pp. 72, 93, 101, 115, 117–19.

16. In the Ricardian stationary state model, the real per capita subsistence wage remains constant while the nominal wage rate rises with the increase in the price of "corn"; moreover, if the growth in population lags the growth in capital, the nominal market wage will cyclically rise then return to the natural real wage. Further, if we assume the aggregate production function has a simple quadratic form with consequent linear marginal and average product curves, an assumption consistent with Ricardo's presentation of the stationary state model, then, although profit's relative share decreases from the outset, the absolute share going to profits initially rises then eventually declines. Technically, capital accumulation ceases at a minimum rather than zero rate of profit, athough as Blaug has observed, as long as the minimum rate of profit is constant, this assumption ". . . does not affect the argument in the slightest; all that happens is that the stationary state comes sooner." Mark Blaug, *Economic Theory in*

Retrospect (Cambridge: Cambridge Univ. Press, 1978), p. 93. In general, Chapter 4 in Blaug's work, "Ricardo's System," is an excellent treatment of the intricacies, limitations, and possibilities of the Ricardian model.

17. *Progress and Poverty*, p. 97.

18. *Ibid.*, pp. 218, 478–80.

19. *Ibid.*, p. 141.

20. As noted above in footnote 10, even Malthus eventually saw where industrialization might restrain population growth and permit the rise in per capita income.

21. John Stuart Mill, *Principles of Political Economy*, edited with introduction by W. J. Ashley (New York: Augustus M. Kelley, 1965), pp. 182–88. Also see pp. 704 and 716–17.

22. *Ibid.*, p. 185.

23. *Ibid.*, p. 161. Also, pp. 187, 380–81, 719, 757–58.

24. *Ibid.*, p. 161.

25. Barker, *op. cit.*, pp. 122, 133–34.

26. Morton Paglin, *Malthus and Lauderdale: The Anti-Ricardian Tradition* (New York: Augustus M. Kelley, 1961), pp. 61–73.

27. *Progress and Poverty*, p. 244. Italics added. George, however, presumes his analysis will hold whether he makes the additional Ricardian assumption about innovation, that, for example, ". . . one-tenth of the labor and capital may be freed, and production remain the same as before . . .", or the opposite Malthusian assumption that the same amount of labor and capital may be employed, and production be correspondingly increased" (p. 250).

28. *Ibid.*, p. 244.

29. *Ibid.*, p. 245. Author's italics.

30. *Ibid.*, pp. 246–47.

31. The percentage change in the quantity consumed of a commodity with respect to the percentage change of income.

32. *Progress and Poverty,* p. 248.

33. *Ibid.*, p. 251.

34. *Ibid.*, p. 250.

35. Available land more productive than zero rent land at George's "margin of cultivation" or "production." *Ibid.*, pp. 249, 251.

36. *Ibid.*, pp. 251–52. As Newton has shown, George's critics thought he had confused the relative and absolute shares of the distributional total (Bernard Newton, *op. cit.*, Part III, p. 98); however, George did know the difference. Newton, Part I, pp. 183–84. As George clearly stated on p. 216 of *Progress and Poverty*, "I am using the word wages not in the sense of a quantity, but in the sense of a proportion. When I say that wages fall as rent rises . . . The proportion may diminish while the quantity remains the same or even increases."

37. *Ibid.*, pp. 253, 259.

38. For example, a number of English writers, notably Arnold Toynbee, challenged the distributional consequences of George's model citing evidence from the American economy which indicated rising wages and interest. See Bernard Newton, *op. cit.*, Part III, p. 98. Also, Francis A. Walker's criticism of George on technological change is summarized well by Steven B. Cord, *Henry George: Dreamer or Realist?* (Philadelphia: University of Pennsylvania Press, 1965), pp. 40–43. See also B. Newton, *The Economics of Francis Amasa Walker* (New York: Kelley, 1967), pp. 53–54.

39. Rita McWilliams-Tullberg, "Marshall's Tendency to Socialism," *History of Political Economy*, 7 (Spring, 1975), p. 86.

40. George J. Stigler, ed., "Alfred Marshall's Lectures of *Progress and Poverty*," *Journal of Law and Economics*, 12 (April, 1969), pp. 188, 193, 194.

41. Alfred Marshall, *Principles of Economics* (2 vols., New York: Macmillan Co., 1961) I, pp. 833–37. However, in characteristic fashion, Marshall shows there are some special cases involving non-linear marginal product curves which alter the consequence of Mill's analysis although not Ricardo's. *Ibid.*, pp. 836–37.

42. *Progress and Poverty*, pp. 232, 123.

43. *Ibid.*, p. 232. It is clear George had grasped the essence of the "increasing

returns" concept, that is, with a given technology, doubling, for example, the number of resources in the long-run will more than double the output produced.

44. *Ibid.*, pp. 242–43.

45. Jacob Oser notes the latent optimism in George's increasing return analysis. *Henry George* (New York: Twayne Publishers, 1974), pp. 60–61.

46. *Progress and Poverty*, p. 233.

47. *Ibid.*, p. 233.

48. This figure is from Richard K. Vedder's work, *The American Economy in Historical Perspective* (Belmont, California: Wadsworth Publishing Co., 1976), pp. 98, 102. For a more detailed study, on which Vedder's work is based, see Robert Gallman, "The Pace and Pattern of American Economic Growth," Chapter 2 in Lance E. Davis, Richard A. Easterlin, and William N. Parker, eds., *American Economic Growth* (New York: Harper and Row, 1972), pp. 33–35.

49. Vedder, *ibid.*, p. 303. Vedder's data on "Property Income (%)" are a simple average of the Gallman and Budd estimates. Robert Gallman, *op. cit.*, pp. 37–39. Also, see Edward C. Budd, "Factor Shares, 1850–1910," in *Trends in the American Economy in the Nineteenth Century*, William N. Parker, ed., *Studies in Income and Wealth*, Vol. 24 (New York: National Bureau of Economic Research, 1960), p. 382. In addition, D. Gale Johnson, "The Functional Distribution of Income in the United States, 1850–1952," *Review of Economics and Statistics*, 36 (May, 1954), pp. 175–82.

50. Output elasticities estimate the marginal contribution to output by each factor of production. Thus, if labor's output elasticity is .68, a 1 p.c. increase in labor, holding other factors constant, will lead to a 0.68 p.c. increase in output. Output elasticities also approximate the factor share of income if each factor is paid according to its marginal productivity under competitive conditions. Robert Gallman, *op. cit.*, pp. 36–37, 39.

51. Vedder, *op. cit.*, pp. 100, 102; Gallman, *op. cit.*, pp. 34–35, 37. The 60 p.c. figure above captures not only the degree of technological change, but also the economics of scale and rising quality of labor (population) inputs that George analyzed in his "increasing returns" model. Also, George appears to have a sense of the relative factor supplies circa 1879. *Progress and Poverty*, p. 393.

52. Oser, *op. cit.*, p. 56.

53. *Progress and Poverty*, pp. 232, 235.

54. *Ibid.*, p. 250.

55. *Ibid.*, pp. 232–33. Also, E. H. Johnson, "The Economics of Henry George's 'Progress and Poverty'," *Journal of Political Economy*, 18 (November, 1910), pp. 716–17.

56. *The Complete Works of Henry George* (Garden City: Doubleday, Page, 1911), VII, pp. 368–69.

57. Although rooted in the evidence of George's economic analysis in *Progress and Poverty*, my conclusion concerning George's behavior is speculative rather than definitive. Its purpose is to suggest or open an alternative line of inquiry into his incomplete treatment of technological change and increasing returns. To conclude that George was merely inconsistent in his analysis, or failed to see the implications of his work would be less risky, but not necessarily correct.

58. *Progress and Poverty*, p. 11.

59. Barker notes the fervor, intensity, and persistence of George's original vision concerning the cause of poverty. Quoting George, "I turned back amidst quiet thought, to the perception that then came to me and has been with me ever since." Barker, *op. cit.*, p. 136. Also, Edward J. Rose, who lucidly and sympathetically portrays George's work as incisive socio-economic analysis embedded in a necessary and carefully woven fabric of religio-ethical Christian idealism, still can accept George as a "successful polemist." *Henry George* (New York: Twayne Publisher, 1968), pp. 77–79, 162.