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Incentive Taxation and the Environment: complex — yet feasible

JÜRGEN BACKHAUS AND JACOB JAN KRABBE

MOST PEOPLE associate Henry George with his proposal for a single tax on land. Although this association is correct, since George tied his name to the single tax proposal for which he campaigned during his bid for mayor of New York City in 1886, it would be wrong to consider George either a political utopian or the author of a very limited scheme of real estate taxation. As we shall argue, his classic *Progress and Poverty* (1879) contains the blueprint of a comprehensive policy towards the environment and the prudent use of natural resources. The policy relies on essentially one instrument. The so-called land tax is a confiscatory tax of the rents drawn from owning all kinds of natural resources, not just land. Although the Georgist program of environmental policy employs just one instrument, it is carefully designed to be far reaching in its effects.

This chapter offers a general characterization of George's economics in section I, considers the rôle of nature in George's theory in more detail in section II, relates his vision to modern economic theory in section III, and discusses the price system with respect to regulating the scarce resources of nature in more detail in section IV. Section V develops a scenario for the reversal of natural resource use in a Georgist world, and section VI gives a practical example by way of illustration.

The bulk of this study is literally based on Henry George's *Progress and Poverty*. In trying to demonstrate the logic of the Georgist system with examples such as those addressed by the

American 'Super Fund' legislation, we move slightly beyond a literal interpretation of George while remaining true to his principles. We show that Henry George's basic approach to economic thinking is timely in the light of some pressing problems currently experienced by industrialized nations. This study makes essentially two contributions. The first three sections show what Henry George's contribution consisted in and how it stands up in the light of contemporary economic thinking. Ultimately, our claim of Henry George's timeliness can only be tested by trying to show what it can accomplish in dealing with a contemporary problem. We take the current clean up efforts in the context of the American Superfund program as our point of departure and suggest how a Georgist approach to industrial siting might result in a more economical use of natural resources, rendering efforts such as the Superfund superfluous in the future. Obviously, before implementing a Georgist system, a phase of transition would be necessary, depending on the different institutional circumstances, and designed to clean up past and present pollution.

I. Henry George's Economics: A General Characterization

As the title of his famous book suggests, Henry George was concerned with explaining the sources of economic growth in order to overcome poverty. George wanted to show why — under current institutional arrangements — *progress* had not eliminated poverty. His is a thoroughly development oriented or evolutionary approach, emphasizing the institutional causes and barriers to economic development, and remaining critical towards the classical doctrine on which he otherwise relies. To George a perfect example of an oversimplistic approach seems to be the Malthusian doctrine. As George sees it: 'For poverty, want, and starvation are by this theory not chargeable either to individual greed or to social maladjustments; they are the inevitable results of universal laws. . . .' (George 1979: 99).

For George, who wanted economics to be a science that could be used to solve social prolems, a good economic theory would identify a specific cause for a societal problem which could be corrected by appropriate political or social action. This pragmatic attitude

emerges from the prose of this practical man, whose ambitions were not primarily those of scholarship but of social progress. He was not shy in registering his disagreement with economic writers who were trying to make economics a professional scholarly discipline. In emphasizing such differences, George rendered himself a disservice in that he never became part of a scholarly tradition, nor did he found an academic school of his own.[1] Consequently, many economists today would not even consider him as one of their own. The reasons for contemporary economists' scepticism *vis-à-vis* Henry George have little to do with his competence as an economist. As Schumpeter (1954: 865) points out:

> He was a self-taught economist, but he *was* an economist. In the course of his life, he acquired most of the knowledge and of the ability to handle an economic argument that he could have acquired by academic training as it then was. In this he differed to his advantage from most men who proffered panaceas. Barring his panacea (the Single Tax) and the phraseology connected with it, he was a very orthodox economist and extremely conservative as to methods.

Even about the Single Tax, Schumpeter has some kind words to say:

> The proposal itself, one of the many descendants of Quesnay's *impôt unique,* though vitiated by association with the untenable theory that the phenomenon of poverty is entirely due to the absorption of all surpluses by the rent of land, is not *economically* unsound, except in that it involves an unwarranted optimism concerning the yield of such a tax. In any case, it should not be put down as nonsense. If Ricardo's vision of economic evolution had been correct, it would even have been obvious wisdom. And obvious wisdom is in fact what George said in *Progress and Poverty* (Chapter I, Book IX) about the economic effects to be expected from a removal of fiscal burdens if such a removal were feasible.[2]

One has to agree with Schumpeter that the Single Tax issue may have stood in the way of a proper appreciation of George's contribution to economics. Most economists conversant with Henry George's writings would probably agree that the Single Tax on land proposal should not be considered his main contribution to economic analysis. We disagree. It was the central part and cornerstone of his political program, and he failed politically — for instance in his bid for the mayorship in New York City. Stripping his contribution of the language that befits programmatic literature, we feel that his

writings contain a thorough contribution to natural resource economics. It is this aspect of his work that we try to set out on the following pages.

As Schumpeter remarks, despite the oratory, George was a fairly thorough economist. His basic contention is that there are institutions in society which hold back economic progress, bringing about unnecessary poverty of the many in the interests of a few. If these impediments to human ingenuity and industry were removed, poverty could be overcome and progress attained. As we shall explain later, his evolutionary theory could take on organic traits, society being considered like an organism. In that, he anticipates some more recent developments in systems theory. An organic approach is not surprising insofar as 'living nature' takes the central place in George's exposition. Only as he confronts nature and draws upon her riches, is man, in his ingenuity, able to produce wealth. While animals and plants, by virtue of their existence and proliferation, press against the limits of their subsistence, man, if given access to natural resources, is able to extend those limits for himself. He can play the laws of nature, as George puts it, ever more effectively using natural resources and thus create a surplus over what had previously been available.

The underlying notion is optimistic indeed, since George opined that as long as man can function in ecosystems in a creative way and remains unhindered by social institutions, the rate of progress would by far exceed the rate of growth in the population. The more men there are, the further division of labor can develop and the more ingenuity will be displayed in using nature's riches to man's advantages. In this sense, nature is the most important factor of production, and George would speak of land, labor and capital in that order. However, 'land' is a shorthand for all natural resources. As he himself points out, 'the term land includes all natural opportunities or forces' (1979: 162). This is an important terminological matter, since many misunderstandings of George's economics derive from too narrow a conception of what he understood by land. Even the much criticized concept of the Single Tax appears in a rather different light if we consider it as concerning the rent of all natural resources, not just land.

George distinguishes between the three standard factors of

production, as opposed to the two original factors, land and labor. Labor includes 'all human exertion' and hence land denotes all the natural resources which man finds at his disposal. Since the Georgist concept of land is of central importance for our discussion, and since he is explicit about it, let us quote *verbatim*:

> Land, labor, and capital are the three factors of production. If we remember that capital is thus a term used in contradistinction to land and labor, we at once see that nothing properly included under either one of these terms can be properly classed as capital. The term land includes, not merely the surface of the earth as distinguished from the water and the air, but the whole natural universe outside of man himself, for it is only by having access to land, from which his very body is drawn, that man can come in contact with or use nature. The term land embraces, in short, all natural materials, forces, and opportunities, and, therefore, nothing that is freely supplied by nature can be properly classed as capital. A fertile field, a rich vein of ore, a falling stream which supplies power, may give to the possessor advantages equivalent to the possession of capital, but to class such things as capital would be to put an end to the distinction between land and capital, and, as far as they relate to each other, to make the two terms meaningless (George 1979: 38).

As Schumpeter had pointed out, the starting point for George's economics is Ricardo. George pushed the Ricardian approach to an extreme by adding a special twist. Since property in land — and natural resources in general — establishes singular rights in those resources, George felt justified in saying that: 'Rent, in short, is the price of monopoly, arising from the reduction to individual ownership of natural elements which human exertion can neither produce nor increase' (1979: 167). He did not suggest, however, that land owners acted in a co-ordinated way so as to avoid competition among each other. By way of explanation, he adds that: 'The law of rent is, in fact, but a deduction from the law of competition, and amounts simply to the assertion that as wages and interests tend to a common level, all that part of the general production of wealth which exceeds what the labor and capital employed could have secured for themselves, if applied to the poorest natural agent in use, will go to the landowners in the shape of rent' (1979: 170). Hence, 'rent' is 'the share in the wealth produced which the exclusive right to the use of natural capabilities gives to the owner' (1979: 166). Consequently the private ownership in natural resources creates a claim on income

that would otherwise have accrued in the form of wages or interest payments.

It is noteworthy that George's theory even extends into a macro-economic dimension. An almost 'Keynesian' optimism shines through when he elaborates on how effective demand stimulates the creation of wealth. 'Just as the subsistence of the laborers who built the Pyramids was drawn not from a previously hoarded stock, but from the constantly recurring crops of the Nile Valley; just as a modern government when it undertakes a great work of years does not appropriate to it wealth already produced, but wealth yet to be produced, which is taken from producers in taxes as the work progresses; so it is that the subsistence of the laborers engaged in production which does not directly yield subsistence comes from the production of subsistence in which others are simultaneously engaged' (George 1979: 76).

Inhibiting forces to economic development are thus not to be found in the economic process as such; they are social, namely to be found in exclusive claims on natural resources.

In the course of time, as all the marginal land was to be claimed and the western frontier pushed all the way to the Pacific Ocean, George expected that the claim on the social product laid by the private ownership of land in the form of the land rent would steadily increase. As a matter of fact, this is not quite what we have observed even in densely populated western countries. While the actual development might have surprised Henry George, it is not in conflict with his economic theory. Indeed, his own theory, as he so aptly explained, would have suggested what really happened. Since man is able to play the games of nature, agricultural productivity has increased way beyond expectations, and this has reduced the relative scarcity of land. On the other hand, uses other than agriculture have assumed increasing importance. Yet, one would be wrong in focussing on land only. Henry George is talking about natural resources in general. And here it is true that the share of the social product claimed by the need to keep up commonly owned natural resources is steadily increasing. Of course, there is no element of proprietal rent here, rather we witness the opposite: an ever increasing scarcity due to overuse of commonly owned resources.

This development can be analysed in terms of George's crucial

distinction between dysfunctional and functional land rent. The distinction refers, on the one hand, to income derived from the property of the resource as such, for instance to income derived from unworked land. Such income, according to George, has no productive purpose or function in the economic system. On the other hand, people may receive income from whatever work they have done to a natural resource in order to improve it. Improvements that have been made on a natural resource should generate income, the function of which is to stimulate such improvements.

The guarantee of private property rights in improvements to natural resources is not stipulated in an *a priori* fashion. George adopts a functionalist legitimization of private property titles. 'What is necessary for the use of land is not its private ownership, but the security of improvements' (George 1979: 398). Hence a functional distinction between private property rights in improvements and common property in the natural resources. The distinction is actually carried further. Since the productive use of natural resources may generate positive externalities, not every improvement can be privately appropriated. The externalities belong to the common property domain, too. 'The law of society is, each for all, as well as all for each. No one can keep to himself the good he may do, any more than he can keep the bad. Every productive enterprise, besides its return to those who undertake it, yields collateral advantages to others. If a man plant a fruit tree, his gain is that he gathers the fruit in its time and season. But in addition to his gain, there is a gain to the whole community. Others than the owner are benefited by the increased supply of fruit; the birds which it shelters by far and wide; the rain which it helps to attract falls not alone on his field; and, even to the eye which rests upon it from a distance, it brings a sense of beauty. And so with everything else' (George 1979: 435).

This telling passage implies that in addition to the rents from natural resources, the accumulated unappropriable improvements in these resources are part of the common property domain. This includes the entire cultural heritage of a country, landscape, the architectural harmony of historic cities and villages, and so on. Realizing that these common resources, to the extent that they are privately used, can potentially generate a stream of tax income up to 100% of the value of their rent, we wonder whether Schumpeter in

his pessimistic assessment of the overall yield of the Georgist tax fully appreciated the extent of the tax base. However, in addition to the full rent from natural resources and the full rent from common property improvements, there is a further Georgist stream of tax revenue stemming from the obverse of those improvements guaranteed to their improvers.

It is perfectly in keeping with George's approach also to look at the impairments to natural resources. For instance, an industry that spoils the land by contaminating the groundwater or pouring poisonous substances into it reduces the value of this natural resource. Hence, such an industry should derive a negative stream of income for damaging the land. The principle is certainly applicable beyond land use. Consider an oil field beneath the sea. Applying George's reasoning, the developer should receive an income from exploring and developing the oil field, but not from the resource as such, upon which the owner state should levy a royalty. Likewise, fishermen should derive income from going out to sea and fishing, but not from the presence of the fish as such, unless they were fish farming and increasing the fish supply. Hence, in a Georgist world, fishermen would be expected to pay a fee for their use of the unimproved waters wherein they fish.

Now consider the case where an oil rig spills oil into the sea, destroying the fish. Although the fishermen do not own the resource, the operators of the oil rig have impaired the natural resource owned by the community, and for that impairment a negative income stream should be derived; or, to put it in less stilted language, the community should derive an income compensating for the abuse of the commonly owned natural resource. As Schumpeter sensed, this is perfectly in keeping with conservative economics. Broadening the scope of what natural resources comprise, however, also broadens the base of the Single Tax, and thus might sway those who are pessimistic about its fecundity. In addition, it should be pointed out that the Georgist tax, from the point of view of allocative efficiency, is fairly neutral. The Single Tax on natural resource use is a tax as close to the allocational neutrality of the textbook tax as one can get. It neither impedes productive economic activity, nor does it distort the price structure. And thirdly, it conforms to the benefit principle. Yet, it tends to economize on

natural resources and to encourage sound economic growth, which in turn has a tax base broadening effect.

The last important element which we want to highlight is technology or, as George preferred to call it, 'mental power'. 'Mental power', he said, is 'the motor of progress' (1979: 507). This he meant with respect to three different aspects: mental power might be devoted to the extension of knowledge, or the improvement of methods, or else the betterment of social conditions. Just as did his contemporaries Gustav Schmoller and Lujo Brentano, he emphasized the latter by way of pointing out that: 'It has the same effect as increased skill or industry' (1979: 308).

There is a special reason why he felt that way. Without calling it by this name, George had a theory of rent seeking behaviour, and he was thus interested in making the distinction between human effort devoted to upholding the institutions which led to mere rent seeking, thus hindering progress, and that effort which led to genuine wealth creation. Obviously, the extension of effort on 'non-progressive purposes' should be minimalized in the interest of society. 'These non-progressive purposes in which mental power is consumed may be classified as maintenance and conflict. By maintenance I mean, not only the support of existence, but the keeping up of the social condition and the holding of advances already gained. By conflict I mean not merely warfare and preparation for warfare, but all the expenditure of mental power in seeking the gratification of desire at the expense of others, and in resistance to such aggression' (George 1979: 507).

II. Nature: A Central Focus of George's Theory

Wealth is said, by George, to consist of natural products, due to their having been secured, moved, combined, separated or in other ways modified by human desires (1979: 41). Natural resources are 'the storehouse upon which [man] must draw for all his needs, the material to which his labour must be applied for the supply of all his desires' (1979: 295). Labor is defined as the factor of production 'which gives value to material things' (1979: 42). Production is then adequately defined as a process of value creation. It is the creation of

value, not reaping its fruits, which is considered production. Accordingly, in agriculture, production does not take place during harvest time 'but step by step during the whole process' (1979: 68). Here, as in various other respects, George's strongly resembles physiocratic theory. The resemblance is, however, not perfect. While for the physiocrats production is necessarily tied to biological processes that take place in nature, George considers production as the interaction between man and nature. Biological and non-biological forms of production may substitute for each other.

Today, we can look upon George's theory of production as a forerunner of an ecologically oriented economics such as the 'materials balance' approach of such economists as Kneese, Ayres and d'Arge (Kneese 1970), but this approach remains more in a mechanistic systems theoretic context. Consider the following: 'Life does not use up the forces that maintain life.' And he adds: 'The human being, physically considered, is but a transient form of matter, a changing mode of motion. The matter remains and the force persists' (George 1979: 133-134). George postulated that an increase in population density will always cause an increase in welfare. Schmoller was more cautious in suggesting that in his time and place, that is Germany at the end of the 19th century, as a consequence of technical innovation and institutional change, there was room for growth in the population. Both George and Schmoller thought of economies that develop; their point of view was dynamic.

From today's point of view, we are surprised by George's optimism. Will industrial production not use up natural resources? George wrote for a time when the frontier was still moving west and he did not consider the destruction of natural resources through the industry of men. However, although he may have underestimated the importance of raw materials, his theory contains the germs that enable us to adequately deal with such a use of natural resources, as we point out in sections 4-6.

In discussing nature, George focussed on what he considered to be the shortcomings of classical thought. In particular, he was critical of Malthus, Ricardo and John Stuart Mill in as much as they asserted that an increase in population would result in a decrease of the average welfare of the populace. Based on this criticism, he formulated an alternative philosophy of development, which, according to

him, does not suffer from shortcomings similar to those of classical theory. Yet, sometimes one gets the impression that in his critical zeal he was pushing too far.

Biological processes take a central place in George's scheme of thought. We may even recognize in his writings the modern ideas of an ecological equilibrium and an ecologically sustainable process of production. George speaks of a 'natural balance' between 'the reproductive and destructive forces of nature' (1979: 196). In his vision, the remuneration of the factors of production depends on regularities by which the living organisms of nature abide. His theory of distribution is certainly consistent. The incomes of all three factors of production are all determined in terms of the same reasoning. This consistency has a price. George's theory of distribution renders but a partial view. His notion of production contains much more than just reaping the fruits of nature. Yet, beyond agriculture, the theory of distribution remains incomplete — although certainly amendable.

Production, says George, 'does not merely mean the making of things, but includes the increase of value gained by transporting or exchanging things' (1979: 155). He distinguishes three 'modes' of production, namely: '*Adapting*, or changing natural products either in form or in place so as to fit them for the satisfaction of human desires. *Growing*, or utilising the vital forces of nature, as by raising vegetables or animals. *Exchanging*, or utilising, so as to add to the general sum of wealth, the higher powers of those natural forces which vary with locality, or of those human forces which vary with situation, occupation, or character' (George 1979: 186).

Only one 'mode', namely 'growing', determines the prices of the factors of production. In other words, 'the reproductive or vital force of nature' (1979: 182) determines the prices of the factors of production. While the other two modes are well considered important in the process of production, they play no rôle in his theory of price formation. Still, George talks about the 'productive power in men' (1979: 184), and these powers fall mainly within the mode of production characterized as 'adapting natural products'.

George was certainly right in saying that institutional changes in economy and society can result in such an increase in welfare on earth that many more people could live on it than up to now, when

Georgist reforms have taken place on only a very modest scale. Where such reforms have taken place, they have actually been very successful. George emphasizes economies of scale that a country can reap as its population grows. He also pin-points a fair number of inefficient uses of the means of production. Yet we think that he went too far in asserting that an unlimited number of people might be able to live a decent life on earth.

A brief look at his method may help us illuminate his thinking. George worked empirically. He drew conclusions from observations, and California served him as a special testing ground. The growth in California's population, which allowed for a deeper division of labor, is considered not only a condition but even the cause of an increase in her welfare. In this respect as in others, his approach parallels that of the historical school and notably Schmoller (Schmoller 1900: 182 [1]; 184 [2], who talked of the *Verdichtung der Bevölkerung*, a term which not only means an increasing population density but likewise an increase in opportunities of productive interaction among men. But George went further than Schmoller.

Classical thought, on the contrary, was a search for defining general equilibria. George did not appreciate this aspect of the classical approach, and consequently he did not accept the classical conclusions. Equally noteworthy in George's thought is his use of biological ideas. We find a similar approach with Roscher (see Krabbe 1987). Statements such as life 'does not use up the forces that maintain life' make him a comfortable neighbor to such ecology economists as Nicholas Georgescu-Roegen who also use organic models (Georgescu-Roegen 1976).

As far as George is concerned, population growth can for our practical purposes continue uninhibited, as long as men have enough 'elbow room' (1979: 134). We feel that assertions such as these, motivated by his desire to disprove Malthus, not only go too far but are also in discord with the basic structure of his thinking. George does not need these extreme statements. On the contrary: his theory allows one to develop remedies against the overuse of natural resources that might put the subsistence of men at peril.

III. George's Vision in Terms of Economic Theory

George's approach to reality may be described in the following way. His method was an integration of the approach discussed in the previous section and classical thought. Hence, one might say that he combined a dynamic theory of an organistic type with classical equilibrium theory. The Ricardian rent theory, which he so vigorously opposed when discussing the sources of economic welfare, is nevertheless the basis for his theory of distribution. As he said himself, his integration took place 'in an original and subtle way.' Let us explain.

When George tried to describe how income is being distributed among the factors of production (land, labor and capital, identified and named in this order), he was dealing with an equilibrium model that could not be more classical. Yet in this model we can distinguish a macro level and a micro level. George suggested that the factors of production and the income accruing to them have to be defined in a consistent way (1979: 160). The distinction must be based on logical reasoning, and the attribution of income to the factors of production must be possible without leaving a residual. His basic macroeconomic equation (1979: 171) is this:

$$\text{Produce} = \text{Rent} + \text{Wages} + \text{Interest}$$

Produce is the national income minus depreciation. Rent is the net income from the land. Wages are the sum of all incomes from labor, including the wages of the entrepreneurs. Interest is the price for using capital. According to George, the net land rent is an improper part of income, and the implication of that assumption is revealed when the equation is rewritten as:

$$\text{Produce} - \text{Rent} = \text{Wages} + \text{Interest}$$

The larger the dysfunctional land rent, other things being equal, the less of national income can be distributed as wages and interest.

On the micro level, the factors of production and the income they derive are defined in such a way that nature becomes the focal point again. The land rent is discussed in classical terms: 'The rent of land

is determined by the excess of its produce over that which the same application can secure from the least productive land in use' (George 1979: 168). His notion of the interest rate again reminds us of the physiocrats. The amount needed to compensate the capital owners for the use of the capital, according to George, equals the increase in the 'vital forces of nature' (1979: 182) accomplished with the investment. The interest rate is thus based upon 'the active power of nature; the principle of growth, of reproduction', this being due to the fact that there is life on earth (1979: 181). Ultimately, interest depends upon the reproductive powers of nature. While capital itself is sterile, the average power of increase which attaches to capital stems from its use in 'reproductive modes'.

Likewise, trade occurs because nature is so varied in different places and trade makes more effective use of the fruits of nature. By 'interchangeability' the creation of value with raw materials is related to biological processes of production (George 1979: 182). Labor income is defined in similar terms. 'Wages depend upon ... the produce which labor can obtain at the highest point of natural productiveness open to it without the payment of rent' (1979: 213) or similarly, on p. 205: 'what a given amount of labor will yield will vary with the powers of the natural opportunities to which it is applied.' The microeconomic framework in which the factors of production operate is perfect competition in all markets, and the price of a factor of production depends on both the average and the marginal productivity, or else the average and marginal income from that factor. The model which is basically static is being dynamized with George's organic theory of development based on nature, which we discuss in the next section.

In the static model, the net land rent is considered an improper income and thus an improper cost component. In the ideal world of things which the writer aimed at, the land rent as defined above will be claimed by government and will be its main source of revenue. We noticed earlier that this idea has been often ridiculed as reflecting a gross overestimation of the possible revenue. Not unlike many modern welfare theorists, George was indeed optimistic about the likely behavior of those in public office. Government will not act so as to maximize the rent revenue, that is as a monopolist, but instead in order to maximize social welfare. Government will levy a user

charge on land, reflecting the 'shadow price' of its use, whereby the shadow price would be calculated under the assumption of perfect competition.

Yet Henry George was clearly not quite as naive about the courses of action in which governments are likely to engage as we might think at first glance. Interspersed throughout the book are critical remarks about the dangers of government bureaucracy and their proclivity to supporting monopolized industry. Yet George did more than just issue warnings. Properly interpreted, George proposed an intricate tax constitution with the most parsimonious means. The tax constitution was designed to harness the taxing government in the interest of economic prosperity, forcing the public authority to make the most prudent use of available natural resources taking into account the long term perspective. How can this claim be sustained? Let us look at the different features of the Georgist system and how they fit together.

The first feature is the obvious simplicity of the tax system, of which George was very proud. There is just one tax, the tax on natural resources broadly conceived, and the tax rate can be set at up to 100% without risking disincentive effects. This important feature of minimizing the excess burden of taxation is achieved by splitting the property rights in the functional way described above. The truly appropriable improvements form private property rights, and the remainder stays in the public domain. Whoever wants to use any aspects of the public domain for his private purposes is expected to compensate the community for this use. This implies that it becomes increasingly costly to put common property resources to a sub-optimal use. George minces no words about this feature of his system: 'If land were taxed to anything near its rental value,' as he suggested it should be, 'no one could afford to hold land that he was not using, and consequently, land not in use would be thrown open to those who would use it. Settlement would be closer, and, consequently, labor and capital would be enabled to produce much more with the same exertion' (1979: 413-414).

A constant intensification of resource use, apart from stimulating economic processes in general and undermining the entry barriers created by mere priority in resource use, broadens the tax base and thereby allows the public sector to grow. The public sector can,

however, only grow as long as it stimulates this search for an ever more efficient use of natural resources. This implies that the fiscal condition for government growth is only met [if the government constantly disappoints traditional elements] in society, bringing about dislocation by forcing new and more efficient resource use upon conceivably reluctant traditional resource users. In the Georgist system, the tax state does have a redistributive function. But it does not redistribute from productive to non productive members in society. On the contrary, it redistributes from less efficient producers to more efficient producers, from established lines of production to new entrants, with the intention to relieve poverty by stimulating progress. The Georgist tax constitution shares some of the features discussed in the modern literature on constitutional public finance, notably the restriction of the tax base and the incentives presented to government to make the restricted tax base more productive.[3]

In the form it was presented, somehow George's vision does not seem to fit the picture of contemporary highly developed western economies. While he does consider nature in the physical sense as a supplier of 'raw materials,' he may have underestimated the extent to which industrial development is based on such supplies. Consider the following statement on technological development:

> 'So, every improvement or invention, no matter what it be, which gives to labor the power of producing more wealth, causes an increased demand for land and its direct products, and thus tends to force down the margin of cultivation' (1979: 249).

This forcing down of the margin of cultivation, George considers in purely organic terms. In developed western economies one might expect technological development to take the form of depleting and exhausting the stock of natural resources. A different view emerges if we follow George's own definition and interpret his notion of land more broadly in order to include all manner of natural resources. George does so himself, as when he was trying to refine his model (1979: 258) in order, for instance, to include 'mineral lands.'

The exhaustion of a mine is clearly different from the exploitation of a waterfall. George includes both in his definition of land. While the waterfall continues to fall and will, under normal circumstances,

not be exhausted by the sheer tapping of the power of the falling water, a mine will generally be depleted. As we recall, only improvements in natural resource use are protected by private property rights, but impairments, such as the depletion of a mine, are clearly not. In a Georgist system of natural resource use, the depletion of a mine has to be compensated for, with the community receiving the rental value from the site as well as the rental value from the extracted materials according to the valuation of the most productive user. This more comprehensive system of compensation will certainly check the exhaustion of natural resources which many environmental economists rightly fear. On the other hand, George did not want to prevent the exhaustion of natural resources, when this was in the interest of progress. He clearly did not want to leave the ore in the mind or the coal in the ground. Yet the Georgist system requires compensation for the impairment on the basis of the rental value of the natural resource.

Economic growth in western societies has not really led to a drastic increase in the demand for agricultural land. The opposite is almost true. It has, however, led to a dramatic increase in the extent and manifold ways in which claims are laid on the most multifarious aspects of nature, such as the water, the air, vegetation and climate, soil and animal organisms, to name but a few.

There is one basic difference between land, on which most of George's attention was centered, and other natural resources of which he speaks only occasionally. The (surface of) land can be surveyed and parcelled out, fenced and defended against intruders and in this way made a private property. For most of the other natural resources, such a privatization process would be much more difficult and it is often inconceivable. Take air as an example, and let us invoke standard collective goods theory. Air is clearly indivisible. It moves about and cannot be contained. Fresh and good air is scarce, yet it must be a collective good, since nobody can be excluded from breathing it. Still, alternative uses are clearly rivalrous. If a brewery ejects its fumes, the sweet smell is laid over the entire city and nobody in the city can really escape breathing it: surely there will be some who may object? This is even more so in cases where paper mills, crude oil refineries or combustion in dense traffic are concerned. Note that the brewery may have been in the city for many

centuries, and claiming a traditional right to operate in its existing location.

The same would apply to groundwater. A difficulty with establishing property rights for individuals or localities over groundwater reservoirs is that the location may not be completely known and may even be subject to change. Normally, rights of use will be established that can be monitored by some common authority.[4] Yet, the common property can be impaired. If someone contaminates the groundwater, all the wells in an entire region may have to be sealed. Similarly, the healthiness of the soil affects everybody, by way of vegetation, wildlife and climate. Yet, it can be readily contaminated and such contamination may be almost impossible to reverse.

Vegetation and wildlife form an ecological system with the environment. While man has, as George puts it, the gift of playing nature, he also has the gift of misreading the rules. The introduction of one particular specie can upset the entire system, with inescapable consequences for everyone. So one would say that the entire natural environment is a common property resource, and the conservation of it a task from which everybody can profit, and which may be spoiled by very few. Finally, it is not only the natural environment that has this feature; the historical and cultural heritage, a particularly designed landscape, and the historic architecture of a city have common property features.

IV. Scarcity and the Price System

In chapter five of the 7th book, Henry George describes how property in land had made it scarce and unavailable for farming and ranching, when, in fact, plenty of it was still unranched and unfarmed but held in anticipation of increased future value. Only a superficial reading of *Progress and Poverty* would nourish the impression that, in George's opinion, it was the institution of private property and the market system that had created this scarcity. Let us look at his rendition in detail. 'The republic has entered upon a new era,' he says, because the frontier has been pushed all the way to the Pacific Ocean and there is no free land to be claimed anymore.

> The public domain is almost gone — a very few years will end its influence, already rapidly failing. I do not mean to say that there will be

> no public domain. For a long time to come there will be millions of acres of public lands carried on the books of the Land Department. But it must be remembered that the best part of the continent for agricultural purposes is already *overrun*, and that it is the poorest land that is left. It must be remembered that what remains comprises the great mountain ranges, the sterile deserts, the high plains fit only for grazing. And it must be remembered that much of this land which figures in the reports as open to settlement is unsurveyed land, which has been *appropriated by possessory* claims or locations which do not appear until the land is returned as surveyed. California figures on the books of the Land Department as the greatest land state of the Union, containing nearly one hundred million acres of public land — something like one-twelfth of the whole public domain. Yet so much of this is covered by railroad grants or held in the way of which I have spoken ... (George 1979: 391 — our italics).

The land, then, has been taken, claims have been staked, railroad companies have built lines and hence were able to claim the land surrounding it, and the first credible use determines what happens with the resource in the future. It is only after private property has been established that a market can begin to function.

George does not describe market forces as allocating the land initially; the allocation of land is decidedly a nonmarket one. The claims need to be officially sanctioned and the new land must be surveyed before a trade in it can begin. Hence, the land will be held in reserve until that time when the title is secure and thus tradable. We notice, of course, that it is not only the institution of property that is necessary for a market in land to develop. A transfer of title requires a contract and thus a legal environment in which contracts can be drawn up, executed and guarded against breach. Thirdly, both property and contract cannot exist as institutions without the third legal institution, liability, to protect the other two. There is no property in anything without a liability on whoever trespasses.

In fact the phenomenon George was describing involves not an orderly transfer of private property in land, but a rather less orderly 'run' to stake private claims on common property. His remedy, as is well-known, calls for taxing the rent derived from the ownership title, while not taxing the improvements made by people to the land.

This remedy neutralizes the negative economic effects of a speculative 'run' on natural resources. By claiming a resource, one incurs a

tax liability. Improving the resource remains the only lucrative course of action, which benefits both the private owner of the improvements and the taxing authority.

Setting up private property arrangements to allow markets to determine the use of aspects of common property resources is extremely difficult. As Hahn and Hester (1986) described in their analysis of the Emissions Trading Program adopted by the American Environmental Protection Agency, most of these markets have to be set up within particular corporations, since the ways in which various polluters affect the common property resource (the air) are diverse. In one particular location, there may not be many polluters competing with each other. However, one polluter may have several technologies or processes which bear upon the same common resource. Hence, most of these programs involve policies directed at one particular polluter, employing emission reduction credits with the specific techniques of 'bubbles', 'netting' and 'banking' all designed at (arbitrarily) restricting the common property used by the polluter, but allowing him to make the most efficient use of his various polluting activities.

The standard setting itself is arbitrary in the sense that it does not allow an optimal overall use of the common property in question. It will invariably start from the current level of polluting activities and accept the current distribution of polluting activities among various polluters. This acknowledges the grandfather rights of the traditional polluters and restricts access to new ones. The process is identical to the one described by George with respect to land. The traditional users of common resources did not acquire a right to pollute; they took it and continue to use it in an environment which changes the value of such rights.

The grandfathering of rights to natural resources (at the expense of potential new uses) is not only central to Henry George's concern and approach to economic policy; it is also at the heart of contemporary environmental policy debates. Wallace Oates, in his discussion of the rôle of economic incentives in environmental policy, notes the opposition to incentive-based environmental policies 'from pollutors themselves'. With respect to tradable permits, he notes that they have traditionally 'not been distributed by auction. Instead they have been distributed free of charge to existing

pollutors. Such a grandfathering of pollution rights greatly reduces the opposition of existing sources to the program' (Oates 1988: 6-7). And Edmund H. Mantell, in a paper dealing with the economics and the politics of environmental protection, makes grandfathering traditional resource use the central feature of his proposal. We quote the central passage from his paper:

> The Gordian Knot of conflicting special interests might be cut by legislative action to assign property rights on the basis of the pre-existence of the challenged economic activity. To explain, when firms are determined to enjoy property rights which permit pollution, there should be no legal obstacle and no objections to paying firms which curtail their production or even leave the industry (or the site) as a result of corrective policy. It is the assignment to these firms of enforceable property rights which legitimizes the selective enforcement/subsidy policy.
>
> However, firms which have never produced pollutants have not exercized a property right and the denial to them of the right to pollute *de novo* does not exact from them a benefit which they previously enjoyed. This means, for example, that new entrants into the industry would not be eligible for subsidy payments, and, moreover, they could not expect selective enforcement of pollution abatement regulation to be imposed on them (Mantell 1985: 444).

The proposal is strikingly at variance with a Georgist approach to regulating natural resource use. By selective enforcement Mantell means that existing industries, if they are particularly opposed to environmental regulations and if they can muster sufficient political support, should be spared application of these standards. Such politically well heeled industries are, of course, the monopolies Henry George tried to politically neutralize with his system of dynamic taxation driven by the process of technical innovation. New technologies make the use of natural resources more valuable and therefore, by virtue of the rental tax, tend to drive the traditional users out of the resource use, unless they improve their productivity. Selective enforcement of environmental regulations would render the Georgist process inoperative.

Grandfathering traditional uses, on the other hand, with tradable permits, although bestowing an unearned windfall gain on them which George feels belongs to society, at least does not undercut the process of technical change. The traditional users relinquish the

traditional use, in their own interest, by selling the tradable permits to a bidder whose bid exceeds the value of the permit to the traditional user with his obsolescent process of production. Hence, issuing tradable permits to current users, as done by the Environmental Protection Agency in the United States right now, at least lets the opportunity costs of alternative resource use enter the economic decisions of traditional users.

Henry George's solution is attractive because nature becomes an increasingly scarce input into industrial production. As described by George, this scarcity is exacerbated by the fact that old uses are already imposing their claims on natural resources, and with population density increasing and possible uses multiplying as well as standards of living increasing, many new uses of natural resources are denied because of the existing ones. Even areas of hitherto worthless but unimpaired natural resources become valuable and command a premium. A contemporary example in the spirit of George may underline the point.

The Black Hills are a mountainous area located at the end of the big plains and extending through the Dakotas, Nebraska, Wyoming and Montana. After many protracted conflicts and after the Sioux-Indians had been pushed all the way to the mountains, in 1851 the government recognized the Sioux-Indians' title to some sixteen million acres and agreed to provide food rations for ten years.[5] In return, the Sioux allowed wagon trails to be built through their territory. Conflicts continued and after the battle at Little Big Horn in 1876, Congress cut off the food rations. The conflict ended when the Indians ceded seven million acres of the Black Hills to the United States in return for assistance. In 1923, the Sioux filed a claim for $500m in compensation for the Black Hills. The claim was dismissed in various courts, but continued to be refiled until 1980, when the Supreme Court awarded $600m to the Sioux for the Black Hills. By then, however, the tribe tried to dismiss its attorney for having taken the wrong legal strategy, refusing to accept the money and insisting on receiving the Black Hills back. What was essentially worthless a century ago — except for the soon disappointed hope of finding gold — what had been given away in exchange for temporary assistance in rations, through the intense process of industrialization on the private land and the continued protection of the unceded

Indian lands in the public domain, had become a most valuable resource. It was finally valued higher than the compensation payment which, at the time, was the highest ever recorded in such claims.

Technological progress and the intensified use of natural resources results in an increasing value placed on unimpaired natural resources. Traditional users of natural resources derive an ever increasing rent without paying compensation, and their grandfather rights become obstacles to competing uses of natural resources. This serves to impede technical progress.

V. Reversal of Use

An important aspect of Henry George's approach is that he separates natural resources from the improvements that may have been made upon them (which he calls capital). The first remains in social ownership, while investment in the second is attributed to whichever private agent made the change. Those changes are always positive in George's context. This split between the natural resource and the alterations made upon it is an important ingredient for an optimal repartitioning of property rights to enhance an economy's ability to grow and progress (Furubotn 1981). The split establishes a criterion on the basis of which renewable natural resources, once dedicated to a particular use, can be automatically reclaimed when the purpose no longer exists or ceases to be as pressing as it used to be. The issue turns on a very simple consideration. Natural resources are limited, while the potential uses are unlimited, changing over time with technical progress: hence the need to reclaim natural resources according to present valuations.

The basic idea can be discussed with reference to the attempt to clean up hazardous waste.[6] In the United States, as in many other industrialized countries over the last hundred years, hazardous waste has been placed in many thousands of locations. An exact number of such sites is not yet known, but there are tens of thousands of them. This waste poses serious threats to human health and the environment. While it may sometimes be possible to determine who deposited the waste, the common law (torts) approach of invoking liability and claiming compensation has clearly proven inadequate.

There are several reasons for this inadequacy. Firstly, evidence as

to responsibility for depositing hazardous waste is difficult to collect and sustain in court, particularly if the waste was deposited long ago. Secondly, cause and effect relationships are difficult to establish in environmental cases, since the ecological system interacts in itself and multiple causations occur routinely. Thirdly, even if a tort-feasor can be identified and the tort (i.e. damage) be proven, there may not be a party that has standing and that could, consequently, claim compensations. This is the case if the damage has not yet occurred. It is also the case if the damage has occurred but has affected a large number of people diversely, so a class cannot be formed. Fourthly this points to weaknesses in using the tort system as a discovery procedure for such waste. As a matter of fact, the tort system has a number of built-in incentives for concealing the extent of the waste and its perils, while establishing few countervailing incentives to expose the threat. Fifthly, if the first four reasons have not proven to be enough of a hindrance, the tort system normally can handle only the relatively smaller cases, since the damage inflicted upon a community by a hazardous waste catastrophe would routinely exceed the net asset value of the tort-feasor.

The Comprehensive Environmental Response, Compensation and Liability Act, commonly known as Superfund, along with similar State legislation, has effectively supplanted the tort system with a complex mixture of regulation, public works and litigation. While the Superfund project has supplanted the tort system, the Fund has not discontinued but strengthened it. This has to do with the financial arrangements of the Superfund program. The Environmental Protection Agency which administers the Superfund may identify potentially responsible parties that are strictly, retroactively, jointly and severally liable. In principle, the government may collect from any single party the entire costs of clean up of a site to which hundreds have contributed. Yet the difficulty of carrying out the program, which is largely financed out of a tax on petroleum and feed-stocks, has led, during the first six years, to very little waste being removed or made safe.

To illustrate how George's economics contributes to a policy oriented analysis of these problems, we discuss the problem of hazardous waste as if it had occurred in a Georgist type world. In George's world, the ownership of land entitled you to the value of

the improvements only, not to the value of the land. If hazardous waste is deposited on land, that activity can, of course, hardly be called an improvement. It is the opposite. Someone who disimproves or impairs the land would have to compensate the community for this land abuse and, finally, to revert the land back to its original state. This would apply irrespective of whether someone impairs his 'own' land or that of another party. Hence, specific uses will give rise to a tax liability. Three problems need to be addressed in turn. (1) How can such a scheme be administered? (2) How can the reconvertibility of a common property resource be assured, and (3) when should reversal occur?

The administration of his scheme is a point George addresses at length. He was anxious not to create a new bureaucracy in charge of overseeing land use. Instead, his scheme uses the assessment that are routinely carried out for property tax purposes — i.e. the rental value of land in its unimproved state. The process would operate fairly similarly if impairments had to be assessed. Firstly, the common property would be assessed in terms of its natural pristine state, yielding the (resource) rent that had to be paid. Secondly, the user would owe the respective tax authority the value of the impairments imposed upon the property. Where there is a market for the properties, the figure can be readily obtained from the market. A different question arises when the common property cannot be marketed. This question will be addressed in the next section.

One of the reasons for the tort system to fail is the likely inadequacy of net assets owned by the tort-feasor to cover the damage. A similar problem arises in our context, if we want to make sure that the abused common property can be recoverted to its original state. Normally, such a reconversion will be very costly. This problem, in the Georgist world, does have a straightforward solution. The user of the common property can be asked to file three valid bids from competent contractors with a demonstrable track record outlining the clean up operation needed and the price required. These bids, one might assume, would be valid for a limited period of time, such as a year. The user could then either deposit a bank guarantee covering the average amount of the three bids; or carry insurance to the same extent. This *bonding* would obviously have to be revised continuously, depending on the expiration of the

bids, and this continuous revision would reflect probable costs in the clean up operation as they occur over time.[7]

There is, then, a dynamic element built into the proposal. Old users, instead of being grandfathered, are continuously confronted with the true opportunity costs to the community of their particular use of the resource. There is a strong incentive to think about production processes that spare the environment. Conversion will occur when either the impairment charge, reflecting the willingness to pay off competing users, notably potential new users, increases to the point where the old use of the common property resource has become uneconomical to the user; or when the alternative benefits to the community from competing uses grow beyond the benefits hitherto received.

The vexing difficulties with hazardous waste clean up that the Superfund operation is saddled with would not have occurred in George's world. Most of these difficulties stem from a strong desire on the part of the potentially responsible parties to conceal the true extent and nature of the waste deposited. These difficulties explain why the American environmental protection agency, having spent $3 billion and committed another $1.5 billion on Superfund projects, by the end of 1989 had not cleaned up more than 40 out of 12,024 sites on the Superfund priority list of the nation's worst poison dumps. Instead, the money was spent on gathering information, identifying waste dumps and establishing responsibilities and reliable clean up techniques (Hobbs Sheibla 1989).

The Georgist proposal outlined here generates opposite incentives. The bid requirement for the clean up operation necessitates a continuous analysis of all the relevant implications of the use of the common property that eventually has to be reversed. The fiscal incentives work their way through the organization of the (corporate) user to safeguard the quality of the environment. The American Superfund experience allows us a glimpse at the extent of those fiscal incentives in a Georgist world. Cleaning up just the toxic sites for which the Superfund has been created is estimated to require $500 billion, according to the Congressional Office of Technology Assessment (Hobbs Sheibla 1989: 18). In a Georgist world, this amount would have been remitted into the state coffers, together with compensation for all those impairments of natural resources

which are not toxic for which estimates are not available. In a Georgist world, these expenditures, instead of being financed out of tax revenues (with their accompanying disincentive effects), would have constituted public revenue. In addition, public regulators would have been free to determine the most appropriate treatment of impaired sites. The information, instead of having to be collected through an extremely costly procedure, would already have been available due to the bid requirement described above.

VI. An Example in Practice

George was a thoroughly practical man and he saw no difficulty in administering his proposal, the 'remedy'. Assessing the rent of land and the value of the improvements could be done with reasonable accuracy, since there was a market in land to check against. However he noted that many of the resources that cannot but be held in common property for that reason have no market, and hence, no ready and undisputable way of assessing their value. This lack of accuracy does not imply the absence of even a rough idea of what a particular resource may be worth to a particular community, even if a precise and monetizable price tag is nowhere to be found.

Again, the Georgist solution is reasonably straightforward. Consider the case of a county that has a precious forest, with a lake nearby that serves as its water reservoir. Hunting, fishing and other recreational activities take place here.[8] A paper mill applies for permission to operate on the margin of the forest, drawing on the raw wood produced in both this forest and the neighboring communities. The paper mill approaches the county with the prospect of creating a certain number of jobs and additional tax revenues. Under current circumstances, the county will normally be glad to grant the permit if it is short of job opportunities or tax revenues. Let us assume the pollution from the mill is reversible and not externalized beyond the jurisdiction of the community. The paper mill would change the environment, however. It emits an unmistakable smell, it uses large amounts of water, the forest will change its composition of trees, which will change the vegetation in general and wildlife in particular. The constant noise and smell affect the recreational value of the area. Under current tax and tenure arrangements, should the paper

industry fall upon hard times in the future, the new jobs may likely be lost. But if the paper mill remains, the recreational area also is lost. With the paper mill in place, a new venture would be hard to attract into the formerly recreational area. A Georgist approach would lead to a different outcome.

Since there is no apparent way of assessing the value of the permit to the county, other than by saying that the paper mill will bring jobs and tax revenues, let us assume that we go by these two figures, a certain number of jobs (L) and a certain amount of tax revenues (T). To the treasurer of the county, one figure translates into the other, since a job with the paper mill on average carries a certain additional net revenue to the county. The permit could then be granted provided the mill yields what it promised: the approximate number of new jobs and the approximate additional net tax revenue. The permit would be conditional upon fulfilling that promise, being automatically revoked if one or the other of the criteria were not met. In addition, as outlined in the preceding section, should the firm — for instance due to the termination of the permit — cease operations, the area which it had affected would have to be reconverted to its original pristine state. This reconversion would have been ensured by the bonding procedure outlined in the preceding section.

Such an arrangement should provide for both parties to the transaction, the mill and the county, to be able to discontinue the exchange of jobs and tax revenues against the use of natural resources after proper notice has been given. The extent of that notice would have to depend upon the time horizon needed for a businesslike investment decision.

This proposal is one of a number of possible variations on George's framework (Backhaus 1988). It splits property into two parts, the natural resource which remains with the community, and the improvements (the plant of the paper mill) which is private. This is extended into the area where there is no market for natural resources. A collective valuation procedure must substitute for a market evaluation. It takes into account the possibility that a particular use, instead of making improvements on the natural resource, impairs its usability for alternative future uses. Compensation is required for such impairments.

VII. Conclusions

A substantial number of natural resources are inefficiently used. We refer not only to the overuse of common resources, but also to the disincentive effects entailed in the acquisition of property rights by means of the grandfathering of established uses. Grandfathering can serve as an effective entry barrier to new industry. To develop a remedy, we have sketched out an alternative system in the spirit of Henry George. This paper stays true to Henry George, however, in systematically covering all natural resources, and in suggesting that damage to natural resources can be effectively dealt with along the lines of Henry George's fiscal policy. And we have shown how industrial development can be approached to ensure an efficient use of natural resources that satisfies the criteria set out before and promotes progress to overcome poverty.

NOTES

1. In the latter part of his life, after *Progress and Poverty* had become an international best seller, George spent most of his time as a public lecturer. This may be the reason why, all over the world, there are (sometimes small) political groups claiming to propagate his ideas. Interestingly, the ideas of these groups differ substantially one from the other, occupying the entire political spectrum from left to right.
2. While there is still disagreement about the yield of a Georgist land tax, some recent estimates approach 25% of GNP. See Cord (1985), and Banks (1989).
3. For this literature, see for instance the seminal work by Geoffrey Brennan and James M. Buchanan, 1979.
4. With respect to water use, see Victor Brager and W.E. Marten (1989).
5. This account is based on the report in the *National Law Journal*, Vol. 9, nr. 47 (1987), pp. 20-25.
6. The following discussion is based on an internal and preliminary account, that Peter Reuter of the Rand Corporation was kind enough to show. The material we are discussing here is public knowledge.
7. This bonding requirement is similar to the one required under the US Surface Mining Control and Reclamation Act of 1977 (P.L. 95-87). This law calls for bonding and specifies landscape contours, vegetation, *etc.*
8. For a further description of this procedure, see: Jürgen Backhaus, 1988.

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