MATHEMATICS AND THE SINGLE TAX By J. J. POT (Lunteren, Netherlands) SPRING 1976

This is in reply to S.S. Gilchrist's comments in the Spring GJ. If R is the site rent in cents per dollar, and 5 is 5% interest rate, then the percentage of rent collected is $\frac{R}{R+5} \times 100$. "As the site rate increases, naturally the price of title falls," says Mr. Gilchrist. So 100 is no longer 100!

Take his example of a "site worth $1000 on the market under present revenue conditions," i.e., after paying the tax. Before paying the tax the real site worth was $1200! for, as Mr. Gilchrist writes: "So, out of a total of $60 worth he is paying $10 to the community": $60 = 5% of $1200, shared by the community ($10) and the owner ($50).

Mr. Gilchrist is confusing readers in saying tha "a site worth yearly can be roughly estimated as one-twentieth (5%) of the market price of the title." For if the tax takes another 1%, the site worth yearly is 5 + 1 = 6%. Or if Mr. Gilchrist nevertheless is right in saying one-twentieth, the real site worth is $1200. The share of the tax equals his formula: $\frac{R}{R+5} = \frac{1}{1+5} = 1/6$ ($10 from $60). At a tax rate of 5 cents per dollar, one has to ask "which dollar?" For 5 cents per dollar from the real site worth of $1200 is $60; so there remains nothing for the "owner" and the title has no "market" price any longer.

Mr. Gilchrist's formula says: If the tax rate is 5% then $\frac{5}{5+5} \times 100 = 50\%$ of site rent collected. So the tax collector gets $30 and the owner gets $30. This, he says, is about one-twentieth of the market price. So the market price is 20 x 30 = $600. Apart from a tax of $30, the tax collector moreover took a property shift of $1200 - $600 = $600. Think about it.

A REPLY TO THE CHALLENGE

By S. S. GILCHRIST (Roseville, N.S.W., Australia)

I have read with interest the discussion paper by Mr. Pot. Firstly, let me say that I heartily approve of the community collecting site rent for revenue, particularly if this could eliminate all other forms of revenue collection.

Secondly, it does not matter whether it is called rent or royalty or land tax or site tax or site rent or site revenue, etc., so long as the charge for the opportunity to hold land is collected by the community from all sites.

Thirdly, I approve strongly of the community leasing sites which it "owns" at present, to collect the "full" economic rent; and the community must never in the future sell the rent-free title to any of its land. However, this does not call for the purchase of existing alienated sites.

Mr. Pot disparages site taxation and ridicules a 1% tax. He should not do that, even if it is only collecting a small proportion of the rent. He should instead support the intensification of site taxes on all sites.

Let us consider a site worth $1000 on the market under present revenue conditions. Normally a site's worth yearly can be roughly estimated as one-twentieth of the market price of the title. So in this case the purchaser considers the yearly worth after paying the tax to be $50 per year. Now if the site holder pays 1 cent per dollar on $1000, he is paying $10 to the community (as rent) and retaining $50. So, out of a total of $60 worth he is paying $10 to the community, or about 16% of the site rent, which is not inconsiderable. It is more than the 1% it appears at first.

There is a simple formula for estimating the percentage of rent collected:

$$\% \text{ of rent collected} = \frac{R}{R + 5} \times 100,$$

where R is the site tax rate in cents per dollar. The 5 is 5% interest rate. Thus, at a tax rate of 5 cents per dollar,

$$\frac{5}{5 + 5} \times 100\% = 50\% \text{ of site rent collected.}$$

As the rate is increased, each successive equal step takes a smaller extra proportion. As the site rate increases, naturally the price of titles falls, and frequent revaluation is needed during periods of increase.

George proposed that all occupiers would pay a uniform site tax. All site occupiers would be treated equally. This is just. But Mr. Pot proposes two classes of site holders: one would pay full site rent to the community to provide the services and privileges which make sites valuable; the other class would not pay site rent to the community but would benefit from the services provided. This is not just.

Mr. Pot says his plan will get the full rent at once and he suggests the site tax does not. But this is not so. He proposes to get no rent from a very high proportion of the sites. He is certainly not likely to get 16% to 25% of site rent for the first year as would a tax of 1% to 2% on all sites.

As for the buying proposal, Georgists must not approve of payments by the community to persons because they happen to have titles to land. No ransom is necessary with site value taxation. It is the duty of good government to collect payments for the benefits it provides.

CLARIFYING THE MATHEMATICS

By JULIAN HICKOK (Philadelphia, Pa., USA)

In an article on "Mathematics and the Single Tax" in the last issue of GJ, J.J. Pot refers to an article in the Spring issue in which S.S. Gilchrist presents an analysis of the tax rate and interest rate to determine the percentage of full rent taken by the government for public uses. There seems to be some need to clarify the significance of rent.

Rent is the product of the sum of tax rate and interest rate times the true market value of the land. If R = annual rent of land, a = current rate of tax, b = rate of interest, L = land value (price), T = tax revenue, then:
$R = (a + b)L = (a + b + c)X$. Then $X = (a + b)L / (a + b + c)$.

Using assumed values: a = 3%, b = 5%, c = 2%, L = $1000, then X, the resultant land price = $800. $T = (.03 + .02)\$800 = \$40$.
$R = (.03 + .05 + .02)\$800 = \$80$.
And $T/R = 40/80 = 50\%$.

If the effective tax rate (a + c) = 10%, then X = $533 and T/R = 66.7%.
If (a + c) = 50%, then X = $145.30 and T/R = 91%.
If (a + c) = 100%, then X = $76.20 and T/R = 95.2%.
This would continue up to (a = c) at infinity with X = zero and T/R = 100%.

An unlimited number of values may be assumed for the various factors, from which two graphs may be drawn. These would demonstrate the law that: As the tax rate is increased and approaches infinity as a limit, land value (price) decreases and approaches zero as a limit, and tax revenue increases and approaches full economic rent as a limit.

This law refutes the argument that land value taxation is self-defeating in operation. Practical consideration in application of this law would lead to the conclusion that land value taxation should be applied gradually. The initial steps should be taken with small increments of tax rate increases, over relatively long periods of time. Sufficient notice should be posted to allow for market adjustments and to avoid undue "jar and shock" to the economy.

This procedure should be continued as far and as fast as popular support is available. At some time land value taxation could be discontinued and, under a system of free enterprise, the State resort to the leasing of lands with the minimum of "chances of favoritism, collusion and corruption this might involve."

WINTER 1977

MORE ON MATH AND SINGLE TAX

By BENJAMIN F. SMITH (Ada, Mich., USA)

With admiration for Julian Hickok for working by the scientific method, I still must disagree with him in his article "Clarifying the Mathematics" in the Autumn 1976 Georgist Journal.

Mr. Hickok erroneously assumes that the value of land equals the price of land, thus he has value and total rent both drop as land prices drop with land value taxes. Every assessor should be legally made to increase his land tax base by the capitalized tax, because it is correct to do so.

In the beginning there were no taxes on land, on improvements, on anything. The entire rent of land (R) went to the owner of the land. Assuming a free market place in everything, including land, the rent of land (R) divided by the current interest rate expressed as a decimal would be the value (V) of the land and in the beginning the price of the land. Thus, $V = P - R/i$. And the rent of land is of course, $R = Vi$ (or Pi).

Now if a land value tax is introduced, what occurs? Does the rent (R) change? Does the value (V) change? Does the price (P) change? So we introduce a tax rate (r) as a decimal to be multiplied by the land value (V) or in this first instance only, by the equal land price (P), to give the first land tax (T). Thus:

$T = rV$ (always true)
$T = rP$ (true in the first instance, where $V = P$)

The new land tax splits the land rent into two parts: One part to the taxing political unit and the remainder to the landowner. The part of rent going as tax is: $T = rV$. But the total rent was $R = Vi$; so what is left for the owner out of the same land rent equals $iV - rV$.

The owner's net share of land rent is what give price (P) to the land. To find this lowered price after the tax, we capitalize the landowner's net rent by dividing by the current interest rate. Thus:

$P = iV/i - rV/i = V - r/i(V)$.

The market place readily establishes the lowered price (P), but the unchanged value (V) of the land is not recognizable in the market place. But it can easily and accurately be calculated by adding the two parts of the split: the current price of land (P) and the cut in the owner's previous share of $V = r/i(V)$.

The value of land before taxes is: $V = P + r/i(V)$. But note what $r/i(V)$ is:
rV = the previous land tax (T)
i = the current interest rate. Thus:
$r/i(V) = T/i$ = the capitalized land tax.

The rule is simple. To obtain the correct value of land before land tax, simply add to the price of land the capitalized land tax: $V = P + T/i$.

We can win in the courts if we do it right!

(In the above presentation, Mr. Smith is proposing a relatively unchanged base for land value taxation, i.e., the value as it would be if there were no tax. Mr. Hickok, on the other hand, proposes using the current selling price as the base and contends it is the practical way endorsed by Henry George. We take this occasion to correct an error in Mr. Hickok's article in the Autumn Georgist Journal. In the fourth paragraph, (a = c) should be a + c). - Ed.)

MATHEMATICS - A PLUS OR A MINUS?

GEORGIST JOURNAL SPRING 1977

By JULIAN HICKOK (Philadelphia, Pa., USA)

In the Winter Georgist Journal ("More on Math and Single Tax"), Benjamin Smith takes exception to my use of the term "L = Land Value (Price)." The letter "L" was used to designate the base on which the tax rate was levied. It could as well be "assessment." He continues, "thus he has value and total rent both drop as land prices drop with land value taxes." I did not say that.

Further in my article, on the basis that rent is a constant at any given instant, regardless of any tax and interest rates, I state: "As the tax rate increases and approaches infinity as a limit, land value (price) decreases and approaches zero as a limit and tax revenue approaches the full rent as a limit."

In Mr. Smith's analysis he proposes, "To obtain the correct value of the land before land tax, simply add to the price of the land the capitalized land tax." This is confusing as we would have a tax based upon a tax, which would be uncertain, unfair and unrealistic. It would be better to apply the land value tax to the highest level practicable and increase progressively the land tax rate and let the open market set the price.

By J. J. POT (Lunteren, Netherlands)

SPRING 1977

The mathematics of Julian Hickok may be correct, but I cannot sell to the taxpayers the idea of paying an infinitely high percentage of tax, nor a land price of zero. Please avoid mathematics. Every one knows what is meant by rent for land, for a house, for a car. If one pays a tax for his land, tell him that is the wrong term. Tell his he is paying rent for making use of his country.

Increasing land value taxation is not self-defeating by reason of mathematics but by reason of propaganda. Tax-rate increases always raise fierce opposition and no popular support can be expected. So don't call it a tax but honestly term it rent for our native land, the land we have to defend with arms and maybe with our life.

By ROBERT SAGE (Sun City, Ariz., USA)

SPRING 1977

Re the articles on mathematics and the single tax, it would be appreciated by many readers, I am sure, if in addition to the lettered formulas, numbers were given. Example: R = 5%, P = 1000, 5% of P = 50.

The symbols used in these articles are not known to every one. Many of use have forgotten them; I haven't worked on algebraic problems since my high school days. So it math must be used, please include some examples in round figures.