BRIEFER COMMUNICATIONS.

SOME ASPECTS OF THE THEORY OF RENT.

The exposition of the doctrine of rent has since the time of Ricardo recognized with greater or less distinctness two aspects to the theory. The Ricardian proposition is demonstrated, first, by reference to the varying fertility of different tracts of land subjected to the same amount of labor, and secondly, by reference to the decreasing productivity of successive "doses" applied to the same land. In many of the current text-books, however, no attempt is made to correlate these two processes.*

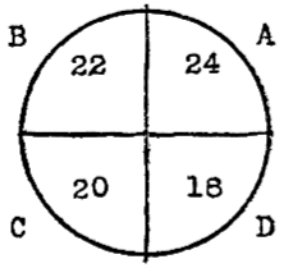
Presumably because of its greater simplicity and because of its wider application, attention is generally directed to the increase of agricultural production, through the extension of cultivation and to the consequences which follow from it for the theory of rent. The prominence given to this aspect of the theory frequently leads students to believe that this is the only question at issue in the theory of rent and gives an exaggerated importance to the knotty question of the existence of no-rent land. Text writers rarely fall into the error of stating that this is all there is to the theory of rent and generally refer with greater or less distinctness to the effect of increasing intensity of cultivation upon the product of the soil. At the same time it is believed that the subject remains uncertain and vague in the mind of the student, because the relation between the extensive and intensive theory of rent is not carefully worked out.

It is not in any hope of adding to the generally accepted doctrine of rent that the writer is tempted to seek a solution to the difficulty which has been named. It is simply with the hope of establishing a clearer understanding of the subject that a demonstration of the relation of the two parts of the doctrine of rent is here presented for the consideration of teachers and students of political economy. Instead, therefore, of treating the subject in general terms, it seems advisable to attach our consideration to the demonstration of the doctrine of rent which is probably most familiar in America, that of President Walker. For this purpose we may reproduce here his well-known diagram, designating the various tracts by the letters A, B, C, D.

His familiar demonstration assumes that equal quantities of labor are applied to these successive tracts of land of unequal fertility, so

* Cf. J. H. Hollander, "The Concept of Marginal Rent," *Quarterly Journal of Economics*, Vol. ix, pp. 175 et seq., especially p. 183.

that by the time cultivation has reached Tract D the cost of production is represented by 18 bushels—the return under the most unfavorable conditions—and the rent by 6 bushels in A, 4 in B, 2 in C and 0 in D. In the demonstration of Walker there is no attempt to formulate the amount of labor which is applied in the different tracts, it being sufficient for his purpose to designate it as being equal. Let us assume that to produce 24 bushels in the Tract A 10 units of labor are required. When all the land in this tract has been taken up and production has proceeded to Tract B, 10 units of labor no longer produce 24 bushels but 22, or 2.2 for a unit instead of 2.4 as in A. Rent appears by 2 bushels per acre or .2 bushel per unit of labor.



Now the question might arise, and certainly does arise, in the mind of the student why production proceeds to the Tract B, why it is that additional labor is not expended upon the land already in cultivation. The reason lies obviously in the diminishing return which would accrue to additional labor in the Tract A. If additional labor in the Tract A will produce as a result more than 2.2 bushels per unit, it is obvious that production cannot proceed to the Tract B, unless the demand were such that it could not be satisfied by the increased product of A resulting from such additional labor. But if it becomes profitable to cultivate B at a return of 2.2 per unit, it is likewise probable that some additional labor will be applied to A, producing not 2.4 per unit as before, but at least 2.2. So that instead of equal quantities of labor being applied to A and B, A will be worked more intensively and consequently there will be an unequal amount of labor applied to the two tracts.

The number of additional units which would be applied to the Tract A with as great a proportionate return as the labor applied to B will, of course, depend upon circumstances. For the purpose of this demonstration we might assume that this is represented by 1 unit. As a consequence of B having been taken into cultivation we shall have the following situation in the Tract A:

10	units	producing	24	bushels
1	"	"	2.2	"
11	"	"	26.2	"

The cost per unit being according to the supposition 2.2 bushels, the aggregate cost of these 11 units will be 24.2 and the rent

26.2—24.2 or 2 bushels, the same as if 10 units had been applied to A and 10 to B, according to the supposition of Walker.

If we proceed a step further and assume that the Tract B is entirely occupied, cultivation will, according to Walker, proceed to Tract C, where 10 units of labor will produce 20 bushels or 2 per unit. Again, it must be assumed that coincident with this extension of agriculture to less fertile lands there will be an additional application of labor to the tracts already cultivated, providing such labor produce a return at least equal to 2 bushels per unit of labor. If again we assume that 1 unit may be added to Tracts A and B with this result we shall find when C is cultivated the following situation in A:

	10	units producing	24	bushels
	1	" "	2.2	"
	1	" "	2.0	"
	12	" "	28.2	"
The cost per unit being now 2.0				
their aggregate cost will be	12 x 2, or 24 bushels			
and the rent	28.2 — 24, " 4.2			

Here we have not only an increase of the aggregate production but an increase in rent in the Tract A over what would have taken place had 10 units been applied equally to the three tracts A, B and C. In the latter case the rent of A when C was cultivated would have been 4 bushels. It will be observed that the increase in the rent .2 bushel is exactly equal to the difference between the product of the 12th and 11th unit. In other words, as production proceeds to the less fertile soil additional labor applied to the more fertile land will produce a rent. Of course, this process must actually take place, as it is contrary to the probabilities to suppose that the cultivators of A will continue to apply only 10 units when by the application of 11 they can increase their rent.

If the Tract D be taken into cultivation, the fact of the contemporaneous action of the two underlying motives of the law of rent is still more clearly seen. Inasmuch as 10 units in D produce 18 bushels, the cost per unit becomes 1.8. It may be assumed that additional units can be added to the tracts previously under cultivation, and if they can be, we may rest assured that they will be.

Consequently we should have under these circumstances in the Tract A, when D is cultivated:

	10	units producing	24	bushels
	1	" "	2.2	"
	1	" "	2.0	"
	1	" "	1.8	"
	13	" "	30.0	"
The cost of these units is again	13 x 1.8, or 23.4 bushels			
and the rent consequently	30 — 23.4, " 6.6 "			

With the cultivation of D we have exhausted the possibility of extending cultivation of less fertile lands, according to the terms of our proposition. In order to illustrate the matter fully, let us now glance at the situation when D is cultivated upon the Tracts B and C. In the Tract B we find:

	10 units	producing 22	bushels
	1 "	" 2.0	"
	1 "	" 1.8	"
	12 "	" 25.8	"
So that the cost is	1.8 x 12, or 21.6 bushels		
and the rent equals	4.2	"	

At the same time in the Tract C we find:

	10 units	producing 20	bushels
	1 "	" 1.8	"
	11 "	" 21.8	"
The cost is	1.8 x 11, or 19.8 bushels		
the rent is	2.0	"	

Comparing these tracts we see that the last unit applied to old lands, as well as the labor which is applied to new lands, yields no rent. We see, however, that those units which precede the last, as applied to the old land and which are yet in excess of the total units applied to the last new land cultivated, do yield a rent. It is clear, therefore, that such units will be applied, that the extensive and intensive progress of agriculture will go on side by side. The result can be best shown in a comparison of the following diagrams. The first represents the situation which would result from the assumption that the same quantity of labor is applied successively to the various tracts. The second shows the more probable result when increased quantities of labor are applied to the more fertile lands according to the assumption of the foregoing demonstration.

FIGURE I.

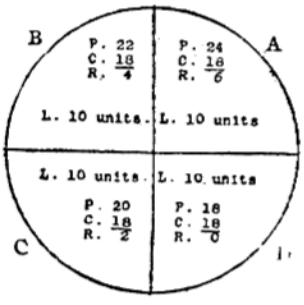
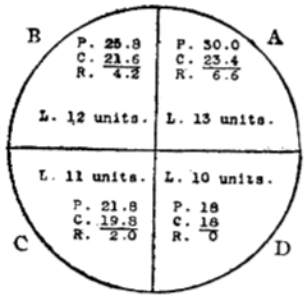


FIGURE II



(P stands for the product, C for the cost, R for the rent, and L for labor.)

In comparing these diagrams it will be noted that in the first a farm located at the centre and consisting of 1 acre of each quality of land would absorb 40 units of labor, would produce 84 bushels and would yield a rent of 12 bushels. In the second diagram the same farm would absorb 46 units of labor, would produce 95.6 bushels and would yield a rent of 12.8 bushels.

In the foregoing demonstration it has been assumed for the sake of simplicity that with each advance of agriculture to tracts of lesser fertility, an additional unit of labor has been applied to the tracts already in cultivation. As stated at the outset the amount of additional labor which might be applied would unquestionably be determined by circumstances and for the purposes of demonstration an exact formulation of this quantity is not essential. It might, however, be closer to the real facts to assume that the additional labor which is first applied would be absorbed by the land more readily and yield greater results than that which is applied subsequently. Taking the Tract A for instance, it is probable that additional units with an effectiveness of 2.2 bushels per acre would be more in number than those which had an effectiveness of 2 bushels per acre. To introduce this element into our demonstration we might fairly assume the following situation in A when D had been taken into cultivation:

10	units	producing	2.4	per	unit	or 24	bushels
3	"	"	2.2	"	"	" 6.6	"
2	"	"	2.0	"	"	" 4.0	"
1	"	"	1.8	"	"	" 1.8	"
16						36.4	

The cost of the units being 16 x 1.8, or 28.8 bushels
the rent would be 36.4 — 24.8, " 7.6 "

On the same supposition we would have in the Tract B 10 units at the rate of 2.2, 2 at the rate of 2 and 1 at the rate of 1.8. This change in the assumption does not, it will be observed, change the principle for which we have contended, but merely the numerical results. It simply means that the first steps toward intensity in agriculture will yield upon the most fertile tracts, a greater absolute, as well as relative rent, than subsequent steps.

The significance of the general principle thus set forth in relation to the existence of no-rent land can now be brought clearly before the student. It will be observed that when the Tract D is occupied, according to Walker's demonstration resort is had to some distant terrritory. To explain that a further rise of rent is possible by the foregoing demonstration it is obvious, however, as it has been brought more clearly before the student that successive

applications of labor bring in decreasing returns, that the assumption of other land is no longer necessary. It will readily be understood that additional units of labor on the land D will produce less than 1.8 bushels per unit. If an additional unit produce, for example, 1.6, and there be a demand for the products in excess of what can be produced in the whole territory, according to our supposition, then additional labor will be applied not only to D but also to the other tracts. The product under the most disadvantageous conditions will be 1.6 bushels whether the labor be applied to D or any of the other tracts. Therefore, according to the Ricardian theory all units producing more than 1.6, those on D, as well as in the other tracts, will yield a rent.

Practical experience in classroom work has demonstrated to the writer the effectiveness of the foregoing variant from current presentations of the subject. He hopes that it may prove of some value to his fellow instructors.

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RELATION OF CITIES AND TOWNS TO STREET RAILWAY COMPANIES.

The recent report of the special committee appointed by the Governor of Massachusetts to investigate the relations between cities and towns and street railway companies* deserves the careful consideration of every one interested in the problems that have accompanied the growth of cities. The care with which the investigation was conducted and the great ability with which the conclusions of the committee have been formulated, give to the report an exceptional position in the series of investigations covering this class of questions during recent years. The report of the committee is comparatively short, covering but thirty-nine pages. In addition, however, the volume contains the draft of a street railway act which embodies the recommendations of the committee. Furthermore, in a series of appendices the following special topics are discussed:

First.—A presentation of the general subject of franchise-granting in this country and in Europe, by the secretary, Walter S. Allen, Esq.

Second.—Abstracts of the statutes of the various states relating to franchises and methods of taxation of street railways.

Third.—A detailed discussion of the relation between street railway companies and the public authorities in the larger cities of the United States.

Fourth.—A similar discussion of conditions in European cities.

Fifth.—A statement as to municipal ownership and operation of street railways in England, by Robert P. Porter, Esq.

Sixth.—An extract from the Rapid Transit and Tax Commissions' reports in relation to the readjustment of the corporation tax.

* House Document No. 457.