# THE ECONOMICS OF RICARDO : A RE-WORKING

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N.B. ''The Principle of Political Economy and Taxation'' by David Ricardo is referred all through as ''Principles''. All page references to this book are to the Every Man's Library edition of 1973 edited by Donald Winch. All excerpts are also from this edition. All stresses and explanations of any sort in these excerpts are ours.

# THE ECONOMICS OF RICARDO : A RE-WORKING

## SCOPE AND PURPOSE OF THE THESIS

1. In this thesis, we set ourselves to work out afresh and on our own the working of an economy under Ricardian assumptions or the Ricardian economy as we may call it. This is our re-working of the economics of Ricardo. More precisely, this is the method by which we try to get into the economics of Ricardo.

The principal point of this method is simply to see things in time. This must be so because it is only in time that the working of an economy gets defined. We point out that this necessarily focusses our attention on processes, mechanism and such as almost the defining elements of the economics of Ricardo as we view it, things that are generally left out in the literature on Ricardo.

2. Let us now explain the thesis content in terms of this viewpoint. We have to begin with Ricardo. Ricardo began the Principles with ''value'' (ch.1). This had to be so because the fundamental problem he had set before himself in writing the book — to discover the ''laws'' which ''regulate the distribution of the produce of the earth among the three classes of the community'' — was a problem in value. To wit, it is only in value that the produce got distributed between the three classes as their respective 'incomes', viz., wage, rent and profit. The problem as a whole, we can say was the problem of value - distribution.

From 'value', Ricardo went successively to 'rent' (ch.2), 'wage' (ch.5) and 'profit' (ch.6). This the ordering or sequence had its logic in the very nature of the working of the economy, which we can leave to the thesis itself to bring out. We call attention to two short intervening chapters coming into the above programme, one on the ''rent of mines'' (ch.3) and the other on ''natural and market price''(ch.4). The former was essentially an appendage to ch.2, and the matter more or less ends there. The latter requires a substantial digression.

3. ''Natural and market price'' defined a <u>complete logical framework</u> for comprehending and analysing all forces acting upon <u>prices of commodities</u> in the sort of an ''economy'' visualised by the classics. We can also call it the classical framework for the formation and dynamics of prices.

The whole of this was very carefully laid out by Adam Smith in the chapter under the same title of the <u>Wealth of Nations</u> (ch.7). Ricardo himself was to end his chapter with a complete endorsement of Adam Smith — ''in the seventh chapter of the <u>Wealth of Nations</u>, all that concerns this question is most ably treated''. (<u>Principles</u>, p. 50). Ricardo's own contribution to the subject consisted essentially of giving it a sharper focus. Whereas Adam Smith sought the forces of price-formation in a system of ''perfect liberty'' where 'land', 'labour' and 'capital' simply lay on par, Ricardo singled out 'capital' and saw the whole force in the profit motive of capitalists, landlords and workers becoming passive elements in the process.

The point to note now is that Ricardo did not feel it necessary to spell out this framework at the beginning. When he talked of ''price'' in ch.1 he simply took it to be ''natural price'', but the point does not get clarified till one comes to ch.4. The dynamics or change of price through time was simply left out in ch.1 presumably because his basic theoretical programme of ''value-distribution'' could be worked out without reference to it. When however he came to discuss <u>wage</u> — in ch.5 — he could not similarly leave out its dynamics or change through time for the same programme. Without an adequate discussion of this, the programme itself could not simply be 'grounded'. It was necessary therefore to set up a conceptual framework for comprehending and analysing all 'forces' acting upon wage (or for the ''formation and dynamics of wage'' if you like). His framework was simply that of ''natural and market wage'' which itself was implicitly argued only by <u>analogy</u> from price (or the price of commodities, to be exact, for Ricardo also talked of ''wage'' as the ''price of labour'').This point will be more fully developed in the thesis below. The point we wish to make right now is simply this, that it was therefore logically necessary for Ricardo to get across the framework of ''natural and market price'' itself before he came to discuss wage. This explains its whole ''positioning'' in the book - way after ''value'' (ch.1) where it rightfully belonged and just before ''wage'' (ch.5).

4. We can now turn to our thesis. We simply begin our whole reworking of the economics of Ricardo with ''natural and market price'' (sec.1, ch.1). This is so because we must view ''price'' itself in time all through, and cannot just a priori rule out its change through time, and so must begin with the whole framework of formation and dynamics of price , i.e., natural and market price. In otherwords, this is just the logical beginning for our purpose, precluding all ''presuppositions''. It is only after, and through, this whole subject that we open up into the underlying area of distribution, thereby meeting up with the ''theoretical programme'' of Ricardo. This comes in sec.2 of ch.1, the chapter itself being termed just ''price'' (not ''value'' — see below).

Before leaving off this point, we have to mention that quite apart from the rearrangement of 'materials' from Ricardo as above, our own viewpoint of ''seeing things in time'' also leads us to some finer discriminations within the total body of thought met in Ricardo. This sort of 'discrepancy' is in fact greatest in our treatment of wage. To the extent that we even discard (as ''misleading'') Ricardo's procedure of extending the framework of ''natural and market price'' from its initial reference in 'commodity' to 'labour'. The point is argued in details in our chapter on wage (see pp.136-8).

5. Let us now return to Ricardo's discussion of value. ''Value'' to Ricardo meant something much more than price, something impervious to a wide range of changes that ''prices'' are necessarily subject to. Stated differently, his concern here was not so much the ''formation''

of price, even disregarding the ''dynamics'', as the <u>procedure of measurement of 'value', taking for granted the rules of price-formation</u>. (It is through these 'rules' that the concept of ''natural prices'' came in).

Ricardo's own treatment of this problem passed from the <u>polemical</u> (disputing Adam Smith, sec.1) to the purely <u>analytical</u> (constructing an ''invariable measure of value'', sec.6) taking instride various complexities arising out of the <u>process of production</u>, all of which he ultimately reduced to the root-element of ''time''. All of this was extremely terse and taut, driving the very language to its limits of expression. Ricardo himself complained again and again of his ''limited powers of expression'' in writing this chapter. No wonder then that this chapter has always stood as a stumbling block to getting into the economics of Ricardo. At least, it denies any straight-sailing passage or entry. We have tried in our own way to ease this out.

6. Before we can explain this, we have to note one simple point. The a priori ''measure of value'' in society is simply <u>money</u>. This was completely granted by Ricardo. He in fact put forward his famous construct of the ''invariable measure of value'' precisely as an implicit restriction on the object serving as money in the economy —

> ''May not gold be considered as a commodity produced with such proportions of the two kinds of capital as approach nearest to the average quantity employed in the production of most commodities ? (<u>Principle</u> p.29)

''Gold'', needless to say, was the money-object.

Let us then turn to <u>money</u> itself in Ricardo. It is obvious that the above sort of implicit restriction on money does not say anything about what money actually is and how it 'works' in the economy. True, Ricardo took this up later on - much later, in his chapter on on ''currency and banks'' (ch.27). But he did not make any attempt to integrate this into his theory of value and distribution which itself was raised on an implicit basis of 'gold' as money.

7. Our ''easing out'' of the entry or passage into the economics of Ricardo consists simply of separating out or disentangling ''money'' from the discussion of ''value'' or ''price'', leaving it in the open there and then taking it up <u>on its own</u>, explicitly as an organic or integral part of the working of the economy as a whole. By its very nature, this comes out at the <u>end</u> of our whole programme, bringing the whole working of the Ricardian economy to its logical completion and conclusion. Stated differently, it <u>closes</u> the system of value and distribution as a whole.

We now point out that this procedure leaves no room for any a-priori theorisation on the ''measure of value'', and so the subject is simply dropped. As a corollary, the ''invariable measure of value'' as an <u>analytical tool</u> or <u>methodological device</u> also drops out of the scene.

8. This does not of course mean that we go without any analytical tool or methodological device in our programme. What we do is simply go to the roots of the whole set of problems that Ricardo had sought to tackle through his ''invariable measure of value'', i.e., to the process of production, and define our ''tool'' at this level. We call this the ''simple type'' of production process, and the economy where all production processes are of the simple type, we call the ''simple economy'' (see Sec. 2, Ch.1). These are our basic tools, and their whole purpose is simply to get rid of ''unnecessary complications'', get us straight to the heart of Ricardo's economics. Stated differently they are part of our whole object of ''easing out'' the entry into Ricardo's economics.

It is to be mentioned that our construct of the ''simple economy'' comes straight out of Ricardo's own handling of ''successive complexities'' in the process of production in his analysis of ''value''. In our language, these ''complexities'' appear as so many departures or stepouts from the ''simple economy''. These are given their due weight in the total work, (see Secs.5-8, Ch.1; Secs. 3 and 5, Ch.4; Sec.5 Ch.5) but the main line of analysis is left to flow free of these ''complexities'' through the construct of the ''simple economy''.

9. Let us return once again to Ricardo. We can say that his basic ''principles'' of ''political economy'' were already set up in the above programme of work on ''value-distribution'' (ch.1-6 of the Principles) and these ''principles'' were then essentially applied to other areas in the rest of the book, which in turn also brought in their own ''principle'',

One major area of such ''application'' was <u>foreign trade</u> which came in the next very chapter (ch.7), the analysis of which still serves as the foundation of this subject. In the last chapter of our thesis we have tried to give a fresh presentation of Ricardo's analysis of foreign trade following our methodology of ''seeing things in time''. Ricardo himself discussed foreign trade very much through ''money'', and we have followed him closely in this respect. This is rather far removed from the usual treatment of the subject in the literature.

10. Before ending, we should reiterate that this is a very simple and <u>simple-minded</u> thesis, the whole object of which is only to understand Ricardo <u>on his own</u> — not from the ''viewpoint'' of later economic theories, of whatever variety. Our own viewpoint of ''seeing things in time'' is only an aide to this, nothing separate from it. It is only a ''methodology'' and has no ''substance'' to it. It cannot therefore bring in anything ''alien'' to the economics of Ricardo. The same observation also holds true of our procedure regarding <u>money</u> already stated. It is not the procedure of Ricardo himself, but the ''substance'' is his (see pp.176-7 , 192-3 below).

The thesis is written in a purely ''expository'' style where the whole argument is simply <u>owned</u>. References to Ricardo are kept to a minimum serving the purpose of only maintaining contact and explaining the ''liberties'' we take in presenting the subject matter, which as already explained, are mostly of a purely ''methodological'' nature.

Finally, there are no outside references in the thesis, i.e. no reference to the voluminous literature on Ricardo. The basic reason is that we ourselves have not consciously taken anything from the literature. The thesis is based entirely on our own reading of Ricardo. No doubt, this has been much facilitated - unfortunately also at times somewhat hampered - by the literature on Ricardo. There are both points we agree to and points we do not with this literature. We have not referred to this simply because, once started we did not just know where to stop - the references could go on and on, and the explanations become lengthy and complex in view of ''other viewpoints'' present in these writings. We have thought this to be unnecessary. As already stated, our object here has been simply to understand Ricardo on his own, and for this purpose, we present him in the manner now explained at length, which, we simply hope, facilitates this ''understanding''. Any departures from the conventional understanding of Ricardo in this may remain entirely in the implicit. We do not wish to make any claim of ''novelty'' in our interpretation of Ricardo. That has not been our object. We are happy (and relieved) to end this introduction on this humble note.

Chapter 1

# PRICE

## Section 1 : Natural and Market Price

Ricardo was concerned all through with the working of a capitalist economy under the forces of free competition*. Our object in this chapter is to see how these forces get expressed in the prices of commodities. This, we may say, defines the outermost layer or 'crust' of the working of the Ricardian economy.

1. In a capitalist economy, a commodity is produced only because capitalists have put in their capital to get it produced, and this they do only for the profit that the capital yields to them on being so used. So, we already have the profit motive of capitalists as the governing force behind the production of commodities. We have to set this force in an environment of ''free competition''.

2. Before we take this up, we have to say something about the working of a capitalist economy as a whole. Let us start back from the point that, in this economy, capitalists get the commodities produced on the basis of their capital. We note that by this very point, the capitalists come to own the whole product as it gets produced (and thus appear as ''producers''

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* This was mentioned at the very beginning of his book;

> ''In speaking then, of commodities ... we mean always such commodities ... on the production of which competition operates without restraint''. (Principles, p.6).

in the economy), which they then sell in order to make their profit. The profit itself is nothing but the revenue or sale proceeds minus the cost incurred for the production i.e. the so called 'cost of production' as seen by the capitalists.

By appropriate definitions, this 'cost' can be reduced to the sum of wages and rents actually paid by the capitalists, which in turn are just the income of workers and landlords as much as 'profit' is the income of capitalists. So, viewed socially, we have a general equality of the total sale proceeds or value of production in the economy with the total income created in the process of production as a whole.

Having come this far, we can now complete the circle by noticing that it is the spending of this income which defines the sale proceeds that we have begun from. We thus come to see the production of commodities as embedded in a circular flow of income, one half of which consists of the creation of income in various forms (wage, rent and profit) and the other half, of the spending of these incomes.

3. Let us now come to the notion of free competition. Let us start as follows. At any point, we see the total capital in society as existing in definite forms sustaining the going production processes. But 'capital' as such is not attached to the production of any particular commodity or any particular line of production. Any capitalist, if he so desires, can remove or withdraw his capital from the line where it is currently engaged and put it in some other line. I.e., there are no barriers or impediments to such movement of capital. This is the essential meaning of ''free competition'' in the present context.

4. Given the setting of free competition, the profit motive of capitalists means simply that if for some reason the profit per unit of capital or rate of profit being yielded by different lines are not all the same, then capitalists withdraw their capital from lines yielding lower rates and put it in lines yielding higher rates*. In other words, a general redistribution or movement of capital between lines is then going on. This is the central upshot of the force of free competition in the present context.

Let us now note that when the movement of capital just described is going on, the supply of different commodities is necessarily changing through time. This is because 'supply' is nothing but the 'output' produced, for a 'commodity' after all is produced only for sale, and the 'output' of any commodity is governed by the 'capital' put in. So, in a state of steady production of all commodities, a uniform rate of profit necessarily prevails in the economy.

5. Let us now take as our reference such a state of the economy and see if this enables us to say anything definite about prices and outputs.

5.1 The first point we note is that, given other things, the rate of profit earned from any line of production depends directly upon the price at which its product is sold - higher the price, higher the rate

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* Cf. "Whilst every man is free to employ his capital where he pleases, he will naturally seek for it that employment which is most advantageous; he will naturally be dissatisfied with a profit of 10 per cent, if by removing his capital he can obtain a profit of 15 per cent". (Principles, p.48)

of profit. From this it follows that uniformity of rate of profit is not possible at arbitrary prices. Prices of different commodities are called their natural prices if they yield the same rate of profit all over. So, in our state of reference all commodities must be selling at their natural prices.

5.2 Let us take off a minute here on a very simple point about 'price'. The price of any commodity represents afterall a definite quantity of money to be given in exchange for one unit of the commodity. Just from this, it is seen that the subject of 'price' cannot be closed without a study of money. We come to this only in chapter 5 of the thesis. Till then, there is bound to remain a certain open-endedness in our discussion of all monetary magnitudes, e.g. price. The immediate point of reference of this observation is this, that just saying that the prices in our economy at some point are natural prices does not by itself tell us the numerical value of the prices. We in fact cannot 'determine' these values, i.e., the level of prices, until we take a complete view of the working of the economy, and that includes 'money'. This granted, we can nevertheless assume that all factors that enter this determination (including money) are such in our economy that at any point we have a well defined set of natural prices for the commodities being produced in the economy. We will now proceed on the basis of this assumption. It will be seen later that under certain conditions, the assumption is indeed valid.

5.3 Let us now come to the <u>outputs</u> in our state of reference. Note, this is a state of <u>steady production</u> of all commodities. In other words, we have the <u>same</u> amount of any commodity being produced 'period' after 'period' of time, for some appropriate definition of a 'period'. We can express this in brief by saying that the outputs are <u>constant</u> over time. We now want to see if anything meaningful can be said about these constants, i.e., the <u>levels</u> of production. Note that we already know that the commodities are selling at their respective natural prices. This is simply taken as 'given' in disqussing the present question.

Now, as already stated, the 'output' of any commodity in our economy is nothing but its <u>supply</u>. We now claim that <u>these supplies must be equal precisely to the demands for the respective commodities, or there would not be 'steady production'</u>. Before we defend this proposition, let us be clear about the notion of 'demand'.

6.1 To say that a person <u>demands</u> a commodity is to say that the person is willing to <u>pay</u> the price of the commodity to acquire it. So, he must have the <u>money</u> to pay, which in turn can come only from his <u>income</u>. So, 'demand' must have the backing of 'income' or 'revenue'. But we have already seen that the income of all people taken together is nothing but the total value of production, which in turn gets defined only through the <u>prices</u> at which the outputs are sold. So, 'demand' strictly speaking is not defined independently of prices.

This does not however create any problem in the approach taken here, for we already know that in our state of reference all prices are natural prices and we have also taken the natural prices to be well defined at any point of time.

6.2 This is one point about the notion of 'demand'. The other point is simply that even when the incomes of all people are <u>given</u>, the demand for any commodity is necessarily the <u>demand at its ruling price</u> which itself is simply taken as 'given' by the buyers or prospective buyers.

Again, this does not create any problem in our approach for the same reason as stated above. So, we can indeed speak of a <u>well defined demand for each commodity</u> in our state of reference, implicitly taking such structural factors as population, income distribution, tastes etc. as 'given' for our purpose.

7. Let us now return to our proposition that in a <u>state of steady production the demand and supply of every commodity must be in balance.</u> The defense is as follows*. Suppose demand ≠ supply, say demand > supply. This means that not all buyers can have their 'demand' satisfied at the current supply. Rather than give up the demand, some at least will try

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* This defense is not to be explicitly found in the <u>Principles</u> for Ricardo simply took it to be understood from a reading of ch.7 of the <u>Wealth of Nations</u> where it was expounded in great details. We have already noted that Ricardo completely endorsed Adam Smith's arguments in this chapter Our statements here are also based on ch.7 of the <u>Wealth of Nations</u>.

to have their demand met by offering a *higher* price for the commodity. Producers then start selling only at this higher price, which is to say that the price actually *rises*. Granting that the price was initially the natural price, it has now gone *above* it. Similarly in the case of demand < supply, some producers unable to sell their whole output, offer it at a *lower* price; everyone follows suit, and the price *falls below* natural price.

Next, we point out that in either case, the *rate of profit* being earned from the line of production under reference has turned out to be *different* from the *general rate of profit* being earned in the economy as a whole. There is then a *movement of capital* into or out of this line of production, as the case may be, implying a *change* in the outputs. So, we do not have a state of steady production. This completes the argument.

Note that as a corollary the 'demand' for all commodities must remain steady through time for our state of reference to actually come into being. Stated differently, we can talk meaningfully of a state of steady production only on the basis of *unchanged demand conditions through time*.

8.1 Let us make an essentially *terminological digression* at this point. The law governing the change in price just described is generally called the ''law of the market'' where by ''market'' is understood simply the meeting place of buyers and sellers. It is clear that the law is

indeed a ''closed'' matter within the market, with both 'demand' and 'supply' treated as <u>given</u>. But neither supply nor demand fall from heaven. It is therefore necessary to view the law from a wider stand point.

We can say that the law of the market simply expresses the force of competition in the <u>selling</u> of commodities, as distinct from their 'production' as such. But 'selling' is only the end-point of the process of production. So, it is quite in order to include the whole law under the general expression of ''forces of competition'', this term itself being understood in reference to the process of production <u>as a whole</u>.

8.2 With this, the ''forces of competition'' splits up into two complementary parts or processes, one defined by the <u>free movement of capital</u> and the other by the <u>law of the market</u>. We note that the first gives us the condition of <u>uniformity of rate of profit</u> (or 'natural price') and the second, the condition of <u>demand-supply balance</u> as the two necessary conditions underlying a state of ''steady production'', i.e., these two conditions must necessarily be satisfied for such a state to actually prevail in the economy.

8.3 Next, we can say that the 'profit' included in the <u>natural price</u> of a commodity is in some sense a part of its ''necessary cost of production'', for it provides the necessary inducement for capitalists to put in their capital into the production of the commodity concerned.

The natural price of a commodity is then by definition equal to (or 'in balance' with) its necessary cost of production in this sense. In view of this, we may refer to a state of steady production as a balanced state of the economy, covering under the notion of ''balance'' not only the balance of demand and supply but also the balance of 'cost' and 'price' in the sense just explained. We have just seen that these are precisely the underlying conditions of a state of steady production. So, the term gives one a causal understanding and not merely an empirical description of the state of the economy under reference.

9.1 Let us now resume the substantive analysis. It is not true that the production of all commodities goes on unchanged for ever. So, it is necessary to study prices and outputs outside the balanced state. However, as will be presently seen, ''outside'' the balance state - i.e. an ''unbalanced'' state — is meaningfully or non-arbitrarily defined only as something that evolves out of a preceding balanced state as a result of some ''change'' in the total. So, our programme must be to start from this ''change'' and follow through its consequences.

Let us locate the ''change'' in the sphere of demand. For some unspecified reason, we take, there occurs at some point a definite change in demand conditions in our economy - say, the demand for one commodity (corn) goes up and the demand for another (wine) goes down. Stated differently, people are now spending more on corn, less on wine than before.

9.2 The first point to note is that immediately after the change, the supply of both corn and wine continue at their previous levels, for it takes time to change the production of any commodity. So, we have an imbalance between supply and demand for both wine and corn. The demand for corn having risen, it is greater than the supply and so the price of corn rises. Similarly, the price of wine falls. These prices which have now come into being are called market prices expressing the fact that it is entirely through the working of the ''law of the market'' that they come into being.

9.3 In our case, the market price of corn and wine at the moment concerned are respectively above and below their natural price. This is to say the same as that capital is yielding a higher than the general rate of profit in one case (corn) and a lower rate in the other (wine). So, capital starts moving from wine to corn. In the due course of time, this necessarily augments the supply of corn and dwindles the supply of wine. This shows that the supplies are already 'getting adjusted' to the new levels of demand. As the change in supply actually takes place, the price movement already begun is also necessarily reversed — the greater supply of corn brings down its price and the reduced supply of wine drives up its price. So, we also have a movement towards natural price for each commodity. It is clear that without further outside disturbances, the economy eventually returns once again to a balanced state. This is a 'new' balanced state where the levels of production are different from those started from. The prices here are again the natural prices, but they are not necessarily the same as the initial prices. This depends upon factors which we can take up only later on.

10. The very fact that once disturbed out of a balanced state, the economy eventually returns to such a state gives complete justification to our earlier statement that an ''unbalanced'' state of the economy is meaningfully defined only as a result of some change in the total thrust upon a ''balanced'' state of the economy. It is this ''change'' that disturbs the economy out of its erstwhile balanced state into an unbalanced state only to return once again to a balanced state. Thus, the unbalanced state in itself is only a transient phase through which the economy traverses from one balanced state to another.

We now note that ''natural'' prices belong to the ''balanced'' state and ''market'' prices to the ''unbalanced'' state. It follows that market prices are purely temporary or transient deviations from natural prices. As already seen, these, ''deviations'' are defined in the first place by the imbalance of demand and supply, and the very fact of ''deviation'' in turn releases forces that correct or erase the imbalance. Market prices are thus part of a ''corrective mechanism'' which we may also call the ''adjustment mechanism'' for it adjusts production levels or outputs to changes in demand conditions. Note however that they do not come into the definition of demand-supply balance. This is done entirely in reference to natural prices.

11. We are now at the end point of this section. We have just seen that once disturbed out of a balanced state, a capitalist economy returns by its own forces of ''free competition'' once again to a balanced state. Our object now is to proceed from this to a comprehensive ''time-view'' of balanced states of the economy.

This involves two questions : one, <u>how long the economy takes to return to a balanced state once it is disturbed out of it</u>, and two, <u>how frequently the ''disturbances'' occur</u>. Let us take up these questions one by one.

11.1 The time taken in re-establishing a balanced state of the economy depends upon two things - one, the <u>speed with which price responds to an imbalance between demand and supply</u> and two, the <u>speed with which supply responds to a change in price</u>. As regards the first, we can say simply that price responds <u>immediately</u> to any imbalance between demand and supply. The response of supply to the change in price takes 'real time'. But even this is a fairly <u>short time</u>. The whole adjustment of supply to a change in demand, we can take, is over within a few 'weeks' or 'months' at most. This answers the first question.

11.2 Let us now come to the second question. The "disturbance'' under reference is defined by a change in demand conditions which itself is left simply as 'exogenous' so far. In actuality, purely exogenous changes in demand conditions are extremely <u>rare</u>. So, to discuss the question more meaningfully we have to recast it in a 'frame' where the change in demand can be seen as 'endogenous'. Such a frame in a capitalist economy is defined by the <u>process of accumulation</u>. Let us however not proceed too fast.

11.3 The first point to be noted is that, unlike production, accumulation is not necessarily going on all the time. There can conceivably be long enough stretches of time, say a few years, when no accumulation is going on. Imbalance between demand and supply would indeed be very rare under such circumstances. This is already a partial answer to the question under reference.

11.4 The next point to be noted is that accumulation by itself does not necessarily create an imbalance between demand and supply of any commodity, for it simply amounts to a potential increase in both supply and demand. An imbalance occurs only when the actual increases do not go hand in hand for all commodities. This is quite likely to occur. In this sense, the imbalances are ''frequent''.

But we have to remember that we are now speaking in reference to a time-scale on which ''accumulation'' itself is meaningfully defined. This is by definition a long time-scale. Let us put this more analytically. We can say that the 'speed' at which capital can be accumulated is very much slower than the 'speed' at which capital is moved between lines of production. Since it is the latter which corrects the imbalance of demand and supply, actual states of such imbalance must still appear as rare or relatively insignificant on the time-scale of accumulation.

11.5 So, we can indeed say that when we take a relatively long view of time, we must find the economy most of the time in a ''balanced state''. This is our comprehensive ''time view'' of balanced states of the economy.

A straight corollary to this statement is that actual prices in our economy coincide most of the time with natural prices. With this, we can tie up with Ricardo. He ended his chapter on ''natural and market price'' with a comprehensive statement of the whole behaviour of prices overtime, which we quote below :

> ''It is then the desire which every capitalist has, of diverting his funds from a less to a more profitable employment that prevents the market price of commodities from continuing for any length of time either much above or much below their natural prices''. (Principles, p.50).

This comes exactly to our statement that actual prices coincide most of the time with natural prices. The whole force behind this is simply the profit motive of capitalists expressed through the movement of capital. Let us end by just pointing out that our assertions regarding ''speeds of adjustment'' are all implicit in this passage. We had simply tried to make them explicit in our own way.

Section 2 : Wage, Price and Profit in a ''Simple Economy''.

1. ''Price'' in a capitalist economy is the key opening up the door to the distribution of income. We now want to pass through this door. The starting point for this passage is the proposition established in sec.1 that the total value of production in the economy is the same as its total income. We can see this proposition as being valid not only for the economy as a whole but also for any particular unit of production in it by simply taking the 'units' to be vertically integrated units of production. This is one of the conditions defining our basic tool of ''simple type'' of production process which we referred to in the Introduction. We shall presently spell out the concept as a whole. But before that, we call attention to the fact that in this section we talk only of ''wage, price, and profit'' (in our ''simple economy'' to be defined). We do not talk of rent. We simply abstract from this category. It will nevertheless be seen in later parts of the thesis that all substantive propositions concerning the relation between wage, price and profit that we establish here still stand even when rent is explicitly introduced into the picture. Understanding this ''immateriality'' of rent goes to the heart of Ricardian economics. However, the point can be explained only later on.

2. Let us now come to our construct of the ''simple type'' of production process. Note, this is by definition a capitalist process of production. Such a process consists at bottom a capitalist engaging

some workers to work by paying them their wage and supplying them with the necessary technical means of production with a view to making a profit by the sale of the product produced*. Let us now look a little carefully into the two points : (a) the payment wage, and (b) supplying the means of production.

2.1 The wage is paid before the product is produced. It is therefore necessarily advanced out of the capital existing with the capitalists.

Let us make this precise. The workers, we assume, are employed on an annual basis and are advanced their entire annual wage at the beginning of each year. So, the whole wage bill for any year comes out of the capital as existing with the capitalists at the beginning of the year.

Over the same year, the workers produce a certain output, and this output, we take, is the entire output of the year. In other words, we assume that the output of workers employed in one year is obtained within the same year.

2.2 Let us now come to the means of production. We assume simply that the workers employed in any particular unit of production themselves

* This is another point not to be explicitly found in Principles, for Ricardo obviously took it as understood from a reading of the Wealth of Nations. This sort of implicit acknowledgement of Adam Smith on matters of ''conceptual foundations'' is simply pervasive in Ricardo's writings. Our statement under reference is a paraphrase of the famous passage in chapter 7 of the Wealth of Nations, ''As soon as stock has accumulated in the hands of particular persons ...'',

produce all the means of production they require*. Further, we assume that all these means of production are completely used up within the year of their production so that there is no carry-over of their stock from one year to the next.

As a result of these two assumptions, we have the whole capital engaged in any particular unit as equal simply to its annual wage bill. The means of production do not explicitly appear in it.

2.3 We can now set out the process of production for any particular commodity as a whole. Any particular year, the producers begin with a certain capital. This enables them to employ a certain number of workers for the whole year at the prevailing wage rate. The whole capital is exhausted by the wage paid at this point. Over the year, the workers produce a certain output which, we take, is also sold within the same year. Out of the total sale proceeds the producers then set aside a part as their 'capital for the next year. The remainder they take out for their own spending. This is how the process 'goes on'.

3. Let us now come to our ''simple economy'' where, as mentioned at the beginning of the thesis, all production process are of the ''simple type''. Let us suppose that this ''simple economy'' has continued in a balanced state for quite some time past with the wage rate having remained unchanged all through. This means in particular that for any particular line of production, the part of the sale-proceeds set aside as

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* This is the assumption of vertical integration of production.

'capital' for the next year is the same as the capital begun with. Note that this 'capital' is the same as the total wage bill of the year which in turn accounts for the whole 'cost of production' incurred by the capitalists that year. It follows that it is precisely the profit made in a year that is taken out of the sale proceeds by the capitalists for their own spending.

Let us denote the commodities produced in our simple economy as $G_1, G_2, \ldots$ . Let $X_i$ and $L_i$ denote respectively the annual output of $G_i$ and the annual employment in the production of $G_i$ in our state of reference. By definition, the capital engaged in this line in this state, as well as its 'cost of production', is given by $(w\ L_i)$ where $w$ denotes the prevailing wage rate (wage per year per worker). Similarly, the annual sale proceeds in this line in this state is given by $(p_i\ X_i)$ where $p_i$ denotes the prevailing price per unit of $G_i$. So, the (annual) profit from the production of $G_i$ in our state is given by $(p_i\ X_i - w\ L_i)$. Dividing this by the capital engaged, we obtain the annual rate of profit, which obviously is given by the ratio, $(p_i\ X_i - w\ L_i)/w\ L_i$. Since this is a balanced state of the economy, we must have by definition :

$$(1) \qquad \frac{p_1\ X_1 - w\ L_1}{w\ L_1} = \frac{p_2\ X_2 - w\ L_2}{w\ L_2} = \ldots = r \quad \text{say}$$

where $r$ denotes the (uniform) rate of profit prevailing in our state of the economy.

We can rewrite (1) as

$$(2) \qquad p_i X_i = w(1 + r) L_i , \qquad \forall i$$

We call these / the fundamental value-distribution equations for our economy, for they show / how the total value of production in any line $(p_i X_i)$ is distributed between wage $(w L_i)$ and profit $(r (w L_i))$.

4. Let us now suppose that some year, say year 0, the wage rate rises from its previous value $w$ to say $(1 + \alpha) w$, $\alpha > 0$. In year 0 itself the wage was paid at the beginning at the old rate, $w$. But at the end of this year, the wage rate has risen to $(1 + \alpha) w$. This is the only 'change' in the economy taken place so far. We want to look into its consequences.

Now, if the producers of $G_i$ want to maintain their level of production, $X_i$, they must still employ the same number of workers, $L_i$. But to do this, they now have to put in a capital in the amount $(1 + \alpha) w L_i$ and not $w L_i$ as previously. Let us now suppose that they do this. (We will return to this 'supposition' at the end). The question arises, where do they find the extra capital needed, $\alpha w L_i$? The answer is that out of the sale proceeds of year 0, $p_i X_i$, the capitalists have taken out only $[p_i X_i - (1 + \alpha) w L_i]$ for their own spending*. This automatically leaves the remainder, i.e., $(1 + \alpha) w L_i$, as their 'capital' for the next year's production. This is true for all $i$. So, the capital engaged in each line of production indeed increases in the same proportion as the wage rate, i.e. $\alpha$.

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* It is taken for granted here that $\alpha$ is sufficiently small to leave this remainder positive.

5. Let us now move into year 1. Employment in the different lines this year remain at the old levels $L_1, L_2, \ldots$. So the outputs produced are also the same i.e., they remain $X_1, X_2, \ldots$. Suppose now prices also continue to be the same, $p_1, p_2, \ldots$. What happens ?

5.1 First, the profit in each line must fall, for the cost of production has risen. Profit from the production of $G_i$ in year 0 was $(p_i X_i - w L_i)$, now it is $(p_i X_i - w L_i - \alpha w L_i)$. So, profit falls by the amount $\alpha w L_i$.

5.2 We had just seen that capital everywhere increases as a result of the rise in wage. This on its own causes the rate of profit everywhere to fall. We now see that profit everywhere falls as a result of the same rise in wage. This again causes the rate of profit everywhere to fall. So, the rate of profit falls on two distinct grounds - the rise in capital and fall in profit.

5.3 The question appears, do the rates of profit still remain equal through this fall ? To answer, let us denote the rate of profit from the production of $G_i$ is year 1 by $r_i'$. By definition

$$r_i' = \frac{p_i X_i - (1 + \alpha) w L_i}{(1 + \alpha) w L_i}$$

$$= \frac{(p_i X_i - w L_i) - \alpha w L_i}{(1 + \alpha) w L_i} \ldots$$

$$= \frac{r}{1+\alpha} - \frac{\alpha}{1+\alpha}$$

$$(3) \qquad = \frac{r-\alpha}{1+\alpha}$$

This is independent of i. So, the answer to the question raised is yes, the rate of profit still remains equalised between lines through its 'fall' just discussed. The rate of profit earlier was r, now it is $r'$ say where

$$(4) \qquad r' = \frac{r-\alpha}{1+\alpha}$$

Note, $\alpha$ appears both in the numerator and denominator of the new rate of profit, $r'$. This simply reflects the two distinct grounds for the fall in rate of profit just noted.

6. All this is derived on the basis of prices remaining unchanged at their original values $p_1, p_2, \ldots$ . We can now turn this around and say that so far as equalisation of rates of profit is concerned, there has not arisen any cause for the prices to change. $p_1, p_2, \ldots$ were the natural prices of commodities to begin with and they still remain the natural prices.

We must now point out that prices will actually remain unchanged at $p_1, p_2, \ldots$ throughout provided no demand-supply imbalance is created in any line by the 'change' in wage. Let us look into this condition.

If both prices and outputs do remain unchanged between year 0 and year 1 then so does the total income. With income unchanged, it is clearly possible that the demand for each commodity also remains unchanged. No change in price will then in fact occur at any point, for both supply (= output) and demand here continue unchanged, being originally in balance. So, in this case we indeed have prices remaining constant all through. A fortiori, the wage-profit relation just established remains intact.

7. However, even though total income in year 1 is the same as in year 0, the distribution of income is certainly altered - more is now earned by workers and less by capitalists. Because of this, it is possible that there is a change in the pattern of demand. If so, there necessarily arises an imbalance between the demand and supply of particular commodities so long as production continues unchanged. We already know that such imbalances are erased by a temporary regime of market prices bringing about the appropriate movement of capital. At the end of this adjustment, the economy is back again to a balanced state. However, it is necessary to look afresh into the whole relationship between wage, price and profit in this context.

8.1 Let us consider a particular case. Suppose that as a result of the rise in wage the demand for $G_1$ is halved and that for $G_2$ is doubled. The demand for all other commodities continue unchanged. Suppose also that (a) originally twice the labour was engaged in the production

of $G_1$ compared to $G_2$ i.e. $L_1 = 2\ L_2$ and (b) a change in the level of employment leads to a proportionate change in output in each of these two lines, i.e., there is <u>constant returns to scale</u> (CRS).

According to our original assumption, the rise in wage rate does not cause any change in real production in any line i.e. the capital everywhere is so adjusted as to maintain the level of employment and hence output intact. So, as a result of the change in the pattern of demand just described, the output of $G_1$ is double its present demand while that of $G_2$ is only half its present demand. As a result of these imbalances, the price of $G_1$ now <u>falls below</u> $p_1$ and the price of $G_2$ <u>rises above</u> $p_2$. At these prices - by definition, the market prices at the moment - the rate of profit from $G_1 < r <$ the rate of profit from $G_2$. So, there occurs a movement of capital from $G_1$ to $G_2$. In the due course, this movement of capital brings the output in both lines in line with the respective demands i.e., the output of $G_2$ becomes $(X_1/2)$ and of $G_2$ becomes $(2X_2)$. By the assumption of CRS, this means that employment in $G_1$ production becomes $L_1/2$ and that in $G_2$ becomes $2\ L_2$. Once these adjustments in employment and capital between lines are over, both commodities sell at their natural price.

8.2 But what precisely are these natural prices, now that the wage rate has risen from $w$ to $(1 + \alpha)\ w$ ? The answer seems to depend at what level the rates of profit gets equalised after the wage rise. We

now claim that the rates of profit get equalised precisely at the level $r'$ defined in (4), i.e., the level at which it would have been equalised had there been no change in the pattern of demand. To put differently, $p_1$, $p_2$, ... still remain as natural prices. The proof is as follows.

From the definition of $r_i'$, we have :

$$p_i X_i = (1 + \alpha) w (1 + r_i') L_i$$

$$= (1 + \alpha) w (1 + r') L_i \quad \text{as} \quad r_i' = r \psi_i$$

From this it follows at once that

$$p_1 (X_1/2) = (1 + \alpha) w (1 + r') (L_1/2)$$

$$p_2 (2 X_2) = (1 + \alpha) w (1 + r') (2L_2)$$

This clearly shows that $p_1$ and $p_2$ are still the natural price of $G_1$ and $G_2$ when their outputs are $(X_1/2)$ and $2 X_2$. Thus, as between the two balanced states, before and after the wage change, no change in price occurs.

8.3 This conclusion depends crucially upon the assumption of CRS. Once this assumption is dropped, equalisation of rates of profit at two different output vectors is generally not possible at the same price vector. Hence under non - CRS, $(p_1, p_2 \ldots)$ will in general no longer be the vector of natural prices in the new balanced state arrived at. We do not go here into the question how precisely the new vector of prices is determined.

9.1 Let us now return to our original supposition that capitalists maintain their levels of production in the face of the rise in wage rate. In a strict sense, this supposition is already relaxed, for, as already seen, capitalists do adjust their levels of production to whatever changes in demand conditions may follow from the wage change. However, this is not the essence of the assumption. The essence is that capitalists maintain intact their potential of 'real production', i.e., simply their employment of labour, in the face of a wage rise. As a result, they have to increase their capital, the 'how' of which is already discussed.

9.2 Let us now set up a simple frame of reference to examine the validity of this assumption. We consider an alternative policy for capitalists in the present context, which consists simply of their maintaining 'capital' intact in the face of the wage rise. The 'frame' then consists of comparing these two policies - ''maintenance of employment'' and ''maintenance of capital'' under the given condition - from the standpoint of capitalists themselves.

9.3 ''Maintenance of capital'' in the present context simply means a reduction in the number of workers employed. This must bring about a fall in output and hence in profit. This fall in profit is over and above the fall caused purely by the rise in wage, without any change in employment. Under the policy of ''maintenance of employment'', only this latter fall in profit is there. So, the fall in profit under the policy of maintenance of capital is greater than that under the policy of maintenance of employment. This is a difference in the permanent consequences of the two policies.

9.4 There is also a purely short-term difference in their consequences, defined only for year 0, i.e., the year when the rise in wage takes place. The policy of ''maintenance of capital'' means by definition that capitalists simply take out their profit from sale proceeds at all times, and therefore also in year 0. But we have already seen that ''maintenance of employment'' is possible only if capitalists take out less than their 'profit' from the sale-proceeds in year 0.

9.5 So, there is a purely short term gain to capitalists in the present context if they maintain their capital rather than their employment intact. But this only involves them in a permanent loss as connoted by the greater fall in profit noted above. Now, we can say that as a general principle capitalists choose between alternative policies on the basis of their permanent and not purely short term or nonrepeatable consequences*. So, in the present context they would rather maintain their employment than their capital intact. This justifies our original assumption.

10.1 Let us however be clear that our defense of this assumption does not mean that the conclusions we have reached depend critically upon its Far from this. Granting CRS, our basic conclusion has been

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* This is the same principle which is expressed in a different context in the following words of Ricardo :

''The desire which every man has to keep his station in life, and to maintain his wealth at the height which it has once attained, occasions most taxes, whether laid on capital or on income, to be paid from income'' (Principles p.96).

simply that a rise in wage rate leads to a permanent fall in rate of profit without causing any permanent change in prices. This conclusion holds intact even under the alternative of maintaining capital intact. The proof is as follows.

By the assumption of CRS, it suffices to prove the assertion for the case where capital is maintained intact in each and every line of production between year 0 and year 1. It is clearly seen that the output of $G_i$ and employment in this line of production in year 1 in this case are given by $X_i/(1 + \alpha)$ and $L_i/(1 + \alpha)$. So, if the price remains $p_i$, then the rate of profit, $r_i$ say, is given by :

$$r_i = \frac{\frac{1}{1+\alpha}\left[p_i X_i - (1+\alpha)\, wL_i\right]}{(1+\alpha)\, w \frac{L_i}{1+\alpha}}$$

$$= \frac{1}{(1+\alpha)} \left\{ \frac{p_i X_i - wL_i}{wL_i} - \alpha \right\}$$

(5) $$= \frac{r - \alpha}{1 + \alpha} \quad \text{Using (2)}$$

This is independent of $i$. Hence the rates of profit are still equalised at the original prices $p_1, p_2, \ldots$ . Further, the level at which the rates of profit are equalised is precisely the same as in the previous case (see (4)). So, even quantitatively, we have exactly the same relationship between wage rate, rate of profit and prices as obtained earlier. Needless to say, the output and employment implication of the rise in wage are very different for the two cases.

10.2 Further, even though the numerical value of the fall in rate of profit is the same in the two cases, its 'decomposition' is not the same. Under ''maintenance of exployment'' the 'fall', as we have seen, decomposes into (a) a fall in profit; and (b) a rise in capital. Under ''maintenance of capital'', (b) is by definition absent. But the ''fall in profit'' itself is in this case composed of two distinct effects : (a') a redistribution of income in favour of workers and against capitalists; and (b') a fall in total output and income. Under ''maintenance of employment'', only (a') is present, not (b').

11. Let us now end. Without our having said so, the analysis of effects of change in wage in the ''simple economy'' given above actually takes one to the very heart of the economics of Ricardo. We have therefore arrived at a vantage point to look back and link up explicitly with Ricardos' own analysis. As will be seen in a minute, a number of methodological points come into this.

11.1 By the ''heart'' of the economics of Ricardo, we mean simply the wage-profit relation expressed in his oft repeated dictum ''profits are high or low as wages are low or high''. The first point to recognise is that the proposition can be argued only through ''value'', i.e., the total value of production. But, rent is as much a part of this ''total value'' as wage and profit, and so, by definition, one cannot establish any relation between wage and profit independently of rent. Ricardo's

in this context
procedure/was simply to first establish the proposition in abstraction from rent and then show that the proposition still held in the presence of rent. This is also exactly the same procedure as we are following. We can call it the ''procedure of generalisation''.

Ricardo set this out at the very beginning of his chapter on rent in the following words :

> ''It remains however to be considered whether the appropriation of land, and the consequent creation of rent, will occasion any variation in the relative value of commodities independently of the quantity of labour necessary to production'' (Principles, p. 33).

''Variation in the relative value of commodities independently of the quantity of labour necessary to production'' was Ricardo's own way of stating the fundamentals of ''value'', from which he derived the wage-profit relation under reference. We will come to this in a minute.

12.1 The next point to be noted is this. The fact that the relation between wage and profit is to be argued through the value of production makes further ground for the ''procedure of generalisation''. The procedure here would consist of beginning with a ''case'' where the change in wage leaves the value of production unaffected, and then see if the relation between wage and profit established on this basis still holds when the ''basis'' is given up i.e., outside the ''case'' began with. This is granting the logical definability of such a ''case''.

We are following exactly this procedure. Our ''simple economy'' has already defined the ''case'' under reference and we will come ''outside'' it with the object of ''generalisation'' in later sections of this chapter*.

12.2 Ricardo's own procedure was somewhat different. This goes back to the very beginning of his chapter on value which was completely interwoven in wrangles over ''measure of value'' handed down by Adam Smith. His very opening proposition of this chapter consisted of upholding one measure of value handed down by Smith (the so called ''labour embodied'' measure) against another (the so called ''labour commanded'' measure) :

> ''The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production, and not on the greater or less compensation which is paid for that labour'' (Principles, p.5)

This is what we just referred as the ''fundamentals of value'' to Ricardo.

We now note that shorn of the reference to ''measure of value'', Ricardo's statement simply asserts that ''value'' is unaffected by variations in wage. Indeed, Ricardo himself later came to state the proposition in this way (''value does not vary with the rise or fall in wage'', p. 24). This already anchors our ''simple economy'' in the total scheme of thought of Ricardo. The linkage becomes clear by noticing the following.

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* Let us take this earliest opportunity of stating that we are only able to initiate the programe of ''generalisation'' in these secs.; the ''generalisation'' itself is accomplished much later in the thesis.

The proposition just quoted was the basic ''principle'' of value to Ricardo. But he was perforce led to allow one ''modification'' of this principle after another by ''causes'' arising ultimately out of ''complexities'' of the process of production. This is what defined the sum and substance of section 4 and 5 of his chapter on value. All through these ''modifications'', he still clung to the wage-profit relation implicit in the basic ''principle''. But he could clinch the point only by bringing in his famous ''invariable measure of value''. Leaving this aside, we now point out in our approach these ''complexities'' re-appear simply as so many departures or stepouts from the ''simple-economy''. Thus, what is explicitly a scheme or procedure of ''generalisation'' in our thesis was only implicitly so, hidden under a set of ''modifications'' of the basic principle of value, in Ricardo.

12.3 We have already noted in the Introduction to this thesis Ricardo's ''invariable measure of value'' constitutes an implicit conditioning of the ''medium'' that circulates as money in the economy and distanced ourselves from this approach*.

However, one significant point is to be noted in this context. Ricardo felt constrained again and again to qualify his statement of the wage-profit relation by reference to the precise ''cause'' or ''source'' of the change in wage begun with for the purpose. This arose precisely

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* As explained there, we will come to study money on its own in the Ricardian economy. This comes in Ch.5 which ''closes'' the whole working of the Ricardian economy. This is one important reason why we cannot ''close'' our programme of ''generalisation'' in this chapter.

from his procedure of arguing in terms of an ''invariable measure of value''. I.e., the ''source'' for his purpose was something defined within this procedure. Sources of wage-change which took one outside the procedure were left out.

Though we do not go by this procedure, we also have to pay heed to the question of source or cause of change of wage, for the change surely has to come from somewhere in the economy as a whole. By treating the change as ''exogenous'' or ''given from outside'' in the present analysis, we have simply dodged this question, which is really to leave open the very meaning or substantive interpretation of the wage-change begun with. Having acknowledged this open-endedness of the present analysis, we can only say that we pay due attention to it later on in the thesis.

Section 3 : Effects of Improvements in Methods of Production.

1.1 In the last section we tried to gain some understanding of the working of the Ricardian economy by looking into the effects of a rise in wage rate in it under certain simplified condition viz., those defining our ''simple economy''. In this section, we pursue the same object by looking into the effects of an improvement in the method of production of some particular commodity in the same ''simple economy''.

1.2 There is an obvious difference in the status of the two problems. In analysing the working of an economy, one takes the ''methods of production'' as given a priori. This is almost definitional and needs no defense. A change in the method of production can therefore be treated as something coming from outside the working of the economy without raising any conceptual or interpretative problems. Such problems do arise when one treats a change in the wage rate as 'exogenous', as we have already indicated. So, conceptually, we have a more well-defined or self contained problem to discuss in this section as compared to the last section.

1.3 However, our analysis of the problem has to be still constrained by the fact that we are looking into the working of our economy purely through the forces of free competition in the realm of commodity production, nothing else. This necessarily delimits the scope of the present analysis. In other words, we can take up now only a partial analysis of our general problem. The precise nature of the limitation will be pointed out in the due course.

2.1 Let us again start from a balanced state of the economy as summed up in the value-distribution equations defined in the last section (eq.2). Let us now suppose that in some particular year there is an improvement in the method of production of $G_1$. Prior to the improvement, $L_1$ workers working for a year produced $X_1$ units of $G_1$ over the same year. As a result of the improvement, the same $L_1$ workers working for a year produce, say, the output $(1 + \alpha) X_1$, $\alpha > 0$, over the year. The capitalists, we take, switch over enblock to this new method of production, which is obviously more profitable than the old one, in the year when it becomes available, say year 1. So, upto and including year 0, $G_1$ is produced by the old method, but then, in year 1, it comes to be produced by the new method alone. Our object is to look into the consequences of this ''change'' in the economy.

2.2 It is to be noted at this point that we have the new method defined in terms of the same employment of labour as originally prevailing. The employment may in fact change as a result of the improvement itself, but at this point we must leave this question in the open to the analysis. There is clearly no question begging in the procedure adopted. This is an important point to stress about our mode of analysis.

3. Let us now begin. As a result of the improvement just described, the producers of $G_1$ have an output of $(1 + \alpha) X_1$ to sell in year 1 as compared to the output $X_1$ they sold in year 0. The question arises, are they in fact able to sell the additional output, $\alpha X_1$?

3.2 To discuss this question, we have to first look at the price at which $G_1$ is sold in year 1. Let us provisionally grant at this point two assumptions : (a) the wage rate and rate of profit continue unchanged at their old levels, $w$ and $r$ ; and (b) commodities always sell at their natural prices. Under these assumptions, $G_1$ must be selling at price $p_1/(1 + \alpha)$ in year 1, for only then does it yield the rate of profit, $r$, given that the wage rate is $w$. This is at once verified by substituting $(1 + \alpha) X_1$ for $X_1$ and $p_1/(1 + \alpha)$ for $p_1$ in eq. 2 of the last section for $i=1$.

3.3 Let us now look into the question we have posed before ourselves. First, we note the following. In year 0, the economy was in a balanced state with $(p_1, p_2, \ldots)$ and $(X_1, X_2, \ldots)$ as its price and output vector respectively. In year 1, the price and output of $G_1$ is just seen to be $p_1/(1 + \alpha)$ and $(1 + \alpha) X_1$ respectively. This obviously leaves the value of production of $G_1$ and hence income generated in this production unchanged. We take it for granted here that the price and output of all other commodities simply continue unchanged, i.e., they remain $p_i$ and $X_i$ for $i > 1$. So, the income generated in these productions also continues unchanged. It follows that the total income generated in year 1 is the same as that in year 0, say $Y$.

3.4 Next, we note that even though the total income is same in the two years, $G_1$ is now selling at a lower price while other commodities are selling at their old prices. From this it follows that if

people did buy the original quantities of the commodities, i.e., $X_1$, $X_2$, ..., then they would have an <u>unspent income</u> left with them. The amount of this ''unspent income'', say M, is obviously given by

$$M = \left\{ p_1 - \frac{1}{(1+\alpha)} p_1 \right\} X_1$$

$$= \frac{\alpha}{1+\alpha} p_1 X_1$$

3.5 We now come to the main point of our analysis. This is simply that <u>the ''unspent income'' with people just defined does not infact remain unspent</u>. This is simply because <u>people's desire for commodities as such is unlimited</u>*. It is only their <u>limited income</u> that holds back their demand. This being so, the ''unspent income'' defined above simply translates itself into a <u>rise in the demand for commodities</u>.

3.6 Let us now introduce a <u>third provisional assumption into our analysis</u>, viz., (c) the <u>whole rise in demand caused by the fall in the price of $G_1$ and no change in total income is for $G_1$ itself</u>. Under

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* This is stated a number of times by Ricardo as ''lesson'' learnt from Adam Smith, e.g. —

> I was, and am, deeply impressed with the truth of the observation of Adam Smith that ''the desire for food is limited in every man by the narrow capacity of the human stomach, but the desire of the conveniences and ornaments of building, dress, equipage, and household furniture, seems to have no limit or certain boundary''. (<u>Principles</u>, p. 264).

this assumption, the demand for $G_1$ is greater in year 1 than year 0 by the amount :

$M$ / the unit price of $G_1$ in year 1

$= M / [\ p_1/(1 + \alpha)]$

$= \alpha X_1$

= the additional output of $G_1$ produced in year 1 over year 0.

This completely answers our question . Under the assumptions made, <u>the producers of $G_1$ are indeed able to sell the whole additional output they have produced as a result of their improved method of production.</u>

4.1 Let us now <u>review the assumptions</u> one by one. First, we assumed that neither the wage rate nor the rate of profit is affected by the improvement in the method of production of $G_1$. The two assumptions are clearly interrelated, for we have already seen that a change in the wage rate in our economy necessarily leads an opposite change in the rate of profit. We can therefore treat the two assumptions together as effectively one single assumption.

Now, we completely grant that an improvement even in some particular line of production may not leave / the wage rate and rate of profit unchanged. This depends upon the <u>precise nature of the commodity concerned.</u> However, the question can be taken up only in a wider frame

of reference than what we have at our disposal now. So, we simply stick to our original assumption of no change in the rate of profit and wage rate. This is precisely the limitation of the scope of the present analysis mentioned at the beginning.

4.2 Our next assumption was that commodities <u>always</u> sell at their natural price. We have already seen in the meanwhile that the natural price itself of one commodity ($G_1$) is changed as a result of the 'event' of our reference (viz., the improvement in the method of production of $G_1$). Now, if this <u>were</u> a ''time-less'' or ''instantaneous'' change, our assumption would not have mattered. But such is not the case. <u>There is but one ''law'' or ''mechanism'' governing the change in price in the Ricardian economy</u>, and <u>that is the ''law of the market''</u>. A change in natural price, if it is to come about, has to come through this same ''law''. This means by definition that there has to be a phase over which the commodity ($G_1$, in our case) is selling at its <u>market price</u> before it can start selling at its new natural price. But the market price can come into being only through an <u>imbalance of demand and supply</u>. This is to be explained.

4.3 Let us now take a look at our third provisional assumption, which was that the entire ''unspent income'' with people created by the fall in the (natural) price of $G_1$ was spent back on the same commodity, $G_1$. Obviously, this is a very particular assumption about demand conditions in the economy. The general assumption as already stated is simply that <u>this ''unspent income'' does get spent back but in what way or pattern is left in the open.</u> It is obviously desirable that we take up the analysis of our problem in this general framework.

Having come this far, we now point out that we make an obvious gain in generality by taking up the explanation of ''demand supply imbalance'' in this general framework rather than with reference to our particular assumption. So, we do not go into any piecemeal analysis of the process through which the natural price of $G_1$ falls under this assumption, but take it up in the general framework. In other words, we will now give up simultaneously both the 2nd and 3rd provisional assumptions on which we based our analysis of the effects of improvement in the method of production of $G_1$ given above.

5.1 As a prelude to this, let us discuss at some length a possible outcome of our original ''event'' of reference not yet pointed out. We have defined this ''event'' to mean that a larger output of $G_1$ is produced with the same labour as originally employed. Obviously, the same output as originally produced can now be produced with a smaller employment of labour. The ''possible outcome'' of the improvement we have in mind is simply such a fall in the employment of labour and hence also capital in the line of production where the improvement has occured. Stated differently, both labour and capital are ''released'' from this line of production.

5.2 We now point out that $G_1$ is still produced more 'cheaply' than before. So, its natural price must fall. As a result, its value of production falls, implying fall in the total income in the economy*.

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* This can also be argued independantly. As just seen, less labour and capital are now employed in the production of $G_1$ and hence in the economy as a whole. Since wage rate and rate of profit remain unchanged, this means a fall in both total wage and total profit earned in the economy. So, the total income falls.

At a purely logical level, this possible outcome of our ''event'' is to be completely granted. It is in fact quite parallel to the case of ''maintaining capital intact'' (rather than ''maintaining employment intact'') in the face of a rise in wage rate discussed in the previous section. But on substantive grounds we can again rule out this possibility by saying that capitalists are always on the look out of a profitable re-investment of the capital that may be released by improvements in methods of production. So, they do in fact reinvest this capital, provided the profitability condition is satisfied. But we have already shown that under our particular assumption about demand conditions, this condition is indeed satisfied by the very reinvestment of the ''released'' capital in the same line when it is released from. It is this reinvestment that brought about the rise in the demand for $G_1$ to absorb its additional output. Without the reinvestment there would have only been a potential and not actual rise in demand, but this by itself would not have brought about the increase in the production of $G_1$. But the re-investment of the ''released capital'' brings about side by side a matching rise in output as well as demand*.

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* This is what constitutes the sum and substance of the famour ''Say's Law'' which Ricardo endorsed completely. Ricardo's very phrasing of this ''law'' makes the point clear.

> ''M. Say has however most satisfactorily shown that there is no amount of capital which may not be employed in a country, because a demand is only limited by productions''. (Principles p.192).

At the back of this lies Ricardo's complete endorsement of Adam Smiths proposition given earlier.

6. Let us now resume our main line of analysis. As already stated, the object is to look into the process of price change following from our ''improvement'' in the general framework of demand conditions as already introduced.

Let us first clarify the meaning of this ''general framework'' in terms of the concepts just introduced. The framework rests on the condition that the ''improvement'' causes no change in total income in the economy. This in turn rests on the condition that the capital ''released'' by the ''improvement'' is actually re-invested. Where this capital is re-invested is however left in the open.

This is where the ''allocative'' or more precisely the ''reallocative'' role of prices come in, viz., it is the movement of prices (market price) that directs the ''released capital'' to particular lines of production, and the very process sees to it that demand and supply are again balanced at natural prices. This is to say simply that the allocation of the ''released capital'' follows the pattern of spending. Let us just give a sketch of this process in a few words.

7. Let us start back from the initial price vector $(p_1, p_2, \ldots)$. At these prices, there is necessarily an inflow of capital into the production of $G_1$ consequent upon the improvement of its method of production, for it now yields a higher rate of profit than any other line of production in the economy. As a result, the output of $G_1$ tends to

increase by an even greater amount than $\alpha X_1$. But certainly, the demand for $G_1$ has not risen this much, if it has risen at all - note, there is no fall in the price of $G_1$ yet. This already explains the imbalance of demand and supply caused by the ''improvement''.

As a result of this imbalance, the price of $G_1$ starts falling through the ''law of the market''. The main point to stress now is simply that once this process is begun, there is no stopping before the price of $G_1$ is again the natural price and its demand and supply are again in balance.

This is a general process affecting all commodities in the same way. So, eventually the economy as a whole returns to a balanced state.

8. Let us now give an explicit characterisation of the new balanced state arrived at under the assumption of CRS in all lines of production. The basic analytical significance of this assumption is that it makes the natural prices independent of the levels of production. So, the vector of natural prices after our ''improvement'' must still be $(\frac{1}{1+\alpha} \cdot p_1, p_2, \ldots)$, whatever be the outputs of different commodities. Obviously the outputs in the new balanced state are simply equal to the quantities demanded at these prices out of a total income which is the same as begun with. Total income remains unchanged as there is no change either in the total capital and labour employed or in the general rate of profit and wage rate through the process. So, as compared with the initial situation, there has occurred a rise in the demand for various commodities, limited by the extent of fall in the natural price of $G_1$, and the change in production levels is simply in line with these changes in demand.

9 We thus see that while <u>by definition</u> an improvement in the method of production of some particular commodity means a potential increase in <u>its</u> supply, when viewed in terms of working of the economy <u>as a whole</u>, it actually comes to mean a <u>potential increase in the supply</u> of all commodities. These 'potential' increases are turned into 'acutals' by the capitalists' search for the profitable investment of the capital that is ''released'' by the improvement, which is actually matched by an increase in the demand for commodities created by the fall in price of the commodity whose method of production has improved. This is the sum and substance of improvements in the method of production in Ricardian economics.

10. It may be worth restating this ''sum and substance'' afresh, looking at it from the standpoint of capitalists.

10.1 An improved method of production (of $G_1$) is discovered. The producers know this. But the method is not yet adopted or implemented. Before implementing, the capitalists will want to make sure that they will be able to sell the additional output that they can produce by the new method. They also see that with the same capital that they have, they can produce an additional output not only of $G_1$ but of any commodity in general, for they can always transfer part of the capital currently engaged in the production of $G_1$ to other lines. So, their ''making sure'' of the ability to sell the additional output takes the form of a <u>general search over the demand conditions, trying to locate areas where they may be able to sell most easily an additional output.</u> Working on this basis, they

will therefore <u>begin</u> by already allocating the ''released capital'' over different lines, as per their own judgement of demand conditions. Thus in actuality, we begin not with an additional output of $G_1$ alone as presumed in our analysis, but with an <u>additional output of commodities in general as per the capitalist calculations referred above.</u>

10.2 However, this is only <u>one half</u> of the story. The other half comes from the working of the economy as a whole and cannot be included in the above sort of a priori capitalist calculations. The crucial point here is that demand actually rises to lift off the ''additional output'' <u>only if there is a fall in the price of some commodity.</u> It is this fall that creates the ''unspent income'' the actual spending of which defines the rise in demand. When capitalists think of ''rise in demand'', they do not think in this manner. That is why their thinking can give us a clue to only one half of the actual process, not the whole of it.

10.3 However, this 'half' is already enough to <u>initiate</u> the actual process. And in this process, the price of $G_1$ must in fact fall permanently thanks simply to the forces of free competition. So, demand actually rises and the capitalists are able to sell the additional output. There may certainly be ''imbalances'' in the process. These are corrected by the same forces just referred. In the end, there occurs only a redistribution of the same total capital as originally employed, producing a larger output matched by a rise in demand.

On the face of it, this is no different from the 'picture' originally envisaged by the capitalists. They may even have reckoned the fall in the price of $G_1$ as thrust upon them by the force of competition. But that it is this fall in price which lies at the 'root' of the whole rise in demand is not something that can come under capitalist calculations. This is why capitalist calculations, even when proved 'correct', do not give one the knowledge of how things work.

## Section 4 : Effects of Appropriation of Land and the Imposition of a Charge upon the Use of Natural Resources

1. This section completes a methodological sequence in our thesis begun in sec.2. In both sec.2 and sec. 3, we started with definite change in our ''simple economy'' and looked into the consequences of this ''change'' through the working of the economy, thereby gaining some fresh insight into the nature of this ''working''. The begining ''change'' in section 2 was a change in the wage rate and in section 3 a change (improvement) in methods of production. In the present section we follow the same methodology, the beginning ''change'' being a change, broadly speaking, in the very institutional set up of the economy (to be made precise in a minute). This is the sequence. We pass, so to say, from an 'economic change' to 'technological change' to an 'institutional change' as the beginning point of our 'method'.

2. Boradly stated, the ''change in institutional set up'' that we envisage here is the appropriation of land i.e., turning land into ''private property''. Now ''land'' is the source of all natural resources. Our focus here will be precisely on this particular aspect of land, not on ''land'' as such. We consider a particular natural resource, water, which was free earlier because land was not appropriated, and which now becomes unfree , i.e., costly to use, simply because the landowner has imposed a charge upon its use. Ou object is to look into the effects of this water-charge being imposed in our ''simple economy''.

3. We take that <u>every</u> producer in our economy has to use water as 'input' in his production process and further that the amount of water so used is in <u>proportion</u> to the labour employed. So, the producer of $G_i$, who is employing $L_i$ workers per year in our state of reference, must actually be buying say $\theta L_i$ gallons of water per year where $\theta$ is a constant (independent of $i$) denoting the amount of water used per worker per year in any production process. The constancy of $\theta$ may appear arbitrary. We will only say that it is of the same <u>genre</u>. of simplifying conditions that make up our construct of a ''simple economy''. It is in this sense part of the same construct.

4.1 Now, before the appropriation of land, the whole 'cost of production' of $G_i$ consisted simply of the <u>wages paid</u>, $wL_i$, $w$ being the prevailing wage rate in our state of the economy. We note in the passing that the wage bill, $wL_i$, includes the wages paid for the actual work of bringing the water from its source, say a natural spring, to the site of production. Once the land where the spring is located has become ''private property'', the producer has to pay a charge for the water drawn <u>over and above</u> the above mentioned 'cost' of bringing water. So, his 'cost of production' now comes to consist of two elements, <u>wage</u> and <u>water charge</u>. If we denote the <u>rate</u> of water charge by $q$ (Rs. per gallon of water drawn) then the water charge borne by the producer of $G_i$ is $q\ \theta\ L_i$.

4.2 We will assume that unlike the wage, the water charge is paid at the end and not the beginning of each year. It is therefore paid out of the revenue or sale-proceeds of the producer, not out of his capital. So, it is only the 'cost of production' and not 'capital' that is affected by the imposition of the water charge.

5.1 We are now ready to look into the effects of the appropriation of land and imposition of water charge in our economy. Let us suppose to begin with that all commodities go on being produced in the same amount and sold at the same price as previously, i.e., they are produced in the amounts, $X_1$, $X_2$, ... and sold at prices, $p_1$, $p_2$, ... where these magnitudes come from the balanced state of the economy prior to the appropriation of land as already described in sec. 2 of this chapter. We also suppose that the wage rate continues unchanged at $w$.

5.2 Let us now look into the rate of profit. The rate of profit previously was $r$ in every line of production. Let the rate of profit from the production of $G_i$ now be $r_i$. Granting that the output, $X_i$, is actually sold within the year of reference, $r_i$ is given by

$$r_i = \frac{p_i X_i - ( w L_i + q\theta L_i )}{w L_i}$$

$$= \frac{p_i X_i - w L_i}{w L_i} - \theta \frac{q}{w}$$

$$= r - \theta \frac{q}{w} \, ,$$

from eq. 1 of sec. 2.

This is independent of i. So, the rates of profit still continue to be the same on the different lines of production, though, obviously at a lower level. If we denote the new uniform rate of profit by r' , then obviously

$$r' = r - \theta \left( \frac{q}{w} \right)^* < r$$

As a corollary, $p_1$, $p_2$, ... still continue to be the natural prices in our economy.

5.3 This is granting that the outputs, $X_i$ , are actually sold within the year of reference with prices remaining unchanged at $p_i$. Stated differently, demand and supply are everywhere in balance. At this point, we can link up explicitly with the analysis of sec. 2 and point out the following. First, since the total income in the 'state' of the economy just portrayed is the same as that begun with, it is entirely possible that 'demands' also continue unchanged and so the 'state' is indeed a balanced state of the economy. $p_1$, $p_2$, ... in this case remain as actual prices in our economy all through. Second, even though total income is unchanged there is now a redistribution of this income (the precise nature of this is explained below) which may cause the pattern of demand to change. There is then an imbalance of demand and supply at old production levels, $X_1$, $X_2$, ... causing the prices to depart from $p_1$, $p_2$,. But this is only a temporary feature at the end of which demand and supply are again balanced at natural prices. Granting CRs., the natural prices still remain $p_1$, $p_2$,..., whatever be the new pattern of demand and production.

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* We take the rate of water change, q, to be small so that $r' > 0$.

6. Let us now look into the nature of redistribution of income caused by the appropriation of land. Prior to this ''event'', the total income in our economy was distributed between workers and capitalists in the amounts ( wL ) and r ( wL ) where L denotes the total labour employed in the economy. Now, landowners come in as a third claimant in the distribution of income. Their share in the total income is given by $q\theta L$. This is exclusively at the cost of capitalists, for there has been no change either in the wage rate or in the total employment. So, there is now a pure redistribution of income from capitalists to landowners. The fall in capitalists' income is given by ( r - r' ) ( wL ) and this by definition exactly counterbalances the landowners income, $q\theta L$.

7.1 We can now end up with a few concluding remarks on our problem area. First, we note that however different capitalists and landowners may be in other respects, their ''spending habits'' are broadly the same. If this is so, a pure redistribution of income between them simply leaves unaffected the demand for different commodities in the economy as a whole. This obviously lends support to the ''possibility'' mentioned above, that 'demands' continue unchanged following the ''event'' of our reference.

7.2 Secondly, we have assumed in the analysis above that the wage rate remains unchanged through this ''event''. Two points may be made in reference to this assumption. One, even if the wage rate did change, this is no cause for a permanent change in prices in our economy. In otherwords, $p_1$, $p_2$, ... would still continue as natural prices. This is already argued in sec.2 above.

The other point is this. As already noted, a change in the wage rate, if it is to actually occur, must have a 'cause' behind. Hence the question is whether there is any causal relation between the 'event' of our reference (and all that follows from it) and the change in wage rate. It is not possible to discuss this question without going into the causes of wage change, which we come to only later in the thesis. It will be seen later that there is really no cause for the wage to change in the present context. This simply upholds the analysis given above.

Section 5 : Wage, Price and Profit Outside the ''Simple Economy'' — Introductory.

1. We have already said that it is the ''causes'' which led Ricardo to introduce successive ''modifications'' in his basic ''principle of value'' that re-appear in our scheme as so many departures from or steps out of the ''simple economy''. These ''causes'' were stated by Ricardo as*:

(a) ''employment of machinery and other fixed and durable capital'' ;

(b) ''unequal durability of capital'';

(c) ''unequal rapidity with which it (capital) is returned to its employer''.

We will take up the corresponding ''departures'' from our ''simple economy'' in secs. 7, 8 and 6 below. (Note the two orders are not the same). The present section is purely introductory.

2. The common problem discussed in these sections is the effect of a change (rise) in the wage rate. This was our essential analytical problem in sec.2, and we have already pointed out that the following sections are attempts at ''generalising'' the analysis of that section.

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* See title-head or caption of sec. 4 and 5 of ch.1 of the Principles.

We have also alluded to the ''open endedness'' of the programme of generalisation, which in a way only underscores the methodological significance of our construct of the ''simple economy''. This is to become clear as we go on. At this point we simply mention some simplifications introduced in the analysis of the following sections and justify them.

3.1 The basic simplification is this. As before, we will start from a balanced state of the economy, introduce a change in wage rate and then trace its consequences through time. We already know that in time the economy once again returns to a balanced state. There is an intervening period of ''unbalanced state'' if and only if the initial demand-supply balances are disturbed by the wage change. But these imbalances get corrected by the very forces they generate. Obviously, if our interest focuses on the permanent effects of the wage change, we may as well cut out the ''intervening period'' and concentrate directly upon the new balanced state of the economy brought about. This is precisely what we will be doing in the following sections, but this by itself constitutes only one half of the ''simplification'' we introduce.

3.2 The other half consists essentially of an implicit assumption that all production processes in the economy are subject to CRS. The significance of this step is as follows. Under CRS, the natural prices of commodities are independent of their scales of production.

It follows from this that in so far as we are interested in the (permanent) effects of wage-change upon <u>prices and rate of profit per se</u> - not upon the levels of production as such — we may as well abstract from any <u>change</u> in the levels of production caused by the wage-change. This again is precisely what we will do in the following sections. Thus, to state in full, our interest now focuses exclusively upon the permanent effect of a rise in the wage rate upon the rate of profit and prices in our economy, and for this purpose, we simply take the levels of production as 'given' as per the original demand-supply balances in our economy. It is because of this 'given-ness' (or ''unchangingness'') that the assumption of CRS in turned into an <u>implicit</u> assumption of the whole analysis, without ever surfacing out. Let us just add that if no demand-supply imbalances are infact created by the wage change, then no change in production levels is also called forth, and the assumption becomes <u>redundant</u>.

4. The other simplification introduced into the analysis is simply that we now assume that <u>only two commodities are produced in our economy</u>. We will refer to them as 'corn' and 'wine' respectively.

Section 6 : Unequal Turnover Period of Capital

As already stated, our step out of the ''simple economy'' in this section is defined by what Ricardo referred as ''unequal rapidity'' with which capital may be returned to its employer (over different lines of production)*. We refer to this as the case of unequal turnover periods of capital. The idea is as follows.

1.1 Let us remember that we now have only two commodities, corn and wine, produced in our economy. 'Corn' we take is produced according to the ''simple type'' of production process defined earlier. So, we make here a departure from the assumptions of the ''simple economy'' only in respect of the production process of wine.

In the ''simple economy'', capital put into any line of production at the beginning of a year yielded its whole return within the same year. We can say that capital had a turnover period of one year. For wine, we now take that capital has a turnover period of two years. This is the departure.

1.2 Let us spell this out in explicit terms. In order to produce 'corn', a capitalist puts in his capital in the form of a ''wage fund'' at the beginning of a year, with which he employs certain workers to work for the year as a whole, and over the same year, these workers

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* An alternate expression given by Ricardo was as follows : ''Circulating capital may circulate, or be returned to its employer, in very unequal times''. (Principles, p.19).

turn out the whole output of corn that is produced on the basis of the capital under reference. In order to produce wine too, we take the capitalist to put in his capital in the form of a ''wage fund'' at the beginning of a year with which he employs certain workers to work for the year as a whole. But the output, we assume, does not get produced till some <u>further time has elapsed</u>. No additional labour is however put in over this ''further time''. The wine just ''matures'' by itself over it.

Let us now take this ''further time'' to be of <u>one year's</u> duration. This means in a word that in the production of wine, labour is put in the first year, but the output is obtained in the second year. The capital employing the labour, which is the whole capital put into the production process, is then automatically ''turned over'' in <u>two years</u>.

1.3 Let us clarify one small detail about the actual production of wine in our economy. It may appear from our statements that labour is actually put in only in <u>alternate years</u> and so output is also obtained in alternate years in this line of production. This however is not so. Even the same capitalist may divide his whole capital into two equal parts and employ labour in <u>one sequence</u> of alternate years (say years 1,3,5 ....) with one half of the capital and in the <u>complementary sequence</u> (years 0,2,4, ....) with the other half of the capital. There is then a <u>uniform</u> employment of labour year after year, implying in turn a uniform output of wine year after year. We now assume that this is precisely how the production of wine is going on in the initial state of our economy.

2. The ''initial state of the economy'' just referred is a <u>balanced state</u> of the economy. Let us come straight to the value-distribution equations of the economy using the same notation as before with just this difference that the commodity index, i, now takes just two values, 'c' (for 'corn') and 'w' (for 'wine').

The value-distribution equation for 'corn' obviously stands as before :

$$(1) \qquad p_c X_c = w ( 1 + r ) L_c$$

The value-distribution equation for 'wine' however is given by

$$(2) \qquad p_w X_w = w ( 1 + r )^2 L_w$$

This is simply becuase the capital engaged in wine yields its return in <u>two years</u>, not one, while r continues to denote the <u>annual rate of profit</u> in the economy. So, to yield the rate of profit, r, the value of wine produced with the capital, $w L_w$, has to be $( 1 + r )^2$ times the capital, not $( 1 + r )$ times. This justifies the form of the value-distribution equation for wine just given.

3. Let us now suppose that at some time the wage rate in our economy rises from its previous value, w, to say $( 1 + \alpha ) w$, $\alpha > 0$. As already stated, our object is to look into the effects of this change taking it for granted that there is no change at the <u>physical</u> level of production in the economy, i.e., 'outputs' and 'employments' in the two lines of production continue to be $( X_c, X_w )$ and $( L_c, L_w )$.

Let us suppose to begin with that <u>corn goes on selling at its old price</u>, $p_c$, even after the wage rise. It is then clear that the rate of profit from corn must <u>fall</u> from $r$ to say $r_c$ where $r_c$ is solved from ( I ) after replacing $w$ by $(1 + \alpha)w$ and taking all other magnitudes occuring in this equation, i.e., $/(X_c, L_c, p_c)$ as given. Similarly, if <u>wine</u> goes on selling at its old price, $p_w$, then the rate of profit from it falls from $r$ to $r_w$ say where $r_w$ is calculated by parallel steps. The explicit solution for $r_c$ and $r_w$ are given below. (We write $(1 + r_c)$ and $(1 + r_w)$ on the LHS for simplicity.)

$$(3) \qquad 1 + r_c = (1 + r)/(1 + \alpha)$$

$$(4) \qquad 1 + r_w = (1 + r)/\sqrt{1 + \alpha}$$

Clearly, while $r_c$ and $r_w$ are both <u>smaller</u> than $r$, they are smaller in <u>different</u> proportions (in fact $r_w < r_c < r$). This simply means that the rates of profit for 'corn' and 'wine', do <u>not</u> remain equalised if <u>both</u> go on selling at their old prices, which is to say that $(p_c, p_w)$ are no longer the natural prices. Stated differently, the prices must now <u>change</u> simply to equalise rates of profit. But going just on the basis provided so far, the argument can only go round in a circle : to find out the new prices we have to know at what 'level' the rates of profit get equalised, and this in

turn depends upon how prices change. This sort of problem did not arise in the ''simple economy'' simply because change in wage did not disturb the equality of rates of profit in that economy.

This is the essential ''complexity'' that arises in analysing our problem outside the ''simple economy''. Having pointed this out, we can only say that the complexity, i.e., the ''circularity'' just discussed, can be resolved only by bringing in <u>other forces</u> of the economy. As already stated, we must wait for this.

4. However, at a purely analytical level, we can proceed a little further with our problem. It is clear that equalisation of rates of profit after the rise in wage in our economy is still possible if <u>only one</u> price changes. Let us proceed with this case.

4.1 Obviously, the case splits up into <u>two sub-cases</u> depending upon which price changes. Let us just analyse the two cases one by one —— case 1, where corn price remains unchanged and case 2, where wine price remains unchanged.

In case 1, we can already see that the rates of profit after the wage rise must get equalised at $r_c$. This means that the price of wine gets so adjusted that wine too yields this rate of profit. So, if we denote the <u>new</u> price (natural price) of wine by $p_w'$ then we have :

$$(5) \qquad p_w' X_w = (1 + \alpha) w (1 + r_c)^2 L_w$$

$$= [w/(1 + \alpha)] (1 + r)^2 L_w \qquad \text{from (3)}$$

$$= p_w X_w / (1 + \alpha) \qquad \text{from (2).}$$

So,

$$(6) \qquad p_w' = p_w / ( 1 + \alpha ) < p_w$$

Similarly, in case 2, the rates of profit after the wage rise get equalised at $r_w$ through an adjustment of the price of corn, its 'adjusted' value, $p_c'$ say, being given by :

$$p_c' X_c = ( 1 + \alpha ) w ( 1 + r_w ) L_c$$

$$= \sqrt{1 + \alpha} \; w ( 1 + r ) L_c \qquad \text{from } ( 4 )$$

$$= \sqrt{1 + \alpha} \; p_c X_c \qquad \text{from } ( 1 )$$

and so,

$$(7) \qquad p_c' = \sqrt{1 + \alpha} \; p_c > p_c .$$

4.2 It is thus seen that so far as <u>price</u> as well as the <u>total value of production</u> is concerned, the results are just <u>opposite</u> in the two cases. In case 1, the price of wine <u>falls</u> as a result of the rise in wage rate, and hence so does the total value of production as outputs are unchanged. In case 2, on the other hand the price of corn as well as the total value of production <u>rise</u> as a result of the same rise in wage rate.

This ''opposition'' does not however obscure the fact that both cases are still united by the fundamental common result that the rate of profit falls as a result of the rise in wage rate. It falls from $r$ to $r_c$ in one case and $r_w$ in the other case and precisely because these are ''unequal falls'' that we have the whole ''effects'' on price and value of production noted above.

5. Let us now end by saying simply that the ''common result'' just noted can remain only as suggestive of a ''general result'' at this point, for the ''cases'' themselves remain purely hypothetical so far; no substantive defense has been given to their defining conditions. It will however be seen later, when ''other forces'' are brought in to ''close'' the problem discussed, that they (the ''other forces'') not only establish the general result that the rate of profit falls as a result of rise in wage, but also give a definite significance to the two ''hypothetical'' rates of profit, $r_c$ and $r_w$, in locating the ''true'' rate of profit following the rise in wage rate postulated. This means in a way that the analysis given above is indeed a ''step'' in the path of ''generalisation'' we are seeking (see p. 38 above.), not ''off'' this path.

Section 7 : Unequal Composition of Capital

As already stated, our reference point for stepping out of the construct of the ''simple economy'' here is what is stated by Ricardo as ''employment of machinery and other fixed and durable capital''. Let us first conceptualise this in our framework of production process.

1. In our ''simple type'' of production processes, capital was in the form of a pure wage fund or circulating capital. The underlying technical assumption was that whatever physical 'inputs' are required in any line of production are not only produced internally within that line, but also ''used up'' within the time elapsing between the 'date' at which workers are put to work and the 'date' within which the whole output produced by these workers is obtained. Further, this ''period of production'' was taken to be one year for all commodities.

As in the last section, let us now suppose that of our two commodities, 'corn' and 'wine', 'corn' is still produced by a ''simple type'' of production process. But wine production requires the use of a tool which, we take, is itself produced in one year and then used from the next year onwards. Kept in proper repair, the 'tool', we further assume, lasts for ever. In other words, it has an infinite life time at constant efficiency. This is how we conceptualise the ''employment of machinery and other fixed and durable capital''.

2.1 The first point to be noted about the ''tool'' just introduced into the picture is that so long as the production of wine continues unchanged, the tool itself never comes to be freshly produced : wine production goes on simply with the pre-existing stock of the tool.

2.2 Nevertheless, the very fact that the 'tool' has to be there for 'wine' to be produced, means that it enters the capital engaged in the production of wine. So, the capital in wine production is now made up of two parts — one, the wage advanced, which is its ''circulating capital'', and two, the value of the tool, which is its ''fixed capital''.

2.3 We now note that there being no fixed capital in the production of corn, the composition of capital, i.e., ratio of fixed to circulating capital, is automatically different in the two lines. This is important to recognise. We not only introduce fixed capital into the picture now, we do it in a way that makes the 'composition' of capital unequal between our two lines of production. (This explains the title we have given to this section).

3.1 Let us suppose that the 'tool' itself is the product of a ''simple type'' of production process. Specifically, it takes $L_t$ workers working for a year to produce one unit of the tool. On this basis, we take the capitalists to value one unit of the tool at $w(1 + r) L_t$, where w and r denote, respectively the currently prevailing wage rate and rate of profit in the economy.

3.2 It is at this value that the tool enters the 'capital' engaged in the production of wine. Let us suppose that only one unit of tool is used in wine production in our state of the economy, where $L_w$ workers working for a year with this one unit of tool are turning out an annual output of $X_w$ amount of wine year after year. The total capital engaged in wine production in this state is then given by the sum :

$$w\, L_w + w\,(\,1 + r\,)\, L_t$$

3.3 This gives the following value distribution equation for wine

$$p_w\, X_w = w\, L_w + r \left[ w\, L_w + w\,(\,1 + r\,)\, L_t \right]$$

(1) $$= w\,(\,1 + r\,)\left[\, L_w + r\, L_t \,\right]$$

The value-distribution equation for corn remains as in the ''simple economy'' :

(2) $$p_c\, X_c = w\,(\,1 + r\,)\, L_c$$

4. Let us now suppose that at some point the wage rate rises from $w$ to $(1 + \alpha)\, w$, $\alpha > 0$. We can now proceed parallelly to the previous section.

4.1 If corn went on selling at its old price, $p_c$, then it would yield a lower rate of profit, than before, say $r_c$ ( $< r$) which is defined through the equation.

$$(3) \quad p_c X_c = (1 + \alpha) w (1 + r_c) L_c$$

Similarly, if wine went on selling at its old price, $p_w$, then it would yield a rate of profit, $r_w$ ( $< r$ ), defined through the equation :

$$(4) \quad p_w X_w = (1 + \alpha) w (1 + r_w) (L_w + r_w L_t)$$

4.2 Let us now see if $r_w$ and $r_c$ can be equal. Suppose they are. Then from ( 4 ) we have

$$\begin{aligned} p_w X_w &= (1 + \alpha) w (1 + r_c) (L_w + r_c L_t) \\ &= w (1 + r) (L_w + r_c L_t) \\ &\quad \text{from eq. ( 3 ) of last sec}^{*}. \\ &< w (1 + r) (L_w + r L_t) \quad \because r_c < r \\ &= p_w X_w \quad \text{from (1)}. \end{aligned}$$

So, we have a contradiction.

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* This equation also holds for the economy being considered in this section because the value-distribution equation for corn is the same in both economies.

4.3 So, we again have the conclusion that both corn and wine cannot go on selling at their old prices, $p_c$ and $p_w$, after the rise in wage. At least one must change for the rate of profit to be again equalised. We can only suggest at this point that this equalisation will take place at a lower level than previously for both $r_c$ and $r_w$ are smaller than r. Since all these conclusions run parallel to these obtained for the ''economy'' discussed in the last section, we need not continue the discussion any further.

Section 8 : Unequal Durability of Capital

1.1 The very notion of ''durability'' of capital is defined in last section in the respect of fixed capital which we have already introduced in the form of a ''tool'' used solely in the production of 'wine'. To get on to the unequal durability of capital starting from this, we must now first take the ''tool'' to be used in the production of 'corn' as well as 'wine'.

Now, in the previous section we assumed that the tool used in wine production had an infinite life span. Let us simply maintain this assumption. In corn, on the other hand, we take the tool to have a life span of only one year, i.e., it has to be replaced after only one year of use. This automatically introduces the element of ''unequal durability'' of capital in the economy as a whole.

1.2 There arises a fresh point at this point. Now that fixed capital is used in both lines of production, it is possible that the composition of capital is turned unequal between the two lines because the workers engaged in one line are 'assisted' by a different number of tools as compared to the other. We want to get this out of our problem here. So, we assume that the number of tools used per worker is the same in both lines. We will denote this tool-worker ratio by k. Finally, it is to be mentioned that we take the production process of the ''tool'' itself to be the same as in the previous section - $L_t$ workers working for a year produce one unit of the tool over the year.

2.1 Let us now begin on the analysis. In the previous section, we assumed that only one unit of the ''tool'' was used in wine production. Now, we assume that k units of the ''tool'' are used per worker and so the total number of tools used is $k L_w$. So far as wine is concerned, this is the only difference in its production process between the two sections, for the tool is still assumed to have an infinite life span in this process. Adjusting for this difference, we have the value-distribution equation for wine in our present economy given by the following equation :

$$(1) \qquad p_w X_w = (1 + r) w [1 + rkL_t] L_w$$

2.2 Let us now turn to corn. The capital engaged in the production of corn has a parallel expression to that engaged in wine for it is the same type of ''tool'' that is used in both lines and the tool-worker ratio is also the same in both lines. A minute's reflection shows that this capital is given by

$$wL_c + kw (1 + r) L_t L_c$$

But whereas in wine, only the ''circulating capital'' part of total capital came up for replacement (in fact annual replacement), for the fixed capital, being infinitely durable, did not have to be replaced at all, in corn the whole capital comes up for annual replacement, for the ''tool'' here has a life span of only one year which

is also the ''period of production'' (time elapsing between the payment of wage and the obtaining of the whole output produced by the labour concerned). From this, we deduce the following value-distribution equation for corn in our present economy :

$$p_c X_c = (1 + r)[wL_c + kw(1 + r) L_t L_c]$$

$$(2) \qquad = w(1 + r)[1 + k(1 + r) L_t] L_c$$

3.1 Let us now suppose that some year the wage rate in our economy rises from $w$ to $(1 + \alpha)w$, $\alpha > 0$. Since the RHS of both (1) and (2) are monotonically increasing in $r$, it follows that if wine went on selling at its old price, $p_w$, then the rate of profit from wine would <u>fall</u> from $r$ to say $r_w$, and similarly if corn went on selling at its old price, $p_c$, then the rate of profit from corn would <u>fall</u> from $r$ to say $r_o$, where $r_w$ and $r_o$ are obtained at once by replacing $w$ by $(1 + \alpha)w$ in (1) and (2) respectively and solving for $r_c$ and $r_w$ from them. I.e., $r_o$ is solved from

$$(3) \qquad p_c X_c = (1 + \alpha)w(1 + r_o)[1 + k(1 + r_o) L_t] L_c$$

and $r_w$ from

$$(4) \qquad p_w X_w = (1 + \alpha) w(1 + r_w)[1 + r_w kL_t] L_w .$$

3.2 We now claim that as in the last two sections :

(5) $r_c \neq r_w$

To prove this, let us notice the following. From ( 1 ) and ( 2 ) we have :

$$p_c X_c = A p_w X_w + w ( 1 + r ) L_t k L_c$$

(where $A = L_c / L_w$ , a constant)

or,

$$p_c X_c - A p_w X_w = w ( 1 + r ) L_t k L_c$$

If $r_c = r_w = r$ say then it is easy to check that we must have

$$p_c X_c - A p_w X_w = ( 1 + \alpha ) w ( 1 + \bar{r} ) L_t k L_c$$

This fixes $\bar{r}$ by

(6) $1 + \bar{r} = ( 1 + r )/( 1 + \alpha )$

But then we have

$$p_w X_w = ( 1 + \alpha ) w ( 1 + \bar{r} ) [ 1 + \bar{r} k L_t ] L_w$$

$$= w ( 1 + r ) [ 1 + \bar{r} k L_t ] L_w \qquad \text{using (6).}$$

This is contradictory to ( 1 ) as $\bar{r} < r$.

With $r_c \neq r_w$ , $p_c$ and $p_w$ cannot again continue as the natural price of corn and wine. This brings to the same point of conclusions (or "openness") as reached in the last two sections. It is therefore unnecessary to continue the discussion any further.

Chapter 2

# RENT

## Section 1 : The Basic Theory of Rent

Rent is the payment for the use of his land that is extracted by the landowner from the user of the land. This is clearly analogus to the ''water charge'' that we had introduced in the previous chapter, for ''land'' and ''water'' both are free gifts of nature. However, previously, we only analysed the effects of the water charge without trying to explain its magnitude. Our fundamental concern here on the other hand will be with the magnitude of rent. This actually includes the question of very existence of rent, for nothing is presumed a priori about whether the rent is positive or zero. Once we are through with the theory of rent in this sense, we can return to our ''water-charge'' of the last chapter and clarify the conceptual basis of the two.

1.1 Let us begin with a statement of our substantive assumption. First, we will consider rent only in relation to agricultural land. We will further assume for simplicity that there is only one agricultural product in the economy, to be called corn. So, rent arises exclusively in the production of corn.

1.2 Next, as in the case of the ''water charge'', we will assume that rent is paid by the producer directly out his revenue or sale proceeds, not out of his capital. As already explained, this means that the rent

is paid at the end of each successive round of production going on, and not at the beginning, as the wage is. We will also take the production process of corn to be of the ''simple type'' as defined in the previous chapter.

1.3 Let us take a little time in introducing our next assumption. At any time in our economy, we will find a certain total output of corn being produced by a certain work-force cultivating a certain land-area. Going inside, we find that this total 'cultivation' is actually carried out in individual plots (or 'farms', which we take for simplicity to be of a uniform size, say one-acre each. We now assume that while the 'labour' required for cultivation is the same on each plot, the output produced is not so. This is accounted for, or grounded in, natural differences in the fertility of the soil (also called ''quality differences''). Obviously, a more fertile plot of land yields a larger output for the same amount of labour used. This is the substance of the assumption just stated.

Let us put this assumption in algebraic terms Let us suppose that there are M different grades of land in all in our country. Let $x_i$ and $n_i$ denote respectively the output per acre and number of workers per acre of grade i land. Arranging the grades of land in the order of fertility, we then have :

(1) $x_1 > x_2 > \ldots > x_M$

(2) $n_1 = n_2 = \ldots = n_M = n$, say.

We also note in this context that there is by definition a <u>given availability</u> of each grede of land in the country. These ''availabilities'' we will denote by $A_1, A_2, \ldots A_M$

1.4 Our final assumption consists of extending the assumption of ''free competition'' to <u>land owners</u>. This means simply that any landowner faces the competition of others in the leasing out of his land. As a result, if a land owner charges a higher rent per acre of any quality of land that he may own than what others are charging for the same quality, he simply finds no 'takers'. In short, there is at any time, a <u>single</u> rent-rate for each grade of land under cultivation, which is the <u>minimum</u> of the rates that may <u>a priori</u> have been 'demanded' by the different landowners.

We also point out in this context that ''free competition'' in the old sense (free movement of capital) entails a <u>uniform rate of profit over all different grades of land actually under cultivation</u>.

2.1 We are now ready to begin on the <u>analysis</u> of rent. Let us take as our reference a <u>balanced state</u> of the economy with $X$ as the <u>total annual output</u> of corn. This means by definition that

$$(3) \qquad X \leq \sum_{i=1}^{M} x_i A_i$$

Let us now specifically suppose that

$$(4) \qquad \sum_{i=1}^{m-1} x_i A_i \leq X < \sum_{i=1}^{m} x_i A_i \quad \text{for some } m,\ 1 < m < M.$$

This means that it is <u>possible</u> to raise the output, X, by cultivating <u>fully</u> the available land of grades 1,2, ..., (m-1) and <u>part</u> of the m-th grade land. Nothing is said in this about how <u>actually</u> the output is produced. We will now show that granted the assumption of <u>free competition</u>, the output, X, must indeed be produced in the manner just described. The proof is as follows.

2.2 Suppose contrary to the assertion just made, the i-th grade land is only <u>partly</u> cultivated where $i \leq m$. We then claim that the rent per acre of the i-th grade land (i.e. the rent-rate for this quality of land) must be zero. The argument is as follows.

By definition, there are owners of grade-i land who have no 'takers' for their land and consequently earn no rent from their land. So, if the rent-rate for this grade of land were <u>positive</u>, these owners would stand to gain by actually offering their land at a slightly lower rent, for which they would certainly find 'takers' for their land. This must bring down their rent-rate. Since this is so for <u>any</u> positive rent-rate begun with, the rent-rate must in fact fall to zero. Stated in symbols, we have

$$\rho_i = 0$$

where $\rho_k$ denotes the rent-rate for grade-k land, k=1,2, ..., m.

2.5 Let us now suppose that corn is selling at the price, p, in our state of the economy and that the wage rate is w. Since no rent is paid for the use of i-th grade land, the rate of profit from the cultivation of one acre of this grade, say $r_i$, is given by

$$r_i = \frac{px_i - wn}{wn}$$

where n denotes the labour required for cultivating one acre of land (by assumption the same for all grades of land).

Let us now turn to a farmer of grade m land. Even if he did not pay rent, his rate of profit is only $r_m$ where

$$r_m = \frac{px_m - wn}{wn}$$

$$< r_i \qquad \therefore \; x_m < x_i.$$

This contradicts the condition of uniformity of rate of profit over all different grades of land under cultivation entailed by the assumption of free competition. Hence in our state of reference all lands upto and including grade (m - 1) must be under cultivation.

3. Let us now proceed on. We may call the m-th grade land, the <u>marginal grade land</u> in our state of the economy (An equivalent expression is that the <u>marginal land is 'located' in the m-th grade</u>). Since this grade itself is only partly under cultivation, the competition of land-owners drives its rent to zero, i.e.,

(5) $\rho_m = 0$

This defines the famous concept of ''no-rent margin of land'' of Ricardo.

4. Next, we note that since we are concerned with a balanced state of the economy, we must have

(6) $$r_1 = r_2 = \ldots = r_n = r$$

where $r_i$ denotes the rate of profit from cultivating one acre of land of grade - i and r denotes the general rate of profit in our state of the economy.

Obviously we can re-write this condition as follows :

(7) $$px_i = w(1 + r)n + \rho_i \qquad i=1,2, \ldots m$$

Putting $i = m$, we at once have from (5) :

(8) $$px_m = w(1 + r)n .$$

Note that rent does not appear in this equation. It is, so to say, ''gotten rid of''. This is sometimes stated in the form that rent does not enter price. The idea is that given (a) the wage rate, w ; (b) the rate of profit, r, and (c) the production conditions on the marginal land as represented by $(x_m, n)$, the price of corn is completely 'determined' by (8). Since rent does not appear in the equation, it is not a 'determinant' of price*. It is rather 'determined by price' or 'price-determined'.

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* This is one of the fundamental propositions of Ricardo's economics, stated by Ricardo himself in the following words -

> ''That corn which is produced by the greatest quantity of labour is the regulator of the price of corn; and rent does not and cannot enter in the least degree as a component part of its price'' (Principles, p. 40).

''Produced by the greatest quantity of labour'' is simply a reference to ''production conditions on the marginal land'', noted above as one of the ''givens'' in the determination of corn-price.

5. Now, from (7) and (8) we obviously have :

$$p\,x_i = px_m + \rho_i \quad , \quad i=1,2, \ldots, m$$

or

(9) $$\rho_i = p\,(x_i - x_m) \qquad i=1,2, \ldots, m$$

We thus see that the rent rates, $\rho_i$, depend only upon two things : (a) the price of corn, p, and (b) the 'extra' output produced per acre of the superior grades of land $(i=1,2, \ldots, m-1)$ over the 'marginal' grade $(i = m)$, i.e., $(x_1 - x_m), (x_2 - x_m) \ldots, (x_{m-1} - x_m)$. We may call the latter briefly the ''differential outputs''. So, the rent rates are simply the value of these ''differential outputs''. The ''value'' is of course defined by the ruling price of corn. This establishes the point that rent is 'price-determined'.

6.1 Let us now observe that while it is true that rent is actually paid in money , this 'money' itself is gotten by the corn-producer only by selling his produce i.e., from his sale-proceeds. So, knowing the price, he can as well set aside a part of the produce itself for the payment of rent. This part defines the rent in corn or corn-rent. Formally, the corn-rent is simply the money rent divided by the price of corn. Obviously if $q_i$ is the rate of corn-rent on grade i land then from (9)

(10) $$q_i = (x_i - x_m)$$

The corn rents are thus simply the ''differential outputs''.

6.2 These differential outputs are completely internal to the physical condition of agriculture in our state of reference. Because of this, we can say that the corn-rent is a ''predetermined'' magnitude in any given balanced state of the economy -- it is determined prior to and independently of the value of corn as well as the distribution of produce between workers and capitalists. The first point is simply axiomatic. The second point is best explained as follows.

6.3 Let us define the notion of corn-wage analogously to corn-rent. It is simply the wage i.e., money wage, divided by the price of corn. Denoting the corn-wage rate in our state of reference by $w^c$, we have from (8) :

$$x_m = w^c (1 + r) n$$

$$(11) \qquad = (w^c n) + r (w^c n)$$

This gives us the division of the produce of the ''marginal land'' between workers and capitalists, each reckoned in corn, the respective shares being simply $(w^c n)$ and $r (w^c n)$. Obviously alternative distributions of the produce between workers and capitalists are possible, which we can see as a movement along the locus of the corn wage rate, $w^c$, and rate of profit, r, defined by (11). The point to note is that whatever be the actual distribution between workers and capitalists i.e., the point on the locus settled on, the rent in corn remains the same. Rent neither enters this distribution nor is affected by it.

7.1 Let us now turn to the total rent in our state of reference. This is obtained purely definitionally. Let us just remember that (a) no rent is yielded by the marginal grade of land, m; and (b) all the superior or intra-marginal grades of land (i=1,2, ..., m-1) are fully cultivated. It follows from these two propositions that the total rent in corn in this state, say $Q$, is given by :

$$Q = \sum_{i=1}^{m-1} q_i A_i$$

$$(12) \qquad = \sum_{i=1}^{m-1} (x_i - x_m) A_i \qquad \text{from (10)}$$

The total money rent in the economy, say $R$, is than obtained simply by multiplying the corn-rent, $Q$, by the prevailing price of corn, $p$, i.e.,

$$(13) \qquad R = p Q$$

We can also come back to this equation by the following definitional steps :

$$R = \sum_{i=1}^{m-1} \rho_i A_i$$

$$= p \sum_{i=1}^{m-1} (x_i - x_m) A_i \qquad \text{from (9)}$$

$$= p Q \qquad \text{from (12).}$$

7.2 We will now derive an alternative expression of total rent defined purely in terms of totals. For this, we note that the total output of corn, $X$, is by definition given by

$$X = \sum_{i=1}^{m-1} x_i A_i + x_m (\alpha A_m)$$

for some $\alpha$, $0 < \alpha < 1$, where $\alpha A_m$ denotes the part of the available land of the 'marginal' grade that is actually under cultivation. So, the total land under cultivation, $\bar{A}$ say, is given by

$$\bar{A} = A_1 + A_2 + \ldots + A_{m-1} + \alpha A_m$$

Now, we can obviously rewrite (12) as

$$\begin{aligned} Q &= \sum_{i=1}^{m-1} (x_i - x_m) A_i + \alpha (x_m - x_m) A_m \\ &= \left[ \sum_{i=1}^{m-1} x_i A_i + x_m (\alpha A_m) \right] - x_m \left( \sum_{i=1}^{m-1} x_i A_i + \alpha A_m \right) \\ &= X - x_m \bar{A} \\ &= X - \bar{X} \text{ say} \end{aligned} \tag{14}$$

where

$$\bar{X} = x_m \bar{A} .$$

$\bar{X}$ is simply the hypothetical output of corn that would have been produced in our economy had the production conditions of the marginal land applied to the total land under cultivation. We can also call this in brief the total output producible under 'marginal conditions'. So, by the (14), we have the total corn rent in the economy as difference between its actual total output of corn and the total output producible under marginal conditions. This is the alternative expression of total corn rent arrived at.

The corresponding expression for money rent is simply :

$$(15) \qquad R = p ( X - \bar{X} )$$

8.1 Let us now end. In discussing the relation between wage, price and profit in the last chapter (see.2), we claimed that all our substantive propositions on this relation stand even in the presence of rent. The claim is already justified by the proposition established above that rent does not enter the price of corn. We can in fact use (8) as the relevant value-distribution equation for corn in the 'total system'. This equation is exactly of the same form as the value-distribution equation for any other commodity in our ''simple economy''.

8.2 Let us however discuss this point, the representation of the value-distribution equation for corn, a little more systematically. The a-priori (or ''outside'') form of this equation is simply :

$$(16) \qquad p X = w (1 + r) L + R$$

where L denotes the <u>total labour force</u> engaged in agriculture in our state of reference. No ''theory'' of rent comes into this. Bringing in this ''theory'', we have the total rent, R, as given by (15). Making this substitution, we obtain

$$(17) \qquad p\bar{X} = w(1 + r)L$$

We can call this the <u>reduced form</u> of the value-distribution equation for corn. (8) is now obtained simply by dividing through this equation by $\bar{A}$ i.e., the total land under cultivation.

Section 2 : Effect of Accumulation of Capital and Growth of Demand on Rent.

1. As stated above, our object here is to trace the effect of accumulation of capital and growth of demand upon rent. The strategy is as follows. We know accumulation of capital leads to the growth of demand across board, i.e., for all commodities in general. Our reference will be to the growth in the demand for corn in particular. In fact, both the general growth of demand and accumulation of capital will only lie implicitly in the background of our analysis. The analysis therefore applies equally to the effects on rent of a progressive shift of demand in the economy from other commodities to corn. However, this is a purely a formal equation. A progressive shift in demand as above is something quite arbitrary. At this point, we will only say that we get rid of this arbitrariness by setting our problem in the background of a process of accumulation going on in the economy. That this ''transference'' is logically justifiable will be shown at the end of the section.

2. Let us begin from the state of the economy described in the last section and take it to be the initial state of the economy in time. So, we take as given all 'magnitudes', both physical and monetary, belonging to this state.

Now, the state being a balanced state of the economy, its annual output of corn, X, is by definition the same as its annual demand for corn. Let us denote the latter by $D_0$. So we have :

(1) $X = D_0$

Now, $D_0$ is by definition the initial demand for corn in our economy. Let us now visualise a sequence of successive rises in the demand for corn taking place in time. This defines ''growth of demand'' for our purpose. Our object is simply to trace the successive changes in rent, if any, that this growth of demand brings about.

3.1 Let us now remember that in our initial state of the economy only a part of the marginal grade of land is under cultivation. This part was denoted by $\alpha A_m$, $0 < \alpha < 1$, m being the marginal grade of land in the initial state of the economy. So, $(1 - \alpha) A_m$ remains as uncultivated margin of this grade of land in this state of the economy.

Let us now suppose that the initial rise in the demand for corn is a relatively small rise in the sense that it can be 'met' simply by extending the area of cultivation over this 'uncultivated margin'. Stated algebraically, this means that if $\delta_1$ denotes the rise in the quantity demanded —— i.e., $(D_0 + \delta_1)$ is the new level of demand - then

$$(2) \qquad \delta_1 < x_m (1 - \alpha) A_m$$

3.2 Let us now look into the consequences of this rise in demand. Its immediate impact must be a rise in the price of corn, for the output of corn at the moment remains fixed at X. Stated differently, we will now have corn selling at a 'market price' lying above its 'natural price', p. This brings forth the usual movement of capital, adjustment of supply and

return of the price back to the 'natural price'. Under the conditions stated in (2), we will have a new balanced state of the economy where the marginal land is still located in the m-th grade, with simply a smaller 'uncultrivated margin of it. Stated explicitly, the uncultivated margin previously was $(1 - \alpha) A_m$ acres, now it is $(1 - \alpha) A_m - (\delta_1/x_m)$ acres.

3.3 Clearly, both money rent and corn rent in this new state must be the <u>same</u> as in the initial state as, between these two states, there has not taken place any change <u>either</u> in the location of the marginal land and hence in the "differential outputs per acre", which govern the rates of corn-rent, <u>or</u> in the price of corn, which governs the money rent (given the corn rents). There is of course a price movement in between the two states, which is what brings the new state into being. This price movement however does <u>not</u> get transmitted to a movement of money rent, for it is purely transient. In other words, the rent responds only to <u>permanent</u> changes in the price of corn. This is a point implicit in the very nature of the rent contract entered between landlord and farmer, but we had no place to explain it earlier as this is the first time that we are coming up with a transient change in price.

4.1 Let us now come to the <u>second increment in the demand for corn in our sequence</u>, the quantity of which we denote by $\delta_2$. Let us suppose that this rise can be <u>just met</u> by bringing the whole remaining land of grade m under cultivation. I.e., we assume

$$(3) \qquad \delta_2 = x_m [(1 - \alpha) A_m - (\delta_1/x_m)]$$

4.2 Again by the usual process of price and capital movement the output will be brought upto the new level of demand, $(D_0 + \delta_1 + \delta_2)$. The m-th grade land is at this point fully under cultivation. Yet, owners of this grade land cannot get any rent for their land. The reason for this is that if the farmer of this grade land had to pay a rent then he would make less than the general rate of profit, r, on his capital, and consequently, this whole grade of land would go out of cultivation.

4.3 The above argument is tacitly based on the presumption that the price of corn remains unchanged at p, at which the rise in demand, $\delta_2$, is originally defined. Clearly, if the price were to rise permanently above p, then the demand would no longer be $(D_0 + \delta_1 + \delta_2)$ but less. This would entail a cutback in the extent of cultivation. There is thus no way that the owners of grade m-land can secure a rent for their land. As a result, both corn rent and money rent in the economy are still left unaffected by the rise in demand taken place.

5. Let us now come to the third increment in demand in our sequence. We will have to argue about it slightly differently.

5.1 This rise in demand is taking place at a time when corn is selling at its initial price, p, being produced in the amount, $(D_0 + \delta_1 + \delta_2)$. Let us denote this output $X'$. By definition

$$(4) \qquad X' = \sum_{i=1}^{m} x_i A_i$$

Suppose hypothetically there were to be no change in the output of corn from $X'$ as a result of the rise in demand under reference. By the very meaning of "rise in demand" people would then be willing to pay a price higher than $p$ for the same supply, $X'$. This higher price is what appears initially as the market price for corn. But if there is no change in the output of corn, the market price itself becomes permanent. As will be presently seen, this is a possibility to be reckoned.

5.2 Let $p'$ be the market price of corn just refered i.e. $(p' - p)$ is the rise in the price of corn brought about by the rise in demand, given that supply remains unchanged at $X'$. Let us suppose that

$$(5) \qquad p' x_{m+1} < w(1 + r) n$$

This is certainly possible as

$$x_{m+1} < x_m$$

and

$$p x_m = w(1 + r) n$$

(5), we take to provide an implicit specification of the rise in demand under reference*.

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* We note in this context that there can be no objection to calling $p$ the natural price of corn under the present conditions, for the rate of profit on corn yielded at this price is indeed equal to the general rate of profit. (This is made clear in the next paragraph.)

5.3 Earlier, we saw that when corn was selling at price, p, the owners of grade-m land could not get any rent. When however the same output of corn is selling at price $p' > p$, the farmer of the m-th grade land is left with a <u>surplus</u> in his revenue after deducting from it the wage paid as well as the profit upon his capital calculated at the going rate of profit. This surplus can now be claimed as <u>rent</u> by the landowners, which the farmer cannot refuse as he is already getting the usual rate of profit on his capital. Even if a particular farmer refuses there will be others willing to pay this rent. So, the rent actually emerges. Let us denote the rent on the marginal grade (mth grade) so found out by $\rho'_m$. Obviously

$$\rho'_m = p' x_m - w(1 + r)n$$

5.4 Let us now denote the rent rate on superior grades of land in the present state of the economy by $\rho'_i$, $i=1,2,\ldots (m-1)$. It is easily checked that for cultivation of all these grades to yield the same rate of profit, r, $\rho'_i$ must be given by

$$(6) \qquad \rho'_i = p'(x_i - x_m) + \rho'_m$$

Comparing (6) with (9) of last section we see at once that

$$(7) \qquad \rho'_i > \rho_i \qquad \forall\, i < m.$$

There are two distinct ground for this rise in the rent-rates. One is the <u>rise in the price of corn</u> from $p$ to $p'$, and the other is the <u>emergence of a rent on the marginal grade of land</u>, $\rho'_m$.

6.1 Let us now go on to consider a <u>fourth rise in demand for corn in our sequence</u>, the quantity of which we denote by $\delta_4$. (Note $\delta_4$ is the rise in the quantity demanded at the prevailing price $p'$). We assume $\delta_4$ can be 'met' by bringing in a <u>part</u> of the $(m + 1)$-th grade land under cultivation i.e.,

$$(8) \qquad \delta_4 < \sum_{i=1}^{m+1} x_i A_i - (D_0 + \delta_1 + \delta_2 + \delta_3)$$

6.2 It is clear that under the usual forces of competition, the price of corn will now rise <u>permanently</u> to a level which induces a sufficient movement of capital into agriculture so that the $(m + 1)$-th grade is cultivated to the extent required to meet the new demand. Since we now have the marginal land located in the $(m + 1)$-th grade, and since only part of this grade of land is under cultivation, we can conclude straight away that the new permanent price of corn, $p''$ say, is given by

$$(9) \qquad p'' x_{m+1} = w (1 + r) n$$

Since $x_{m+1} < x_m$, it is clear from (9) above and (8) of last section that

$$(10) \qquad p'' > p .$$

So, there has indeed been a <u>permanent rise in the price of corn</u>.

6.3 Let us denote the rent-rates at the present stage by $\rho_i''$ i=1,2, ... (m+1). These rates are determined exactly parallely to the rates prevailing initially and are given by

$$(11) \qquad \rho_i'' = p'' (x_i - x_{m+1}), \quad i=1,2, \ldots (m+1).$$

The marginal grade land now is the (m + 1)-th grade and it is again yielding no rent. The rent on all superior grades of land ($i \leq m + 1$) is given by the value of their differential outputs over the marginal grade land.

6.4 It is clear that as between the initial state and the current state of the economy, there has been a <u>rise</u> not only in the rates of <u>money-rent</u> but in the rates of <u>corn-rent as well</u>. The corn-rent has risen because the extension of cultivation has now shifted the marginal land to a <u>lower quality</u>, which by definition increases the differential output of all intra-marginal or superior grades of land. Even without any change in the price of corn, this would have raised money rents. But the price of corn has in fact risen to <u>induce</u> the very extension of cultivation just talked of. So, the money rents rise <u>additionally</u> on this ground. In other words, the money rents rise because (1) the corn rents have risen and (2) the price of corn has risen. (Let us just point out that this is so when we compare the present state of the economy with the <u>initial</u> state, not with the state immediately preceeding it.)

7. Let us take a brief stock of the course traversed so far. We began with the demand for corn being such as to bring m grades of land under cultivation, there remaining an uncultivated margin of the marginal grade. We have ended at a point where the demand has grown to an extent which has brought the next grade of land under cultivation, there being again an uncultivated margin of this, the present, marginal grade of land. This defines a complete ''cycle'' in the general expansion or growth of demand, in the sense that further rises only take us to a ''next'' cycle, the effects of which we can argue about in a <u>parallel</u> fashion. It is therefore not necessary to continue further with successive rises in demand that may be taking place in our economy. All the analytical propositions on the effect of growth in demand upon rent are already derived.

8. Let us make a short digression at this point. The object is to clarify the precise status of the notion of <u>no-rent margin of cultivation</u> in the general theory of rent.

''No rent margin of cultivation'' means that no rent is yielded by the marginal land, i.e., the worst quality of land under cultivation. We have seen that this 'rule' obtains at both the initial and the ending state of our economy in the ''cycle'' discussed above. However, we have also located an <u>exception</u> to this 'rule' through the complete cycle. A necessary but not sufficient condition for this exception to happen

is that the marginal land is fully under cultivation. This we can consider as something 'accidental'. Stated differently, we can say that this is a sort of exception which only proves the rule. So we can indeed take the notion of ''no rent margin of land'' as embodying a general rule in the working of our economy.

9. Let us now return to the point made at the beginning, that we visualise the growth in the demand for corn postulated above in the background of a process of accumulation of capital going on in the economy. This may look like a ''contradiction'' for it is only in reference to the movement of capital into agriculture in response to successive rises in demand for corn that we have established our propositions. This may appear even like precluding any ''accumulation'' of capital in the economy.

We now point out simply that even if the extension of cultivation that we have talked of is backed up by new capital in the economy, this will not be automatic. The 'new' capital itself will be directed to its proper line of investment by the prospective rates of profit which is precisely what governs the movement of capital as well. So, so long as there is no change in the general rate of profit in the economy the process of extension of cultivation will be the same, whether based on the movement of capital or on the accumulation of capital. This is the logical justification of the ''transference'' of our analysis mentioned at the outset.

10. One more point before ending. We have assumed all through that there is no change either in the wage rate or in the general rate of profit in our economy over its whole course discussed above. This simply draws a boundary to the scope of the analysis, which is necessary in view of the fact that we are yet to analyse the factors that cause a change either in the wage rate or in the rate of profit. We may nevertheless mention that in so far at least as the course of <u>corn-rent</u> is concerned, it would remain the same as discussed above even if these two rates were changing and not remaining constant through time. This follows simply from the proposition established earlier that the rates of corn-rent at any stage are independant of the actual value of the rate of profit as well as the corn wage rate then prevailing.

Section 3 : Effect of Improvements in the Method of Cultivation on Rent.

1. Analytically speaking, there are two basic types of improvement in the method of cultivation, those that raise the output per acre of land without altering the labour required, and those that reduce the labour required to cultivate an acre of land without affecting the output produced*. Examples of the former are the discovery of better strains of 'seed', improved 'manure' etc., and of the latter are the introduction of labour saving machineries, substitution of forces of nature for labour power etc. Our object here is to trace the consequences of these two types of improvement upon the rent of land.

2. This splits up into five distinct steps. They are defined by the effect of the two types of improvement successively upon (a) the area under cultivation, (b) capital employed in agriculture, (c) the price of corn, (d) the rent in corn, and (e) money rent.

3. Before taking up this analysis, we must restrict its scope to some extent. These restrictions are as follows.

3.1 The first restriction is purely methodological. We will confine ourselves simply to comparison of two ''balanced states'' of the economy, one before the improvement and one after. I.e., we leave out the ''process of adjustment'' from the scope of our discussion.

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* ''Improvements in agriculture are of two types : those which increase the productive powers of the land and those which enable us to obtain its produce with less labour''. (Principles, p.42).

3.2 The Substantive restrictions are as follows. First, we assume the wage rate and the rate of profit to be the same in both these states. Stated differently, we take these variables to be unaffected by the improvement in methods of cultivation. The assumption is already discussed in the context of our analysis of the effects of improvements in methods of production in general given in the last chapter (see. pp. 45 - 6 above).

3.3 Next, we assume the demand for corn also to be unaffected by the ''improvement'' under reference. The justification of this assumption is that corn is a 'necessity' and hence there is a more or less stable demand for it at any given time.

Note that since we are concerned only with balanced states of the economy, the above assumption implies that the total output of corn is also unaffected by the ''improvement''.

3.4 Finally, we will assume that both types of improvement are equally effective on all grades of land. Stated differently, they are general improvements, not grade - specific improvements. Let us put this in algebraic terms.

Let us suppose that before the improvement, 'm' grades of land are under cultivation, the output per acre of these m grades being $x_1, x_2, \ldots, x_m$, $x_1 > x_2 > \ldots > x_m$, and the number of workers employed per acre being 'n' for all grades. Under our first type of improvement, the output per acre is raised by a uniform margin, say $\delta$, on all these

grades i.e., the per acre outputs now become $x_1 + \delta$ , $x_2 + \delta$ ,..., $x_m + \delta$ , $\delta > 0$. The labour required per acre remains 'n'. Under the second type of improvement, on the other hand, the outputs per acre remain $(x_1, x_2, \ldots, x_m)$, but the labour required is reduced uniformly to say $\beta n$, $\beta < 1$.

4. Let us now begin on the analysis. Under the first type of improvement there is a uniform increase in the output per acre for all grades of land. Since there is no change in the total output of corn, the area under cultivation must shrink. For simplicity, we take the 'shrinkage' to mean that the location of the marginal land is now shifted from grade m to grade $(m - 1)$, leaving an uncultivated margin of this grade of land. For the second type of improvement, on the other hand, there is no change in the productivity of land. Hence unchanged output means unchanged area of cultivation. We conclude then that the area under cultivation shrinks under our first type of improvement and remains unchanged under the second type.

5. Let us now come to the capital employed in agriculture. We have just seen that under the first type of improvement, a certain amount of land goes out of cultivation. It follows that the capital that was employed in cultivating this land is now redundant and is therefore removed from agriculture. Under the second type of improvement, on the other hand, though land under cultivation remains the same, a part of the labour previously employed on any land becomes redundant. Hence

the capital employing this labour also becomes redundant and is again removed from agriculture. Thus we have the common effect of a reduction or removal of capital from agriculture for both types of improvement.

6.1 We now come to the effect on price of corn. Let us denote the corn price after the improvement by $p'$. (We speak only of the natural price). For the first type of improvement, $p'$ is given by the equation

$$(1) \qquad p'(x_{m-1} + \delta) = w(1 + r)n$$

where r and w denote respectively the wage rate and rate of profit in our economy, both remaining by assumption the same before and after the improvement. For the second type of improvement, $p'$ is given by

$$(2) \qquad p' x_m = w(1 + r)(\beta n)$$

Remembering that the price before the improvement, p, is given by

$$(3) \qquad p x_m = w(1 + r)n$$

we see at once that there is a fall in the price of corn i.e., $p' < p$ in both cases.

6.2 The common cause of the fall in price in both cases is the rise in the productivity of labour. But in the first case, this rise in the productivity of labour is compounded out of a direct effect of the improvement, which is represented by $\delta > 0$, as well as an indirect effect, viz., the shift of the margin of cultivation to a superior grade of land (from grade 'm' to grade 'm-1'). In the second case, we have only the direct effect of the improvement, represented here by $\beta < 1$.

7.1 We now pass on to <u>corn-rent</u>. Total corn-rent before the improvement, $Q$, is given by

$$(4) \qquad Q = \sum_{i=1}^{m-1} (x_i - x_m) A_i$$

Under the second type of improvement there is no change <u>either</u> in the <u>area under cultivation</u> and hence the margin of cultivation (the margin remains located in grade - m) <u>or</u> in the <u>productivity of land</u> (the productivity remains $x_1, x_2, \ldots$ for the different grades of land). It follows that <u>no change</u> in corn rent is caused by this sort of improvement i.e., the total corn rent remains $Q$ even after the improvement.

7.2 Let us now consider the first type of improvement. There is, in this case, <u>both</u> an <u>improvement in the productivity of land</u> (which is purely definitional) as well as a <u>shift in the margin of cultivation</u> (which is a consequence of total output remaining unchanged). The improvement in land productivity does not affect rent as it is uniform over all grades of land. But the shift in the margin of cultivation being an 'inward shift' simply reduces the 'differential outputs' of the intra-marginal lands and hence causes the rent to <u>fall</u>.

Let us just verify this result algebraically. Let $\bar{Q}$ denote the total corn-rent in agriculture after this type of improvement. Then

$$\bar{Q} = \sum_{i=1}^{m-2} [(x_i + \delta) - (x_{m-1} + \delta)] A_i$$

$$= \sum_{i=1}^{m-2} (x_i - x_{m-1}) A_i$$

$$(5) \qquad < Q \qquad \text{from (4)}$$

This proves the result under reference.

7.3 In sum, we are back to an asymmetric effect of the two types of improvement : the rent in corn falls under the first type of improvement but remains unchanged under the second.

8. We now pass finally to money rent. Since money rent is simply the corn rent multiplied by the price of corn, it is clear that money rent falls under both types of improvement. In the first case, this fall is compounded out of the fall both in the price of corn and in the corn-rent, but in the second case it is due only to the fall in the price of corn*.

9. Let us now bring the analysis to a point of conclusion. The point to stress is that it is the money rent and not corn rent that matters to the landlords. This is simply because rent is actually paid in money and not corn. It follows immediately from this that landlords as a class lose as a result of improvements in the method of cultivation, regardless of what 'type' of improvement it is. They will therefore be opposed to the introduction of the improvements.

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* This may be compared to Ricardo's basic statement of the effects of the two types of improvement -

> ''They both lead to a fall in the price of raw produce; they both affect rent, but they do not affect it equally'' (Principles, p.42).

What Ricardo meant by ''not affecting equally'' was simply that one affected both the rent in corn and the rent in money while the other affected only the rent in money, not the rent in corn.

But the nation as a whole obviously gains by the improvements. A measure of this gain is provided by the capital removed from agriculture and put to other uses, or more precisely by what it produces elsewhere. This removal of capital from agriculture is a common feature to both types of improvement.

Section 4 : A Variant of the Basic Theory of Rent.

1. The theory of rent gone over so far is embedded in a ''structure'' of agriculture defined by the coexistence of different qualities or fertilities of land under cultivation. Ricardo however also talked of of an alternative structure embedding essentially the same basic theory of rent. But he did not develop the theory on this alternative basis on its own. He discussed it inter alia of the earlier ''structure'', not separately from it,* and came to stress the general principles in which the theory got unified over these two alternative bases or structures.

We will now take up the theory on the alternative basis on its own, without any reference to the earlier basis or structure. (This is what we refer to in the title as ''variant'' of the basic theory). However at the end of the section, we will come to see together the two alternative bases or structure, i.e., we will see them co-existing with one another, as Ricardo did.

2.1 Let us now begin. In the ''structure'' of agriculture presumed so far, there was only one method of cultivation viz., by the ''application'' of the labour of n workers per acre of land. The ''alternative structure'' begins with the assumption of alternative methods of cultivation, also called ''varying degrees of intensity of cultivation''. What this means is simply that the same plot of land can be cultivated by varying amounts of labour.

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* This discussion is to be found in paras 7-9 of Ricardo's chapter on Rent.

Since labour is employed by capital, we can pass on to the latter, and say that <u>different 'doses' of capital</u> can be put into the cultivation of the same plot of land, where by a 'dose' of capital we mean an amount of capital just sufficient to employ a technically well defined ''team of additional workers'' to work on the same land. For simplicity, we take the successive doses of capital to be of <u>equal</u> magnitude, each employing say 'n' number of workers for a year on one acre of land.

2.2 . The next point assumed in the alternative structure is that <u>successive doses of capital bring in a smaller and smaller increment in output from the plot of land where it is put in</u>. In other words, there is <u>diminishing returns to capital</u>. The algebraic statement is as follows.

Let the output per acre of land when only <u>one</u> dose of capital is employed be $x_1$ ; when two doses of capital is employed be $(x_1 + x_2)$ and so on i.e., $x_k$ is the <u>additional output</u> obtained by putting in the k-th dose of capital. By ''diminishing returns'' we then mean that $\{x_k\}$ is a <u>decreasing sequence</u> i.e.,

(1) $\quad x_1 > x_2 > \ldots > x_k > \ldots$

2.3 It is possible to <u>superimpose</u> the law of diminishing returns as just understood on any particular <u>grade</u> or <u>quality</u> of land. However, as already stated, we shall come to this only at the end of the section. For the present, we simply abstract from any fertility difference of land. This completes our exit from the ''structure'' of agriculture presumed in the previous sections.

5. Let us however be more analytical. In the earlier structure, as more and more capital was put into agriculture, the area under cultivation was progressively extended to less and less fertile qualities of land. Since ''less and less fertility'' means lower and lower output per acre (for the same labour employed), this only takes one back to the same ''diminishing returns from capital'' which is the fundamental characteristic of the alternative structure of agriculture being explored. We thus see this — the ''law of diminishing returns to capital in agriculture'', as we may put it — as the common factor binding both the structures. Since the ''law'' itself is obtained by going to a more intensive method of cultivation in one case and a greater extent of cultivation in the other, a distinction is sometimes made by saying that the ''law'' is defined in an intensive form in one case and an extensive form in the other.

4.1 Let us now come to the theory of rent on the alternative basis just laid out. This begins with two further assumption viz., (a) the entire available land in the country is under cultivation and (b) this whole land is cultivated at a uniform intensity, say by m-doses of capital per acre*. Needless to say, these come out of a particular state of the economy, which we simply take as our ''reference''. We take this to be a balanced state of the economy.

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* It may be pointed out here that only (a) constitutes a genuine assumption of the theory ; (b) is really a conclusion derivable from the assumption of competition, but we do not explicitly show it here.

4.2 Let us denote the wage rate, rate of profit and corn price prevailing in this state by $w$, $r$ and $p$ respectively. We now argue that $m$ doses of capital are employed per acre of land in our state of reference only because it is profitable to do so. Stated rigorously, this means that (a) the $m$-th dose itself is profitable and (b) the $(m+1)$-th dose is not profitable

Algebraically, the two conditions give us the double inequality :

$$(2) \qquad \frac{p\,x_m - wn}{wn} \geq r > \frac{px_{m+1} - wn}{wn}$$

we may rewrite (2) as :

$$(3) \qquad px_m \geq w(1+r)n > px_{m+1}$$

We may call this the profitability condition underlying our state of reference.

4.3 Note that 'rent' does not appear in the statement of the profitability condition. The argument is as follows. In the rent contract entered between landlord and farmer, nothing is stated about the way the land is to be cultivated —— this is simply left to the farmer to decide on his own. Since he has to pay the same rent as agreed regardless of the method of cultivation, the rent itself does not enter his selection of the method i.e., the number of doses of capital to be put in.

4.4 Let us now look at the value of corn produced per acre in our state of reference. Since m-doses of capital is applied per acre, the output per acre is $(x_1 + x_2 + \ldots + x_m) = z_m$, say, and hence the value produced per acre is $pz_m$. Under the rules of competition, if there is something left in this value after the wages of workers and the profit of capital engaged in production, as calculated at the going rates, w and r, are taken out, then this residual must go to the landlord as his rent. Since m doses of capital is applied, the number of workers engaged is (mn) and the total capital engaged is w (mn). Hence if we denote the rent by $\rho$, then we have

$$\rho = p z_m - w(mn) - r[w(mn)]$$

$$(4) \qquad = p \sum_{i=1}^{m} x_i - (1 + r) w(mn)$$

Obviously $\rho$ here is the same as the rent-rate per acre of land.

From (3) and (4) we now see at once that $\rho$ is bounded within the following interval

$$(5) \qquad p \sum_{i=1}^{m} (x_i - x_{m+1}) > \rho \geq p \sum_{i=1}^{m} (x_i - x_m)$$

This proves the existence of rent in our economy as the bounds for $\rho$ given are positive.

4.5 We can now proceed in parallel to section 2 (see page 100) and argue that <u>except by accident</u> the rent rate will be at its <u>lower limit</u> set in (5). This gives us :

$$\rho = p \sum_{i=1}^{m} (x_i - x_m)$$

$$(6) \qquad \rho = p \sum_{i=1}^{m-1} (x_i - x_m)$$

Obviously the rate of <u>corn rent</u>, say q, underlying ( 6 ) is given by

$$(7) \qquad q = \sum_{i=1}^{m-1} (x_i - x_m)$$

5. We are now in a position to go into the <u>conceptual unification</u> of the two 'versions' of the theory of rent, that of sec.1 and that of this section. In the original version (sec.1), the rates of corn-rent for the <u>different</u> grades of land under cultivation are simply their ''differential outputs''over the <u>marginal</u> grade. In the present version, there is only <u>one</u> rate of rent as all land is of a uniform quality. From ( 7 ) we see that this one rate of corn rent is the <u>sum total</u> of the ''differential outputs'' of the earlier doses of capital over the <u>last</u> dose (per acre of land).

We now note that neither ''different qualities of land'' nor ''different doses of capital'' (which is the same as ''different intensities of cultivation'') have an observable meaning in themselves. This ''meaning'', they both derive from a process of successive investment of capital in agriculture. It is this process that drives the farmer to a less fertile land in one case and a more intensive method of cultivation in the other. The common consequence is that the additional capital yields a smaller output per unit of capital than the capital put in previously. This is due solely to the law of diminishing returns working in its two 'forms' in these two cases. So, there emerges a 'surplus' in the output produced by the previous capital. Under the rules of competition, this surplus must go to the landlord as his rent.

This is the general principle of rent in Ricardo. In his own words :

> ''rent is always the difference between the produce obtained by the employment of two equal quantities of capital and labour'', (Principles, p.36).

Needless to say, this ''difference'' is simply the ''surplus'' we just talked of. As just clarified, the very existence of this difference or surplus and its usurpation as rent are successively guaranteed by (a) the law of diminishing returns, and (b) the forces of free competition.

6. This is a convenient point to return to the ''water charge'' of the last chapter. There we had simply started from ''land becoming private property'' or ''appropriation of land'', on the basis of which we

simply granted that the landowner could demand a payment for the use of natural resources and get it realised, for the user had no other alternative. It follows from this that the precise basis of the charge or payment, i.e., of the whole 'income' of the landowner, was not just his 'ownership' of land but monopoly ownership. 'Rent', however, is argued here purely through the forces of competition, including the competition of landowners. This rests ultimately upon a sufficient dispersal of land-ownership. The conceptual basis of the ''water charge'' of the last chapter and ''rent'' of this chapter is thus seen to be very different from one another, within the framework of ''private property''.

7. We now come to consider together both variants of the theory of rent set out above. This means at bottom that we visualise an agriculture with different qualities of land, each cultivable at varying degrees of intensity, and so subject to both forms of diminishing returns, 'intensive' and 'extensive'.

7.1 It suffices to consider only the simplest case of such coexistence. This is conceived as follows. First, we consider our agriculture in a state where only the two best qualities of land (grade 1 and grade 2) are cultivated, the first by 2 doses (or units) of capital per acre and the second by one dose per acre. Let the corresponding outputs per acre be $(x_1 + z)$ and $x_2$, where $x_1$ and $z$ denote the output per acre on grade 1 land from the 1st and the 2nd dose of capital respectively. Next we assume

$$(8) \qquad z = x_2$$

Finally, we assume that grade 2 land is only <u>partly</u> under cultivation, while grade 1 land (which is necessarily fully cultivated) is <u>uniformly</u> cultivated at 2 doses of capital per acre.

7.2 It is easily seen that this is an internally consistent state of agriculture under the rules of competition. The underlying assumption is that having brought the available amount of grade 1 land under cultivation at one dose of capital per acre farmers are left with some capital, which can be employed either for a more intensive cultivation of grade 1 land (2 doses of capital per acre) or for bringing grade 2 land under cultivation. Under the conditions stated in ( 8 ), both of these ways of deployment of capital are <u>equally profitable</u> and hence both in general will be tried. Having come this far, we have simply assumed that the actual amount of capital available with farmers is such that after the available amount of grade 1 land is uniformly cultivated at 2 doses of capital per acre, the capital left over can bring only <u>part</u> of the available amount of grade 2 land under cultivation (at the lowest intensity). This describes in full the state of agriculture assumed.

7.3 Let us now turn to <u>rent</u>. We need discuss only the rent in <u>corn</u>. Since grade 2 land is only partly cultivated, it yields no rent. So, it is only the rent on grade 1 land that is to be discussed. Let us denote it-the rent in corn per acre of this grade of land by q.

Now, grade 2 land is not yielding any rent in our state of agriculture. But any acre of grade 2 land is brought under cultivation by a 'capital' which is employed equally profitably as 2nd dose of capital

on grade 1 land. For this to be so, the whole output resulting from the second dose of capital on grade 1 land must go to the farmer, i.e., he pays no rent out of this output. q is then simply the difference between the output from the 1st and the 2nd dose of capital on an acre of grade 1 land i.e.,

$$(9) \qquad q = x_1 - z$$

7.4 This obviously is to go about the determination of rent in the present set up following purely the mode of argument of the ''variant'' of the basic theory. Let us now see what the mode of argument of the ''basic theory'' itself leads to.

The output per acre of the two grades of land in our state of agriculture are $(x_1 + z)$ and $x_2$ respectively. However, the first is obtained on the basis of 2 doses (or units) of capital and the second is obtained on the basis of 1 dose of capital. We cannot therefore compare the two outputs directly but must first reduce them to a common denomination of capital i.e., we must compare the output <u>per unit of capital</u> on the two grades of land. This is given respectively by $(x_1 + z)/2$ and $x_2$ for the two grades. According to the mode of argument of the basic theory, the rent per <u>unit of capital</u> on grade 1 land is simply the difference between these two outputs. But rent as such is defined <u>per unit (acre) of land</u>, not per unit of capital. Since, <u>two</u> doses of capital are employed per acre of grade 1, the rent per acre of

this grade is <u>twice</u> the ''difference'' just referred. Stated algebraically,

$$q = 2\left[\tfrac{1}{2}(x_1 + z) - x_2\right]$$

$$= (x_1 + z) - 2x_2$$

$$= (x_1 + z) - 2z \qquad \text{from (8)}$$

$$= x_1 - z$$

This is exactly the expression of rent arrived at earlier. So, the two modes of argument lead to one and the same conclusion.

7.5 This ''equivalence'' simply takes one back to the ''general principle'' of rent in Ricardo as already stated earlier. To repeat :

> ''rent is always the difference between the produce obtained by the employment of <u>two equal quantities of capital and labour</u>''.

Chapter 3

# WAGE

## Section 1 : Real and Money Wage

1. In a capitalist economy, workers are paid their wage in money. But to the workers themselves, what matters is not the 'money' paid but the 'level of living' that it allows them to attain. Real wage refers to this 'level of living'. Let us now turn to make this notion precise.

The fundamental concern of workers is simply with their own survival or subsistence, by which we must mean, at the individual level, the subsistence of the whole family that a worker has to maintain by his earnings, i.e. himself and his 'dependents'. Obviously, the subsistence requires a certain annual consumption of certain necessaries like food, clothing and shelter*.

Let us denote these necessaries by $G_1, G_2, \ldots, G_s$. Taking a working class family of 'standard' size, we can denote their annual consumption necessary for subsistence (or the ''subsistence requirement'' for short) by a vector, $(b_1, b_2, \ldots, b_s)$ where $b_i$ stands for the subsistence requirement of $G_i$ per working class family of standard size. Analytically, we

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* All this is compactly stated by Ricardo in the following passage at the beginning of his chapter on Wage

> ''The power of the labourer to support himself, and the family which may be necessary to keep up the number of labourers, does not depend on the quantity of money which he may receive for wages, but on the quantity of food, necessaries and conveniences become essential to him from habit which that money will purchase'' (Principle, p.52)

can pass from this vector conception of ''subsistence requirement'' to a scalar conception by defining a fictious ''composite commodity'', $G_c$ say, one unit of which consists of $b_1$ units of $G_1$, $b_2$ units of $G_2$ and so on. In this language, the subsistence requirement per working class family of standard size is simply one unit of $G_c$.

2. Let us halt for one substantive observation at this point. Neither the 'list of necessaries', nor the precise 'subsistence requirements' of these necessaries are necessarily invariant through time. An element of habit necessarily enters the notion*. Since over time, habits may change, so may the precise definition of ''subsistence'' in terms of commodities. Obviously, it is a very long time that is referred here. However, even over this very long time — decades or even a century — habits do not change on their own. They change only as part of the social evolution of the country as a whole. We are thus automatically led to a broad historical element in the notion of subsistence, rooted by definition in the developments over a long time past. The relevance of this point for our purpose will be noted at the end of this chapter.

3. Let us now return to our main line of argument. Let W denote the wage received over a year by a certain worker with standard family — size. (Note, nothing is said in this about the 'labour time' over the year put in

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* ''It essentially depends upon the habits and customs of the people''. (Principle, p.54). See also the previous excerpt.

by the worker to earn the wage, W. So, the wage <u>rate</u> is left in the open). We can then define his <u>real wage</u> for the year under reference to be a 'quantity', say V, defined by

$$(1) \qquad V = W / \sum_{i=1}^{s} p_i b_i$$

where $p_1, p_2, \ldots, p_s$ are the prices actually paid by the worker in buying the necessaries, $G_1, G_2, \ldots G_s$.

Obviously, V is the quantity of the composite commodity, $G_s$, that the worker <u>can</u> buy in the year under reference. Note, nothing is said in this about his <u>actual</u> purchase or consumption in the year. However, if $V = 1$, i.e., the worker is just able to buy the subsistence requirements, we must take that it is precisely these quantities that he buys and consumes, thereby just maintaining his family. (This defines his <u>subsistence level of living</u>). If $V < 1$ or $V > 1$ then his standard of living is respectively 'below' and 'above' the subsistence level. But nothing strictly is determined about his actual pattern of consumption at these levels by our notions.

4. Let us now turn to the <u>labour time</u> actually put in by a worker. At any time, there are definite 'norms' regarding <u>work hours per day</u> and <u>work days per year</u> in the economy, which are established through long practice and therefore have a certain 'permanence' attached to them. Let us denote the annual work time as per these norms by $\bar{H}$. The <u>actual</u>

worktime of workers in a year may deviate from $\bar{H}$, but such deviations cannot by definition last long. We now define the notion of subsistence wage rate as the wage rate which allows a worker working normal working time to attain just the subsistence level of living. We shall denote the subsistence wage rate measured in real terms, i.e., in units of $G_c$, by $\bar{v}$. The corresponding wage rate in money is obviously $\bar{v} \sum_{i}^{s} p_i b_i$, which obviously depends upon the prices of necessaries as actually paid by the workers.

5.1 So much is purely definitional where we have merely motivated the notion of real wage by looking at ''wage'' itself from the standpoint of its recipients, i.e., the workers. Nothing is said about status of the notion in the actual ''working'' of the economy. We shall come to this in the next section. Before that, we want to discuss briefly a logical problem that arises in this context, granting that the notion does have a real status in the working of the economy. More particularly, we suppose that this status arises entirely out of the working of the so called ''labour market'' of the economy (This point is justified in the next section).

5.2 The problem is as follows. By definition, a change in the real wage of workers at any time has to come about either through a change in money wage or through a change in the prices of necessaries. But a priori, it is only the first change which we can take to ''originate'' in, or from, the ''labour market''. Since it is from this same source

that <u>real</u> wage derives its status we must take that the change in money wage is only a means — or ''surrogate'' — for a change in real wage. The question is simply what this means in terms of the ''actuality''.

5.3 Let us start with the simple point that <u>at the time of the change in money wage rate,</u> the necessaries are selling at definite prices. <u>As of these prices,</u> the change in real wage and change in money wage are simply <u>equivalent notions</u> — a 1 per cent rise or fall in money wage implies a 1 per cent rise or fall in real wage.

Our next point, a substantive one, is that both workers and capitalists simply take these prices as ''given'' when they agree to the change in money wage. (Without this agreement , the 'change' itself could not come into being) On this basis, we conclude that the <u>beginning step</u> for a change in real wage must not only be a change in money wage, it must be an <u>equal</u> change in money wage.

5.4 Let us now proceed on. Two cases arise. In one case, the change in money wage does not cause any change in the prices of necessaries (Such, e.g., is the case of our ''simple economy''). It is obvious that a given change in real wage is in this case brought about simply by a once-and-for-all 'equal' change in money wage, and the matter ends there.

5.5 The other case is where the change in money wage itself causes the price of one or more 'necessaries' to <u>change</u>. In this case a <u>further</u> change in

money wage becomes necessary simply to <u>compensate</u> for the change in price*. This change itself, we now argue, is granted or conceded as the case may be by the workers and capitalists simply as corollary to their original ''agreement''. But of course this second change in money wage may again cause prices to change and so on. We take it for granted at this point that this process as a whole converges** . So, at the end of it, we have a definite change in money wage compared to the initial situation, which is simply the algebraic sum of the change in money wage over all the successive steps of the process. It is this change in money wage that accomplishes the change in real wage signified by the original (or initial) change in money wage. Turning this around, we can say that a given change in real wage is brought about by the total change in money wage just defined, the magnitude (even the ''sign'') of which depends essentially upon the behaviour of prices.

5.6 We have now answered our original question, what it means to say that a change in money wage is only a ''means'' to a change in real wage in terms of the ''actuality''. We have seen that the ends-means relation

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* Note that the prices of necessaries may in fact <u>fall</u> as a result of a <u>rise</u> in money wage, a possibility already pointed out in Ch.1 (p. 68 ). The ''compensatory'' change in money wage is in this case in the <u>opposite direction</u> of the ''original'' change.

** It can be shown that under the forces of the working of the Ricardian economy as a whole, this process indeed converges. But the demonstration involves tedius technical calculations and so we omit it.

is defined simply by a ''once-and-for-all'' and ''equal'' change in money wage for a given change in real wage in one case and by a ''cumulative'' change defined over a ''sequence'' in the other. Not withstanding this difference, the point remains that there is a well defined procedure in terms of ''actuality'' for the change in real wage. This resolves the problem which we had set before ourselves, which itself arose simply because ''real wage'' is not an ''observable'' in itself but lies hidden behind the two ''observables'', money wage and prices of necessaries.

Section 2 : The Level of Real Wage

As already stated, we now look into the significance of the notion of real wage in the actual working of the Ricardian economy. Through this we are automatically led to the general forces working upon the level of real wage. Our ultimate object here is simply an understanding of these forces.

1.1 Let us begin with the significance of the subsistence wage rate, $\bar{v}$. Obviously, if all workers are continuously employed for the normal working time at this wage rate, then the total size of the working population is just maintained through time. Stated differently, the base of labour supply remains constant. We can also take it for granted that workers on their own do not offer to work for shorter or longer duration than the normal worktime at this wage rate. So, we can say that the supply of labour itself remains constant, given the conditions of continuous full employment for the normal working time at the real wage rate, $\bar{v}$.

1.2 Let us now see if the converse of this proposition is also true. More particularly, we take for granted a constant labour supply, fully employed for normal working time, and ask what the real wage rate must be. Clearly, the real wage rate cannot be below $\bar{v}$, for then workers cannot maintain their families and so the total number of workers must be falling through time. (The precise mechanism for this will be clear in a minute). Let us now see if the real wage rate can be persistently above the subsistence level, $\bar{v}$.

The answer is no. This is because compared to their subsistence level of living, workers can now take better health care of themselves and their children, which causes the death rate in their families at all ages to decline. At unchanged birth rate, this already implies a rise in the size of the families and hence in the supply of labour. But the birth rate too would now be under a pressure to increase, for receiving better wages in real terms, workers can now afford to marry early and raise a larger family. So the supply of labour is increasing, not remaining constant or steady*. We just point out that if real wage rate is persistently below $\bar{v}$ then the mechanism described works in the reverse, which explains the fall in population and labour supply in this case*. We can call this mechanism together in all its parts the population mechanism.

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* This is stated by Ricardo in the following words :

> ''When the market price of labour exceeds its natural price .... he has it in his power to command a greater proportion of the necessaries and enjoyments of life, and therefore to rear a healthy and numerous family .... the number of labourers is increased ....'' (Principles, p.53).

To tie this up with our statement under reference, we need only point out that, but for a dimensional difference, the ''natural price of labour'' that Ricardo talks of is the same as the subsistence wage rate defined above. We will return to Ricardo's terminology (natural and market price of labour) at the end of this section.

* *Cf ''when the market price of labour is below its natural price .... their privations reduce their number'' (Principles, p.53).

1.3 We thus see that the real wage rate being equal to $\bar{v}$ and the supply of labour being 'steady' or 'constant' are just two sides of the same coin, given that there is continuous full employment of labour for normal working time. To avoid any possible misgiving, we explicitly state that 'steadiness' or 'constancy' is understood here in reference to a very long period of time. This is implicit in the very nature of the population mechanism as stated above, which governs the whole supply of labour.

2.1 So much is argued in purely hypothetical terms. Let us now turn to the actuality. Let us suppose that over a long time past, the real wage rate in our economy has actually been at the subsistence level, $\bar{v}$, with all workers finding employment for the normal working time. This is the ''initial state'' of the economy.

We now argue that in this state, the demand for labour too must have remained steady or constant at precisely the same level at which labour is supplied i.e., if $N$ is the number of workers and $\bar{H}$ the normal working time, then the demand for labour must be equal precisely to $N\bar{H}$ for the 'state' under reference to be actually in existence. The support of this proposition comes from the fact that by its own working, the labour market too is endowed with the same law of the market as the market for any commodity as discussed in ch.1 ('Labour' is in this sense like a 'commodity' in our economy). Let us briefly go over the working of this ''law''.

2.2 The ''law'' in a word is that if demand $\neq$ supply then the 'price' —— here the <u>wage rate</u> —— goes up or down according as demand $\gtrless$ supply. Now, it is true that the <u>change</u> in wage defined through this law is in the first place a change in the <u>money</u> wage rate. But unless translated into <u>real</u> terms the supply of labour does not simply respond to the change, not even in the sense of workers offering to work for shorter or longer durations. Let us now suppose that starting from a 'balance', the demand for labour has gone up and so there has emerged an 'excess demand' for labour in the market. According to the law of the market, capitalists now bid up the wage rate in an effort to induce a greater supply of labour. But no greater supply is in fact induced if it is a change in money wage only, not real wage i.e., if for some reason the prices of necessaries too rise in a way to nullify the rise in money wage. There is then simply no change in the 'imbalances' between the demand and supply of labour. (We are taking the demand for labour to be unaffected by the change in money wage). So, the imbalance does not get corrected.

2.3 Let us now suppose that the rise in money wage <u>is</u> translated into a rise in <u>real wage</u>. How do workers respond to this ? We take that their immediate response is to offer <u>longer hours of work</u>. Since there is already an excess demand for labour, the working time is actually lengthened. In some sence, a correction of the 'imbalance' has already started. (We look further into this in a minute).

Now, the employers of labour, i.e., the capitalists, are already aware of this point that a rise in money wage as such fails to induce any greater supply of labour while a rise in real wage does induce it. So, by the very meaning of the 'law of market' we can take it they in fact in effect offer a higher <u>real</u> wage rate in case there is a shortage of labour. Stated fully, this means that while they begin with the offer of a high money wage, if for some reason this higher money wage is 'nullified' by a rise in price of necessaries, then they simply compensate for the price rise with a further rise in money wage offered and so on. Eventually, there is a rise in 'real wage' setting the correcting forces of market at work. In short, the '<u>working' of the labour market is reflected in the movement of real and not money wage rate</u>. This is enough to establish a logical status of real wage in the actual working of the economy.

2.4 Let us return to the <u>response of workers to the rise in the real wage rate</u> which itself is a result of the rise in the demand for labour starting from our initial state. As already noted, their offer of working longer hours is only the <u>immediate</u> response. In time there comes about a <u>more substantial</u> response through the population mechanism. Now that workers are enjoying a higher than the subsistence level of living, their <u>population begins to grow thereby enlarging the whole 'base' of labour supply</u>.

2.5 Let us just note in the passing that while the root cause of the population growth is the rise in the real wage rate, the lengthening of work time also acts as a subsidiary cause, for it means a higher income for workers for the same wage rate. Just from this it follows that no permanent adjustment of supply of labour to the rise in its demand is possible just through the lengthening of work time. We shall also point out that the lengthening of worktime itself can only be of a 'temporary' nature, for there is a long term norm governing the work time. The adjustment proper is defined only through the population mechanism, and once this has worked itself out, the real wage rate must return to its initial value i.e., the subsistence rate.

3.1 So much for the law of the market and the associated adjustment of the supply of labour to changes in its demand. We, now call attention to an obvious point about this, viz., it takes a long time for the population mechanism to work itself out. It is worth while to be a little concrete about this point. We can put the working age of a person to begin at 18 or 20 years. We must then allow two decades or so to elapse before we can speak of the number of workers to be 'adjusted' to a (permanent) rise in the demand for labour taken place from our initial state*.

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* Note however that this adjustment begins within a much shorter time, for the 'beginning' is defined through the life- prolongation of workers already in the workforce, not through the entry of new generation of workers.

3.2 But two decades is obviously a very long time in the 'time scale' associated with general economic processes such as production and accumulation. Things that change so slowly can as well be taken as ''given'' in the actual working of the economy.

The direct point of reference of this statement is the size of the working population. We will now argue that subject to some qualification, the statement also applies to the real wage rate i.e., we can broadly take the real wage rate itself to be a 'given' in the actual working of the economy at any time, the actual value of which is simply rooted in past developements —— it plays, in short, the role of a historical datum.

4.1 The argument is as follows. So far, we have only one logical benchmark for the actual value of the real wage rate viz., the subsistence wage rate. But the subsistence wage rate actually prevails in the economy only if it is in a completely stationary state where in particular no accumulation of capital is going on. This is because capital is the very 'base' of the demand for labour (just as population is the base of the supply of labour) and if it were growing, so would the demand for labour. The real wage rate could not have then remained at the subsistence level.

4.2 Now, in a capitalist economy over a long time, there is generally some accumulation of capital. So we cannot generally adduce anything more than a purely logical significance to the benchmark either of a completely stationary state or its corrolary, the subsistence wage rate.

4.3 Let us now suppose that over a long period capital is growing on the whole at a certain rate , g, i.e., g is the so called long term growth rate of capital. Let us also allow sufficient time to have already elapsed for population to respond to the growth in the demand for labour implied by this. So, the supply and demand of labour are in balance, and both are growing at the same rate, $g^*$. By the 'law of the market', the real wage is then stationary, but it is stationary at a level higher than $\bar{v}$. The actual value of the real wage rate, say v, can in this case be explained only in reference to the past developments alluded above, in particular the 'strength' acquired by workers through past experience in pressing for higher real wage under conditions of labour scarcity which actually prevailed so long as population growth fell short of the rate of capital accumulation, g, and which actually brought the present wage rate, v, into being. This completely establishes the proposition that the actual value of the real wage rate, v, in our state of the economy can be treated as a historical datum.

4.4 We can now go outside these conditions. Once population has started growing at a definite rate, g, it will continue to do so for quite some time independently of changes in the real wage rate. Stated differently, the rate of growth of population has a certain 'stability'

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* We abstract from the factor of 'technical progress' here. We will take this into account in the next section.

of its own. The rate of growth of capital is less stable. So, departure from the conditions described above will come mainly through changes in the rate of growth of capital. These ''changes'' we can also put as fluctuations around the long term rate, g. Through the law of the market, these fluctuations will cause similar fluctuations in the real wage rate around v i.e., the real wage rate will go above or below v as the rate of accumulation goes above or below g. There can also take place purely short term variations in work time with these changes, which again affect the actual value of the real wage rate. These are broadly the qualifications to which the statement that the real wage rate appears as a historical datum in the actual working of our economy at any time must be subjected. Let us just reiterate that given these qualifications, we do have have the real wage rate as a historical datum in our economy at any time. This is our main proposition concerning wage in the Ricardian economy.

5. Let us now turn to the Ricardian terminology, natural and market price of labour. The definitions were as follows :

> ''Labour like all other things which are purchased and sold, and which may be increased or diminished in quantity., has its natural and market price. The natural price of labour is that price which is necessary to enable the labourers, one with another, to subsist and perpetuate their race, without either increase or diminution''.

> ''The market price of labour is the price which is really paid for it, from the natural operation of the proportion of the supply to the demand; labour is dear when it is scarce and cheap when it is plentiful''. (Principles, p.53)

This is argued by analogy from the concept, natural and market price for commodities. But how far does this analogy go ? As regards ''market price'', there is in both cases the support of the same ''law of the market''. But what about the central concept of ''natural price'' ?

Behind the concept of ''natural price of commodities'', we have the force of free competition of capitalists propelled solely by the profit motive. This goes to the very heart of the working of a capitalist economy. Behind the concept of ''natural wage'' (= ''natural price of labour''), we have the population mechanism. This has nothing to do with competition or profit.

The two are thus united not on any common conceptual basis but by some common analytical property. As stated by Ricardo, the property is that of ''central tendency'' —

> ''However much the market price of labour may deviate from its natural price, it has, like commodities, a tendency to conform to it''. (Principles, p.53).

However, such unification turns out to be very misleading in the present context. As we have seen, the ''central tendency'' in the case of price means that actual prices coincide most of the time with natural prices; any deviation is speedily corrected. Nothing of this sort is defined for wage. The actual wage rate may stay deviated from the natural rate for a very very long time through the whole

''population mechanism'' which itself acts at best as a ''remote control'' on labour supply and wage. This is explicitly acknowledged by Ricardo himself —

> ''Notwithstanding the tendency of wages to conform to their natural rate, their market rate may, in an improving society, for an <u>indefinite period be constantly above it</u>''. (<u>Principle</u>, p.53).

The lesson we draw from this is that so far as wage and price are concerned the <u>fundamental theoretical categories</u> in Ricardian economics must be <u>actual wage</u> on the one hand and <u>natural price</u> on the other. This becomes evident the moment we view the actual working of the economy in time. We then see that it is these categories that are always in the fore-front. Both natural wage and actual price recede into the background, one by its very ''remoteness'' and the other by its ''transience''. There is no way of fitting this into a common conceptual framework of ''natural and market price''*.

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* Perhaps we should also call attention to the fact that we ourselves never apply the term ''price'' to ''labour''. ''Wage'' is sufficient. So, the conceptual departure from Ricardo goes deeper than the epithets, ''natural'' and ''market''. But this may be left as purely terminological.

Section 3 : The Long Run Movement of Wage

1. We know that the subsistence wage rate, which Ricardo called the ''natural'' wage rate, comes into being only when the economy is in a stationary state in the strict sense of the term. By definition, no accumulation of capital is going on in such a state of the economy. Let us try to understand what this means in terms of the underlying forces of a capitalist economy.

We can say that a ''stationary state'' is the outcome of a vicious circle of poverty. The idea is as follows. We begin with the assumption of an extremely low productivity of labour in all lines; that is to say, the methods of production are ''primitive''. As a result, the real per capita income of all classes is ''low''. Hence there is little potency to save or accumulate in the economy. This is one side of the story. On the other side, the ''low productivity of labour'' means that the rate of profit is low, even though the wage rate is only at the subsistence level*. So, the prospective rate of return on any fresh accumulation of capital is also deemed to be low. As a result, so long as no fresh methods of production are in sight capitalists do not have much incentive or motive for carrying out capital accumulation. With neither any potency nor any motive for accumulation, accumulation simply does

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* This proposition, which we take for granted here, is really a corollary to the determination of the rate of profit in the Ricardian economy discussed in the next chapter.

not occur and the economy stays where it was. This explains why the economy by its own forces cannot come out of the ''state'' portrayed, which is the very idea of the ''vicious'' circle of poverty.

2.1 Let us now suppose that at some point <u>new and more productive methods of production come to be discovered</u>. It is true that till these methods are actually adopted, real income remains low and consequently potency to save is not improved. But the motive for accumulation gets instilled, for the <u>prospective</u> rate of return upon new capital is now higher than the rate of profit actually being earned. We can simply suppose that in view of this, capitalists for the time tighten their belts and get the necessary 'saving' done for actually implementing the new methods. So, the economy comes out of the vicious circle.

2.2 We now see this coming out of the vicious circle as the beginning of a <u>more or less sustained process of accumulation</u>. The underlying idea is that improvements in methods of production are going on in the background creating a 'pool' of new methods to be exploited by accumulation. So, the motive for fresh accumulation is always there.

3. We can now link up with the analysis of the previons section where we said that <u>over a long time some accumulation of capital is generally going on in a capitalist economy</u>. We can now see this as

''explained'' by a continuous improvement in methods of production or technical progress going on in the background. Let us now simply follow up the analysis of the previous section taking it for granted that capital is growing at a long term rate , $g > 0$.

It was shown that, under this condition, forces are generated within the economy which keep the real wage rate permanently above the subsistence level, with demand and supply of labour both growing at the same rate over time. Because of technical progress, the rate of growth of labour — which is also obviously a long term rate — is smaller than the rate of growth of output, which in turn we can take to be roughly of the same order as the rate of growth of capital. So, labour and hence population is growing at a rate $h$ where $h < g$. Implicitly $( g - h )$ is a measure of the rate of technical progress going on.

4. Let us now return to the real wage rate actually earned by workers in our economy. In the last section we implicitly took both this as well as the subsistence rate as constants through time. This point is now to be freshly looked into.

4.1 We recall the element of habit in the very definitions of 'subsistence' discussed in sec.1. In the economy we are talking of now, the ''stationary state'' with its ''subsistence level'' is left off far behind. Over this whole time, there has been much 'progress'

all around. In particular, starting from the subsistence level, workers have now experienced a gradual improvement in their standard of living reflected in the present value of the real wage rate. Let us now denote this present real wage rate by $v$ and the original subsistence wage rate — defined with respect to the ''stationary state'' started from — by $\bar{v}$. Obviously $v > \bar{v}$. Just from this, it can be argued that workers have become 'accustomed' to new habits which therefore come to re-set the very 'standard' of subsistence. This means that the present subsistence wage rate is no longer $\bar{v}$ but higher, say, $\tilde{v} > \bar{v}$.

4.2 However, this is still a partial argument. The formation of social custom and habit is not a 'closed' process within the working class. As mentioned at the beginning, it flows from the evolution of society as a whole. So, just a background of 'high' — or high and growing — wage over a long past is not enough to redefine the 'standard' of workers' subsistence. What is necessary is a background of overall progress of economic development. But such precisely is the 'background' we have here, thanks to the element of technical progress. So, we would now indeed have the 'standard' for subsistence in our economy set at a higher level at present than initially. We can say that while 'high wage' may have been established just by the fact of sustained accumulation (as in the last section), it is the element of technical progress that is responsible for the higher 'standard' for subsistence. Since, we have technical progress going on uninterruptedly through time, we end up in fact with a long term trend in the 'standard' of subsistence.

This means that the subsistence wage rate in our economy at present is not only greater than $\bar{v}$, it itself growing at a certain 'trend rate' with $\bar{v}$ as its 'initial value'. This trend rate of growth of subsistence wage obviously depends upon the rate of technical progress ( $g - h$ ). We may even equate the two at a notional level.

4.3 We can now take up the <u>actual course of the real wage rate</u> in our economy. We already have the proposition, $v > \tilde{v}$. Not only this, $v$ is in fact defined <u>relative</u> to $\tilde{v}$, for it is defined ultimately through the population mechanism. Just from this we can argue that the real wage rate too is endowed with a <u>trend rate of growth</u>, the same as that of the subsistence wage rate. This is part and parcell of the long run development of the economy as sketched above.

Let us end by just pointing out that this ''trend'' element in the long run course of wage only adds further strength to the main proposition on wage established in the last section, viz., the real wage rate in our economy at any time is a <u>historical datum</u>.

Chapter 4

# PROFIT

## Section 1 : The Determination of Rate of Profit

1. In the chapter on rent we saw that the rent in corn or corn rent at any time in our economy is given by the excess of the actual output of corn over the output producible under the worst existing or marginal condition of corn-production. Stated differently, the marginal land itself yields no rent. Hence we can say that the 'output' produced on this marginal land divides between a 'corn-profit' and a 'corn-wage' defined parallelly to 'corn-rent' Corn-profit is not a meaningful entity by itself, but corn-wage is, for 'corn' is certainly the prime ''necessity'' in the economy we are talking of. Going one step further, let us suppose that 'corn' is the only necessary in the economy. Corn-wage and real wage are then simply equivalent notions. But we have already seen that the real wage rate at any time in our economy is broadly in the nature of a historical datum, being determined through social and economic forces as they have worked themselves out over a long time past. The total working population in the economy at this time is also of course given. The two together — the real wage rate and the size of the working population — broadly set the total output of corn being produced in the economy, for the demand for corn coming from landlords and capitalists form but a meagre proportion of the total. This completes the circle, for it is precisely the actual output of corn in our economy that we had started from. We can now take this output as 'given' in a

substantive sense (not just formally). This sets the margin of cultivation as well as the total labour employed in agriculture. This in turn leaves the total profit in corn as a pure 'residual', for it is simply the difference between the total output of corn producible under marginal condition and the total wage bill in corn*.

But we have already said that ''profit in corn'' is not a meaningful entity by itself. This problem is gotten rid of by dividing the profit in corn by the wage bill in corn which is also the total capital engaged in agriculture (expressed in corn) under the assumption of a ''simple type'' of production processes for corn. In short, we can pass from the profit in corn to the rate of profit in corn-production or agriculture, which is also the general rate of profit in the economy thanks to the forces of free competition. So, the rate of profit in the economy is now indeed determined.

2. For an algebraic statement of this determination of rate of profit we need simply refer back to the locus between the rate of profit and corn wage rate established in ch.2 (see eq. 11 , sec. 1 ). As already explained, we now have the corn wage rate the same as the real

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* This is the sum and substance of Ricardo's famous proposition on profit —

''At all times, profits depend on the quantity of labour requisite to provide necessaries for the labourers on that land or with that capital which yields no rent'' (Principles p. 76)

wage rate, i.e., in symbols :

$$w^c = v$$

where $w^c$ and $v$ denote respectively the corn-wage rate and real wage rate. Making this substitution, eq.11 of ch.2, sec.1 reads

$$(1) \qquad x_m = v\,(1 + r)\,n\,.$$

Since m (index of fertility of the marginal land), $x_m$ (output per acre of the marginal land), n (labour per acre of the marginal land) and v (the real wage rate) are now all 'given', r is the only 'unknown' in (1) and hence is determined by it. Stated explicitly

$$(2) \qquad r = \frac{x_m - vn}{vn}$$

This can be written more compactly as :

$$(3) \qquad r = \frac{u_m - v}{v}$$

where

$u_m = x_m / n$ = productivity of labour in producing corn under ''marginal conditions''.

3. We will look into the determination of rate of profit under more complex conditions in secs. 4 and 5 of this chapter. Let us now pass on to implications of the 'determination' as set out above*.

4.1 First, it at once follows from ( 2 ) or ( 3 ) that, the higher the real wage rate v, the lower the rate of profit, r. In other words, the rate of profit is inversely related to the real wage rate. This goes to the heart of Ricardo's economics and represents its ''wage-profit relation'' in the proper form. Two back references to our own work in the thesis are called forth by this statement.

4.2 First, let us refer back to the locus between corn wage rate (= real wage rate) and rate of profit established in ch.2 In a purely formal sense, this locus already defines an inverse relation between the two variables. But the formal sense is misleading as it says nothing about the rise or fall of which variable causes the other variable to fall or rise and thus gives the impression that variation in the rate of profit may cause opposite variation in the real wage rate as much as the other way round. This is simply not economics of Ricardo. We must take the expression itself (''inverse relation'') in its substantive sense as established here. The substantive sense hinges upon a prior identification of the real wage rate as the independent variable in ( 2 ) and this has its whole backing in the substantive analysis of wage given in the last chapter.

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* This actually includes ''closing'' of certain problems left in the open in ch.1, which we will take up in secs. 2 and 3 below.

4.3 Next, we must refer back to the inverse relation between the money wage rate, w, and rate of profit, r, in our ''simple economy'' established through the analysis of effects of a rise in the value of w in ch.1, sec.2. The two relations are brought together by the simple point that in this economy there is no permanent effect of change in money wage upon prices and hence change in real and in money wage come to one and the same thing. In other words, even in ch.1, the inverse relation was properly between 'real' wage and the rate of profit, but this ''appeared'' as a relation between 'money' wage and rate of profit because of this equivalence. This actually provides the clue to ''closing'' the inconclusive analysis of secs. 6-8 of ch.1, viz., we have to take the rise in money wage begun with there as surrogate for an equivalent rise in real wage (as already argued in the previous chapter; sec.1 pp.124-5) and then see what changes in prices and the rate of profit this brings about. But, as already stated, we take up this analysis itself only in a later section (see sec.3).

4.4 Before leaving this point, we should mention that just because the inverse relation is stated in terms of the rate of profit, it does not become merely of technical interest. The fall in rate of profit that a rise in real wage rate brings about is actually a fall in the total profit earned by capitalists in 'real' terms. This is because whatever the real outputs being produced, a higher real wage rate simply means that the workers command a greater part of these outputs, while the part claimed

by landlords remain the <u>same</u>, for the rent (in corn) remains the same. Hence the capitalists by definition have a <u>smaller</u> share of the outputs, which is to say that the total profit in real terms goes down. Thus, the inverse-relation brings us straight to an <u>opposition</u> between the interests of workers and capitalists.

5. Next, we note that it is <u>only</u> the so called ''marginal condition'' of corn-production that enters the determination of rate of profit. In otherwords, the rate of profit is independent of the production condition of all <u>other</u> commodities, as well as the production condition of corn on intra-marginal or superior qualities of land. The first gives point to the statement made in ch.1 that improvements in the method of production of a particular commodity may affect the wage rate and rate of profit depending upon the precise nature of the commodity. But again we will pursue this point separately in a different section.

6. Let us now come to see the problem of determination of rate of profit in the <u>total perspective of Ricardo's economics.</u> Let us start from the fundamental problem Ricardo had set before himself in writing the <u>Principles</u> : to determine the laws governing the distribution of the total social produce between the three classes in society, landlords capitalists and workers. These ''laws'', we can say, are now in fact determined.

There are at bottom <u>two independent</u> laws - one, that the <u>rent in corn</u> is given simply by the difference between the actual output of corn and that producible under the worst existing or marginal conditions of production in agriculture; and two, that the <u>real wage rate</u> at any time is rooted in past historical developments and therefore appears as a 'datum' in the actual working of the economy. We have just seen that between these two laws (which we may call respectively the 'law of rent' and 'law of wage'), the rate of profit in the economy is completely determined.

7. This in a way simply resolves the fundamental problem of Ricardo - ''in a way'' because it is not the original categories of 'wage', 'rent' and 'profit' that are referred here, but some <u>transform</u> of each, viz., <u>real</u> wage, <u>corn</u>-rent and <u>rate</u> of profit. It is these 'transforms' that we can now speak of as 'determined', leaving the 'originals' in the open.

Note, these 'originals' are all in <u>value</u>, and it is precisely the <u>value-dimension in each that is gotten rid of in its 'transform' spoken of</u>. So, it is simply the determination of values that remain in the open. It has been our consistent position from the beginning that the determination of values is inseparable from 'money', what it is and how it works. We will come to this in the next chapter. This is what is to bring the Ricardian system of value-distribution to a logical completion. But there is already a clear <u>logical decomposition</u> of this total system onto a 'real' plane where the real wage rate, rate of profit and corn-rent are 'determined', and a 'monetary' plane where 'values' are left to be determined.

8. Let us now turn to the methodology underlying the transforms under reference. 'Corn-rent' is obtained simply by dividing rent by the price of corn, i.e., by the price of the 'product' from whose production rent is earned. This has its logic in the simple fact that to the producer of corn, it is immaterial whether the rent is paid directly in the product or in money, for in one case it has to come out of the output produced and in the other out of the value of the same output or sale proceeds.

'Real wage' is obtained by dividing wage by a price index of ''necessaries''*. This has its logic in the very ''meaning'' of wage to the workers, not in any logic of payment by the producers.

'Rate of profit' again has a very different conceptual basis. It simply expresses profit in terms of the very base upon which it is earned, i.e., capital. Because 'capital' and 'profit' both are in value, the value-dimension is automatically gotten rid of in this ratio leaving us with a pure percentage per unit of time (more on this in a minute). This is completely internal to the very notion of 'profit'. Dividing wage by labour or rent by land does not have any technical significance of this sort.

It is thus clear that each of our 'transform' has a conceptual basis or logic of conception of its own quite distinct from others. The point is worth mentioning because one can always get rid of the ''value

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* This is evident from the general definition of real wage given in eq.(1) of sec.1, ch.3, where the denominator is indeed a price-index of the necessaries, $G_1, \ldots, G_s$.

dimension'' in the distributive categories by one stroke, e.g., by devising a ''numaraire'', or by simply passing onto ''relative shares''. What relevance such formalisms have for understanding the economics of Ricardo is however quite a different matter.

We have only to add that the notions we have talked about derive their significance ultimately from the very nature of working of the economy, which they help to describe. So far as the concepts 'corn rent' and 'real wage' are concerned, this is already evident from the very statement of the 'law of rent' and 'law of wage'. As for the rate of profit, we are back to the very beginning — the force of competition. This is what sets up the rate of profit as the ''central variable'' of the whole system, to be determined by pure economic forces. This programme is now fulfilled.

Obviously, nothing of this rich texture is caught in the formalisms of a ''numaraire'' etc. They have no grounding in the actual working of the Ricardian economy and tell us nothing about it.

9. Before ending, we have to return once again to the concept of rate of profit. We have seen that it represents a pure percentage per unit of time. The point to mention is that when we view the concept explicitly as part of the working of the economy as a whole, the ''unit of time'' in it is no longer left in the open. The ''unit'' is a year simply because

that is the only meaningful time-unit for conceiving the working of the economy as a whole*. To go back to Ricardo's fundamental problem, the problem of distribution, it was the problem of distribution of the annual produce of society between the annual wage, rent and profit. The rate of profit in this context was therefore by definition the annual rate of profit.

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* Cf the very opening sentence of the Wealth of Nations :

''The annual labour of every society is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes''.

This again was part of the ''conceptual foundations'' taken over by Ricardo from Adam Smith.

Section 2 : Effects of Improvement in Methods of Production Once Again.

1. In ch.1 (sec.3) we talked of the effects of an improvement in the method of production of some particular commodity in our ''simple economy'' without regard to the nature of the commodity concerned. Simultaneously, we based our analysis on the tentative assumption that the rate of profit and wage rate (money wage rate) in the economy were left unaffected by the ''improvement''. We can now see that the two points are not unrelated. If the improvement is in the method of corn production then the rate of profit must be affected; in fact it must rise, for the ''improvement'' under reference means by definition a rise in the labour productivity, $u_m$, in (3) of sec.1. But improvements in the method of production of any other commodity simply leaves the rate of profit unaffected, for their production conditions do not simply enter the determination of rate of profit. Our object here is simply to spell out these results in terms of the mechanisms at work. This will also explain what happens to the wage rate as result of the ''improvement''. Stated differently, the object is to extend the analysis of sec.3 of ch.1 by dropping its ''tentative assumption'' referred above.

Before beginning, we mention that ''corn'' derives its whole significance in the present context on being the only ''necessary'' in the economy. As we will see later, this significance is shared by all ''necessaries''. For the time, we simply take this for granted and talk of the commodities in our economy as ''necessaries'' and ''luxuries''.

2. Let us begin with the case of improvement in the method of production of a ''luxury''. We have just seen that this leaves the rate of profit unaffected. What about the wage rate? We had seen in sec.2 of ch.1 that a rise in the wage rate in our ''simple economy'' must permanently lower the value of rate of profit. This is in fact symmetric , i.e., a fall in the wage rate permanently raises the value of rate of profit. It is thus clear that no change in the wage rate is possible in this economy without a corresponding change in the rate of profit. It follows that neither the wage rate nor the rate of profit in this economy is affected by the ''improvement'' under reference. Its only effect is a fall in the price of the commodity concerned, as already argued in ch. 1.

3. Let us now consider an improvement in the method of production of a ''necessary''. We already know from the analysis of sec.3 of ch.1 that this brings about a fall in the price of this ''necessary''. As of the money wage rate then prevailing, this clearly means a rise in the real wage rate. But this rise is without any basis in the real conditions of the labour market. So, it does not actually take place. This simply means that money wage rate must now fall, and fall to the extent required to keep real wage rate constant. But we already know that fall in money wage in our ''simple economy'' raises the rate of profit. So, the rate of profit in fact rises.

This completes the extension of the analysis of sec.3 of ch.1 in the present case. To recapitulate, an improvement in the method of production of a 'necessary' not only lowers its price, it also lowers the wage rate and raises the rate of profit, all these forming a ''logical chain''.

Section 3 : Wage, Price and Profit Outside the ''Simple Economy'' Once Again.

1. Let us consider the ''non-simple economy'' described in sec.6 of ch.1. Only two commodities are produced in it, 'corn' and 'wine'. Corn, we take, still remains the only ''necessity'' in the economy. It follows that only the production condition of 'corn' enters the determination of rate of profit in the economy. These production conditions are however of the same ''simple type'' as presumed in the equation of determination of rate of profit in sec.1 above (eq.2). If follows that the rate of profit in our economy is still determined by this equation. Being ''outside'' the simple economy does not make any difference in this case so far as the determination of rate of profit is concerned.

2. Let us now suppose that there is a rise in the wage rate from its previous value $w$ to $(1 + \alpha)w$, $\alpha > 0$, in our economy. This is by definition a rise in the money wage rate but we have already argued that a change in money wage is really a ''surrogate'' for an equal change in real wage. So, we now suppose that there is a $\alpha$ per cent rise not only in the money wage rate but in the real wage rate as well in our economy, and look into its ''effects''.

Obviously, the above ''supposition'' is satisfied if there is no change in the price of corn following the change in money wage i.e., corn goes on selling at its old price, $p_c$. Let us now take this condition for granted. We already know from sec.6 of ch.1 that the rate of

profit in this case falls from its previous value, $r$, to $r_c$ as defined by eq. ( 3 ) of that section, while the price of wine also falls from its previous value, $p_w$, to $p'_w$ as defined by eq. ( 6 ) of the section. At these prices, $p_c$, $p'_w$ the rates of profit from corn and wine are already equalised (at a lower level than begun with). So, no change in these prices is called forth for ''equalisation'' of rates of profit. We also do not bring in here any demand-supply imbalance to cause prices to change (this point has already been argued in ch.1, sec.5 pp. 61-62). So, we can say that given the fact that a change in money wage is after all only a ''surrogate'' for the change in real wage, the price of corn will in fact remain unchanged at $p_c$ and the price of wine will fall to $p'_w$ thereby causing the general rate of profit in the economy to fall to $r_c$.

3. This is precisely what happened in ''case one'' of our analysis in sec.6 of ch.1. But it remained as purely ''hypothetical'' there; now it is turned into the ''actual''. This is the difference. By the same token, we have now brought to a completion the programme of ''generalisation'' of our analysis of sec.2 of ch.1 begun in sec.6 of ch.1.

A similar completion can be given to the analysis of secs. 7 and 8 of ch.1 our two other instances of the ''non simple'' economy. Because there is no new economic content to these extensions, we do not repeat the exercises.

Section 4 : The Case of ''Many Necessaries'', I.

In sec.1 we looked into the determination of rate of profit in our economy under the assumption that there is only one ''necessary'', corn, in the economy. We will now give up this assumption. We however retain the assumption of a ''simple economy''.

1. Let us begin straight from the definition of the real wage rate in case of many ''necessaries''. This is already given by eq. (1) of ch. 3, sec.1 which we reproduce below :

$$(1) \qquad v = w / ( p_1 b_1 + p_2 b_2 \ \ldots + p_s b_s )$$

Granting the assumption of a ''simple economy'', we have the following value-distribution equations for the necessaries, $G_1$, $G_2$ .... $G_s$.

$$(2) \qquad p_i X_i = w ( 1 + r ) L_i \qquad i=1,2, \ldots, s$$

Dividing through by $X_i$ , we can write the equations as

$$(3) \qquad p_i = w ( 1 + r ) / u_i \qquad i=1,2, \ldots, s$$

where

$u_i = X_i / L_i$ = the productivity of labour in the production of $G_i$.

2. Let us now multiply through each equation in (3) by $b_i$ and add up the two sides. This gives us

$$\sum_{i=1}^{s} p_i b_i = w ( 1 + r ) \sum_{i=1}^{s} (b_i / u_i)$$

Dividing both sides of this equation by $\Sigma\, p_i b_i$, we have the equation

$$1 = \frac{( 1 + r ) w}{\sum_{i=1}^{s} p_i b_i} \sum_{i=1}^{s} (b_i / u_i)$$

Using (1) we have:

$$(4) \qquad 1 = v ( 1 + r ) \sum_{i=1}^{s} (b_i / u_i)$$

$r$ can be explicity solved for from this equation. The solution is

$$(5) \qquad r = \frac{1 - v \sum_{i=1}^{s} ( b_i / u_i )}{v \sum_{i=1}^{s} ( b_i / u_i )}$$

This determines the rate of profit, $r$, for, as already argued, both the real wage rate, $v$, and the productivity of labour, $u_1, u_2, \ldots u_s$, can be treated as ''givens'' in the working of the economy at any time. Note that the generalisation from (3) of sec.1 to (5) above is simply that productivity of labour, $u_m$, is now replaced by a weighted average of the productivities $u_1, u_2, \ldots u_s$, the ''weights'' coming from the very definition of real wage*.

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* Without loss of generality, we can take $b_1 + b_2 + \ldots + b_s = 1$, so that $(u_1 b_1 + \ldots + u_s b_s)$ is indeed a weighted average of $u_1, u_2, \ldots u_s$.

Section 5 : The Case of ''Many Necessaries'', II.

1. This section is a sequel to sec.3. There, we returned to the ''non-simple'' economy described in sec.6 of ch.1 and looked into both (a) the determination of rate of profit, and (b) the effects of a rise in the wage rate in this economy, assuming that of the two commodities (corn and wine) produced in the economy, only one (corn) was a ''necessary''. We will now take both commodities to be ''necessaries''. So, the present analysis also seeks to extend the analysis of the previous section to outside the ''simple economy''. It may be mentioned that a parallel extension can also be given with respect to the ''non-simple'' economics described in secs. 7 and 8 of ch.1. To avoid undue repetition, we do not take this up.

2.1 Let us start from the value-distribution equation for corn and wine in our economy (eqs.1 and 2 of sec.6 of ch.1 ) reproduced below. Using the notations established in the previous section, we can write these equations more compactly as

$$(1) \qquad p_c = w(1+r)/u_c$$

$$(2) \qquad p_w = w(1+r)^2 / u_w$$

2.2 Given the state of the economy implicit in the above equations we have its real wage rate, v, defined by

$$(3) \qquad v = w / (p_c b_c + p_w b_w)$$

Making this substitution ( v for w ) in (1) and (2), we have

$$p_c = v ( p_c b_c + p_w b_w ) ( 1 + r ) / u_c$$

$$p_w = v ( p_c b_c + p_w b_w ) ( 1 + r )^2 / u_w$$

Multiplying these two equations respectively by $b_c$ and $b_w$, adding and cancelling common terms, we end up with the equation :

$$(4) \qquad 1 = v ( 1 + r ) [ b_c / u_c + ( 1 + r ) b_w / u_w ]$$

2.3 By arguments already given, all variables appearing in (4) other than $r$ are ''given'' at any given time. So, $r$ is the only unknown in this equation and is determined by it. That this is a ''meaningful determination'' is evident from the fact that the RHS of (4) is a strictly increasing function of $r$ with its value going from $v [b_c/u_c + b_w/u_w]$ to $\infty$ as $r$ goes from 0 to $\infty$ and further that the RHS $< 1$ at $r = 0$*. Obviously, the substantive interpretation of this 'determination' remains the same as before, viz., the rate of profit is determined exclusively by (a) the real wage rate, and (b) the productivity of labour in producing the ''necessaries''.

3. This completes one part of our problem in this section. Let us now turn to the 2nd part. Let us consider a rise in the <u>real wage</u> rate in our economy from $v$ to say $( 1 + \alpha ) v$, $\alpha > 0$. From (4) we then

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*This is taken for granted all through as it is definitionally implied in the very notion of ''capitalist production''.

see that the value of the rate of profit must change from $r$ to $\bar{r}$ say where $\bar{r}$ is obtained by solving the equation :

$$(5) \qquad 1 = ( 1 + \alpha ) v ( 1 + \bar{r} ) [ b_c / a_c + ( 1 + \bar{r} ) b_w / a_w ]$$

Since RHS of (4) is an increasing function not only of $r$ but also $v$, it is clear that

$$\bar{r} < r$$

4.1 Now, we have already seen (sec.3) that had 'corn' been the only ''necessary'' in our economy, the rate of profit would have in fact fallen from $r$ to $r_c$ as a result of the rise in wage under reference, where $r_c$ is defined by eq. ( 3 ) of sec. 6 of ch.1. A parallel interpretation also attaches to the other hypothetical rate of profit, $r_w$, defined in that section. From a purely analytical point of view, it is of interest to locate the relation, if any, between $\bar{r}$ on the one hand and $r_w$ and $r_c$ on the other. Let us now take this up.

4.2 Let us recollect the expressions for $( 1 + r_c )$ and $( 1 + r_w )$ obtained in sec.6 of ch.1 :

$$(6) \qquad 1 + r_c = ( 1 + r ) / ( 1 + \alpha )$$

$$(7) \qquad 1 + r_w = ( 1 + r ) / \sqrt{1 + \alpha}$$

Let us now put $r_c = \bar{r}$ in the RHS of (5). We then find

$$\text{R.H.S. of (5)} = (1+\alpha)v(1+r_c)\left[b_c/u_c + (1+r_c)\,b_w/u_w\right]$$

$$= v(1+r)\left[b_c/u_c + \{(1+r)/(1+\alpha)\}\,b_w/u_w\right]$$

$$< v(1+r)\left[b_c/u_c + (1+r)\,b_w/u_w\right]$$

$$= 1 \quad \text{from (4).}$$

This is a contradiction of (5).

This proves that $r \neq r_c$. Further, the RHS of (5) is a strictly increasing function of $r$. Since its value at $r_c$ is just seen to be less than one while its correct value according to (5) is one, it follows at once that

$$(8) \qquad r_c < \bar{r}$$

By exactly parallel steps it can be proved that

$$(9) \qquad r_w > \bar{r}$$

4.3 Combining (8) and (9) we have the result

$$(10) \qquad r_c < \bar{r} < r_w$$

This establishes the relation we have been looking for. From a purely analytical point of view, we can say that $r_c$ and $r_w$ already establish the two bounds within which the ''true'' rate of profit following a $\alpha$ per cent rise in real wage in our economy must lie, whatever may be the precise identity of its ''necessaries'' as well as their composition in defining the real wage rate. In case the identity is established by only one commodity, $\bar{r}$ coincides with either one or the other of these two bounds depending upon which is the ''necessary''; otherwise, it is strictly contained between the two bounds. We thus see that $r_c$ and $r_w$ do have a general analytical significance in locating the true rate of profit. All this, we can say, brings our programme of ''generalisation'' begun in sec.6 of ch 1 to one further degree of completion or closure.

Section 6 : The Trend in Rate of Profit

1. We have seen that rate of profit at any time is completely determined by the prevailing real wage rate and productivity of labour in the production of 'necessaries'. It follows that the behaviour of rate of profit over time is governed completely by the behaviour of these two 'determinants' of it over time. However, neither the real wage rate nor the productivity of labour changes on its own through time. To come to a consistent view of their behaviour through time, we must begin with the 'prime mover' of the system, that is the accumulation of capital. In other words, we now look into the course of rate of profit in the background of accumulation of capital going on in the economy. This must give us by definition the ''long term'' behaviour of the rate of profit.

2. As capital is accumulated, more capital is put into the production of all commodities, their proportion being governed by the growth of demand following from the same accumulation of capital. In the case of 'corn', the new capital brings fresh land under cultivation. If the marginal land was located earlier in the m-th grade land, it now comes to be located in the ( m + 1 ) th grade. But the productivity of labour on this grade is lower than on the m-th grade. So, the productivity of labour falls. Since, 'corn' is certainly a 'necessity', the rate of profit must fall. This defines the basic tendency of the rate of profit to fall through time in our economy*. We say 'tendency' because there may be other developments in the economy arresting the fall.

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* Cf ''The natural tendency of profits then is to fall, for in the progress of society and wealth, the additional quantity of food required is obtained by the sacrifice of more and more labour''. (Principle p.71)

3.1 The basic force arresting the fall, it is clear, has to consist of improvements in the methods of cultivation. Let us look into the mechanism of this effect in some detail.

We recall that there are two basic types of improvements in the method of cultivation — those improving the productivity of labour and those improving the productivity of land. Since the rate of profit depends directly upon the productivity of labour in corn, improvements of the first type directly counteract its tendency to fall. Improvements of the second type will also have this effect, in fact in a logically more 'basic' way. This is because as the productivity of land is increased, it becomes possible in fact to shrink the area under cultivation to produce the same output of corn i.e., to meet the same demand for corn. So, improvements of this type counteract the very cause behind the falling tendency of the rate of profit.

3.2 Leaving aside corn, i.e., the agricultural product, it is clear that improvements in the method of production of other necessaries will also conteract the falling tendency of the rate of profit*. However their significance will be relatively less so long as 'corn' continues to be the prime necessity for workers. Technical progress in ''luxuries'' has no bearing in the present context. This is already discussed.

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* Cf ''this tendency, this graviation as it were of profits, is happily checked at repeated intervals by the improvements in machinery connected with production of necessaries, as well as by discoveries in the science of agriculture, which enable us to relinquish a portion of labour before required, and therefore to lower the price of the prime necessary of the labourer'' (Principles p.71).

4. Let us now see what 'tendencies' in the long run course of rate of profit are defined by the long run movement of the real wage rate as discussed in ch.3, sec.3.

This movement had its basis in a process of overall economic development brought about ultimately by a sustained process of technical progress. We have seen that as part of this process, there gets defined an upward trend in the very 'standard' of 'subsistence', which comes to be reflected in the actual course of the real wage rate as well.

On the face of it, it may appear that this trend in the real wage rate simply feeds into or further accentuates the falling tendency of rates of profit, for the real wage rate and rate of profit are after all ''inversely related''. This however is not so. We have to remember the background factor of ''technical progress''. We have already seen that technical progress in the production of necessaries on its own tends to improve the rate of profit. This in fact is the direct effect of the technical progress under reference. Its effect on the 'standard' for subsistence takes place very much more indirectly, with a long lag associated with it. Even at the end of this 'lag' only a part of the general beneficial effects of technical progress generally 'percolate down' to the workers. It follows from this that seen through time, the net effect of the technical progress must be to counteract the falling tendency of the rate of profit, not accentuate it.

# Chapter 5

## MONEY

### Section 1 : Money and the Determination of Values - The Case of the ''Pure Gold-Money Economy''.

1. At the very beginning we said that in our ''re-working'' of the economics of Ricardo, 'money' comes in as the final point or completion of the working of the Ricardian economy as a whole — it closes the Ricardian system of value and distribution. We have now seen that what remains to be 'closed' in this system are simply the 'values', i.e. all monetary magnitudes. Its basic 'distributive' variables are all already determined on a 'real' plane in the form of real wage, rate of profit and corn- rent. This sets the basic direction of our enquiry in this chapter which itself has to pass through several 'stages' to become clear as we go on.

2. The first stage division is this : we begin with the case of a ''pure gold-money economy'' (as we call it) and then extend it to include ''paper money'' (last section). By ''pure gold-money economy'' we mean simply that 'money' in this economy exists in the form of pure gold-coins. These coins, let us say, are called ''oros'' and a one-oro coin, let us say, contains one gram of gold. The ''unit'' of money in this economy can then be equivalently put as one oro or one gram of gold.

3.1 Let us now make clear the creation of money in the economy. We assume simply that there is a mint in the economy to which anyone having 'gold' can bring his gold and have it coined into so many oros :

one oro for each gram of gold taken. I.e., the mint does not <u>charge</u> any 'seignorage' for its service. This is how money is 'created' in the economy.

3.2 On the other side of this, we will assume that anyone can freely <u>melt down</u> his coins into gold if he so likes, i.e., there are no legal restriction on this. Further, we suppose that there is no ''loss'' of gold in melting. I.e., melting down a one-oro coin one simply gets back a gram of gold. This is the basic set up of ''gold-money'' in our economy.

4.1 Let us now turn to the <u>production of gold</u>. Gold, like any commodity, is produced by capitalists for the profit that it yields to them. However, <u>gold itself is not in the strict sense a 'commodity'</u>. The gold producer does not <u>sell</u> his output but simply takes it to the mint and gets it coined. This automatically turns his output into 'revenue' unhindered by any problem of finding 'buyers'.

4.2 The question arises whether there is any buying-selling of 'gold' at all in the economy. Obviously, any 'buying' of gold presupposes some use or need for gold other than as money (e.g. for 'ornaments'). Let us simply grant this.

Let us now suppose that someone wants to <u>buy</u> gold in order to meet such 'need' in our economy. He would at once find out that no one is going to <u>sell</u> him gold at less than one oro for 1 gram of gold. But having one oro, he can himself melt down his coin and have the 'need' fulfilled. So, the buying-selling does <u>not</u> actually take place. This answers the question raised and also justifies the point that 'gold' is not a <u>commodity</u> in our economy.

4.3 Without any buying and selling of gold, there is also no meaningful notion of price of gold in our economy. However, in a purely notional sense, we can say that the 'price' of gold always remain fixed at unity (one oro for one gram of gold). We will return to this point a little later, but let us repeat that this is a purely notional price without any operational content to it.

5. We can now get into the subject of determination of 'values' in our economy. Let us suppose that in a certain state of the economy $X_g$ grams of gold is being produced annually. ($X_g$ is by definition also the value of the output produced.) To produce this output, the producer has laid out a certain capital. Granting that the production process of gold is of the ''simple type'' as defined in ch.1, this capital is simply the wage advanced at the beginning of each year by the producer of gold.

Denoting the wage rate prevailing in this state of the economy by $w$ and the annual labour engaged in the production of gold by $L_g$, we have the rate of profit in gold production, say $r_g$, given by :

$$r_g = \frac{X_g - w L_g}{w L_g}$$

Granting that this is a 'balanced state' of the economy, the rate of profit, $r_g$, must be equal to the general rate of profit being earned in the economy, say $r$. So

$$r_g = r$$

and hence

$$(1) \qquad r = \frac{X_g - w L_g}{w L_g}$$

Obviously, we can also write this equation as

$$(2) \qquad X_g = w ( 1 + r ) L_g .$$

This is by definition the value-distribution equation for 'gold' in our state of the economy, for it shows how the 'value' of production, $X_g$, is distributed between 'wage', $w L_g$, and 'profit', $r ( w L_g )$. But $X_g$ is also the physical output of gold. This makes it clear that the 'price' of gold, if we want to speak of it, is unity. Stated in symbols :

$$(3) \qquad p_g = 1$$

where $p_g$ denotes the price of gold. Let us again repeat that this is a purely notional price of gold without any operational content to it simply because gold is never bought-and-sold in the economy being talked of.

6.1 We are now in a position to take up the determination of 'values' in our economy. For this, it is convenient to write (1 ) in a more compact form as follows :

$$(4) \qquad r = \frac{u_g - w}{w}$$

where $u_g = X_g / L_g$ = the productivity of labour in gold production in our state of the economy.

6.2 Now, the rate of profit, r, is already determined by 'real' forces in the economy. It is therefore simply a 'given' in ( 4 ). The productivity of labour in gold production, $u_g$, can be treated as a pure technical datum of our state of the economy*. Hence it also appears as a 'given' in ( 4 ). So, the wage rate, w, is the only 'unknown' in ( 4 ) and hence is <u>determined</u> by it. Stated explicitly

$$(5) \qquad w = u_g / ( 1 + r )$$

This, we can say, is the <u>fundamental value-determination</u> in our economy, for with the wage rate, i.e., the <u>money</u> wage rate, already determined, all other monetary magnitudes are also at once 'determined'. Let us just explicitly bring this out for <u>prices</u> and <u>rent</u> in respect of our ''simple economy''.

6.3 For <u>prices</u>, we need simply turn to the value-distribution equation for commodities reproduced below :

$$(6) \qquad p_i X_i = w ( 1 + r ) L_i , \qquad i=1,2, \ldots$$

Since we are talking of a balanced state of the economy, we can say that the <u>output levels</u> $X_i$, in ( 6 ) are already set by the condition of <u>demand-supply balance</u>, and the <u>employment levels</u>, $L_i$ ,

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* We should point out that this hinges upon the production process of gold being subject to CRS.

are then set by the <u>technical relations</u> of the going production processes of this state. So, $X_i$ and $L_i$ are now both treated as 'given' in (6 ) for each i. Further, the rate of profit, r, is already determined by 'real' forces, while the wage rate, w, is now just seen to be determined prior to these equations. Hence, both appear simply as 'given' in ( 6 ). So, $p_i$'s are the only 'unknowns' in ( 6 ) and are <u>determined</u> by the respective equations of (6).

6.4 As for <u>rent</u>, the rent in corn or corn rent is already 'determined'. The rent as such, i.e., money rent, is simply the corn rent times the price of corn. But the price of corn is also now determined on par with all other prices. This in turn determines rent.

6,5 These determinations on the money plane can be schematically depicted as follows :

$$w \longrightarrow p_i \longrightarrow R$$

where R denotes the <u>total rent</u> in our state of the economy.

Section 2 : Effects of Improvement in the Method of Production of Gold

1. We have already seen in sec.3 of ch.1 and sec.2 of ch.4 that any improvement in the method of production of a commodity brings about a permanent fall in its price, through which it may also affect the wage rate and rate of profit depending upon the nature of the commodity concerned. But there is no meaningful gold-price in our economy. Hence the causal sequence beginning with an improvement in the method of gold-production must be different. (Even if we speak of the 'notional price' of gold, $p_g$, no change in its value is simply definable, and hence we are back to the point just made.)

2.1 Let us now try to find out the 'causal sequence' just referred. This is easily done. An improvement in the method of gold production means by definition a rise in the labour productivity, $y_g$, in eq.(4) of the previous section, which in turn must lead to a rise either in the rate of profit, r, or in the wage rate, w. But no rise in labour productivity other than in ''necessaries'' actually affects the rate of profit. So, the rate of profit remains unchanged. Hence, it is the wage rate that must rise, and rise in the same proportion as the rise in $y_g$, for otherwise the rate of profit too is changed.

2.2 However, this cannot be the end of the story. Turning to the value-distribution equations, we see at once that a rise in the money wage rate, w, with no change in the rate of profit, r, must bring about a proportionate rise in all prices. This completes the 'causal sequence' we have been looking for.

3. It is necessary at this point to return to our analysis of the effects of a rise in the wage rate in our ''simple economy'' in sec.2 of ch.1. At the end of this section we pointed out that the rise in wage, which we simply treated as ''exogenous'' there, must have its origin somewhere in the economy as a whole, and our procedure therefore simply left in the open the very meaning or substantive interpretation of this rise in wage. We then promised to pay ''due attention'' to the question later in the thesis.

This promise was taken up partly in the chapter on wage (see pp. 132) and then in the chapter on profit (see pp. 148, 156). Our argument there in a word was that in so far as a rise in wage arises from the so called ''labour market'' of the economy, it is really ''surrogate'' for a rise in <u>real</u> wage, the latter having already been given a substantive status by the very working of this ''market''. This interpretation fitted in exactly with our analysis of the effects of a rise in wage in ch.1. To be explicit, the effect was simply a <u>fall in profit</u> (as well as in the <u>rate</u> of profit) with <u>no change in prices</u>. This was in the ''simple economy''. Going outside the ''simple economy'', we have since seen that while the rate of profit necessarily falls as a result of rise in wage (arising from the labour market) <u>prices may also change</u> in the <u>process</u>.

4. Let us now turn to the causal sequence we have just drawn from an improvement in the method of gold production. We have seen that the improvement leads to a rise in the wage rate and this in turn leads to a proportionate rise in all prices. The rate of profit remains unaffected all through. These effects are the diametric opposite of the effects of a wage-rise established previously and just recounted. It is necessary to resolve this ''paradox''.

5. We have only to remember that the rise in wage here arises from a very different source or origin. It arises from the <u>sphere of money, not the labour market</u>. The very ''meaning'' of the rise in wage arising from these two sources is very different. This is self-evident in an a priori sense. There is therefore no ''paradox'' in the fact that the two ''rises in wage'' have entirely different consequences.

6. This is a point which Ricardo took considerable pains to set out and explain a number of times in his book. Thus we find him stating his basic conclusion regarding the effects of a rise in wage already in his chapter on ''value'', before he had come to properly 'situate' the notion of real wage, in the following words :-

> ''A rise in wages, from an alternation in the value of money, produces a general effect on price, and for that reason it produces no real effect whatever on profits. On the contrary, a rise of wages, from the circumstances of the labour being more liberally rewarded, or from a difficulty of procuring the necessaries on which wages are expended, does not, except in some instances, produce the effect of raising price, but has a great effect in lowering profits'' (<u>Principles</u> p.31).

This is precisely the point we have just made. For any ''tying up'' that may be felt necessary, we simply point out that ''alteration'' in the <u>value</u> of money in this passage stands simply for a change in the labour content of the object serving as ''money'' (i.e., gold) for Ricardo had already convinced himself of the validity of the procedure of measuring the ''value'' of any object by its labour content. Since change in the labour content of gold can come only from a change in its method of production, one is back simply to the ''origin'' of the rise in wage that we have discussed here. We may also mention that the ''exceptions'' which Ricardo grants towards the end of this passage (''except in some instances'') all refer to happenings outside the ''simple economy''. These are now also all explained.

Section 3 : The Monetary Mechanism

1. In sec.1, we analysed the structure of determination of 'values' in our economy simply by locating 'unknown' in its value-distribution equations (including that of gold), one 'unknown' for each equation in a particular structure. This was purely logical. Little of the actual working of the economy came into it simply because no 'change' was introduced and how the economy responds to a change in the sphere of money was therefore left in the open. In the next section, we did talk about the effects of such a 'change', but that too was on the purely logical plane, through the same equations. We did not see the effects as coming about through a process in time initiated by the 'change'. Stated differently, the 'mechanism' was left out.

In this section, we pass on to a study of this mechanism. By definition, this is a mechanism defined on the monetary plane. So, we may call it the ''monetary mechanism''. For reasons to become clear as we go on, we will begin with a rather different sort of 'change' in the money sphere and trace its consequences through time in order to set out the ''monetary mechanism''. However, we shall also in the end discuss the mechanism through which the effects of the 'change' of the last section — improvement in the method of gold production — are obtained. All this constitutes a clear stage-transition in our analysis of money.

2. What is the essential nature of this transition ? In the actual working of an economy, the primary role of money is as <u>medium of circulation</u>; as a corollary, it also serves as its <u>standard of value</u>. We have however looked upon money so far purely as standard of value. We now begin with its actual functioning as medium of circulation. This is the transition.

3. The essential point about money as medium of circulation is that it is a <u>stock</u> of money (gold-coins) that circulates in the economy, effecting all the money-flows through buying-selling and other receipts-and-payments. This stock at any point of time is already given by the <u>past</u> creation of money, net of the 'de-creation' already taken place (e.g., through the melting down of coins and the wear and tear of coins).

It follows from this that the most straight-forward 'change' in the monetary sphere to begin with for our *purpose* is simply a <u>change in the stock of money</u>. So, we will now look into the consequences of this change.

4.1 Let us first be clear about the <u>nature</u> of the change itself. We suppose that at some point, our country is invaded by a foreign nation and they take away a lot of gold, including coins. So spell out a little more, this means that the state has found some way of withdrawing the coins from circulating and hand it over to the foreign nation. This explains the change in the stock (or quantity) of money in the economy. The stock let us say was originally $M$ and now becomes $\alpha M$, $0 < \alpha < 1$.

4.2 Since in circulation money is always changing hands, this means in the end that people are now left with a lesser quantity of money in their hands to spend. So their spending must actually go down. In the markets, this appears as a fall in the demand for commodities across board. (This is as of the prices originally ruling.)

The 'invasion' just talked of has not disrupted the real production going on in society. So, let us assume that the production continue exactly as before. There is then a short fall of demand for every commodity. By the law of the market, the prices then begin to fall across board. The question arises, how far does this fall in prices go on ?

4.3 Let us note to begin with that with prices falling across board, the 'demands' (quantity demanded) are also picking up. So, some sort of an adjustment process is already under way.

4.4 Let us now look into the incomes of people. Rent, the money rent, is clearly falling in the same proportion as corn-price. Wage, the money wage, is also falling because there has not been any change in the real conditions of the labour market and so the real wage is maintained intact. Money wage therfore falls pari passu with the fall in the prices of necessaries. With no change in the real wage rate, the rate of profit is maintained intact. We may take it for granted here that the equality of rates of profit between commodities is also maintained through the process. All prices as well as money wage, money rent and money profit are then falling in the same proportion. So, the 'real income' of all classes is maintained in tact. This means that the real quantities demanded also remain unchanged.

But we began with a fall in these quantities. This only means that prices fall to the extent necessary to restore the real quantities of demand back to this original levels.

4.4 This ''required fall'' in prices we may simply equate in ratio to the reduction in the stock of money, i.e., they all fall in the same ratio, $\alpha$. The underlying idea is that if the quantity of money, M, had supported the circulation of a total value of production, say Y then the quantity of money, $\alpha$ M, can only support the circulation of a total value, $\alpha$ Y, and this means that all prices are now $\alpha$ times their original value, given that the volumes of production have unchanged. We may call this the ''quantity principle'' of money circulation.

5. This completes one stage of our analysis of the monetary mechanism. The second stage begins with a critical re-examination of our postulate of unchanged production in all lines following the reduction in the quantity of money. The point to note is that while the rates of profit from all commodities may remain equalised at the original level all through the fall in prices and money wage just described, the same causes must create a difference between this rate of profit and the rate of profit from gold. The fall in wage necessarily drives up the rate of profit from gold while the fall in prices, in so far as it is unmatched by a fall in wage, pushes down the rate of profit for commodities. On both counts, capital would now be moving away from commodities into gold. So, the level of production of commodities go down and that of gold goes up.

6.1 We now point out that the net effect of these changes in production must be a reversal of the price movement defined in stage one of the analysis just given. I.e., prices must now begin to rise. This is because there is now both a fall in the supply of commodities as well as a rise in the demand for them. The former is obvious. As per the latter, we simply point out that rise in the production of gold augments the preexisting quantity of money, and this means more money in the hands of people to spend. So, the spending actually goes up.

6.2 The next point to note, is that in time the movement of capital just defined comes to a stop on its own, and so the process as a whole converges. In other words, the rates of profit do get equalised all over. Obviously, the wage rate and prices at this point again satisfy eq. ( 5 ) and ( 6 ) of sec.1.

6.3 The total value of production is then also back to its original level, Y. By the quantity principle, the quantity of money then must also be back at its original level, M. So, what the process as a whole has achieved is simply a restoration of the stock of money from its 'reduced' level, $\alpha$ M, to the original level, M, through a temporary rise in the level of gold production and fall in the levels of commodity production. All this is the outcome of the free movement of capital governed by the profit motive of capitalists. This is the complete statement of the monetary mechanism at work in our economy.

7. The monetary mechanism just described makes it clear that the 'determination of values' in our economy spoken of in sec.1 is not just a logical determination, valid only 'on paper'. It is supported by the monetary mechanism which necessarily gets into operation with any 'disturbance' in the monetary sphere as described above and eventually 'corrects' it. Since the mechanism itself rests on the same principle of ''free movement of capital'' (or ''free competition''), by which the whole working of the economy is explained, the unification or integration of money into the actual working of the economy is also now automatically achieved.

8.1 Let us now return to the improvement in the method of gold production whose effects were discussed on a purely logical plane in the last section. We now look upon this improvement as a <u>disturbance</u> in the monetary sphere. What precisely is the nature of this disturbance ?

8.2 Let us just recall our analysis of the effects of an improvement in the method of production of any <u>commodity</u> in ch.1 (sec.3). There we pointed out that the immediate impact of the improvement must be a <u>rise</u> in the 'output' of the commodity, both <u>directly</u> because the productivity of labour is raised as well as <u>indirectly</u> because, at the going prices, the production of this commodity has turned <u>more profitable</u> than commodities, and so capital must now be moving into this line of production.

8.3 Exactly on the same grounds, the output of gold must now rise. This means in turn a rise in the stock of money as well. Once this point is grasped, it is evident that the whole ''monetary mechanism'' just described will now be set to work with only this difference that we begin here with a rise and not a fall in the quantity of money. Obviously this does not affect the nature or properties of the mechanism itself. So, prices and with that, all money incomes, will now initially begin to rise, but this itself will tilt the balance of rates of profit in favour of commodities and against gold. Eventually, the economy must return once again to a balanced state with rates of profit equalised all over - over 'gold' and 'commodities' and not just the latter. It is easily verified that in this new balanced state of the economy the wage-price configuration is exactly as stated in the previous section. So, the 'effects' of the improvement established previously are now simply re-established as the end effects of a 'process' initiated by the improvement. This is exactly, what we had set out to do.

9. One side-point of this re-establishment may be briefly noted. In the 'causal sequence' of the last section, the improvement in the method of gold production directly implied a rise in the wage rate and this in turn implied a rise in all prices. This was obtained purely through the logical structure of the value-distribution equations. Let us now take a fresh look at the same effects through the process initiated by the ''improvement''. We see that the immediate impact of the

improvement must be a rise in prices through the quantity principle, and this in turn must raise wage through the working of the labour market. This is exactly reverse of the causal sequence established previously, which is only to call attention to the fact that a ''causal sequence'', which is a purely logical proposition, is not to be mistaken for the actual sequence of 'changes' in time. The latter is defined by the actual forces at work which by definition disappear — leave no traces of themselves - in the configuration they brings about while the ''causal sequence'' is deduced purely from the logical properties (internal consistency condition) of this configuration.

Section 4 : Paper Money

1.1 The background to the ''paper money'' that we now introduce in our economy is as follows. We begin with a Bank understood simply as a money lender with a huge reserve of gold serving as its 'capital'. In the pure ''gold money economy'', it lent simply out of this 'reserve' which itself was replenished through the loan-repayments. Starting from this, it has now come to acquire a status where instead of lending in gold, it can simply issue ''notes'' or ''certificates'' acknowledging its own debt to the amount lent, these notes having the status of money, i.e. the borrower can settle his monetary obligation as much with these notes as with gold, which is why he accepted the loan in this form in the first place. These notes, the Bank-notes, are our ''paper money''.

1.2 The status of Bank notes as money can be backed purely by law. But we will come to that later on. For the time, we simply assume that anyone can present his paper-money to the Bank and have it converted into an equal value of gold coins (one one-oro coin for each ''paper-oro''), i.e., the Bank is obliged by law to convert its own ''notes'' into ''gold'' on demand. This is enough to guarantee the ''acceptability'' of these notes as money.

One immediate corollary of the above convertibility property of our paper money is that the Bank still has to carry a reserve of gold, for otherwise it cannot honour its obligation of ''conversion''. So much for the basic set-up of money in the economy as we visualise it now.

2. Let us now go on to consider the operational characteristics of the economy.

In the pure ''gold money economy'', there was no <u>buying-and-selling gold</u> as anyone could simply melt down his coins to serve whatever <u>other</u> ''need'' for gold he had. In the present set up, he can have his money (or income) entirely in paper, which he surely cannot melt down. But he can have it converted into gold through the Bank, which (the coins) he can then melt down. So, no need for any buying of gold still arises from this source i.e., from the <u>general public</u>. However, the Bank itself, should it be in need for gold (in excess of its reserve), must turn to someone else, ultimately the gold-producer. So, there is now a legitimate notion of <u>demand for gold</u> coming from the Bank, bringing in its wake the buying and selling gold. With this, we now take the free buying and selling of gold in our economy for granted and look into the determination of 'values' in it.

3. We have seen that in the pure gold money economy, the wage-price vector ( w, p ) as determined by equations ( 5 ) and ( 6 ) of sec.1 is sustained by a monetary mechanism at work which ''corrects'' deviations of the quantity of money from that required to circulate the going volumes of production of a balanced state of the economy at the price-vector, p. Taking the volumes of production as given, the required quantity of money was denoted M.

Let us now begin from the same balanced state of the economy with the same quantity of money in circulation, M, with only this difference that there is now some paper money in the total quantity, M. We take this as the ''initial state'' of our present economy. In this initial state, the wage-price vector is still given by ( w, p ).

Starting from this state let us now take <u>the Bank to have injected a lot of paper money</u> (through the granting of easy loans, say) <u>as a result of which the total quantity of money in circulation increases from M to say $\alpha$ M, $\alpha \geq 1$.</u> By the ''quantity principle'', this drives up the wage-price vector to $\alpha$ ( w, p ). Now that there is free buying and selling of gold in our economy, there is a meaningful <u>gold price</u>, and the <u>natural</u> price of gold at this juncture is $\alpha$ , for it is only by selling a gram of gold for $\alpha$ oros that the gold producer earns the going rate of profit of our initial state of the economy while paying wage at the rate, $\alpha$ w.

4.1 Under these circumstances, if one gets one paper oro converted, melted down and sold, one ends up with $\alpha$ oros, or 'paper oros' to be precise, for no one will now pay him in coins for the gold sold. He thus makes a pure <u>gain</u> of ($\alpha$ - 1 ) oros for each such conversion. This is very attractive even if $\alpha$ is only slightly above one, as melting and converting does not take much time. Because of this, there occurs a lot of demand for conversion at the juncture under reference. This means the Bank is losing a lot of its reserve. This reserve being its capital, its whole existence gets threatened. What does it do ?

Suppose the Bank begins to <u>buy</u> gold in order to replenish its reserve. This means that for every gram of gold handed over by the Bank through conversion, it is now trying to buy another gram of gold paying $\alpha$ oros for it. By this process, the Bank simply adds ( $\alpha$ - 1 ) amount of money to its preexisting stock for every such conversion. With the quantity of money on the increase, so are all prices, including that of gold, making it still more attractive for the public to get its paper converted into gold. It is thus clear that instead of solving its problem, the Bank has only aggravated it by the attempt to buy gold.

4.2 Now, the <u>root cause</u> of the whole problem being faced by the Bank is its own <u>over-issue of paper</u> to the extent $(\alpha - 1)$ M. It is only by acting at this root that the Bank can solve its problem. I.e., it has to bring down the quantity of money back to its original level, M. This it can do by asking for earlier repayment of loans already granted, not renewing loans etc. Once it has with drawn enough paper from circulation by these means, the wage-price vector settles down once again at ( w, p ). The price of gold also returns to unity. The whole gain from conversion vanishes at this point and so does the run on the Bank. Its reserve gets stablished once again.

4.3 This shows that we again have a self-correcting monetary mechanism operating through the quantity of money in our economy which brings all prices as well as the wage rate to their 'levels' as determined in sec. 1 from which they were thrown out by the sort of monetary disturbance we had started with ("over issue"). Substantive and not just

the logical validity of the ''determination of values'' as depicted in sec.1 is not limited to the pure ''gold money economy''; it also holds good in the presence of paper money having the property of ''convertibility''.

5. Before going on to consider inconvertible paper money, we have to be a little more complete about the working of money in the present economy. In the discussion above, we had let the quantity of money go <u>above</u> the quantity that circulated its volumes of production at the price-vector, p, i.e., the ''required'' quantity, and saw this deviation to be corrected by the Bank's own action taken for self-preservation. What if the quantity of money had fallen <u>below</u> ?

This simply takes us back to the monetary mechanism in the ''pure gold money economy'' as already discussed in sec.3 : the fall in the quantity of money drives down all commodity prices as well as the money wage rate; both of these turn the production of gold relatively more profitable; capital moves away from commodities into gold; the increased production of gold gets coined and augments the pre-existing stock of money. With the quantity of money so rising, all prices begin to return to their 'levels' as determined in sec.1. The Bank plays no <u>essential</u> role in this adjustment though it can hasten the process by offering easier loans and thereby injecting fresh paper money while the adjustment is on.

6. We now come to <u>inconvertible paper money</u>. As already suggested, this must operate ultimately on the basis of a <u>legal support</u>, i.e., the idea at bottom is that the state declares the bank notes as 'legal tender' and hence it is accepted as 'money' by all. The question is, what happens to the determination of values in this case.

6.1 The first point to make is that the 'values' as determined in sec.1 will still have a definite significance in this economy; they will no longer necessarily set the level of values in it, but they will set a <u>lower bound</u> to these levels, in the sense that the levels cannot fall <u>permanently</u> below these levels. This is simply because the Bank plays no essential role in the adjustment process by which 'values' are brought <u>up</u> to this level starting from a point 'below'. Hence convertability or inconvertability of paper money is immaterial for this process.

6.2 Next, it is also clear that the precise level of 'values' in the present economy are set simply by the <u>total quantity of money in circulation</u> (relative to the volume of goods produced). Treating the paper in this total quantity as the variable part, we can speak of its ''over-issue'' as setting the margin above the 'levels' of sec.1 at which the values in our economy now settle down. The other side of the same proposition is that it is always possible to maintain values at their 'level' of sec.1 through <u>controlling the issue of paper</u>.

7. We can now tie up with Ricardo. In his chapter on ''Currency and Banks'', he began with ''gold and silver'' as money rather like our ''pure gold money economy''. For this beginning point he simply asserted:

> ''Gold and silver, like all commoditities, are valuable only in proportion of the quantity of labour necessary to produce them and bring them to the market''.(Principles p.238).

This was nothing but a reiteration of his basic ''principle of value'' (see pp. 39 above), the same as that expressed by our ''value-distribution equation for gold'' in sec.1 (eq. 2 ).

His next proposition was the following :

> ''The quantity of money that can be employed in a country must depend on its value : if gold alone were employed for the circulation of commodities, a quantity would be required one *fifteenth only* of what would be necessary if silver were made use of for the same purpose.
>
> ''A circulation can never be so abundant as to overflow; for by diminishing its value in the same proportion you will increase its quantity, and by increasing its value, *diminish its quantity*''. (Principles p.238).

What Ricardo speaks of here as the ''quantity of money that <u>can</u> be employed'' is the ''required quantity'' of money we spoke of. The only difference is that while we took the <u>form</u> of money as <u>given</u>, viz., 'gold', and hence could speak of a determinate magnitude of the ''required quantity'' of money, for all 'values' were now already settled through the value-distribution equation

for gold, Ricardo kept the 'form' in the open between 'gold' and silver'. He was saying that the ''required quantity'' would depend upon the 'form' for their value distribution equations are not necessarily the same.

Starting from this, he went straight to <u>paper money</u>. He did not mention ''convertibility'' or ''inconvertibility'' but came straight to his fundamental proposition on money which ran as follows :

> ''Though it (paper money) has no intrinsic value, by limiting its quantity, its value in exchange is as great as an equal denomination of coin, or of bullion in that coin ... . There is no more important point in issuing paper money than to be fully impressed by the effects which follow from the (this) principle of limitation of quantity''. (<u>Principles</u> p.238).

This is exactly the last proposition we had arrived at in our analysis of money. Now, Ricardo wanted the value of money to be maintained at its metallic standard. However, he was not hopeful that the ''limitation of the quantity of money'' that this required would ever be practiced by the monetary authorities. Let us quote him on this in full.

> ''Experience, however, shows that neither a state nor a bank ever had the unrestricted power of issuing paper money without abusing that power; in all states, therefore, the issue of paper money ought to be under some check and control; and none seems so proper for that purpose as that of subjecting the issuers of paper money to the obligation of paying their their note either in gold coin or bullion''. (<u>Principles</u> p.241)

Ricardo's ''solution'' was thus simply the guarantee of <u>convertibility</u>. We on our part have simply spelt out on our own <u>how</u> precisely the convertibility property supports Ricardo's ''solution'' as part of the overall monetary mechanism at work.

Section 5 : The Relation between Wage and Profit Once Again

1. The construct of the ''simple economy'' was our basic tool for establishing the basic Ricardian proposition that a rise in wage leads to a fall in profit, as well as the rate of profit. This was prior to any notion of ''real wage'', but since then we have seen that changes in money wage and real wage are equivalent notions in the ''simple economy'' simply because no permanent change in prices is caused by a change in wage in it. Later, in secs. 3, 4 and 5 of ch. 4, we saw that the above ''wage-profit relation'' was indeed true even outside the ''simple economy'' provided ''wage'' was understood as ''real wage''.

2. Though all of this is rooted in the total scheme of thought in Ricardo, he himself did not proceed this way to his wage-profit relation. He proceeded via the construct of ''invariable measure of value'' which again was prior to any notion of real wage. We have already said that we make no use of this Ricardian tool. The reason is that the tool is an implicit restriction on the 'money' in the economy, and 'money' we treat explicitly as an organic or integral part of the working of the economy, dispensing with all implicit specifications.

However, this very point raises an interesting methodological point. The point is this : granting that Ricardo's ''invariable measure of value'' was an implicit restriction on 'money', is it not possible to impose some <u>other</u> restriction on money to derive the inverse relation between wage and profit as a <u>general proposition</u> prior to any notion of real wage ? The answer is <u>yes</u>.

Our object here is simply to establish this alternative route to the Ricardian wage-profit relation.

3. The restriction we have in mind is simply a <u>given</u> stock or quantity of money circulating in the economy, independently of all 'forces' as discussed previously that act upon it. In other words, these 'forces' are now laid aside. This 'money' may still be pure gold, but gold-production, whether going on or not, is not subject to the forces of free competition. It lies outside the orbit of all capitalist calculations. As a result, the value-distribution equation for gold - eq.(2) of sec.1 — gets wiped out. This is our fresh setting of the problem now.

On the face of it, this turns all 'values' or 'monetary magnitudes' in the economy <u>indeterminate</u>. But this is not so. They are now determined by the given quantity of money in circulation relative to the going volumes of production. This is simply the notion of <u>required quantity of money</u> put in the <u>reverse</u>. Considering a balanced state of the economy, if a certain quantity of money is 'required' to circulate given volumees of production at given prices, then a given quantity of money will circulate the same given volumes of production only at a determinate 'level' of all prices, for the 'relation' between these prices, i.e., the price ratios, are all already set by the balance-conditions of the state of reference.

4. Let us now suppose that there is a rise in wage, money wage, in our economy. With a given quantity of money circulating it, the total value circulated also remains the same. If more of this total value circulated is now going to wage, less must go to profit. In other words, <u>profit falls</u>. The <u>rate</u> of profit must fall <u>further</u>, for <u>capital</u> also increases in value with the rise in wage. This completely establishes the wage-profit relation of Ricardo as a general proposition under the present stipulation on 'money'.

5.1 Before ending, let us connect up once again with real wage. The motivation is this. Earlier, we argued that the ''proper'' inverse relation between wage and profit in Ricardo is between real wage and the rate of profit (see p.148). But now we have just proved an inverse relation between money wage and the rate of profit under the stipulation of a fixed quantity of money circulating in the economy. The two become compatible with one another only if we can show that 'real' and 'money' wage always vary in the same direction under the aforesaid stipulation, not otherwise. Our object now is to show that the 'if' part of this statement is indeed true.

5.2 Note, we want this as a general proposition holding even outside the ''simple economy''. We have already seen that the so called ''value-distribution equations'' for particular commodities may take various particular forms in the ''non-simple economies''. We have not established any general form for it. Hence we shall start by simply presuming this ''general-form'' to be the following :

$$(1) \qquad p_i X_i = w L_i f_i(r)$$

where each $f_i$ is a monotonically increasing function having value 1, at $r = 0$, i.e.,

$$(2) \qquad f_i(0) = 1, \quad \text{and} \quad f_i > 0$$

It is easily checked that all the particular forms of the value-distribution equations defined in sections 6-8 of ch.1 do satisfy (1) and (2). There is also a straight intuitive justification of (1) and (2) but we do not go into it here.

5.3 Let us now begin on our problem, the relation between money wage rate, w, and real wage rate, v in our present economy (this includes the stipulation of a fixed quantity of money) where v is formally defined by

$$(3) \qquad v = w / \sum^{s} p_i b_i \quad \text{(see eq.1 ch.3)}$$

We have already seen that in our present economy there exists an inverse relation between w and r, i.e.

$$(4) \qquad dr/dw < 0$$

Let us now turn to (1) and take all the physical magnitudes appearing in it, i.e. $X_i$ and $L_i$, as <u>given</u>. (This assumption was already justified for the purpose of analysing the relation between wage, price and profit rate in sec.5 of ch.1). By logarithmic differentiation of both sides of (1) we then have:

$$(5) \qquad dp_i/p_i = dw/w + (f_i'/f_i)\, dr$$

5.4 Suppose now $dw > 0$. We then know from (4) that $dr < 0$. Since $f_i' > 0$, it follows at once that

(6) $$dp_i/p_i < dw/w$$

We thus have the important proposition that while the price of any particular commodity may either rise or fall with a rise in the wage rate in our present economy (see. secs.6-8, ch.1), no price can in fact rise as high a proportion as the wage rate or, in other words, every price falls <u>relative</u> to the wage rate.

This is true in particular of all ''necessaries'' and hence also of the ''composite commodity'', $G_0$, defined out of these ''necessaries''. It then follows from the definition of the real wage rate, $v$, that it too <u>rises</u>. So, we do prove the positive association between $v$ and $w$ which we had set out to prove.

Chapter 6

# FOREIGN TRADE

## Section 1 : The Pre-Trade Situation

In order to understand the logic of trade between two countries, we must begin with their condition before trade. Starting from this, we can see the countries as ''opened up'' to trade and note the consequences. This broadly is our plan for the whole chapter. In this section, we concern ourselves simply with the pre-trade situation.

1.1 Let us denote our two countries as 'A' and 'B'. A, we take to be a technologically advanced country and B a backward country, in the sense that the productivity of labour in each line of production in A is higher than in B. This is not necessary for the essential argument, but it lends an extra dimension to the whole analysis.

1.2 Implicitly underlying the above characterisation of the two countries, we have two further assumptions, viz. (a) the same commodities are produced in each country before trade; and (b) each country has a ''simple economy''.

2. Let us denote the commodities being produced in the two countries by $G_1$, $G_2$, ... . We now assume that each country is in a balanced state in our 'pre-trade situation'. With this, we can come straight to the value-distribution equations in our two countries. Let us denote the going levels of output, employment, price, wage rate and rate of

profit in B by $x_i$, $l_i$, $p_i$, w and r and in A by the corresponding capital letters, $X_i$, $L_i$, $P_i$, W and R, 'i' being the common commodity index for both countries. The value-distribution equations for the two countries are then written as

$$(1) \quad p_i x_i = w(1+r) l_i \qquad i=1,2, \ldots.$$

$$(2) \quad P_i X_i = W(1+R) L_i \qquad i=1,2, \ldots.$$

3. Now, all <u>value</u> or <u>monetary magnitudes</u> of the two countries are expressed in their respective 'monetary units' which are called, say 'oro' in B and 'auro' in A. As such, they appear non-comparable. However, this is superficial. One auro and one oro may each represent a pure gold coin of 1 gram, only stamped differently and called differently, and all values or monetary magnitudes are then comparable across the two countries simply in <u>gold</u>. We now assume this to be the case with us, i.e., we take A and B both to be ''pure gold-money economies''.

4. However, this is subject to <u>one important qualification</u>. We now take each of our two economies to work on the basis of a <u>given quantity of money in circulation</u>, as described in the last section of the chapter on money, which is quite distinct from the working of the ''pure gold money economy'' as originally set out in sec.1 of that chapter. As a result of this assumption, the 'level' of prices in each country is left simply to its quantity of money relative to the going levels of production ( $X_i$ or $x_i$ as the case may be).

We now take the relative quantity of money in A before trade to be so much higher than that in B that <u>prices in A are all higher than in B</u>. Stated differently

(3) $P_i > p_i \qquad \forall i$

This completes our statement of the 'pre-trade situation' in A and B. We now pass on to the ''opening up'' of trade between them.

Section 2 : The ''Opening Up'' of Trade

1. By the ''opening up'' of trade, we simply mean that producers of any country can sell their products abroad. This however is the opening up of trade in a pure event sense, which is only the beginning or initiation of ''opening up of trade'' in a complete process sense. This ''process' consists of the whole time-sequence of ''events'' caused by the primary event till things settle down to a permanent state of their own in both countries. Our object here is to study this process as a whole from beginning to end.

2.1 In the initial situation before trade, the price of each commodity is higher in A than in B. Granting that 'selling abroad' does not entail any additional cost, it follows that all producers in B have an incentive to sell abroad, i.e., export, but no producer in A has any such incentive. The trade that can come up on this basis can only be a one-way trade (goods exported from B to A but not A to B).

2.2 The question immediatly occurs, how the export from B to A is paid for. The answer simply is that it is paid for in gold. The mechanism is as follows. Any producer of B selling in A gets paid in 'auros'. He does not buy anything in A with these auros, but simply melts them down, brings back the gold and has it converted to so many 'oros' through the mint in B. So, all his profitability calculations are still done in oros, or more simply in pure units of gold.

Note that implicitly underlying this whole mechanism there lies the assumption of <u>no restriction on the movement of gold between the two countries.</u> This is a fundamental prop on the basis of which we carry out our analysis of trade between the two countries.

3. Let us now proceed on. We have just seen that once trade is opened up, every producer in B finds it profitable to export. Let us now proceed to the <u>actual trade</u> that comes up on the basis through <u>two further assumptions.</u>

The first assumption is simply that the whole ''opening up'' of trade is limited to just <u>two commodities,</u> which we will call 'silk' and 'wine'. I.e., only silk and wine are allowed to be traded. (This assumption is explicitly of a 'political' and not 'economic' nature). The other assumption, which is of an economic nature, is as follows.

In the situation started from, 'selling abroad' is profitable in an <u>absolute</u> sense for producers of both silk and wine in B. But the <u>relative</u> profitability of the two exports are not necessarily the same. By selling one unit of silk abroad rather than at home, the producer makes a gain of $( P_s - p_s )$ oros where the subscript 's' stands for silk. The percentage gain is $( P_s - p_s )/p_s$. Similarly, the percentage gain from the export of wine is $( P_w - p_w )/p_w$ where the subscript 'w' stands for wine. We now take that initially only <u>one</u> commodity is exported from B, that which is relatively more profitable i.e., either 'silk' or 'wine' is exported according as :

$$( P_s - p_s )/p_s \quad \gtrless \quad ( P_w - p_w )/p_w$$

4.1 We now suppose that

(1) $P_s / p_s > P_w / p_w$

So, only silk is initially exported from B to A. This is the actual trade that initially comes up between our two countries.

4.2 In this trade just come up, silk is being imported into A. This is over and above the domestic production of silk in A, which, at the moment is unchanged at $X_s$. So, there is an increase in the supply of silk in A. By the ''law of the market'', the price of silk in A must now fall, i.e., it falls below $P_s$. At this lower price, production of silk is no longer profitable in A (it does not yield the 'usual' rate of profit, R). Hence it is discontinued.

Silk thus comes to be produced only in B, and in a larger quantity than before, for the ''export market'' it now serves is over and above the ''domestic market'' being already served. This larger production is already implicitly explained by the 'high' export price, which makes the overall rate of return upon capital invested in silk in B higher than its 'usual' rate of profit, r, inducing a movement of capital into this line of production.

4.3 Let us return to the price of silk in A. We have seen it to be falling. The question is, how far does it fall ? The answer is that it must fall to the level of the natural price of silk in B. The reason is simply that so long as the price is higher than this, the rate of profit from silk in B is higher than r and so its supply, in particular its export to A, is increasing and this must cause its price in A to fall.

4.4 Let us explicitly assume CRS in the production of silk in B. This makes the natural price of silk in B independent of its level of production. So, the natural price of silk in B continues to be $P_s$, and it is at this price that silk is sold both in A and B.

5. Let us now shift our attention to the monetary plane. As pointed out at the beginning, in the 'one way trade' now going on, gold is continually moving out of A into B. By the 'quantity principle' this must be raising all prices (as well as the wage rate) in B and lowering them in A. Let us follow through the consequences of these price-movements going on in both countries.

6. One point is to be carefully noted at the very beginning Variation in the quantity of money in any country affect the prices of only such commodities in the country as are actually produced there. A commodity which is not produced but imported will have a price at which it is selling in this country, but this price is rooted in the conditions of the exporting country, not the importing country. Hence, it is affected by variations in the quantity of money in the foreign and not the home country.

In the case we are concerned with, this point applies only to the price of silk in A. In B itself, all commodities are being produced, and their prices are all rising because of the inflow of gold. But in A, silk is not being produced and is selling at the same price as in B. Since all prices are rising in B, silk-price in A is also rising. But all other prices in A are falling because of the outflow of gold from this country.

7. Let us now define a new concept. All prices we have been talking of are the natural prices of the respective commodities in their respective countries of production. But there is no longer any natural price of silk in A simply because silk is not being produced in A. However, we can still speak of a notional 'natural price' of silk in A as simply the price that would have to be paid to its producers to get the commodity produced, i.e., for the production of silk to yield the rate of profit, R, which is the general rate of profit obtaining in A. We now define the term production price to denote a notional natural price in this sense. We can immediately apply the term to commodities which are actually being produced, in which case the 'production price' simply coincides with the 'natural price'. So, the concept of 'production price' is more general than 'natural price'. With this, we now conduct our argument explicitly in terms of this new concept.

8.1 The analytical significance of this transition is obvious. As we have just seen, the actual price of all commodities in a country under trade is not necessarily affected by variations in the quantity of money in that country. But its production prices are all uniformly affected by these variations, i.e., they all rise or fall in the same proportion of the rise or fall in the quantity of money. (This follows at once from the ''quantity principle'' and the definition of production price). So, we now have all production prices as rising in the same proportion in B and falling in the same proportion in A. (However, these two proportions are not necessarily the same).

8.2 These movements are depicted by the arrows along the two half-lines, OA and OB in fig. 1 below, where OA refers to country A and OB to country B*. The starting point of these price movements is depicted by $\alpha$ for A and $\beta$ for B in the figure, where

$$\alpha = ( P_w, P_s ) \text{ and } \beta = ( p_w, p_s ).$$

of last section

Note that by ( 3 ), the point $\alpha$ dominates the point $\beta$, i.e., $\beta$ lies to the left of as well as below $\alpha$. Further, by ( 1 ), OA has greater slope than OB.

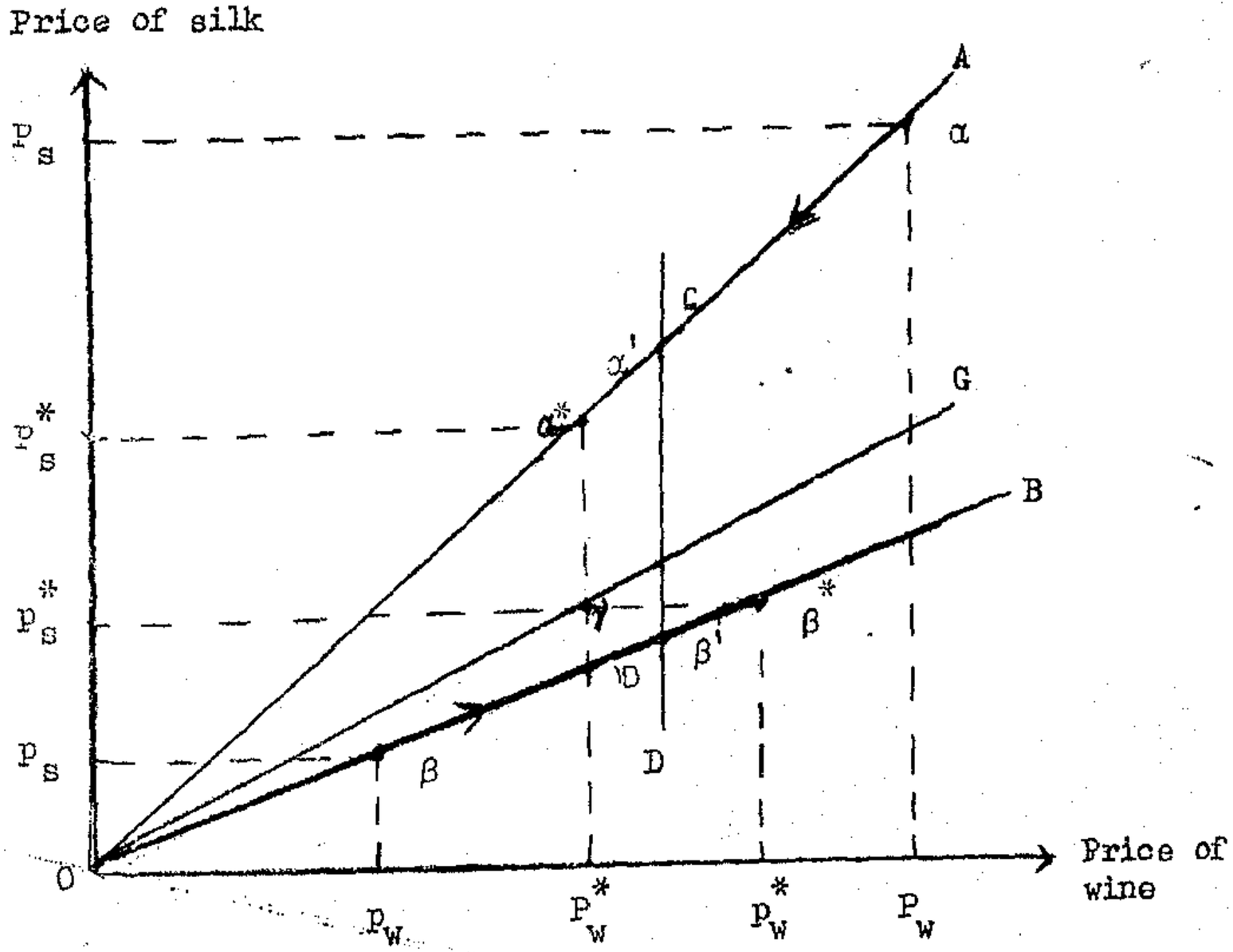


Figure 1

* At this point, we have tacitly extended the assumption of CRS to the production of both commodities in both countries.

8.3 Now, starting from $\alpha$ , there is a downward movement along OA in A, and similarly, starting from $\beta$ , there is an / upward movement along OB in B. It follows that there must come a time when the points along OA and OB reached respectively in A and B lie on the same vertical line. (This is indicated by the line CD in the figure). At this point, the production price of wine is just <u>equal</u> in the two countries while the production price of silk is still lower in B than in A.

However, there is no stopping of the price movements at this point. So, the respective points on OA and OB are crossed, and immediately as they are crossed, the production price of wine in A falls below that in B while the production price of silk in B continues to be lower. Such a point is depicted by ( $\alpha'$ $\beta'$ ), in the figure with cordinate say $\alpha' = ( P_w' , P_s' )$ and $\beta' = ( p_w' , p_s' )$ (not shown in the figure).

Obviously, at this point <u>wine producers in A find it profitable to sell abroad</u>. So they start doing this. With this, we enter the phase of <u>two-way trade</u>, as we may call it, for the 'wine trade' just defined gets added to the 'silk trade' still going on. As in the case of silk-trade, the wine trade now brings about (a) the <u>closure of wine production in B</u>, and (b) the <u>establishment of the natural price of wine of A as the actual selling price of wine in B</u>. So, taken <u>as a whole</u>, we now find each of silk and wine as selling at a <u>uniform price</u> in both countries, the prices being given by their respective production prices ( = natural prices) in the countries where they are respectively produced. I.e., the price of silk is $p_s'$ and wine is $P_w'$.

9. Now, the root-cause of the price movements we have been talking of is the outflow of gold from A into B. So, the price movements continue so long as the gold-movement continues and stops when the latter stops. When does this occur ? It occurs when the two-way trade becomes <u>balanced</u>, i.e., the <u>import of either country comes to be paid by its export</u>. Clearly, if this condition is satisfied in one country, it is also satisfied in the other, and between the two, the condition guarantees that no net movement of gold is taking place.

10. Whatever the volumes of export and import , the very direction of price-movements in the two countries ensures that eventually they arrive at a balanced trade configuration in this sense. We may call this a balanced state of the ''world economy'' as a whole ( A and B together). This brings the whole process of ''opening up'' of trade to its logical conclusion,for by nature it is a <u>permanent state</u>. The trade that goes on between the two countries after this state is reached is also therefore the trade that <u>comes up on a permanent basis</u> once they are ''opened up'' to trade.

The balanced trade configuration is depicted in figure 1 by the production price configuration $\alpha^*$ for A and $\beta^*$ for B having coordinates ( $P_w^*$ , $P_s^*$ ) and ( $p_w^*$ , $p_s^*$ ) respectively. By results already proved, wine is now selling at the price $P_w^*$ in both countries and silk at the price $p_s^*$ in both countries. This actual price configuration is depicted by the point $\gamma$ in fig.1. By definition, the ray OG drawn through this point lies between the two rays started with, OA and OB. Stated algebraically, the balanced state configuration is characterised by the following price configuration :

$$( 2 ) \quad P_w/P_s \leq P_w^*/p_s^* \leq p_w/p_s .$$

Section 3 : The Principle of Comparative Advantage

1. Our whole analysis of the opening up of trade between two countries has been explicitly on the monetary plane : we had started from a certain initial price configuration in our two countries before trade, and through the trade opened up we have seen the two countries to end up in a certain price configuration related to the first. However, underlying all these price configurations there must be some 'real' factor explaining the whole structure of trade. Our object here is to get to this real factor.

2.1 Let us start from the initial price configuration. This was defined by two conditions : one, that the price of every commodity is higher in A than B (eq. 3 , sec.1); and two, that the relative price of 'silk' to 'wine' is higher in A than B (eq. 1 , sec.2). The first was explained purely through the relative quantity of money in the two countries. By definition, this cannot give us any clue to real factors underlying the situation. This is already evident from the fact that the initial prices are higher in the advanced and not the backward country. Let us also point out that nothing is conveyed by this about the configuration of real wage and rate of profit in the two countries. These are just left in the open in the sense that no particular assumption about these magnitudes have come into our analysis.

2.2 Let us now turn to the second condition we imposed upon the initial price configuration. This does take us at once to a difference in the real conditions of the two countries. This is easily seen by substituting in eq. ( 1 ) of sec.2 the values of $P_s$, $P_w$, $p_s$ and $p_w$ from their respective value - distribution equations of sec. 1. After the substitutions, we find this reads :

$$(1) \quad \frac{u_s}{U_s} > \frac{u_w}{U_w} \quad or \quad \frac{U_s}{U_w} < \frac{u_s}{u_w}$$

What this does is simply to compare the ratio of labour productivity in 'silk' to 'wine' between the two countries. It is found that underneath the configuration of relative prices assumed for the pre-trade situation, there lies the real structural difference that the ratio of labour productivity in silk to wine is higher in B than A, which is to say the same as that the ratio of labour productivity in wine to silk is higher in A that B.

2.3 Let us now remember that our assumption of A being a technologically advanced' and B a 'backward' country is also directly a statement of productivity differences between the two countries. Stated formally, the statement is :

$$(2) \quad U_i > u_i \ , \ \text{all } i$$

We can restate the 'real differences' connoted by ( 1 ) and ( 2 ) as follows : According to ( 2 ), A has an absolute advantage over B in the production of every commodity, but according to ( 1 ), B has a comparative advantage over A in the production of 'silk' (as between the two tradeables, 'silk' and 'wine'). As just stated, the latter comes to the same as saying that A has comparative advantage over B in the production of 'wine'.

3.1 Let us now turn to the trade on a permanent basis that comes up between our two countries. This is seen to be a 'two-way trade' with silk moving from B to A and wine from A to B. Thus, each country is exporting that commodity in which it has 'comparative advantage'. The whole structure of trade is in this sense governed by the principle of comparative advantage. The fact of A having an 'absolute advantage' in the production of all commodities just does not play any role in this.

3.2 The principle of comparative advantage does not end just in 'trade' but enters the whole structure of production through trade. There we find that through the process of trade, 'wine' and 'silk' come to be produced only in A and B respectively. The production of that commodity which is comparatively disadvantageous in a country is simply given up and the country comes to meet its whole 'need' for that commodity through trade, i.e., ultimately by producing enough of the commodity which is comparatively advantageous to it.

3.3 The fundamental point about the permanent price configuration reached through trade is simply that each 'tradeable' (silk and wine) is selling uniformly at its natural price in the country of its production or origin. This is by definition lower than its 'production price' in the other country where it is consumed but not produced. Thus each country is getting its 'import' at a lower price than that at which its domestic production is 'profitable' under the ruling price configuration. This is simply the principle of comparative advantage expressed in terms of ruling prices.

Section 4 : Gaing from Trade

1. So far we have looked at trade merely as ''happening'', the 'why' and 'how' of it. Let us now see what ''gains'' it brings about, if any.

For this, let us think of a hypothetical shift of a small number of workers, say just one, from the production of wine to silk in B. As a result, the output of wine falls by the amount $u_w$, and the output of silk rises by the amount, $u_s$.

Let us also shift in like manner $u_s/U_s$ workers from the production of silk to wine in A. As a result, the output of silk in A falls by the amount $u_s$, and that of wine rises by the amount, $( u_s/U_s ) U_w$.

By these shifts, output of silk goes up by the same amount in B as it goes down in A, viz., $u_s$. So, the 'world output' of silk ( A and B together ) remains unchanged. The output of wine goes up by a larger amount in A than it falls in B, for the first is given by $( u_s/U_s ) U_w$ and the second by $u_w$ and by ( 1 ) of last section :

$$\left( \frac{u_s}{U_s} \right) U_w > u_w$$

So, there is an increase in 'world output' of wine. This, we can say, is ''gain'' for the world as a whole resulting from the 'shift' under reference.

2. Let us now come to trade. Consider first the case where B is just able to import the decrement in wine-output resulting from the shift by exporting the whole increment in silk output. Obviously, B neither gains nor loses in physical terms by this trade, and so the whole 'gain' at the world level accrues in this case to A. Similarly, in the case when A is just able to import its decrement in silk - output resulting from the shift by exporting the whole increment in wine - output, the whole gain at the world level accrues to A. Both of these are by definition instances of balanced trade with the so called 'terms of trade' (silk to wine) being given respectively by $u_w/u_s$ and $U_w/U_s$ respectively.

It follows that if the terms of trade lie <u>between</u> these two ratios, then <u>both countries gain from trade</u>. Remembering ( 1 ) of sec. 2 , the condition for both countries to gain is then simply :

$$(1) \qquad u_w / u_s < \xi < U_w / U_s$$

where $\xi$ denotes the terms of trade.

3. Let us now return to the balanced trade of the last section. We have seen that under this trade, silk and wine are selling at their respective prices, $p_s^*$ and $p_w^*$ in both countries. So, the terms of trade is $p_s^* / p_w^*$. By ( 2 ), sec. 2 this ratio lies between the initial price ratios, $P_s / P_w$ and $p_s / p_w$ , which in turn are already seen to be

equal to the respective ratios of labour productivity in the two countries $U_w / U_s$ and $u_w / u_s$. So, we do have :

$$u_w / u_s < \xi < U_w / U_s.$$

This proves that both our countries do indeed gain in physical terms out of the 'balanced trade' that permanently come up between the two once they are opened up to trade.