## An Outline of Circulation Analysis.

1. View-point. It is the view-point of the present inquiry that, besides the pricing system, there exists another economic mechanism, that relative to this system man is not an intermal factor but an external agent, and that present economic problems are peculiarly baffling because man as external agent has not the systematic guidance he needs to operate successfully the machine he controls.

On classical analysis economic mechanism is the pricing system. It coordinates spontaneously a vast and ever shifting manifold of otherwise independent choices of demand and decisions of supply. But man does not stand outside this machine; he is part of it; his choices and decisions are themselves the variables in the system. It follows that there is no possibility of setting muchdidly, on the one hand, the exigences of the machine and, on the other, the consequent performance of man. A study of the machanics of motor-cars yield premises for a criticism of drivers, precisely because the motor-cars, as distinct from the drivers, have laws of their own which drivers must respect. But if the mechanics of motors included, in a single piece, the anthropology of drivers, criticism could be no more than haphazard.

There is at present an abundance of economic criticism. It is haphagard criticism. It does not proceed systematically from solid premises. It is the intuition of socialists who find a radical incoherence in individual choices and decisions and leap

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with a gay profusion of rhetoric to the simpliste solution of subordinating preferences and expectations to the benevolence of a tyranny. In contrast the criticism of traditional economists is the soul of sobriety. It is acute, informed, exact, subtle. But perhaps one may doubt that it is inspired, that it suffers from the imperious pressure of really significant ideas. Too often does one learn that problems are very complex indeed, that this or that element in the complexity may be singled out as especially troublesome, that such and such a makeshift perhaps meets the issue more satisfactorily than others which have been advocated. For as makeshift follows makeshift, it becomes increasingly difficult to distinguish between a democratic and a totalitarian economy.

But economists can be champions of democracy as well as advisers to dictators or planning boards. The proof of the possibility is an historical fact: the old political economists were champions of democracy; and if the content of their thought has been found inadequate, its democratic form is as valid to-day as ever. That form consisted in the discovery of an economic mechanism and in the deduction of rules to guide men in the use of the economic machine, a rule of laisser faire for governments and a rule of thrift and enterprise for individuals. It is now fully apparent that these rules serve their purpose only in particular cases, but it is still insufficiently grasped that new and more satisfactory rules have to be devised. Without them human liberty will perish. For either men learn rules to guide them individually in inctheouse of the economic machine, or else they surrender their liberty to be ruled along with the machine by a central planning board.

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The reality of that dilemma measures the significance of an effort, however tenuous and incomplete, to formulate the laws of an economic mechanism more remote and, in a sense, more fundamental than the pricing system. Now there is little dispute that the dilemma is real, for the liberal dream of an automatic economy has, like all dreams, at long last broken. The necessity of rational control has ceased to be a question, and the one issue is the locus of that control. Is it to be absolutist from above downwards? Is it to be democratic from below upwards? Plainly it can be democratic only in the measure in which economic science succeeds in issu utterings not counsel to rulers but precepts to mankind, not specific remedies and plans to increase the power of bureaucracies, but universal laws which men themselves administrate in the personal conduct of their lives. Thus the breaking of the liberal dream of automatic progress provokes a revision of judgement on the old political economists. Their greatness lay not in fostering an amoral devotion to automatism but in developing an economic science and from it issuing universal precepts of proper economic conduct. The automatism is a husk that has withered and fallen, and to cling to it is to fall into the totalitarian abyss. The old science and the old precepts have gone the way of Ptolemy and Newton. But to deny the possibility of a new science and new precepts is. I am convinced, to deny the possibility of the survival of democracy.

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2. Method. The method of circulation analysis resembles more the method of arithmetic than the method of botany. It involves a minimum of description and classification, a maximum of inter-connections and functional relations. Perforce, some description and classification are necessary; but they are highly selective and they contain the apparent arbitrariness inherent in all analysis. For analytic thinking uses classes based on similarity only as a spring-board to reach terms defined by the correlations in which they stand. To take the arithmetic illustration, only a few of the integral numbers in the indefinite number series are classes derived from descriptive similarity; and, by definition, the whole series is a petral with profression in which each successive term is a function of its predecessor. It is this procedure that gives arithmetic its endless possibilities of accurate deduction; and, as has been well argued (\*), it is an essentially analogous procedure that underlies all effective theory.

#### Note:

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(\*) See for instance, Ernst Cassirer, Substanzbegriff und Funktionsbegriff, Berlin 1910.

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On such a methodological model AA raises a large super-structure of terms and theorems upon a summary classification and a few brief analyses of typical phenomena. Classes of payments quickly become rates of payment standing in the mutual conditioning of a circulation; to this mutual and, so to speak, internal conditioning there is indmediately added the external conditioning that arises out of transfers of money from one circulation to another; in turn this t twofold conditioning in the monetary order is correlated with the conditioning constituted by productive rhythms of goods and services; from the foregoing dynamic configuration of conditions during a limited interval of time, there is deduced a catalogue of possible types of change in the configuration over a series of intervals. There results a closely knit frame of reference that can envisage any total movement of an economy as a function of variations in rates of payment, and that can define the conditions of desirable movements as well as deduce the causes of break-downs. Through such a frame a reference one can see and express the mechanism to which classical precepts are only partially adapted; and through infer it again one can/the fuller adaptation that has to be attained.

However, to set up such a systematic unit of terms and theorems is a logical procedure with norms and criteria of its own. The nature of his task leads the descriptive economist to use, as much as possible, the language of orderary speech, to be content with resemblances that strike the eye, to move through easy stages of generalization to a **NANNA** nuanced picture of what, in the main, takes place. Again, the statistical economist has his own criteria. He will take advantage of a specialized terminology but, as far as he is concerned, the only justification for a terminology is a proximate possibility of measumements; further, he has no objection to recondite generalizations, but his generalizations resemble not the generalizations of mathematics but those of positive science. Now as the statistical approach differs from the descriptive, the analytic differs from both. Out of endless classificatory possibilities it selects not the one sanctioned by ordinary

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speech nor again the one sanctioned by facility of measurement but the one that most rapidly yields terms which can be defined by the functional inter-relations in which they stand. To discover such terms is a lengthy and painful process of trial and error. <u>Experto crede</u>. To justify them, one cannot reproduce the tedious blind efforts that led to them; one can appeal only to the success, be it great or small, with which they serve to account systematically for the phenomena under investigation. Hence it is only fair to issue at once a warning that the reader will have to work through pages, in which parts gradually are assembled, before he will be able to see a whole and pass an equitable judgement upon it.

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7. The Exchange Economy. In any economy with a degree of development beyond that of primitive fruit-gathering it is possible to verify the existence of a productive process with basic and surplus stages. The restrictive supposition of an exchange economy is now introduced. It involves property, exchange, prices, money; it postulates a correlation between quantities produced and quantities sold; also it postulates systematic modifications of prices when the productive process accelerates. The latter postulate will be outlined in the next section; this section is devoted to setting down a series of definitions; and as the matter is familiar, treatment will be summary.

a) Prices. If a quantity,  $q_i$ , of objects in a class, i, is exchanged for a quantity,  $q_j$ , of objects in a class, j, then it is always possible to assign a ratio,  $p_{ij}$ , such that

qi = qj<sup>p</sup>ij

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The ratio so defined is named a price; and the price, p<sub>ij</sub>, is said to be the price of a unit of "j" measured in units of "i". From the definition it also follows that

 $q_{j} = q_{i}p_{ji}$ (3)  $q_{j} = q_{k}p_{jk}$ (4)

and the solution of the three equations gives

<sup>p</sup> ij <sup>p</sup> ji	=	1	· · ·	(5)
<sup>p</sup> i j <sup>p</sup> jk	•	<sup>p</sup> ik	· · ·	(6)

More generally, with respect to "n" classes of objects, there

are possible n(n - 1) different ratios, but of these only (n - 1)are independent ratios; the remaining  $(n^2 - 2n + 1)$  are deducible from the independent (n - 1) by the formulae (5) and (6).

b) The Consistency of Prices. By the consistency of prices is meant, first, that at any one time in a given economy there is mili redired histo be found but a single price,  $p_{ij}$ , in all exchanges of classes "1" and "j" and, secondly, that any of the n(n - 1) ratios between quantities in "n" classes is deducible from any (n - 1)independent ratios.

This consistency of prices may be postulated by making it a definition of the objects in the "n" classes. Suppose two exchanges or two sets of exchanges represented by

 $q_{i} = q_{j}p_{ij}$ (7)  $q_{i}' = q_{j}'p_{ij}'$ (8) where  $p_{ij} < p_{ij}'$ (9)

then one may always write

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 $p_{ij}^{*} = p_{ij}^{*} + p_{ik}$ (10)

where  $p_{ik}$  is the price of some other object or objects. This other object pay always be described as inck of consistency. If usually is may be described as special services, more agreeable circumstances, pride of purse; the employment of agents, information, transportation; the neglect of introducing these three; lack of foresight, lack of initiative, ignorance, gullibility. As a last resort one can always say that  $p_{ik}$  is the price of a lack of consistency.

If equations (7) and (8) do not represent exchanges directly but are deduced from equations representing exchanges between classes "i" and "h", "j" and "h", it is equally possible to introduce a further object, p whose price is p<sub>ik</sub> and so explain the apparent lack of consistency as before.

In a word it is postulated that the classification of objects exchanged carry analysis far enough that prices be consistent.

c) Money. When in the vast majority of exchanges one of the objects exchanged always belongs to some given class, that class of objects is named the medium of exchange. If further all prices are measured in units of the medium of exchange, that medium is also the common measure of prices. Money is defined as the medium of exchange and the common measure of prices.

When  $m_1$  units of money are exchanged for  $q_1$  units of the object, i, then it is always possible to assign a ratio,  $p_1$ , such that

 $m_1 = q_1 p_1$  (11) where  $p_1$  is defined as the monetary price of the object, i. If in an exchange of the object, j, one has

 $m_{j} = q_{j}p_{j}$ (12) then on condition that  $m_{i} = m_{j}$ (13) it follows that

$$q_{i} = q_{j}p_{j}/p_{i}$$
 (14)

From a comparison of equations (14) and (2) one has

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 $p_{ij} = p_j / p_i \tag{15}$ 

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which relates the monetary prices of "i" and "j" with the real price, p<sub>ij</sub>.

d) Demand and Supply. The equation defining real prices involves three variables,  $q_i$ ,  $q_j$ ,  $p_{ij}$ . Similarly the equation in defining monetary prices involves the three variables,  $m_i$ ,  $q_i$ ,  $p_i$ . We have now to consider equations involving only two variables, namely,  $p_i$  and  $q_i$ . They are of the form

 $q_i = f_d(p_i) \tag{16}$ 

$$q_{i} = f_{s}(p_{i}) \tag{17}$$

where equation (16) is called the demand function of the effect class of objects, i, and equation (17) is called the supply function of the class of objects, 1. The subscripts, "d" and "s", denote demand and supply respectively.

A demand function may be defined as resulting from the summation of demand schedules. A demand schedule may be constructed by asking an individual what is the most he is prepared to pay for 1, 2, 3,... units of the class of objects, i. To answer the question the individual concerned has to consider the equation

### $M = p_1q_1 + k$

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where M is the quantity of money at his disposal,  $p_1q_1$  the sum of money he would have to pay for  $q_1$  units costing  $p_1$  apiece, and the remainder for other purposes would be the sum, k. If he prefers to pay  $p_1$  for one unit rather than do without the object, then he has a demand schedule with respect to the Again object.  $p \neq r$  if  $p_2$  is small enough, he may prefer to pay  $(p_1 + p_2)$ for two, objects rather than devote his money to other purposes. Similarly, with regard to a third, fourth, fifth, etc., until the point is reached at which any lowering of price fails to

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elicit a preference for a further unit. Now by questioning all individuals one may discover how many demand schedules for the class of objects, i, exist and what they are. Further, though the demand schedules make prices a function of quantities, the summation of demand schedules is effected by asking what quantity is sold at given prices. Hence a complete survey yields a function

 $q_i = f_d(p_i)$  (19) such that for any price within a given range there is a determinute quantity of the class, i, sold and, as follows from the definition of demand schedules, with quantities increasing as prices decrease. There is not, however, any correspondence of infinitesimal increments.

As the demand schedules make clear, the demand function varies with variations in the circumstances of individuals. A demand schedule for the class of objects, i, becomes stronger as the quantity of money, M, increases; it becomes weaker as the individual prefers to have a greater remainder, k, to devote to other purposes than the purchase of the object, i. Thore is not then some one demand function but a category of demand functions; at any time some one demand function exists; but it is subject to change as changes emerge in M and k.

Supply schedules yield a supply function as demand schedules yield a demand function. There are however differences. The question to be put is not what is the most you are prepared to pay but what is the least you are ready to accept for 1, 2, 3,... units of the class, i. The pround of this difference is that

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for the seller the relevant equation is

 $\mathbf{k} = \mathbf{p}_{\mathbf{i}}\mathbf{q}_{\mathbf{i}} + \mathbf{M}$ for the greater the quantity he sells and the higher the price the greater the remainder, k. Further, with respect to goods and services produced, asxwith x maps there are distinct categories of supply schedules and supply functions. Supply schedules and functions may be constructed with respect to immediate sales, with respect to present production for future sales and so with respect to a series of future dates, and finally with respect to the initiation of new enterprises. Again, when any function is determined with respect to some one of these categories, it is capable of variation in view of unexpected changes of circumstance. However, with respect to immediate sales there always exists some one supply function

 $q_i = f_g(p_i)$ 

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and other existent supply functions may be regarded as potential modifications, more or less proximate, of the immediate function. Within a given range, there is a determinate value of q, for every value of  $p_i$  and, in general, as  $q_i$  increases,  $p_i$  will first decrease and then increase. The latter assertion is true when the quantity supplied is in the vicinity of the production optimum: there is not so little demanded that the use of the best h methods is unprofitable, nor again so much that the best methods available are unequal to handling so great a quantity.

Eron the nature of the demand and supply schedules it appears at least in part that the demand and supply functions are independent within

the regione, in which the two functions exist, there will be at one solution or

least one common point if the most that will be paid by the most

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Granted the existence of both demand and supply functions valid with respect to concrete conditions, there remains the question of solutions. Now if a solution exists, it occurs where the least eager buyer and the least eager seller come to terms. For the postulate of consistency of prices admits only one price; and, while more eager buyers would pay more and more eager sellers take less, still a higher or lower price, emergent in particular cases, could not be generalized. 0n the supposition of a higher price, less eager buyers could find sellers ready to sell at a lower price. On the supposition of a lower price, less eager sellers could find buyers ready to buy at a higher price. But at the price at which the least eager buyer and seller come to terms, all more eager buyers and sellers exchange at an advantage, and leave on the markets only buyers who will pay less than this price and only sellers who require more than this price.

When, then, there is a solution to a demand and supply function, it determines a price at which the least eager buyer and the least eager seller come to terms, and at this price there is sold the maximum quantity that could be sold on the consident prices and supposition of the given demand and supply functions.

e)\_MD\_Nature of Briess. Rrises are the warginal comparative valuations of the community. By a valuation is meant and judgement of appreciation on any grounds with respect to any edject. By a compapative valuation is meant a decision with respect to alternatives; of which only one is possible of two events, A and B, only one is possible, the comparative valuation takes one and leaves the other; A is preferred to By

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e) The Nature of Prices. Prices are the marginal comparative valuations of the community. By a <u>valuation</u> is meant any judgement of appreciation on any grounds with respect to any object. By a <u>comparative valuation</u> is meant a decision with respect to alternatives: of two events, say A and B, either alone is possible; the comparative valuation decides in favour of one and against the other; it prefers A to B or B to A. By a <u>marginal comparative valuation</u> is meant a decision with respect to alternative quantities. The issue is not, Either A or else B but not both. One may decide in favour of some of A and some of B, but the more one takes of A, the less one can have of B, and vice versa. Thus the marginal comparative valuation has to decide in favour of some pattern, say x of A and y of B, against an indefinite number of other equally possible patterns.

Now any productive process sets a continuous problem of marginal comparative valuation. From a given stock of materials and with a given quantity of labour and management, a variety of goods and services in a greater variety of quantitative puttername. patterns may be supplied. But the more there is supplied of any one, the less there can be of one or more others. Hence on the supposition of definite stocks of materials and a definite quantity of labour and management, goods and services are a matter of alternative quantities. But the supposition may be removed. and management Count labour/as negative leisure of various kinds: then the greater the supply of goods and services, the less the leisure and vice versa. Again, the greater the present use of materials, the less is either or both present leasure or future available materials. Thus, the whole productive process is a problem of

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alternative quantities, and the problem is re-born every instant.

The solution of such a problem necessarily is a set of marginal comparative valuations. These decisions have to be made. In a Robinson Crusce economy, Robinson makes them. In an exchange economy everyone, according to the measure of his influence on prices, contributes to making them. In a socialist economy the long-term decisions regarding surplus goods and services are made by a planning authority, while the short-term decisions regarding basic goods and services are left to a price mechanism in so far as this is compatible with the decisions of the planning board and with the necessity of maintaining that board's reputation as an excellent institution with a superb personnel. But no matter what the political organization of the economy, the pattern of the productive process has to be determined; and the determination of that pattern is a set of marginal comparative valuations, of decisions with respect to alternative quantities.

Now it is the characteristic of the exchange economy to make not one but two sets of marginal comparative valuations. A first set occurs in supply, in decisions to produce. A second set occurs in demand, in decisions to buy what is produced. Producers are faced with the problem, With how much of materials, labour, management, capital equipment, are how how much of objects in classes, 1, j, k,... to be produced? In the manner explained above, the problem is one of alternative quantities. There is needed the solution of a differential equation of the type,

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 $0 = A_{i} dx_{i} + A_{k} dx_{k} + A_{j} dx_{j} \dots$ 

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where  $x_i, x_j, x_k, \dots$  are the quantities to be determined, and the coefficients,  $A_i, A_j, A_k, \dots$  are all positive, so that more of any one quantity means less of some other quantity or quantities. Now the solution of this equation may be written in the form

X.	=	x_r,	(23)
1		2 1 2	• • = •

$$\mathbf{x}_{j} = \mathbf{x}_{z} \mathbf{r}_{jz} \tag{24}$$

$$\mathbf{x}_{\mathbf{k}} = \mathbf{x}_{\mathbf{z}} \mathbf{r}_{\mathbf{k}\mathbf{z}} \tag{25}$$

and so on, where  $x_z$  is some known quantity and  $r_{iz}$ ,  $r_{jz}$ ,  $r_{kz}$ ,... aren known ratios. Such ratios resemble prices in one respect and differ from prices in another. Like prices they are ratios between quantities. Unlike prices, they are not ratios emergent pragmatically in exchanges, but ratios **emergent** emergent pragmatically in decisions to produce. Both prices and what may be termed production ratios are matters of fact: but the matter of fact that is a price is a ratio between quantities exchanged; and the matter of fact that is a production ratio is a ratio between quantities produced.

Production ratios are sufficient to determine what is to be produced in what quantities in the sense that they give a determinate productive process. But the exchange economy endeavours to meet a further issue, namely, Is the pattern of quantities under production the **qua** pattern of quantities that happens to be wanted? No doubt producers' marginal comparative valuations select the pattern of quantities that producers prefer; but is it also the pattern of quantities that consumers and workers and owners of the sources of raw materials prefer?

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This question the exchange conomy answers by rewarding the contributions of property, labour, and management with monetary income for the purchase of the goods and services exergent from resulting from these contributions. Now income sets another problem of alternative quantities, for the more one buys of any object, i, the less one can buy of other objects, j, k,... Thus there is another differential equation to be solved, say,

 $0 = B_j dm_j + B_j dm_j + B_k dm_k \cdots$  (26) where the coefficients are again all positive, so that the more one spends on any object the less one can spend on other objects. The solution of this equation sets up another set of marginal comparative valuations, say,

<sup>m</sup> i	Ξ	<sup>m</sup> z <sup>s</sup> iz		(21)
"1	=	<sup>m</sup> z <sup>S</sup> jz		(28)

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and so on, where  $m_z$  is a known quantity, and  $s_{1z}$ ,  $s_{jz}$ ,... are known ratios, which may be called spending ratios.

Thus, corresponding to the production ratios determined by the decisions of sellers, there are spending ratios determined by the decisions of buyers. If one could postulate a preestablished harmony guaranteeing the continuous congruence of both sets of ratios -- and such a postulate is implicit in the benevolent forms of socialism in which the planning board supplies just what people want -- then there would be no need for the pedestrian trial and error of supply and demand. Without such a pre-established harmony and without authoritarian solutions on what the standard man is and what he is going to want, whether he likes it or not, supply and demand are inevitable. For supply schedules are production ratios determined with respect

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estimated demand; demand schedules are spending ratios determined with respect to hypothetical prices; and actual prices are the solutions, when they exist, of consequent demand and supply functions. They are the solutions at the point at which the least eager buyer and the least eager seller come to terms, and at which the maximum quantity, that could be sold with consistent prices and given conditions, is sold as a matter of fact.

One now may say in what sense prices are the marginal comparative valuations of the community. The statement does not mean that the least eager buyer and seller are the representatives of the community. The least eager buyer may be a monopsonist; the least eager seller a monopolist; and both monopsonists and monopolists need represent no one but themselves. In a first sense, prices are the work of the community in so far as prices are the method chosen by the community for determining its marginal comparative valuations. In a second sense, prices are the work of the community in so far as this method of determining marginal comparative valuations does not make economics a department of politics, operatas more through desire than through fear, does not of itself restrict initiative, provides a continuously effective weapon against producing what is not wanted (in this line the genius of technical experts is without limit), and provides a continuous incentive to produce in the most efficient manner precisely what is wanted.

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**f**} The Dialectic of Prices. Within the last hundred years economic thought has moved steadily away from the view that fluid prices and competition are the panacea for all economic ills and the guarantee of ever greater benefits. Underlying this change of thought there is the very simple fact that, while the price system is an exquisite mechanism, still it is not a mechanism into which one can put little knowledge and less wisdom and then reasonably expect to receive notable amounts of both. The price system will strike a balance of any present set of preferences; but it will not make the preferences wise, nor will it make the expectations, on which they are based, turn out to be true. On the contrary, it will find the economic mean, so to speak, of wise and stupid, intelligent and foolish preferences; it will weight true and false expectations with the money that backs them; and with a relentless accuracy it will work out the anomaly one may expect a machine so controlled to yield. In the long run one is presented with a did dilemmma: either whin have freedom of choice of pressing itself. In exchange and phiass from every strategic post in the ecohomy either eliminate from every strategic post in the economy the unenlightened freedom of choice that works ruin through exchanges and through prices, or else, if you would preserve that freedom, take effective steps to enlighten it. The alternatives are socialism or an enlightenment of insufficiently enlightened self-interest.

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By a dialectic of prices is meant, not subscription to the doctrines of the more absurd philosophic systems, but simply the historical see-saw that marches ineptly from the insufficiency of rugged individualism to the insufficiency of rugged collectivism. In a first period fluid prices and competition bring obvious benefits: markets enforce the consistency of prices; first, the economies of the nations, then the nations of the world, are worked into an unified system; the prices of inconsistency disa tend to be reduced to a minimum, and with them the payments for mere inconaistency. This enforcement of consistency affects not merely actual processes in themselves but also the actual with respect to the potential; the entrepreneur emerges to set up a procession of new and more efficient combinations of production factors; there is an industrial revolution; there are new ideas, new men, new firms, new ways of doing things, new capital equipment, and, as the acceleration works through the surplus stages to reach the basic, eventually a rising standard of living.

But upon the First period superposes a second. Supply and demand under competitive conditions are harsh masters. The less /greater \$4. Eyr %.... of quantities produced cannot be greater but may be be-less than the corresponding group of quantities sold. Further, there is the plasticisty of prices to effect moderate adjustments.

But upon the first period there superposes a second. Supply and demand are harsh masters. The elasticity of fluid prices will adjust the  $x_i, x_j, x_k, \ldots$  of quantities produced to the  $q_i, q_j, q_k, \ldots$  of quantities sold. The trial and error of verify metitionized windfall profits and losses will tend to bring

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competitive producers to the acceptance of minimum profits and to an ever better knowledge of an ever more elusive equilibrium. Still computitive producers are ever victims of the unforeseen and, what is worse, even when they do foresee, their foresight will not avail them unless they also combine. Why not combine? Is not the doctrine of competition merely an embargo upon one of the more valuable types of new idea, namely, new ideas in organization? The trouble is that that is true. The age of corporations begins. It re-organizes industry. It organizes labour. It reaches out to tame the individualism of small producers of basic materials for world markets, producers of wheat, of cotton, of coffee. It forms cooperatives to link in united fronts of monopolists and monopsonists little sellers and buyers of any description. Issues cease to be merely economic. They are also political in a stretch of legislation that began with the Factory Acts and does not culminate even with Social Security. For such a growth of political interference has its premiss in the inadequacy of competition and fluid prices to meet economic issues. It cannot but continue until it absorbs the whole sphere of economics or, alternatively, until economics find a new charter. Already. Bat with the generalization of monopoly and monopsony, both competition and fluid prices are dead letters.

If one attempts to break the impasse of government settling the aggreements terms upon which monopolists and monopsonists are to agree, and if one proceeds along the existing line of development, one reaches socialism. There is no longer ownership of means of production, but the use and the production of them is dictated to civil servants by the wise and learned men on the planning board. On the supposition that their wisdom and learning

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is not over-balanced by fanatical streak, that the liquidation of classes does not prove necessary, that the universal enthusiasm for the system precludes the use of secret police and terrorism, one may expect an economy that is-free presents the advantage of being free from booms and slumps of the old type

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· 9. Circuit Velocities. In the preceding section there were defined two monetary circuits, each involving two independently independently varying rates of payment and an independat varying quantity of money. The basic circuit involved the rate of basic expenditure, DE', and the rate of basic outlyy, DO', and during the interval its quantity of money increased by DM'. The surplus circuit involved the rate of surplus expenditure, DE", the rate of surplus outlay, DO", and during the interval its quantity of money increased by DM". Further the whole system of movements became determinate by the addition of another variable, the cross-over differente, DG. For with DE', DO', DM', DE", DO", DM", and DG, there are equations which determine by identity DR', DI', DD', DS', DR", DI", DD", and DS". To increase the implicational compactness of the analysis, this section investigates relations between rates of payment and quantities of money, between DO' and DE! and on the other hand DM!, between DO" and DE" and on the other hand DM".

Now the relation between a rate of payment and a quantity of money is the velocity of money. By definition rate of payment is equal to quantity multiplied by velocity; and it is to be noted an additional that velocity of money is not a conclusion derived from the fact that rates and quantities may vary independently. Even if there were only one dollar in existence, it would be possible for a number of people to spend a hundred dollars a day; to achieve this, everyone would have to spend the dollar as soon as he received it; and however fantastic, the illustration makes obvious that an aggregate rate of payment of several hundred dollars of a day is possible with one dollab.

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However, a circuit velocity is not any velocity of money. Its measure lies not in the number of times a given quantity of money changes hands but in the number of times it makes a determined circuit. A basic circuit velocity is a movement of money from basic expenditure, through basic receipts, to basic outlay, through basic income, back to basic expenditure. A surplus circuit velocity means a traversing the similar surplus circuit. How many times money changes hands on the way is a matter of indifference. The one question is how rapidly it gets back to its starting point. Evidently, circuit velocities are much more definite than monetary velocities in general, for they involve not merely evenance but definite circular series of exchanges.

It is the purpose of this section to show that in the basic and surplus circuits respectively the quantity of money varies with the magnitude of turnovers and the velocity of money with the frequency of turnovers. The consequence of this theorem will be a correlation of the added quantities of money, DM' and DM", with increases in the rates of outlay, DO' and DO", through the mediation of another variable, namely, the production period.

The theorem will be established by generalizing the analysis of an illustration. Suppose two ship-builders, A and B, who each launch a new ship every 15 days. Suppose further that A has 5 ships under construction at once and so completes a ship every 75 days, while B has 10 ships under construction at once and so completes a ship every 150 days. To eliminate irrelevant differences we may suppose also that each ship is sold as soon as it is launched, that all are sold for the same

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price, and so that payments to A are at the/rate as payments to B, and again that payments by A (including initial payments of profiss to himself) are at the same rate as payments by B. There are, then, two equal volumes of business: the selling price of one ship every 15 days. On the other hand, the magnitude of A's turnover is half the magnitude of B's; and the frequency of A's turnover is twice the frequency of B's. The magnitude of A's is only half of B's, because when A is paid af for a ship, he has been making payments for its construction over a period of 75 days, payments on a second ship for 60 days, on a third for 45 days, on a fourth for 30 days, and on a fifth for 15 days; on the other hand, when B is paid for a ship, he has been making payments on it for 150 days, on a second, third, fourth, fifth, sixth, seventh, eighth, ninth, and tenth for respective periods of 135, 120, 105, 90, 75, 60, 45, 30, and 15 days. Thus, B's need of circulating capital to bridge the gap between payments to him for his ships and payments made by him transitionally and initially is twice as great as A's need; yet A carries on the same volume of business, because he moves money twice as rapidly.

It will emphasize a few points to change the illustration slightly. Let us suppose that A could sell a ship no oftener than once every 16 days. It still remains possible for him to keep his production period at 75 days per ship, but inevitably his turnover period lengthens to 80 days per ship. He can produce as rapidly as ever, but he cannot sell as rapidly; and in an exchange economy production is production for sale. Further, in the limit decreasing sales effect a reduction of turnover magnitude; if a les dropped to one ship every twenty days.

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magnitude; as sales dropped from one ship every 15 days to one ship every 16, 17, 18 days, the first ship-builder, A, might lengthen his turnover period in each case; but when sales dropped to one ship every 19 days, then most probably he would revert to a shorter turnover period of 76 days but with 4 instead of 5 ships under construction at once. Thus, at a first approximation only do turnover periods coincide with production periods. Decreasing efficiency of sales makes the turnover period longer than the production period. But in the limit decreasing efficiency of sales restores what is approximately the minimum turnover period with, however, a decreased turnover magnitude. In the opposite case of increasing sales, the inverse theorem holds. As sales advanced to one ship every 14, 13, 12 days, the first ship-builder would have to put 6 ships under construction at once and then 7 under construction; when supplying one ship every 14 days, the turnover period of 6 ships would be 84 days; with one every in 13 days, the period would be 78 days; with one every 12 days, there would have to be 7 ships under construction at once and the turnover period would increase to 84 days.

This analysis has now to be generalized. Every entrepreneur carries on at any given time a certain volume of business. In this volume of business there are two components: a quantity of monetary // circulating capital; and a frequency of use of the quantity of monetary circulating capital. The quantity of monetary circulating capital varies with variations in the magnitude of his turnovers; and the magnitude of the turnovers varies with two factors, first, the number of items in production at once and, second, the monetary value of each item. The frequency of use of monetary circulating capital also faries with two factors, first, with the period

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of time taken to effect the required physical change that is the entrepreneur's contribution to the productive process and, second, with the additional time that may be needed for the entrepreneur to sell his contribution. Obviously, if the entrepreneur effects no physical change, then the additional time for selling is the whole time of his turnover period.

The next step is to proceed from each entrepreneur to all entrepreneurs. To make this advance it is well to use symbols. With respect, then, to the jth turnover or fractional turnover of the <u>i</u>th entrepreneur in the standard interval of time, let  $r_{ij}$  be the aggregate of bas initial basic payments,  $r_{ij}^{\mu}$  be the aggregate of initial surplus payments,  $s_{ij}$  be the aggregate of transitional basic payments. It follows that in the <u>j</u>th turnover or fractional turnover of the interval the <u>i</u>th entrepreneur moves a total quantity of money represented by the sum,

 $r_{ij} + r_{ij}^{"} + s_{ij} + s_{ij}^{"}$ (20)If he is engaged exclusively in supplying basic goods or services, the second and fourth elements of the sum are zero. If he is engaged exclusively in supplying surplus goods and services, the first and third elements of the sum are zero. In any case the third and fourth elements of the sum are paid transitionally to other entrepreneurs, while the first and second elements are paid initially, that is, to the entrepreneur's own factors of production. The total sum represents the <u>i</u>th entrepreneur's monetary circulating capital in the jth interval turnover of the interval. It represents monetary circulating capital both not in the sense in which monetary circulating capital exists when an entrepreneur begins business, for then it does not

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include profits and similar elements in initial payments, but in the sense in which monetary circulating capital exists in any turnover subsequent to the first, though then it does include profits and similar elements. Again, it represents monetary circulating capital, not as received from other entrepreneurs or from final buyers in payments to the <u>i</u>th entrepreneur, but as paid by the <u>i</u>th entrepreneur either initially or transitionally; thus the sum represented by equation expression (20) may be greater or less than the sum paid to the <u>i</u>th entrepreneur in the <u>j</u>th turnover, for the given entrepreneur in that turnover may be enlarging or decreasing the scale of his operations, upon and in doing so he may will be drawing Ap a positive excess transfer from the redistributive function or contributing to a negative excess transfer.

Further, expression (20) as a sum gives the monetary circulating capital of the <u>i</u>th entrepreneur in the <u>j</u>th**m** turnover of the interval. But the suffix "j" varies from one entrepreneur to another. One entrepreneur may have 52 turnovers in the interval, another 12, another 4, another 1, another merely the fraction of a turnover, or the last part of one turnover and the beginning of another. Still in any case each entrepreneur has a definite number (which may include fractions) of turnovers during the interval; and the suffix "j", considered in all its instances, supplies an initial indication of what this turnover frequency is. Thus, expression (20) as a sum gives a turnover magnitude; turnover frequencies vary not with this sum of money but with the suffixes "j".

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Let us now consider the following summations.

$$o_{i}n_{i} = \sum_{j} r_{ij}$$
(21)

$$o_{j}^{"}n_{j}^{"} = \sum_{j} r_{j}^{"}$$
(22)

$$D0' = \sum_{i} \circ_{i} n_{i} = \sum_{i} \sum_{j} r_{ij} \qquad (23)$$

$$DO'' = \sum_{i} o''n''_{i} = \sum_{i} \sum_{j} r''_{ij}$$
(24)

Here,  $r_{1j}$  are the **initial** basic payments of the <u>i</u>th entrepreneur in his <u>i</u>th turnover of the standard interval. The first equation (21) adds up the initial basic payments made by the <u>i</u>th entrepreneur during the whole interval: it is the sum of initial basic payments,  $r_{11}$ ,  $r_{12}$ ,  $r_{13}$ ,... to "j" terms where "j" is the number of turnovers or fractional turnovers. This sum is identical with the product,  $o_i n_i$ , where  $n_i$  is the number of turnover of the <u>i</u>th entrepreneur and  $o_i$  is the average per turnover of his initial basic payments. Note that  $o_i$  differs from  $r_{1j}$  as an average differs from a series of exact figures:  $o_i$  is the average of  $r_{11}$ ,  $r_{12}$ ,  $r_{13}$ ,... which, multiplied by an exact  $n_i$ , gives  $\sum_i r_{1j}$ .

Next, with respect to equation (23), DO' has already been defined as the aggregate of initial basic payments of the interval. Consequently it is equal to the sum of all instances of  $o_i n_i$ , and so to the double summation of all instances of  $r_{ij}$ . Similarly, one may obtain equations (22) and (24) with respect to initial surplus payments during the interval.

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So much for initial payments,  $r_{ij}$  and  $r_{ij}^{"}$ , por turnover. But there are also transitional payments,  $s_{ij}$  and  $s_{ij}^{"}$ , per turnover, and the immediate task is to grasp their relation to the **init** initial payments. The question is, Are the transitional payments the same sums of money as the initial payments or are they additional sums of money? In both cases the answer is affirmative. They are the same sums of money in the sense that eventually every transitional payment becomes an initial payment: one entrepreneur pays another who may pay a third and so on, but eventually that payment is used to be d**áv**ided up among the factors of some entrepreneur in initial payments. But it is also true that transitional payments are additional sums of money in the sense that the quantity of money required to carry on the business of basic supply is

$$\sum_{i} (r_{ij} + s_{ij})$$
(25)

and the quantity of money required to carry on the business of surplus supply is

 $\sum_{i} (r_{ij}^{"} + s_{ij}^{"})$ (26)

the summations being taken with respect to all instances of "i" in one set of and any/contemporaneous instances of "j". For the quantity of money required is the aggregate of monetary circulating capital. Monetary circulating capital includes not merely money to pay far immediate factors of production but also money to pay for the contributions of other entrepreneurial units. Granted that in the proximate future the money for transitional payments will become money for initial payments, it remains that now it is for transitional payments and at the proximate future date

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it will have to be replaced by more other money for transitional payments. There would be a relevance to a consideration of future dates if at future dates transitional payments and the requirement of circulating capital to meet them would venish. But there is no vanishing, and so no relevance.

The same conclusion may be reached by another route. The function of transitional payments is to shorten turnover periods. Were sij smaller, rij in other instances of "i" would have to be greater. Suppose a manufacturer produces 1000 products per month each month of the year; suppose he enjoys monopolist advantages and can force dealers to buy the 1000 products each month; suppose the product can be sold only seasonally, so that in May, June, and July 9000 products can be sold but in the rest of the year only 3000, say, 1000 in August and 250 in each of the remaining months. Let the manufacturer sell at \$100.00 a product, so that his turnover is \$100,000.00 a month. Now the aggregate of dealers accumulate the products at the rate of 750 a month from September to April, and at the end of April they have on their hands 6000 products for which they have paid \$6000 \$600,000.00; at the end of May they have in stock 4000, at the end of June 2000, at the end of July and at the end of August, zero. Thus, their aggregate circulating capital has to reach \$600,000.00 at a minimum during April. But if the manufacturer lost his monopoly advantage so that dealers could buy as they pleased, then he could not run his business of a monthly turnover of \$100,000.00; he would have to build the warehouse and increase his mon.tary circulating capital, provided he kept to the same production rates, for the dealers would refuse to foot the interest bill and other

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carrying costs. Thus, in calculating aggregate monotary circulating capital, one is calculating the amount of money required to bridge the aggregate of initial payments to all factors from sources of raw materials to sales to final buyers and, one the other hand, the aggregate of final subjects. The burden of these monetary carrying costs will fall entirely on one entreprensur if there is only one; and in that case there will be no transitional payments. But if there are several entrepreneurs, and so also transitional payments, then the longer periods of that transforms what would be circulating capital for initial payments into circulating capital for transitional payments.

Now to put the matter analytically, consider the equation following equation:

$$\sum_{i} s_{ij} = \sum_{i} v_{i}r_{ij} \qquad (27)$$

This states that with respect to any contemporaneous set of turnovers, "j", the aggregate of quantities of money,  $s_{ij}$ , required for transitional basic payments is equal to the aggregate of quantities required for initial basic payments,  $r_{ij}$ , multiplied by some factor,  $v_i$ . This factor,  $v_i$ , will vary in the case of each entrepreneur according to the number of times his contribution to the productive process during one of his turnovers, namely  $r_{ij}$ , is found to be the property of some other entrepreneur on its way to final sales. Thus, if the <u>i</u>th entrepreneur is a retailer conducting final sales,  $v_i$  is zero. If the <u>i</u>th entrepreneur is a wholesaler with the same turnover poriod as the retailers to whom he sells,  $v_i$ 

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is unity. If the wholesaler's turnover poriod is twice that of the retailers to whom he sells,  $v_1$  is one half. Universally, entrepreneurs at any instant are carrying some multiple of each  $r_{1j}$ ; they are carrying that multiple because they have made transitional payments for it and have not yet recovered their payments; and the aggregate of quantities of money required for transitional payments at any time is equal to the aggregate of quantities required for initial payments multiplied by that elusive multiple,  $v_4$ .

It is to be noted that  $v_i$  varies in two ways: relatively and absolutely. It varies relatively inasmuch as the present  $r_{ij}$  is greater or less than the earlier instances now on their way to final sales. It varies absolutely inasmuch as greater efficiency of production and of selling or again less efficiency means that there are maxe fewer or more instances or fractional instances of  $r_{ij}$  between the <u>i</u>th entrepreneur and final sales of his contribution.

The next step is to turn to increments of circulating capital. Let us define the increments,  $dr_{ij}$ ,  $ds_{ij}$ ,  $dr_{ij}^{"}$ ,  $ds_{ij}^{"}$ ,  $ds_{ij}^{"}$ , by the difference between the respective types of initial and transitional payments at the beginning and at the end of the standard interval of time. Thus, if initial basic payments of the <u>i</u>th entrepreneur at the beginning of the interval are  $r_{ij}$  and at the end of the interval are  $r_{ij}$ , then

 $dr_i = r_{ij} - r_{ij}$  (28) with parallel definitions for the other three terms. Hence the aggregate increase of basic circulating capital during the interval is

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 $\sum_{i} (dr_i + ds_i)$ 

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(29)

and if one defines a multiplier,  $u_1$ , somewhat similar to  $v_1$ , by the equation

$$\sum_{i} ds_{i} = \sum_{i} u_{i} dr_{i}$$
(30)

one may write as well for the increment of ms basic mometary circulating capital during the interval

$$\sum_{i} (1 + u_{i}) dr_{i}$$
(31)

and similarly for the increment in surplus monetary circulating capital during the interval

$$\sum_{i} (dr_{i}^{n} + ds_{i}^{n}) = \sum_{i} (1 + u_{i}^{n}) dr_{i}^{n}$$
(32)

where all summations are taken with respect to each "i" or each entrepreneur.

Let us now return to DM' and DM" which were defined as the increments during the interval of the quantities of money available within the basic and the surplus circuits respectively [equations (13) and (14)] and were shown to be equal to the increments in basic and surplus supply respectively at the end of the interval [equations (18) and (19)]. Consider, then, whether one may write

$$DM' = \sum_{i} (1 + u_{i}) dr_{i}$$
(33)

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$$DM'' = \sum_{i} (1 + u_{i}') dr_{i}''$$
(34)

so that the increment in the quantity of money in the basic or surplus circuit during the interval is equal to the increment in basic or surplus monetary circulating capital during the same interval. The condition of the truth of these equations (33) and (34), is that either the entrepreneurs have not yet paid out this increment in initial payments at the moment the

the basic increment interval ends or else, if they have paid it out, II has already returned from basic demand to basic supply and the surplus increment has already returned from surplus demand to surplus supply. On the other hand, if the increment has been apid out and has not yet returned to the same supply function, then either it has gone to the opposite supply function or else to the redistributive function. For by the definitions of DD' and DD", equations (11) and (12), the quantity of money in either demand function is the same at the end of each interval as it was at the beginning, and consequently the increments in the demand function are zero. Thus, the truth of equations (33) and (34) is a matter of timing the end of the interval or, alternatively, of connecting the right-hand sides of the equations by subtracting any initial payments made towards the end of the interval but, at least for the moment, lost to the circuit by migration to the other circuit or to the redistributive function. In pure theory it is simpler to suppose timing; in practice corrections would have to be the procedure.

Now it may be noticed that nothing has been said about the velocities of money in the demand functions. The reason is that the analysis pins these velocities down to functions of velocities in the supply functions. Velocities in the supply functions are a matter of turnover frequencies: but the turnover on one side generates income by initial payments and on the other side takes in the expenditure of final payments; if the demand functions spend their income in expenditure more rapidly or more slowly, this automatically shortens or lengthens turnover periods; on the other hand, because DD' and DD" merely make good

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the difference between DE' and DI', between DE" and DI", quantity variation is shifted from the demand to the redistributive function. This shift of quantity variation to the redistributive function makes income velocities entirely dependent upon turnover frequencies and so eliminates the need of introducing a further pair of variables.

To collect results, the monetary circulation of the basic and surplus circuits per interval is determined by the rates of payment, DE', DO', DE", DO" and the cross-over difference, DG, and it is further determined by changes in quantity of money per interval, DM' and DM". In terms of these rates the other terms of the system may be defined as follows:

DE! Ξ DRI DE" DR<sup>II</sup> DI! = DO' + DG DI'' = DO'' - DGDD DE! - DE! = DD"  $DE^{\parallel} = DI^{\parallel}$ DS! DM' - DD' - DG= DS" = DM<sup>#</sup> - DD<sup>#</sup> + DG

though another determination is necessary to distinguish between  $G^{\dagger}$  and  $G^{\dagger}$  since

 $DG = G^{H}DO^{H} - G^{\dagger}DO^{\dagger}$ 

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(5)

(35)

The question raised in this section was whether it was possible to correlate changes in quantity, DM' and DM", with rates of payment, DE', DE", DO', DO". The answer is had by comparing equations (23), (24), (33), (34). To write them out together, we have:

Do: = 
$$\sum_{i} o_{i}n_{i} = \sum_{i} \sum_{j} r_{ij}$$
 (23)

$$DO'' = \sum_{i} o''_{i}n''_{i} = \sum_{i} \sum_{j} r''_{ij}$$
(24)

$$DM' = \sum_{i} (1 + u_{i}) dr_{i}$$
(33)

$$DM'' = \sum_{i} (1 + u_{i}') dr_{i}''$$
(34)

The first two equations state that rates of outlay per interval are a single summation of average outlays,  $o_i$  and  $o''_i$ , per turnover multiplied by burnover frequencies or, again, are a double summation of exact outlays per turnover. The last two equations state that the circuit increments in quantities of money are equal to single summations of increments in outlays per turnover over the interval,  $dr_i$  and  $dr''_i$ , plus the multiple of these increments,  $u_i$  and  $u''_i$ , that are increments in transitional payments. Further, the last two equations are subject to a supposition of timing or else to correction for losses to the circuit in question.

Thus the relation is of DO' and DM', or again of DO" and DM", underthe supposition or correction required, is as follows. DM' and DM" increase both transitional and initial (estlays) payments with the part going to the increase of initial payments (outlays) dpending on multiples, u<sub>i</sub> and u<sub>i</sub>". The quantitative of outlays increments/appear in the rems terms of the series, r<sub>11</sub>, r<sub>12</sub>, r<sub>13</sub>,... and again in r<sup>n</sup><sub>11</sub>, r<sup>n</sup><sub>12</sub>, R<sup>n</sup><sub>13</sub>,... which are summated to give DO' and DO". On the other hand, DO' and DO" vary independently of these increments, for the number of terms in the series are increased or decreased by changes in turnover frequency, which give the velocity components of DO' and DO". Further, changes in turnover frequency not only affect the number of terms in the

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series of outlays,  $r_{ij}$  and  $r_{ij}^{"}$ , but also affect the multipliers,  $u_i$  and  $u_i^{"}$ . A more rapid turnover frequency decreases these multipliers while a slower turnover frequency increases them: suppose an entrepreneur with a monthly turnover producing an object that a) three months and b) two months later is sold to final buyers; on the first supposition,  $u_i$  is 3, on the second,  $u_i$  is 2.

Thus, turnover frequency has a double effect: a higher frequency both increases rates of outlay, DO' and DO", without any increment in circulating capital Mender for initial payments and, at the same time, effects a decrease in circulating capital for transitional payments; inversely a lower turnover frequency decreases rates of outlay and increases requirements for circulating capital. Similarly, DM' and DM" have a double effect: they increase bath monetary circulating capital both for initial and for transitional payments, the division between the two types of payment depending on the pattern of turnover frequencies.

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<u>9. Circulation Trends</u>. Trends are determinate relations between successive intervals. Circulation trends are determinate relations between the rates of payment and of transfer in successive intervals. With respect to any two successive intervals, <u>i</u> and <u>i</u>, let a suffix, <u>i</u>, added to a rate of payment or transfer denote the rate during the earlier of the two intervals and a suffix, <u>i</u>, denote the rate during the later interval. Further, let the symbol,  $D^2$ , denote the change of rate from one interval to another so that, for example,

 $D^2 O' = DO'_j - DO'_i$  (15) and similarly in the case of all other rates.

Nine classes of circulation trend are distinguished according as  $D^2O$  and  $D^2O$  are positive, zero, or negative. The names of the classes are given most simply in a table, as follows.

D201

"D<sup>2</sup>O"

	<i>P</i> <b>v</b>	10
Leve <b>l:</b>	0	0
Basic Expansion:	÷	0
Surplus Expansion:	0	÷
Compound Expansion:	÷	+
Basic Contraction:	-	0
Surplus Contraction:	0	-
Compound Contraction:	-	-
Basic Disequilibrium:	-	÷
rplus Disequilibrium:	÷	-

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Thus, a circulation level is a series of intervals in which the

rates of basic and of surplus outlay remain constant from one interval to the next. In the circulation expansions one or both rates of outlay is increasing but neither is decreasing. In the circulation contractions, one or both rates is decreasing but neither is increasing. In the disequilibria one rate is increasing and the other decreasing.

The discussion of circulation trends presupposes some correlation of the variables, DO', DO", DG, DE', DE", DS', DS", DD', DD", all of which, as far as definitions go, are independent. Hence the notion of a normative trend is introduced and the procedure will be to examine, first, normative trends and, secondly, the various possible departures from the normative.

Normative trends are defined as series of intervals in which  $D^20$  and  $D^20$  are as defined in any one of the nine classes and, as well, the following equations are satisfied:

0 =	DG	= D	D١	$= DD^{ii}$		(16)
d <sup>2</sup> E1	8	D <sup>2</sup> 0'	=	۷۱ D <sup>S</sup> S1	<b>.</b>	(17)
${}_{D}^{2}E^{n}$	Ξ	d <sup>2</sup> 0"	=	۷"D <sup>2</sup> S"		(18)

and there is supposed some initial interval in which

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0 = DS' = DS'' = DO' - DE' = DO'' - DE'' (19)so that

$$DS_{1}^{i} = D^{2}S_{2}^{i} + D^{2}S_{3}^{i} + \dots + D^{2}S_{n}^{i}$$
(20)

$$DS_n^{"} = D^2 S_2^{"} + D^2 S_3^{"} + \dots + D^2 S_n^{"}$$
(21)

Equations (16), (17), (18) hold in each interval of the series of intervals constituting the trend. Equations (19) need be no more than an hypothetical initial interval providing a

definite frame of reference for subsequent changes. Equations (20) and (21) refer to any <u>n</u>th interval. Finally, V' and V" in equations (17) and (18) are velocity coefficients relating changes in DS', DS", which are pure rates of transfer, to changes in DO', DO", LE', DE", which are rates of payment.

Two main questions arise: first, are the normative trends possible, and what are their conditions; secondly, what departures from the normative trends are possible, and what are their conditions. The significance of these questions is that they provide a systematic method of investigating the possible functional relations of the independent variables over a series of intervals.

The possibility of the normative trends seems to follow from an examination of their definition. Their fundamental feature is that in each interval therate of basic outlay equals the rate of basic expenditure and the rate of surplus outlay equals the rate of surplus expenditure. This follows for the first interval from equations (19) and for subsequent intervals respectively from equations (17) and (18). Such equality of /basic and surplus outlay and expenditure is no more than the affirmation of continuity in two circuits interval by interval: it is unreal in so far as it disregards the possibility of lags; but to disregard lags is to remain within the limits of theoretical possibility. On the other hand, equalities of outlays and of expenditure affirm a necessary tendency of the circulation: the general condition of a circulation is that entrepreneurs receive back the equivalent of their outlays, so as to be able to repeat them, and similarly that demand receives back in income the equivalent of its expenditure, so as to be able to repeat it.

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It is to be noted that the equality of outlay and of expenditure does not exclude profits. Profits are the part of initial payments which entrepreneurs pay to themselves; as far as the equality of outlay and expenditure goes, that part may be as large or as small as you please. Further, it is not necessary that profits be spent in themselves for expenditure to keep pace with outlay; any expenditure of an equivalent sum not derived from current income will enable expenditure to keep pace with outlay does not disappear simply because expenditure is not keeping pace with outlay, for then outlay may keep pace with expenditure and, in fact, that is what happens, since against falling sales entrepreneurs reduce the scale of their operations.

The second feature of the normative trends is that cross-over equilibrium is maintained. The surplus circuit does not gain from the basic nor the basic from the surplus. Though there is a crossover, still each circuit carries on as though there were none. This is a theoretical possibility and, obviously, a simplifying condition to be introduced as long as one wishes to examine not the inter-actions of the circuits but the process within each circuit.

The third feature of the normative trends is the neutrality of the demand functions. DD' is zero and DD" is zero. This does not mean that there are no savings. It does mean that present earnings, which are not spent, are balanced by the present spending of post earnings. With respect to the **geom** basic demand function, this involves an equilibrium between the sanguine people who borrow to meet current expenses and the melancholy who put by for rainy days more than they are ever moung to spend. With respect

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to the surplus demand function, DD" at zero involves an equilibrium between current surplus income that is not spent and, on the other hand, the movement by investment from the redistributive function to the surplus demand function.

Finally, the increase or decrease per interval of rates of outlay and of expenditure are attributed in each circuit to either of two factors

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to the surplus demand function, DD" at zero means that expenditure of funds for surplus goods and services, whether derived from current surplus income or from mobilizations of money by-investment in the redistributive function

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云 1, 1, G3 414 - - - -Tilani Lin d•, יין dr12 dr13 dr14 - - - -Sil Siz Siz Siz - - - Silan) Sen dsig dsig - - - - - dsin ds.  $Y_{i_1} + S_{i_1} + \sum_{j=1}^{j=n} (4r_{i_j} + ds_{i_j})$ Circ. cop. Ξ varia à menses in mitrie payments per tim the second diana tois water vange Ender any logo Varie à Turnom frequency set first coste that are not "piece - coste" ways puday varies is increases ftransitional prois I transitional primitities ( deput your Frynning Side of Sij Szj Szj Saj 0 number of motances ravi is fryw rig rig rig is in mon prontribution O Quantity is a function of frequency quantity - ferricity = we grant for interval

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Though the main body of any analysis consists in relations between terms that themselves are defined by relations, initially it is necessary to assume or describe some objects or points of reference. Here this preliminary work of assumption and description will consist in marking off sections of a monetary circulation, but we would note at once

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