I. FISHER

THE " IMPATIENCE THEORY „ OF INTEREST

A STUDY OF THE CAUSES

DETERMINING THE RATE OF INTEREST

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NICOLA ZANICHELLI

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I. Interest and Money.

Most people imagine that the rate of interest is a technical phenomenon, concerning only money lenders or borrowers. Of explicit or contract interest this is in a measure true; but interest may be implicit as well as explicit. It is implicit in every price. If we invest in a bond, for instance, the price that we pay for the bond carries with it the *implication* of a rate of interest, — that is, the rate we expect to realize on the investment. When a man buys stocks instead of bonds, or even a house or a piece of land, the same element of implicit interest enters into the transaction. He cannot even buy a piano or an overcoat or a hat without « discounting » the value of the use which he expects to make of that particular article. The rate of interest, then, is not a narrow technical phenomenon. It touches the daily life of us all.

Concerning the verbal definition of the rate of interest, there is no dispute; but concerning its nature and its causes, which I propose to discuss, there are numerous and conflicting theories.

By definition, the rate of interest is the price of capital in terms of income, when both capital and income are measured in terms of the same unit, as, for instance, of money; or, what amounts to the same thing, the rate of interest is the excess above par which has to be paid for this year's money in terms of next year's money.

But why should there be this excess? Why should not a dollar to-day exchange on even terms for a dollar next year? And what principles determine the amount of excess? These questions are among the most perplexing with which economic science has had to deal, and for two thousand years economists have been trying to solve the riddle which they represent.

The theory of interest here briefly presented is that more fully contained in my book *The Rate of Interest.* [1] It may be called for short, the « Impatience » Theory of Interest.

First of all let us note the relation of interest to money. Among the earliest fallacies concerning the rate of interest was that it depends on the amount of money in circulation. In particular, this fallacious theory held that plentiful money makes the rate of interest low. We commonly speak of interest as the « price of money », and when the trade journals tell us that « money is easy » in Wall Street, or Lombard Street, their meaning is that interest is low, and low *because* it is easy to borrow money. Or, we are told that « the money market is tight », meaning that it is hard to borrow money. Probably the great majority of unthinking business men still believe that interest is low when money is plentiful, and high when money is scarce. We often hear the argument that the present high cost of living cannot be due to any plentifulness of money, because if money were really plentiful, it would be « cheap », meaning that the rate of interest would be low, whereas it is fairly high, and therefore, it is argued, money must be scarce.

The fallacy consists in overlooking the fact that plentiful money raises the demand for loans just as much as it raises the supply. If money becomes more abundant, prices will rise and if prices rise, any intending borrower will need to borrow more money in order to purchase the same amount of goods.

That the relative abundance of money has, under normal circumstances, no influence on the rate of interest, has been well known to those versed in this subject ever since the days of Locke; yet the opposite belief still prevails among many intelligent people. One reason for this error is found in the experience and usages of banks. If his reserves are

[1] Macmillan, New York and London, Co., publish, 1907.

low the banker raises the rate of interest to « protect » those reserves. If the reserves are abundant, he reduces the rate of interest in order to get rid of them. But he mistakes a merely *relative* scarcity or abundance of reserves (as compared with money in circulation) for an *absolute* scarcity or abundance. When he says that more money lowers the rate of interest, he ought to say « When bank reserves get an undue fraction of money, the rate of interest will be low; but when an undue fraction goes into circulation outside of banks, the rate of interest will be high ». In other words, an increase of money will operate in two different ways, according to where it happens to go first. Normally, however, and eventually an increase of money distributes itself equally among pockets, tills, and bank reserves; and, in this case the rate of interest will not be affected at all.

We conclude, then, that an inflation of the currency, as such, does not affect the rate of interest at all, *provided, however, the inflation affects the loan at the time the loan is made just as much as it affects the repayment at the time the repayment is made.* This proviso is important. For the loan and the repayment do not occur at the same time; and it may be that the degree of inflation is greater or less at the end than at the beginning of the intervening period, in which case the inflation may, through its effects on the values borrowed and repaid, affect the rate of interest *during the process of change.*

Let us consider this *transitional* effect. Suppose, for instance, that the inflation of money has proceeded at such a pace that prices have been made to rise at the rate of one per cent per annum. Then, 100 dollars lent last year is equivalent in purchasing power not to 100 dollars repayable next year, but to 101 repayable next year. If prices had not risen, the borrower would pay back in his principal of 100 the value of the same amount of goods as were represented by the 100 which he borrowed. In terms of goods he would be in the same position at the end as at the beginning, and so would the lender. But we are supposing that prices have been rising. Then the lender, when he gets back his principal of 100, does not get back as much purchasing power as he lent, and the borrower does not pay back as much purchasing power as he borrowed. Under these circumstances, the principal of a debt

becomes less and less valuable. If prices are rising 1 per cent a year then the falling principal of the debt would have to be eked out each year by an indemnity of about 1 per cent in order that there should be exactly the same burden on the borrower in paying back as there would have been if prices had not risen. In practice this indemnity may be paid as 1 per cent higher interest. Likewise, if prices are rising 2 per cent per annum, 2 per cent would have to be added to the rate of interest, and so on. On the other hand, if prices are falling, the rate of interest, in order to offset the appreciation of the principal, would have to de reduced.

A study of the periods of rising and falling prices in the United States, England, Germany, France, China, Japan, and India verifies these principles. It shows that, in general, when prices are rising, the rate of interest is high, and that in general when prices are falling, the rate of interest is low.

II. Previous Theories of Interest.

We have considered the relation of the relative abundance of money to the rate of interest. We saw that the money supply has no effect on the rate of interest except during transition periods. But the real riddle of interest still remains unsolved. Why is there such a thing as a rate of interest, even when the purchasing power of money is constant, and what determines that rate?

Many theories have been proposed. One of the most persistent is the theory that « interest is due to the productivity of capital ». If a man who has never thought on the subject is asked why the rate of interest is 5 per ccnt, he will almost invariably answer: « Because 5 per cent is what investments pay ». Now it is true that if you have 100 dollars and invest it, and it yields you 5 per cent a year, the rate of interest is 5 per cent. A 100,000 dollars mill will produce a net income of 5000 a year. A 100,000 dollars piece of land will produce a net crop worth 5000 a year, and so on throughout the whole series of investments. When the rate of interest is 5 per cent, nothing at first sight seems more obvious than that it is 5 per cent because capital *yields* 5 per cent. Since capital is productive, it seems self-evident

that an investment of 100 dollars in productive land, machinery, or any other form of capital, will yield a rate of interest proportionate to its productivity. This proposition looks attractive, but it is superficial. Why is the land worth 100,000? Simply because this is the discounted value of the expected 5000 a year. The value of capital is derived by the process of « discounting » from the value of its income, not the value of the income from that of the capital. But whenever we thus discount income, we have to *assume* a rate of interest. One hundred thousand dollars is a capitalization calculated on the basis of 5 per cent interest. If we capitalize 5000 dollars at 5 per cent, and get 100,000, we naturally find that we are getting 5 per cent on the investment, for we assumed 5 per cent in the first place. We get out exactly what we put in.

Besides the productivity theory (which itself has many variations) there are numerous other theories, such as the following: that interest represents labor saved by capital; that interest is the reward of abstinence, or of waiting; that interest is the cost of managing capital: that interest is the exploitation of laborers by capitalists. The last is the socialist's theory. To the socialist, interest appears an evil — *the* evil — and he thinks it ought to be abolished. He says: « It is all wrong that the capitalist who does not lift a finger should get any pay; he is getting something for nothing, namely interest; interest is robbery; interest is sucking the blood out of the underman, viz. the workman ».

The socialist's position involves two propositions: first, that practically all income and all capital are produced by labor; and secondly, that all income should be paid to the laborer. Now the first proposition is much more nearly correct than the second. We need not contest it in order to see the fundamental error in the theory of socialism. Let it be granted that practically every instrument of production is produced by labor; let it be granted that the capitalist is always living on the product of past labor. Yet as Böhm-Bawerk says:

« The perfectly just proposition that the laborer should receive the entire value of his product may be understood to mean either that the laborer should *now* receive the entire *present* value of his product, or should receive the entire *future* value of his product *in the future.* But Rodbertus and

the socialists expound it as if it meant that the laborer should *now* receive the entire *future* value of his product ».

Finally there is Böhm-Bawerk' s own theory, which, with some variations, is that of his predecessors Rae, Jevons, Sax and Launhardt, as well as some of his various successors, especially Adolphe Landry. Böhm-Bawerk calls his theory the « Agio Theory ».

Böhm-Bawerk distinguishes two problems: (1) Why does interest exist? and (2) What determines any particular rate of interest? In answer to the first problem, he states virtually that this world is so constituted that most of us prefer present goods to future goods of like kind and number. This preference is due, according to Böhm-Bawerk, to three circumstances: one being the « technical superiority » of present over future goods, or the fact, as Böhm-Bawerk conceives it, that the « roundabout » or « capitalistic » processes of production are more remunerative than those which yield immediate returns. This circumstance — the so-called technical superiority of present over future goods — we believe contains essential errors.

According to Böhm-Bawerk, labor invested in long processes of production will yield larger returns than labor invested in short processes, and will therefore confer a « technical advantage » upon those who have the command of that labor. This technical advantage produces, so Böhm-Bawerk believes, a preference for present over future goods which is entirely apart from and in addition to the preference due to the perspective underestimate of the future or that due to the underendowment of the present. Böhm-Bawerk regards this part of his theory as most essential, and repeatedly states that the theory must stand or fall by the truth or falsity of this part.

The fact is that the only reason any one prefers the product of a month' s labor invested to-day to the product of a month' s labor invested next year is that to-day 's investment will mature earlier than next year' s investment. If a fruit tree is planted to-day which will bear fruit in four years, the labor available to-day for planting it is preferred to the same amount of labor available next year; because, if the planting is deferred until next year, the fruit will likewise be deferred a year, maturing in five instead of four years

from the present. Nor is this essential fact altered by the possibility of a number of different kinds of investments today. It is true that a month's labor in the present may be spent in planting slow-growing or fast-growing trees; but so may a month's labor invested next year. It is from the preference for the early over the late fruition of *any* productive process that the so-called « technical superiority of present over future goods » derives all its force and not from the superior productiveness of roundabout processes of production. The latter has no power whatever to create interest.

It is impossible in this brief article to enter into a detailed account of Böhm-Bawerk's theory and its merits and defects. For amplification of the brief statement here presented the reader is referred to my « Rate of Interest ».

III. Human Impatience the true Basis of Interest.

We are now ready to state briefly our own theory of interest. This is a modification of Böhm-Bawerk's agio theory. Partly to distinguish it from Böhm-Bawerk's, and partly to find a better term than « agio », it is here proposed to call the present theory the « Impatience theory ». It is odd that no one has happened heretofore to hit on this term, which seems to be the only one expressing accurately and in a single word, the real basis of interest. The term *delay* (« mora ») was used by some medioeval writers, who first sought to excuse interest taking on the ground that repayment of a loan was « delayed » and that the delay should be penalized; but the justification of interest consists not exactly in the delay in paying, but in the fact that the borrower *does not like the delay.* The term « abstinence » has had much currency; but it is not abstinence but the *inconvenience* of abstinence which is the real factor. By Professor Marshall the term « waiting » has been suggested; but it is not the waiting which is significant but the reluctance to wait. Böhm-Bawerk's term « agio » has attracted much attention; but it has no evident meaning until it is explained by a longer phrase — i. e. « a premium in the esteem of man for present over future goods ». The idea which it is sought to express by all these proposed terms — delay, abstinence, waiting, agio, as well

as by other more clumsy expressions such as « labor of saving », — is simply the very familiar one expressed in daily experience by the term « impatience ». It is because a man is impatient that he thinks « delay » should be penalized; it is because he is impatient that « abstinence » from immediate indulgence or « waiting » for future indulgence, is regarded with disfavor; it is because he is impatient that he puts a premium or « agio » on present goods as compared with future.

The peculiar fitness of the term « impatience » is here emphasized because so much stress has been laid on economic catch-words and because this particular catch-word seems to have escaped notice. In my own book, « The Rate of Interest », for instance, this term was unused because unthought of, and the clumsier and less self-explanatory term « time-preference » was employed instead. The proposal to employ the term « impatience » is here made for the first time. While the use of one term or another does not in the least affect the principles involved, it does affect the popular comprehension of those principles.

Impatience is a fundamental attribute of human nature. As long as people like to have things to-day rather than to-morrow, there will be a rate of interest. *Interest is, as it were, impatience crystallized into a market rate.* The rate of interest is formed out of the various degrees or rates of impatience in the minds of different people. The rate of impatience in any individual' s mind is his preference for receiving an additional dollar or dollar' s worth of goods at once, over receiving it a year from to-day. In other words, it is the excess of the « marginal utility », or as I prefer to express it, « desirability » of to-day' s money over that of next year' s money viewed from to-day' s standpoint. It can be expressed in numbers as the premium that a man is willing to pay for this year' s over next year' s money. If, for instance, in order to get 1 dollar at once he is willing to promise to pay 1.05 next year, then his rate of impatience is 5 per cent. The present 1 dollar is worth to him so much that, in order to get it, he is willing to pay 5 per cent more than 1 dollar in the future for it. It is because of the willingness to do this to gratify one' s impatience that there is such a thing as a rate of interest. A man will prefer to have a machine to-day rather

than a machine in the future; a house to-day rather than a house a year from now; a piece of land to-day rather than a piece of land when he is ten years older; he would rather have some food to-day than wait until next year for it, or a suit of clothes, or stocks, or bonds, or anything else.

But what are these present and future « goods » which are thus contrasted? At first sight it might seem that the « goods » compared are rather heterogeneous, — wealth, property, services, or any economic elements whatever. This is true but some of these cases are reducible to others. When present capital is preferred to future capital, this preference is really a preference for the *income* of the first capital as compared with the *income* of the second. As already indicated the reason we would choose a present fruit tree rather than a similar fruit tree available in ten years is that the fruit of the first will be available earlier than the fruit of the second. The reason we prefer immediate tenancy of a house to the right to occupy it in six months is that the uses of the house will begin six months earlier in one case than in the other. In short, capital available early is preferred to capital of like kind available at a more remote time, simply because the *income* of the former is available earlier than the *income* of the latter.

It will thus be seen that all rates of impatience resolve themselves into preference for early *income* over late income. Moreover, the preference for present income over future income resolves itself into the preference for present *enjoyable* income over future enjoyable income. The income from an article of capital which consists merely of an intermediate step in production is desired for the sake of the final enjoyable income to which that intermediate step paves the way. We prefer present bread baking to future bread baking because the enjoyment of the resulting bread is available earlier in the one case than in the other.

We thus see that all impatience for goods (preference for present over future goods) resolves itself, in the last analysis, into impatience for enjoyable income (a preference for early enjoyable income over late enjoyable income). The preference for present over future goods, when thus reduced to its lowest terms, i. e. a preference for enjoyable income rids the present and future values of the interest element, which, in

all other attempts at explanation, is so unconsciously presupposed. For when any other goods than enjoyable income are considered, their values already imply a rate of interest.

IV. The influences on impatience.

But we have not yet wholly solved the problem of interest. It is not enough to know that the more impatient a people are, the higher will be their rate of interest, and that the more patient they are, the lower will be their rate of interest. We must also know *on what causes* the rate of impatience depends. It depends principally upon two circumstances, the character of the individual and the character of the income of which he finds himself the owner.

It is clear that the rate of impatience which corresponds to a specific income-stream will not be the same for everybody. One man may have a rate of impatience of 5 per cent and another a rate of impatience of 10 per cent, although both have the same income. The difference will be due to the personal characteristics of the individuals. These characteristics are chiefly five in number: (1) foresight, (2) self-control, (3) habit, (4) expectation of life, (5) love for posterity. We shall take these up in order.

1) First, as to foresight. Generally speaking, the greater the foresight, the less the rate of impatience, and *vice versa*. In the case of primitive races and instructed classes of society, the future is seldom considered in its true proportions. The story is told of a Southern negro that he would not mend his leaky roof when it was raining, for fear of getting more wet, nor when it was not raining, because he did not then need shelter. Among such persons the rate of impatience for present gratification is powerful because their comprehension of the future is weak. If we compare the Scotch and the Irish, we will find a contrast in this respect. The Irish, in general, lack foresight and are improvident, and the Scotch have foresight and are provident. Consequently the rate of interest is high in Ireland and low in Scotland.

These differences in degrees of foresight produce corresponding differences in the dependence of impatience on the character of income. Thus, for a given income, say 1000 dollars

a year, the reckless might have a rate of impatience of 10 per cent, when the forehanded would experience a rate of only 5 per cent.

Therefore the rate of impatience, in general, will be higher in a community consisting of reckless individuals than in one consisting of the opposite type.

2) We come next to self-control. This trait, though, distinct from foresight, is usually associated with it and has very similar effects. Foresight has to do with *thinking;* self-control with *willing.* A weak will usually goes with a weak intellect, though not necessarily, and not always. The effect of a weak will is similar to the effect of inferior foresight. Like those workingmen who cannot carry their pay home Saturday night, but spend it in a grogshop on the way, many persons cannot deny themselves any present indulgence, even when they know definitely what the consequences will be in the future. Others, on the contrary, have no difficulty in controlling themselves in the face of all temptations.

3) The third characteristic of human nature which needs to be considered is habit. That to which one is accustomed exerts necessarily a powerful influence upon his valuations and therefore upon his rate of impatience. This influence may be in either direction. A rich man's son who has been brought up in habits of self-indulgence, when he finds himself with a smaller income than his father provided him during his formative years, will have a higher rate of impatience than a man who has the same income but who has climbed up instead of climbed down.

4) The expectation of life will affect a man's rate of impatience. A man who looks forward to a long life will have a relatively high appreciation of the future, which means a relatively low appreciation of the present, i. e. a low rate of impatience; whereas a man who has a short life to look forward to will want it at least to be a merry one. « Eat, drink, and be merry, for to-morrow we die », is the motto applying to this type.

5) The fifth circumstance is love for posterity. Probably the most powerful cause tending to reduce the rate of interest is love for one's children and the desire to provide for their good. When these sentiments decay, as they did decay at the time of the decline and fall of the Roman Empire,

and it becomes the fashion to exhaust wealth in self-indulgence and leave little or nothing to offspring, the rate of impatience and the rate of interest are high. At such times the motto « After us the deluge », indicates the feverish desire to squander in the present, at whatever cost to the future. A noted gambler, who had led a wild and selfish life, once said, when life-insurance was first explained to him. « I have seen many schemes for making, money, but this is the first time I have seem a scheme where you had to die before you could rake in the pile ». That man didn' t care for a payment which would come in after his death. But there are many men who do, and in fact care much more for it than for anything else in the world. This care leads them to insure their lives in order that they may leave the money to their families. Their desire to provide for those who survive them gives them a low rate of impatience. Life insurance, by training people to provide for posterity, is acting as one of the most powerful means of lowering the rate of impatience and therefore the rate of interest. At present in the United States the insurance on lives amounts to 20,000,000,000 of dollars. This represents, for the most part, an investment of the present generation for the next. The investment of this sum springs out of a low rate of impatience, and tends to produce a low rate of interest.

Thus we see that men may differ in many ways which affect the rate of impatience and rate of interest. We may contrast two extreme types of men, irrespective of the character of their income. Men may have a high rate if they are shortsighted, or are weak-willed, or have spendthrift habits or look forward to a short or uncertain life, or are selfish and without regard for posterity. They will have a low rate if they have the opposite characteristics, — foresight, self-control, habits of thrift, length and certainty of life, and altruism with respect to posterity.

But not only does impatience vary as between different individuals; it varies also for the same individual according to circumstances. The most important circumstance affecting an individual' s degree of impatience is the character of his expected income in the immediate and in the remote future,

Smith' s impatience for satisfactions will depend on the abundance of his present as compared with his future satis-

factions. If the future satisfactions that he expects and looks forward to are very great, and his present satisfactions are very small, he will be impatient to hurry from his present scarcity and arrive at the expected future abundance; that is, he will have a high rate of preference for present over future satisfactions. This is on the same principle that prices are high when goods are scarce. The preference for present satisfactions is high if present satisfactions are scarce. Now the rate of preference which Smith has for present satisfactions over future satisfactions will depend on his whole future stream of satisfactions, that is, what we call his final enjoyable income. It will depend on four chief characteristics of that income: first, as just said, it will depend on the *time-shape* of the income, the relative abundance of his present and his future satisfactions; second, on the *amount* of the income, i. e. whether his satisfactions are few or many; third, on the *uncertainties* of the income, i. e. to what extent his satisfactions throughout future years can be depended upon; and fourth, on the *composition* of the income, i. e. the relative amounts of foods, shelter, etc., of which it is composed.

For brevity we shall here consider only the time-shape of income, i. e. the distribution of income in time. Three different types of time-shape may be distinguished: uniform income, consisting of equal yearly items, income increasing in the future, and income decreasing in the future.

The effect of possessing an increasing income is, as we have already indicated, to make the possessor impatient, i. e. to make his preference for present over future income higher than otherwise; for it means that the earlier parts of his income are relatively scarce, and the remoter, relatively abundant. For instance, a man who is now enjoying an income of only 1000 dollars a year, but expects in ten years to be enjoying one of 10,000 dollars a year, will be impatient to have ten years elapse. He has « great expectations ». He may, to satisfy his impatience, borrow money to eke out this year's income, and make repayment by sacrificing from his more abundant income ten years later.

Reversely, a decreasing income, making, as it does, the earlier income relatively abundant, and the remoter income relatively scarce, tends to reduce impatience, or the preference for present as compared with future income. The man

with a descending income already has a high income without being compelled to wait for it. With him there is little reason for impatience; there is nothing to be impatient for; on the contrary, the future does not look at all inviting. He will therefore strive to save from his present abundance to provide for coming needs.

V. The determination of the Rate of Interest.

The question now arises, will not the rates of impatience of different individuals be very different, and if so, what relation do these different rates have to the rate of *interest?* It might seem at first that the rates of impatience would differ widely. In a nation of hermits, without any mutual lending and borrowing, this would be true; the rate of impatience of individuals would diverge widely, and there would be no common market rate of interest. It is modern society's habit of borrowing and lending that tends to bring into equality the rates of impatience in different minds, and it is only because of the limitations of the loan market that absolute equality is not reached.

The chief practical limitation to lending is due to the risk involved, and to the difficulty or impossibility of obtaining the security necessary to eliminate or reduce that risk. Those who are most willing to borrow are oftentimes those who are least able to give security. It will then happen that these persons, shut off from the loan market, experience a higher rate of impatience than the rate of interest ruling in that market. If they can contract loans at all, it will be only through the pawnshop or other high-rate agencies.

But for the moment let us assume a perfect market, in which the element of risk is entirely lacking. We assume that all individuals are initially possessed of fore-known income streams, and are free to exchange any parts of them so that present income may be exchanged for future income. This exchange may be effected by borrowing or lending, by buying and selling wealth or property and by changing the uses to which capital is put.

Under these conditions, the rates of impatience for different individuals will be perfectly equalized. Borrowing and

lending evidently affect the time-shape of the incomes of borrower and lender; and since the time-shape of their incomes affects their rate of impatience, such a modification of time-shape will react upon and modify their rate of impatience and bring the market into equilibrium.

For if, for any particular individual, the rate of impatience differs from the market rate, he will, if he can, adjust the time-shape of his income-stream so as to harmonize his rate of impatience with the interest rate. For instance, those who, for a given income-stream, have a rate of impatience above the market rate, will sell some of their surplus future income to obtain (i. e. « borrow ») an addition to their present meagre income. This will have the effect of enhancing the value of the future income and decreasing that of the present. The process will continue until the rate of impatience of this individual is equal to the rate of interest. In other words, a person whose impatience-rate exceeds the current rate of interest will borrow up to the point which will make the two rates equal. Reversely, those who, with a given income-stream, have a rate of impatience below the market rate, will sell (i. e. « lend ») some of their abundant present income to eke out the future, the effect being to increase their rate of impatience until it also harmonizes with the rate of interest.

To put the matter in figures, let us suppose the rate of interest is 5 per cent, whereas the rate of impatience of a particular individual is at first 10 per cent. Then, by hypothesis, the individual is *willing* to sacrifice 1.10 of next year's income in exchange for 1 dollar of this year's. But in the market he is *able* to obtain 1 dollar for this year by spending only 1.05 of next year. This ratio is, to him, a cheap price. He therefore borrows, say, 100 dollars for a year, agreeing to return 105 dollars; that is, he contracts a loan at 5 per cent when he is willing to pay 10 per cent. This loan, by increasing his present income and decreasing his future, tends to reduce his rate of impatience from 10 per cent to, say, 8 per cent.

Under these circumstances he will borrow another 100 dollars being now willing to pay 8 per cent, but having to pay only 5 per cent. This loan will still further reduce his rate of impatience. He will continue to borrow until his rate of

impatience has been finally brought down to 5 per cent. Then for the last or « marginal » 100 dollars, his rate of impatience will agree with the market rate of interest. As in the general theory of prices, this marginal rate, 5 per cent, being once established, applies indifferently to all his valuations of present and future income.

In like manner, if another individual, entering the loan market from the other side, has at first a rate of impatience of 2 per cent, he will become a lender instead of a borrower. He is *willing* to accept 102 dollars of next year' s income for 100 of this year' s income, but in the market he is *able*, instead of the 102 dollars, to get 105. As he can lend at 5 per cent when he would gladly do so at 2 per cent, he jumps at the chance and invests, not one 100 dollars only, but another and another. But his present income, being reduced by the process, is now more highly esteemed than before, and his future income, being increased, is less highly esteemed. The result will be a higher relative valuation of the present, which, under the influence of successive additions to the sums lent, will rise gradually to the level of the market rate of interest.

In such an ideal loan market, therefore, where every individual could freely borrow or lend, the rates of impatience for all the different individuals would become equal to each other and to the rate of interest.

The two men whom we have imagined started out with rates of impatience different from the market rate of interest. The market rate was 5 per cent, while the first man had a rate of impatience above this, and the second, a rate of impatience below this. But when they finished their loan operations or readjustments in the time-shape of their income-streams, they brought their rates of impatience each into harmony with the rate of interest and therefore with each other. Therefore, as long as there is a market in which everybody can borrow or lend at will at 5 per cent, everybody will have at the margin a rate of impatience of 5 per cent. Nobody will have a rate of impatience above 5 per cent, because, if it is at first above it, he will borrow enough to bring it down to the market rate; and nobody will have a rate below it, because if it is at first below it, he will lend enough to bring it up to the rate of interest.

Thus we see that even men of widely different natures

as to foresight, self-control, etc., will have the same *marginal* rates of impatience. This adjustment of the impatience of different individuals takes place, as we have seen, by adjusting their respective incomes, increasing their immediate income at the expense of future income or increasing their future income at the expense of immediate income. These changes in income we have supposed, for illustration, to be effected by borrowing and lending. As a matter of fact they may also take place in two other ways. One way is by buying and selling property. If a man buys property like a growing forest, which will bring him remotely future income and sells property, like household furniture, or short-time notes which brings him more immediate income it is clear that he can profoundly change the character of his present and future income. The other way is by changing the uses to which he puts his capital, e. g. changing the use of land from growing immediate crops to growing timber in the remote future. But whether he modifies this income by borrowing and lending, or by buying and selling, or by changing the uses of his capital, the essential point is that he does modify its time-shape and by so doing raises or lowers his rate of impatience so as to make it agree with the market rate of interest. For the individual the rate of interest is a relatively fixed fact, since his own rate of impatience and resulting action can affect it only infinitesimally. All he can do is to adjust his rate of impatience to it. For society as a whole, however, it is these same rates of impatience which meet in, and determine, the rate of interest. While for the individual the rate of interest determines the rate of impatience, for society the rates of impatience of the individuals determine the rate of interest. The rate of interest is simply the rate of impatience, upon which the whole community may concur in order that the market of loans may be exactly cleared. Supply and demand will work this out.

To put the matter in figures: if the rate of interest is set very high, say 20 per cent, there will be relatively few borrowers and many would-be lenders, so that the total extent to which would-be lenders are willing to reduce their income-streams for the present year for the sake of a much larger future income will be, say 100,000,000 of dollars; whereas, those who are willing to add to their present income at the

high price of 20 per cent interest will borrow only, say, 1,000,000 of dollars. Under such conditions the demand for loans is far short of the supply, and the rate of interest will therefore go down. At an interest rate of 10 per cent, the present year's income offered as loans might be 50,000,000 of dollars, and the amount which would be taken at that rate only 20,000,000 of dollars. There is still an excess of supply over demand, and interest must needs fall further. At 5 per cent we may suppose the market cleared, borrowers and lenders being willing to take or give respectively 30,000,000 of dollars. In like manner it can be shown that the rate would not fall below this, as in that case it would result in an excess of demand over supply, and cause the rate to rise again.

Thus the rate of interest is the common market rate of impatience for income, as determined by the supply and demand of present and future income. Those who, having a high rate of impatience, strive to acquire more present income, at the cost of future income, tend to raise the rate of interest. These are the borrowers, the spenders, the sellers of property yielding remote income, such as bonds and stocks. On the other hand, those who — having a low rate of impatience — strive to acquire more future income at the cost of present income, tend to lower the rate of interest. These are the lenders, the savers, the investors.

VI. Verification and Conclusion.

We have sketched the main principles determining the rate of interest. Some have not been mentioned save by implication. In summary we may say the rate of interest, considered independently of fluctuations in the monetary standard, is determined by six conditions. Those which we have here considered and explained are the following three: (1) the dependence of impatience upon prospective income — its size, shape, composition, and uncertainties; (2) the tendency of rates of impatience for different individuals to become equal to each other and to the rate of interest, through the loan market; (3) the fact that supply and demand must be equal so that the modifications in the income-streams of individuals, through

buying and selling, or borrowing and lending, must « clear the market. » Of the other three determining conditions the most important is that the rate of interest must be equal not only to the marginal rates of impatience but also to the « marginal rates of return on sacrifice ». This, though a fundamental and distinctive feature in my theory of interest cannot adequately be presented in this short sketch. It is fully elaborated in the « Rate of Interest ». It is there shown that this principle — that rates of return on sacrifice harmonize with the rate of interest — may also be stated in the following form: of all the optional uses to which a man may put his capital he will choose that one which at the market rate of interest maximizes the present value of his capital — the discounted value of the uses chosen.

The remaining two conditions are the very obvious ones; (1) that what is borrowed at any time by some persons, equals what is loaned at that time by other persons and (2) that what any person borrows at one time must be repaid by that person at another time with interest at the market rate.

These six determining conditions are all essential. If any one of them is omitted we shall find ourselves trying to determine the unknown quantity, the rate of interest, by means of other unknown quantities — rates of impatience, rates of return on sacrifice, amount of loans and incomes — without providing adequate means for determining these other unknown quantities also. This is the difficulty with most theories of interest, the attempt to explain *ignotum per ignotius.* There is no objection to explaining one unknown in terms of others provided only we furnish enough determining conditions for all. It is a fundamental law of algebra that in order to determine fully each one of the unknowns we must have an exactly equal number of independent equations. As is shown in « The Rate of Interest », the six sets of determining conditions above mentioned provide exactly the number of equations needful to determine all the unknown quantities involved in them including the rate of interest itself.

We have now completed our study of the causes determining the rate of interest. If they are correct, we should find that the rate of interest is low (1) if in general the people are by nature thrifty, far-sighted, self-controlled, and love their children, or (2) if they have large or descending income-

streams; and that it is high (1) if the people are shiftless, short-sighted, impulsive, selfish, or (2) if they have small or ascending income-streams.

History shows that the facts accord with these conclusions. The communities and nationalities which are most noted for the qualities mentioned — foresight, self-control, and regard for posterity — are probably Holland, Scotland, England, France. Among these people interest has been low. Moreover, they have been money lenders; they have the habit of thrift or accumulation, and their instruments of wealth are in general of a durable kind.

On the other hand, among communities and peoples noted for lack of foresight and for negligence with respect to the future are China, India, Java, the negro communities in the Southern states, the peasant communities of Russia, and the North and South American Indians, both before and after they had been pushed to the wall by the white men. In all of these communities we find that interest is high, that there is a tendeney to run into debt and to dissipate rather than to accumulate capital, and that their dwellings and other instruments are of a very flimsy and perishable character, built for immediate, not remote, gratification. This is true even where, as in China, the people are industrious. Industry without patience will work only for immediate gratification.

These examples illustrate the effect on the rate of interest of differences in human nature. We now turn to illustrations of differences in the time-shape of incomes. The most striking examples of increasing income-streams are found in new countries. It may be said that the United States has almost always belonged to this category. In America we see exemplified on a very large scale the truth of the theory that a rising income-stream raises, and a falling income-stream depresses, the rate of interest, or that these conformations of the income-stream work out their effects in other equivalent forms. A similar causation may be seen in particular localities in the United States, especially where changes have been rapid, as in mining communities. In California, in the two decades between 1850 and 1870, following the discovery of gold, the income-stream of that state was increasing at a prodigious rate. During this period the rates of interest were abnormally high. The current rates in the « early days » were

quoted at 1 ½ to 2 per cent a month. « The thrifty Michael Reese is said to have half repented of a generous gift to the University of California, with the exclamation : « Ah, but I lose the interest » — a very natural regret when interest was 24 per cent per annum ». After railway connection in 1869, Eastern loans began to flow in. The decade 1870-1880 was one of transition during which the phenomenon of high interest was gradually replaced by the phenomenon of borrowing from outside. The residents of California were thus able to change the time-shape of their income-streams. The rate of interest consequently dropped from 11 per cent to 6 per cent.

The same phenomena of enormous interest rates were also exemplified in Colorado and the Klondike. There were many instances in both these places during the transition period from poverty to affluence, when loans were contracted at over 50 per cent per annum, and the borrowers regarded themselves as lucky to get rates so « low. »

We have seen that the rate of interest is not a mere technical phenomenon, restricted to Wall Street and other « money markets, » but that it permeates all economic relation. It is the link which binds man to the future and by which he makes all his far-reaching decisions. It enters into the price of securities, land, and capital goods generally, as well as into rent and wages.

The rate of interest also plays a central rôle in the theory of distribution. The true problem of distribution is that of determining the amounts of capital and income possessed by different individuals in society. Individuals of the spendthrift type, if in possession of land and other durable instruments, will either sell or mortgage them in order to secure the means for obtaining enjoyable services more rapidly. The effect will be, for society as a whole, that those individuals who have an abnormally low appreciation of the future and its needs will gradually part with the more durable instruments, and that these will tend to gravitate into the hands of those who have the opposite trait. By this transfer and inequality in the distribution of capital is gradually effected, an this inequality, once achieved, tends to perpetuate itself. Hence, in some countries the rich and poor come to be widely and permanently separated, the former constituting a hereditary aristocracy and the latter a helpless and degraded peasantry.