Journal of Accountancy

Volume 37 | Issue 1 Article 2

1-1924

# Interest Question

Frederick Vierling

# The Interest Question

By Frederick Vierling

Interest as now generally understood is the compensation allowed by law or fixed by the parties within legal limits for the use of money or credit, or compensation for the detention of a debt due. Interest may be considered from the point of view of whether it be simple interest or compound interest; also whether it be lawful interest or unlawful interest; and legal interest, or the rate fixed by law in the absence of an agreed rate. In early times the words "interest" and "usury" were synonymous terms, and the word "usury" was generally used to express the idea of taking or receiving a profit for the use of money. Among the ancient peoples the taking of interest was considered unlawful. After the taking of reasonable interest became lawful, the word "interest" came to signify lawful compensation for the use of money, and the word "usury" unlawful compensation. The two words are now so understood, as will be seen by reference to the statutes of our various states. Unless there is a law which limits the rate of interest that may be charged, there can now be no usury. By universal custom interest is specified at a certain rate per cent. per annum on the amount of the loan or debt, and is considered on that basis whether the period of the loan be less or more than a year, the amount of interest decreasing or increasing in the ratio as the time of the loan is less or more than a year. Unless otherwise agreed, interest becomes payable at maturity of principal of the debt. By agreement interest may be made payable in instalments during the running of a debt, and on long-time obligations is generally made payable periodically, as annually or semi-annually. Interest received in advance for a loan, at the time of making the loan, is designated as "discount." The privilege of receiving interest is not considered a natural right, but strictly a matter of law or contract.

## Brief History of Interest

The custom of taking interest for the use of money is lost in antiquity. It was known from earliest historical times. In early times the taking of interest was prohibited and to take interest was punished. Usury was prohibited by the early laws of the Chinese and Hindus and by the Koran. Among the Romans interest charges were limited by the twelve tables (451 B.C.),

but subsequently, totally abolished. The Babylonians carried on business by loans at interest. Among the Athenians moderate interest charges were allowed. In the middle ages the people of England considered the taking of interest for the loan of money as a crime. In England, if, after death of a guilty party it was shown that he had been an habitual receiver of interest, his estate was forfeited to the crown. The taking of interest was sanctioned in Prussia in 1385; in Marseilles in 1406; in Denmark in 1554. The practice of taking interest existed in England for generations before it was allowed by law. The first statute in England authorizing the taking of interest for a loan was enacted in 1545, fixing a rate not exceeding 10 per cent. In the quaint language of that time, the act read in part as follows, viz.: "Be it . . . enacted . . . that no person or persons, . . . by way or meane of any corrupte bargayne, loone, eschaunge chevisaunce, shifte, interest of any wares, . . . accepte or take, in lucre or gaynes, for the forebearinge or givinge daye of payment of one hole yere, of and for his or their money, . . . above the sume of tenne poundes in the hundred." The act was repealed in 1555. In 1570 the statute was restored. In 1624 the highest rate allowed was fixed at 8 per cent., and in 1651 at 6 per cent. In 1714 the rate was fixed at 5 per cent., but in 1833 and 1854 the restrictions were removed on certain short-time obligations.

The right by legislation to regulate the amount of interest receivable for the use of money has been recognized in our various states. Each state by statute expressly regulates the rate of interest to be paid on contracts where no rate is specified by the parties. The penalties fixed by various state statutes for usurious charge of interest may be grouped as follows, to-wit: Forfeiture of usurious interest; forfeiture of double the amount of usurious interest; forfeiture of three times amount of usurious interest; forfeiture of all interest; forfeiture of all interest and 10 per cent. of principal; forfeiture of all interest and principal; usurious charge declared to be a misdemeanor.

### The Ethics of Interest

In the days of barter, before commerce had developed, a strong prejudice existed against the taking of interest. Under the conditions of early times money as a medium of exchange was of little commercial value, and loans of money were generally confined to cases of necessity to relieve distress of the poor. There was no

demand for the loan of money for use in commerce and for the purpose of gain. The masses of people had no remunerative employment for money, and money was borrowed only in desperation or for self-indulgence. Borrowers of that day had little property or goods to pledge for the repayment of loans, and, as the pledge of the persons of debtors was permitted, the security was mostly the persons of borrowers, resulting in the practical enslavement of large numbers of the inhabitants of the nations. One can readily imagine that under such circumstances the taking of interest from poor debtors was regarded with abhorrence. Early economists regarded money as a mere medium of exchange and did not see money as the representative of value, and concluded that money could not be productive and its lending could not justify more than replacement of the principal; and they, therefore, regarded the taking of interest as immoral.

Under the term "usury" the taking of interest is frequently condemned in the old testament, and the early church, from its view of the various provisions of the old testament law, regarded the taking of interest as sinful and against the laws of God and morality. The early Christian church accepted the prevailing prejudice against taking compensation for the use of money and for centuries forbade its members to take interest. Secular laws naturally followed the convictions of the people of the times and prohibited the taking of interest. An act of Edward VI (1537-1553) recited that "the charging of interest was a vice most odious and detestable and contrary to the word of God."

From an examination of the various provisions in the old testament, it will be seen that (a) the practice of taking interest from the poor was prohibited; (b) that the practice of a member of the Jewish nation taking interest from any other member of the nation was likewise prohibited; (c) that the practice of taking interest from any other person was also prohibited.

The foregoing references furnished ample authority for the ancient believer to oppose the practice of taking interest, and were the foundations for his religious convictions on the question. No doubt the teachings referred to were mainly responsible for the views entertained by the ancient peoples in these matters, but, when in addition, we consider that masses of the ancient peoples eventually found themselves in a deplorable condition, almost slaves by reason of the burden of debt and its increase by interest,

we can realize in a measure their fury against debts and the taking of interest. In Athens, in ancient Greece, the conditions became unbearable, and about 595 B.C., by the laws of Solon, the debts were canceled and the making of new debts upon the security of the debtor's person was forbidden; also a debt upon all of debtor's property. The conditions in ancient Rome were similar, and about 500 B.C., a law was passed regulating the rate of interest, in the belief that the setting of a maximum rate would overcome the evil. That remedy did not prove sufficient. During the time of Julius Caesar (102-44 B.C.) the plan of Solon was adopted in Rome. Justinian (483-565 A.D.) established a rate not exceeding 8 per cent. interest on mercantile loans, and not exceeding 6 per cent. on other loans.

To give an idea of the attitude of ancient philosophers on the interest question, we mention two, to-wit: Xenophon (445-359 B.C.), a pupil of Socrates, is quoted as showing an appreciation of value of trade and approving the payment of compensation for the use of money. Aristotle (384-322 B.C.) taught the sinfulness of interest, stating: "As the natural riches of all mankind arise from fruits and from animals, interest on money is detestable; that money should be born of money is contrary to nature."

From the teachings of the new testament it would appear that our Saviour was not opposed to the taking of interest, and we may infer that at the time of Christ it was more or less customary to take interest or usury. There are two quotations from the Master in the new testament, indicating his assent to the practice of usury, to-wit:

> (1) Thou oughtest therefore to have put my money to the exchangers, and then at my coming I should have received mine own with usury.—Matthew xxv: 27.
>
> (2) I will judge thee, thou wicked servant: Wherefore then gavest not thou my money into the bank, that at my coming I might have required mine own with usury.
>
> —Luke xix: 23.

By slow change of public opinion, the prohibition against usury or interest became less severe, and loans for commercial purposes were approved between persons economically equal. This was a step forward from the strict prohibition, based upon loans from a rich man to a poor man. More modern philosophers agreed that the continued prohibition of interest was wrong.

Calvin (1509-1564) declared that the prohibition of interest was not justified by authority of the bible or by reason, and that other property, as well as land, was productive. As noted above, it was in the days of Calvin that the English statute of 1545 was enacted, permitting interest at not exceeding 10 per cent.

Grotius (1583-1645) declared if the compensation for the use of money allowed by law does not exceed the proportion of the hazard run, its allowance is not repugnant to the revealed or natural law. If it exceeds these bounds, it is then oppressive usury and unjust, though sanctioned by state law.

Even after the various countries had begun by law to allow interest, because of advanced thought on the subject, yet students of those times continued to oppose interest. Domat (1625-1696) declared that every agreement under which interest is taken for a loan is a crime, most piously condemned by the law of God and that of the church, no matter what pretext is made to color it.

Bacon (1561-1626) sharply brought out the thoughts of the people of his day on the question of taking interest, as the following quotations from his essay on usury will indicate, to-wit: "Many have made witty invectives against usury. They say that . . . the usurer is the greatest sabbath-breaker, because his plough goeth every Sunday. . . . That the usurer breaketh the first law that was made for mankind after the fall, which was 'in the sweat of thy face shalt thou eat bread'—not, in the sweat of another's face. . . . That it is against nature for money to beget money, and the like. I say this only, that usury is . . . a thing allowed by reason of the hardness of men's hearts, for, since there must be borrowing and lending, and men are so hard of heart as they will not lend freely, usury must be permitted. . . . But few have spoken of usury usefully. It is good to set before us the incommodities and commodities of usury, that the good may be either weighed out or culled out; and warily to provide that, while we make forth to that which is better, we meet not with that which is worse. The discommodities of usury are: First, that it makes fewer merchants; for, were it not for this lazy trade of usury, money would not lie still, but would in great part be employed upon merchandizing, which is the 'vena porta' of wealth in a state. The second, that it makes poor merchants; for, as a farmer cannot husband his grounds so well if he sit at a great rent, so the merchant cannot drive his trade so well if he

sit at great usury. The third is incident to the other two, and that is the decay of customs of kings or states, which ebb or flow with merchandizing. The fourth, that it bringeth the treasure of the realm or state into a few hands; for the usurer, being at certainties and others at uncertainties, at the end of the game most of the money will be in the box; and ever a state flourisheth when wealth is more equally spread. The fifth, that it beats down the price of land, for the employment of money is chiefly either merchandizing or purchasing and usury waylays both. The sixth, that it doth dull and damp all industries, improvements and new inventions, wherein money would be stirring if it were not for this slug. The last, that it is the canker and ruin of many men's estates, which, in process of time, breeds a public poverty. On the other side, the commodities of usury are: First, that howsoever usury in some respect hindereth merchandizing, yet in some other it advanceth it; for it is certain that the greatest part of trade is driven by young merchants upon borrowing at interest; so as, if the usurer either call in or keep back his money, there will ensue presently a great stand of trade. The second is, that, were it not for this easy borrowing upon interest, men's necessities would draw upon them a most sudden undoing; in that they would be forced to sell their means (be it lands or goods) far under foot; and so, whereas usury doth but gnaw upon them, bad markets would swallow them quite up. As for the mortgaging or pawning, it will little mend the matter: for either men will not take pawns without use, or, if they do, they will look precisely for the forfeiture. I remember a cruel monied man in the country, that would say, 'The devil take this usury, it keeps us from forfeitures of mortgages and bonds.' The third and last is, that it is vanity to conceive that there would be ordinary borrowing without profit, and it is impossible to conceive the number of inconveniences that will ensue, if borrowing be cramped. Therefore to speak of the abolishing of usury is idle. . . . To speak now of the reformation and reiglement of usury, how the discommodities of it may be best avoided and the commodities retained. It appears, by the balance of commodities and discommodities of usury, two things are to be reconciled. The one, that the tooth of usury be grinded, that it bite not too much; the other, that there be left open a means to invite monied men to lend to the merchants for the continuing and quickening of trade. This cannot be done,

except you introduce two several sorts of usury, a less and a greater. For if you reduce usury to one low rate, it will ease the common borrower, but the merchant will be to seek for money. And it is to be noted, that the trade of merchandize, being the most lucrative, may bear usury at a good rate: other contracts not so."

As production beyond absolute necessities became universal, as means of transportation developed, and as economic goods produced in one section or country were needed for the well-being and happiness of man in others, trade developed. Such development necessarily required the use of money as a medium of exchange, and borrowing for commercial purposes naturally followed. Certainly there is no moral turpitude in a reasonable interest charge on loans made for carrying on business for profit. Taking human nature as it has been and is, there must be some inducement to a person who has accumulated money to incline him to allow the use of it by another, especially for the purpose of trade, with more or less hazard of loss. Also, as economic thought developed, it was found that coin was not only a representative of value, but had intrinsic value, and was not merely a token for use in exchange. It was discovered that coin was a valuable species of property, and that it was generally harmful to a community to prevent its use. It was found that hardship was not necessarily connected with all borrowing, and discrimination began to be made between loans. Laws permitting a reasonable charge for the use of money followed the change of public opinion; yet, not forgetting the past history of usury, such laws, to protect the masses, usually regulate the highest rates that may be charged. Loans have been wonderful aids in the development of the world. Without compensation for commercial loans, most of such loans would not have been made and the progress of the world would have been retarded; thus, interest has been and is a powerful agency in the development of commerce and civilization.

If it be conceded that it is ethical to receive reasonable rent for land used in production of husbandry, subject to the hazard of agriculture, why is it not ethical to receive reasonable interest for the use of money to be used in commerce, subject to the hazard of trade? If it be ethical to receive reasonable interest for the use of actual money, why not for the use of credit, a modern substitute for money?

THE ECONOMICS OF INTEREST

From the economic point of view, interest may be regarded as composed of two elements: (a) Insurance against risk of loss of principal, and (b) pure compensation for the use of money. Lenders are perhaps not conscious of these two elements, in asking a certain rate per cent. for the use of money, but they are involved nevertheless. Occasional losses are bound to occur with the greatest care possible, and these losses must be covered in any volume of business. In a carefully conducted banking business, these losses are very, very small indeed, considering total loans made. However, these losses must be considered. They are the basis of the provisions of our national banking laws, limiting the largest amount to be loaned to any one borrower to not exceeding 10 per cent. of the capital and surplus of the lending banks respectively. Similar provisions will be found in the modern banking laws of our various states. These provisions are a great protection to the various institutions. The excess of interest received, over the losses sustained, is the actual compensation received for the use of the volume of money borrowed, and represents profit, not net profit, because from the actual compensation must be deducted the expenses of doing business.

Franklin (1706-1790) in one of his essays expressed his thought as to the fundamentals involved in a sale on credit, as follows: "He that sells upon credit asks a price for what he sells equivalent to the principal and interest of his money for the time he is to be kept out of it. . . . In buying goods it is best to pay ready money, because he that sells upon credit expects to lose 5 per cent. by bad debts; therefore, he charges on all his sales upon credit, an advance that shall take up that deficit; those who pay for what they buy upon credit pay their share of this advance."

Before commerce developed to the point where it was profitable to borrow money to facilitate trade, the economists regarded money as having no value and as being merely an unnecessary instrument in making exchanges of goods. Economic thought has advanced to the point of recognizing that coins have real value and are a valuable species of property, and that any owner permitting the use of such property is entitled to compensation, the same as the owner of other property used in the production of economic goods or the transportation or distribution thereof, or the well-being of the people of the community. It is now general and

universal for those engaged in commerce to borrow money for use in business. What a contrast to the original economic theory in that regard! As the money is borrowed by the respective obligors for use in business, and as they themselves make a greater profit from the use of the money, they are glad to pay reasonable rates of interest for the use of the funds, and economically the community is benefited by the increase in trade thereby permitted. Ancient economic principles and ancient laws on the question of interest cannot be comprehended by the modern student, unless he inquire into the conditions of ancient times, as already briefly reviewed above. Aristotle said in effect that money was barren; that one piece of coin could not beget another. His philosophy did not contemplate modern conditions. While a coin cannot be increased by planting in the ground as seed, it can in these days be put to work and render a useful service to mankind and aid in economic development.

Franklin in another of his essays expressed his thought as to the fruitfulness of money, as follows: "Remember that money is of the prolific generating nature; money can beget money, and its off-spring can beget more, and so on."

The question of the rate of interest, to be paid for the use of money in the different communities, varies largely according to local supply and demand, but also in a marked degree according to the use to be made of the amounts borrowed, and according to the length of time for which borrowed. In ancient times it was thought that setting the highest rate to be allowed would be sufficient to overcome abuse in interest charges, but experience taught otherwise, and the law was repealed. It is now recognized, as already stated, that owners of funds cannot be expected to make loans without reasonable interest; that there must be an inducement to let another use the funds, instead of having the owner himself do so. By lending his funds the owner passes the responsibility for its use upon another, and the owner himself avoids the care and worry incident to the actual employment of funds in some process of commerce or business. The relief is some consideration and makes for the establishment of a supply of funds in the community, and thus affects the rate of interest. Rates of interest in a financial center are always much lower than in an undeveloped and sparsely settled community, this inclusive of loans where the element of insurance of principal may be con-

sidered equal. Under such circumstances, the law of supply and demand will control the rate, and in the center the rate, because of increased supply, will always and inevitably be less than in the sparsely settled community.

The credit, or recognized ability to pay, behind an obligation has a material effect on the rate of interest, persons of highest credit rating receiving the benefit of the lowest prevailing rate of interest for money. If funds borrowed are invested in readily convertible economic goods, and borrowed for a short time only, so that the paper representing the loan comes in the class considered liquid, then the borrowers also receive the benefit of the lowest prevailing rate of interest. Borrowing for investment in fixed and not readily convertible assets, and for long periods of time, must be absorbed by funds held for permanent investment and necessarily must pay higher rates than liquid paper. Income taxes upon income and property taxes upon securities affect interest rates in a direct way, and lenders seek an increase in rates to make up in part at least the amount of taxes to be considered. Of course, government securities have the highest credit, and are negotiated at the lowest prevailing rate of interest; next come securities of states; next political subdivisions of states; then individual and corporate securities.

There are a number of theories as to the philosophical conception of interest, concerning which economists are not in agreement. The theories referred to are (1) the monopolistic theory; (2) the abstinence theory; (3) the productivity theory. (a) Economists of the monopolistic school hold that those who have or control accumulated funds enjoy a monopoly over those who need money, and, therefore, have power to levy upon the needy the equivalent of a tax, more or less severe, for the use of the funds; that accumulated capital may control means of production and must not be allowed to oppress the people by what is equivalent to an assessment on the producer and thus to the consumer; that, therefore, the use of capital is a matter for the state, and should be controlled for the protection of all. (b) Economists of the abstinence school hold that interest is a reward to those who produce more than they consume, the amount not consumed being represented by the amount of money saved; that thrift benefits not only the one who saves, but the people also, and, therefore should be rewarded; that one who abstains from using up all of

his production should be encouraged to use his surplus for the benefit of others and earn a profit, or allow others to borrow for commercial use and be paid a reasonable profit; also, that the present use of money has a value greater than the right to the use later, and, if loaned for present use to another, that reasonable profit may be required. (c) Economists of the productivity school hold that interest is a return for production of capital, on the same basis that wages are a production of labor; that money invested in commercial facilities or goods is not dead, but active; that working capital invested in business the same as other capital, is active; that in such forms capital is indispensable to the production or transportation or distribution in commerce, and entitled to its fair reward.

### Some General Legal Rules Affecting Interest

1. Interest is allowed by law only on the ground of a contract, express or implied, or as damages for a breach of duty. After an agreement has been duly made for the payment of a lawful rate of interest, the charging of a higher rate in the particular transaction is illegal.

2. On a contract for the payment of a debt, where no interest rate is specified, or where the law imposes an interest penalty for delay in payment, the interest allowed is at the legal rate. This rate varies in the different states, according to the laws of the respective states, and reference must be had to the laws of the states as to what are their legal rates. These rates vary from 5 per cent. to 8 per cent. per annum.

3. When a loan is made for a lawful rate of interest between the original parties, the holder of the paper thereafter may sell the same at any rate per cent., and (although such sale may be made at a rate higher than is allowed by law against usury between the original parties) the second transaction is not tainted by the question of usury.

4. If an instrument is made payable at a future date with interest, and nothing is said in it as to the commencement of the interest period, interest is to be computed from the date of the instrument. Where interest is allowed as damages for the breach of a contract, interest ordinarily would run from the date of the breach; but in many cases demand is essential to fix the time of default.

5. A general deposit in a banking institution does not bear interest, unless there is an agreement or usage to the contrary. The undertaking of such institution on a general deposit is only to repay on demand amounts deposited. Interest is properly allowed upon a cheque, the payment of which has been wrongfully refused by the institution, from date of presentation of the cheque for payment.

6. Interest obligations, such as interest notes or interest coupons, that provide for the payment of a definite sum at a definite time, and having no provision for interest after maturity generally bear interest from maturity. A few cases hold that interest on coupons will run only from demand. In this connection one must bear in mind that the law does not favor compound interest, and, where compound interest is prohibited or limited, then the law will prevail.

7. A mistake in the calculation of the amount of interest due is regarded as a mistake of fact. Where a mistake has been made as to the proper rule to apply in the calculation of interest in a given case, such mistake will be regarded as a mistake of law. This distinction is important, because the law always allows the correction of a mistake of fact, where correction is requested within a reasonable time, while the law does not allow correction where the mistake is one of law.

8. Interest is generally to be computed so as to avoid the payment of compound interest. Courts oppose the allowance of compound interest unless the law expressly permit and there be a definite contract to pay interest upon interest, or to pay interest with stated periodical rests. To quote Chancellor Kent: "Interest upon interest . . . would as a general rule become harsh and oppressive. Debt would accumulate with a rapidity beyond all ordinary calculation and endurance. Common business cannot sustain such overwhelming accumulation. It would tend also to inflame the avarice and harden the heart of the creditor. Some allowance must be made for indolence of mankind and the casualties and delays incident to the best regulated industry; and the law is reasonable and humane which gives, to the debtor's infirmity or want of precise punctuality, some release from the same infirmity of the creditor. If the one does not pay his interest to the uttermost farthing, at the very moment it falls due,

the other will quickly avail to demand it with punctuality. He can demand it and turn it into principal when he pleases; and we may safely leave this benefit to rest upon his own vigilance or his own indulgence." The great evil referred to by Chancellor Kent will be more fully realized when the growth of compound interest is taken into consideration. See computations given below.

9. The general rule is to the effect that compound interest is not recoverable, unless there has been a settlement between the parties, or a judgment, whereby the correct amount of principal and interest is turned into a new principal.

10. An agreement making interest payable annually, and if not paid when due to bear the same rate as the principal, in a majority of the states is held invalid, as contrary to public policy, but if interest has actually become due, and payment has been extended, then a new agreement to pay interest upon such interest is permissible.

11. As to whether a contract is usurious, the law in force at the time the contract was made determines the matter.

12. Interest is an incident to a debt, and cannot exist without it. When a debt is extinguished, interest is also.

### The Calculation of Interest

As already noted, by custom interest is calculated at an agreed percentage per annum on each dollar, or fraction, of indebtedness. To quote a rate of 6 per cent. per annum, means 6 cents per year on 100 cents, or $1, of indebtedness. The rate expressed as a fraction would be 6/100 of the principal per annum.

Simple interest may be easily calculated by arithmetical methods, as explained in any book on business arithmetic taught in primary schools. In addition there are combination methods and short methods, and also interest tables are provided for those who have much interest to calculate and need to be speedy and accurate in their work.

While the usual calendar year contains 365 days and a leap year 366 days, it is the custom of banks and merchants to calculate interest on basis of 360 days to the year, and to consider the interest for one day equal to 1/360 of the amount for the year, for all periods of fractional years. Where the rate of interest is less than the highest legal rate allowed by law in a state, no question of usury is encountered by using the 360 days' method,

as the usury laws will not be infringed upon. Strictly speaking, the 360 days' method causes an overcharge of interest equal to 5/365, or 1/73, in the usual calendar year (6/366, or 1/61, in a leap year), and to that extent error is made in the calculation of interest on the debt. As the error is slight, it is deliberately overlooked and generally accepted even by the courts. However, when the highest legal rate of interest is the rate on a loan, then to use the 360 days' method will result in a usurious charge of interest, and the loan may be subject to the penalties of usury. In the latter case, it would seem advisable to follow the exact method in the calculation of interest. Where an institution uses the 360 days' method for calculating interest in its favor, proper appreciation of proprieties should induce it to use the same method for interest it pays, instead of the exact 365 days' method; but this is not always the case.

It is the custom in banking institutions to discount short-time obligations; that is, deduct in advance from the proceeds of loans the interest to accrue thereon for the period of each loan. Again, so long as the rate of discount is less than the highest legal rate allowed, no question of usury is encountered; but, if the highest legal rate is used, then the transaction may be tainted with usury, because the deduction in advance of the highest legal rate on the whole amount of the loan would result in a charge for interest in excess of the legal limit on the net amount of the loan. Stated in another way, the present worth of an amount of interest, deducted in advance from a loan, is less than the amount of interest payable at the maturity of the loan, and, to the extent of the excess, would be usurious; $1 to be paid in the present is worth more than $1 to be paid at the end of the loan period, considering the money to have an interest-earning value. In the last case, it would seem advisable to follow the exact method in figuring interest at the highest rate, and, for purpose of discount, calculate the present worth thereof, instead of taking the whole amount as interest. The present worth is readily ascertained by dividing the amount of interest by one-plus-the-rate-per cent. of the interest for the year, or pro rata of the per cent. for fractional year, as the case may be.

Another practice in the calculation of interest generally indulged in by banking institutions is to calculate interest from the date of a note to the maturity of the note, both days inclusive.

This method of calculation gives the institution interest for one extra day on the amount of each note and is an illegal method for figuring an agreed rate; for the rule of law, governing matter of time of performance of contracts, is to exclude either the first day or the last day, in finding the number of days the obligation is to run. If, instead of actually paying his note on the day of maturity, the maker gives a renewal note on such day of maturity, for the same debt, the result is that the institution for such day receives two days' interest, as the day has already been taken as an extra day. So long as the rate of interest taken is not the highest legal rate allowed in the state, the question of usury will not enter. If the highest rate is taken, usury may again taint the contract, unless exact interest is calculated for the legal number of days the contract is to run.

The general rule in the United States for the calculation of interest on a debt, where partial payments are made from time to time, is the rule known as the United States supreme court rule, because approved by that court. Under the rule, interest is to be calculated on the debt up to time of first payment; then add interest to principal and deduct payment; then cast interest on remainder, to the second payment; add the new interest to the remainder and deduct therefrom the second payment; and so on, until the last partial payment; except where the interest up to any partial payment shall exceed the partial payment, in such case the partial payment is to be deducted from the interest, and the excess of interest is to be carried forward without casting interest thereon to the next payment that will discharge the excess. While courts are opposed to the allowance of compound interest, yet it will be noted that, in the case of partial payments, compounding against such payments, where more than the accrued interest for the period covered, is allowed without an express contract for such compounding of interest. This rule is general and must, therefore, be taken as an exception to the rule of the courts never to allow compound interest without an express permissible contract. On the other hand, the equitable rule known as the merchants' rule, for calculating interest on partial-payment contracts, is to calculate the interest on the debt without regard to partial payments, and ascertain the amount of such interest; then separately to calculate interest on each partial payment from the time of payment to maturity of the debt, and credit such interest on partial

payments against the interest first calculated on the debt; and the reduced amount of interest is then taken as the true simple interest to be paid on the debt.

When money is loaned at interest compounded once a year, or, as it is said, at annual rests, it means that the interest accrued to the end of the year is to be added to the principal to form a new increased principal, upon which interest is to be calculated for the second year, and so from year to year while the debt remains unpaid. If the interest is to be compounded semi-annually, it means that the interest accrued at the end of each half-year is to be added to the principal and the increased amount each half-year shall form a new principal for the calculation of interest. Compound interest may be calculated arithmetically, by repeated calculations for each period, on the principal and interest of the preceding period, for the number of years or periods the loan is to run. Where the periods are few, the amount may be so calculated without very much work, beyond an ordinary interest calculation. Where the periods are many, then the arithmetical work becomes very laborious, and, as it also is liable to error at each step of the process, the tedious calculation becomes uncertain. To make compound interest calculations resort is usually had to a table of compound interest for the desired number of years or periods, at the required rate of compound interest.

### Unusual Studies in Compound Interest

The growth of money placed at compound interest is astounding. Unless previous thought has been given to such problems the result is hardly believable.

Increase in rates of compound interest cause more than proportionate increase in results of such investments. In illustration of the fact, note results of investments of $1 each for 100 years at interest rates of following decimal values, compounded annually, to-wit:

(a) .040; (b) .041; (c) .042; (d) .043; (e) .044; (f) .045; (g) .046; (h) .047; (i) .048; (j) .049; (k) .050; (l) .051; (m) .052; (n) .053; (o) .054; (p) .055; (q) .056; (r) .057; (s) .058; (t) .059; (u) .060.

At the end of the period the respective investments will equal the following amounts, to-wit:

(a) $50.50; (b) $55.60; (c) $61.20; (d) $67.36; (e) $74.13; (f) $81.59; (g) $89.78; (h) $98.78; (i) $108.67; (j) $119.55; (k) $131.50; (l) $144.63;

(m) $159.06; (n) $174.92; (o) $192.34; (p) $211.47; (q) $232.48; (r) $255.56; (s) $280.91; (t) $308.74; (u) $339.30.

It will be noted, while the above interest rates increase on basis of an arithmetical progression by tenths, the amounts increase on a basis of a geometrical progression at a faster and higher ratio.

From various remarks of writers of the 16th, 17th, 18th and 19th centuries, it appears that rates of 5 per cent. and 6 per cent. have been assumed to be a fair and reasonable rate of interest. In connection with various court matters involving questions of compound interest, the rate of 5 per cent. compounded annually has been taken as more than reasonable. The first interest statute of England (1545) permitted interest at a rate not exceeding 10 per cent. per annum. Since that time to the present (1923) 378 years have elapsed. One dollar invested for 378 years at 10 per cent. simple interest, the highest rate allowed under the statute, would now amount to $38.80. One dollar invested for 378 years at 5 per cent. interest compounded annually, the compound interest rate assumed as more than reasonable, would now amount to more than $102,224,000. Comparison of the two amounts, although the latter is taken at one-half the rate of the former, shows the terrific growth at compound interest in long periods of time, and hence the wisdom of the courts in not permitting compound-interest calculations in legal matters, unless there be express authority under the law of the various jurisdictions and a clear contract for compound interest.

To illustrate the short periods required for money to double, treble, etc., note the following: The sum of $1 placed at interest at the rate of 5 per cent. per annum, compounded annually, in 14.20 years will double; in 22.51 years will treble; in 28.41 years will quadruple; in 32.09 years will quintuple; in 36.72 years will sextuple; in 39.88 years will septuple; in 42.62 years will octuple; in 45.03 years will nonuple, and in 47.19 years will decuple.

To illustrate the immense totals that may be accumulated in a few centuries, note the following: The sum of $1 placed at interest at the rate of 5 per cent. per annum, compounded annually, in 100 years will amount to $131.50; in 200 years to $17,292.59; in 300 years to $2,273,997; in 400 years to $299,033,586; in 500 years to more than $39,323,000,000. The latter amount is practically four times a recent estimate of all gold and silver money in the world.