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When should Depreciation be Deducted to Find the Rate Making Value of Public Utilities

A discussion of some common misconceptions of the nature and determination of depreciation as affecting the fair value of public utility properties for rate making purposes.*

H. C. Hasbrouck†

The United States Supreme Court in May and June, 1923, handed down three decisions of great importance in public utility regulation because they dealt with certain very fundamental questions. These three opinions, made public at about the same time and referring to similar issues, have been widely discussed and very frequently quoted. The three cases may be referred to briefly as the Southwestern Bell Telephone Company case, 262 U. S. 275, the Bluefield case, 262 U. S. 679, and the Georgia Railway and Power Company case, 262 U. S. 625. Because of their importance and the wide-spread interest they have aroused, it is perhaps natural that any discussion at this time of public utility rate-making as a governmental function should be assumed to center around these three decisions. In fact, however, the matter of depreciation was not specifically an issue in any of these cases nor was it touched on in any of the opinions except—principally by implication—in the Southwestern Bell case, and there without any discussion of what the term really means or why it is so vitally important in governmental rate-making.

The fact is that the courts are only beginning to recognize the pitfalls that lie in the way of a sound economic conception of depreciation as affecting the rates that should be charged by public utilities. The fundamental issue has never been squarely presented to the United States Supreme Court and but seldom to the Federal District Courts or the State Courts. Where it has been most fully presented the leading recent court decisions are opposed to the deduction from “value for rate-making purposes” of any estimate of theoretical “accrued” depreciation simply and solely for lack of new-

*For the discussion of the distinction between “Accrued depreciation” and “Observed depreciation” the writer is in large measure indebted to Mr. E. J. Cheney, Consulting Engineer, 61 Broadway, New York City, formerly Chief of the Division of Light, Heat, and Power, Public Service Commission, Second District, State of New York.
†Formerly Chief of the Division of Statistics and Accounts, Public Service Commission, Second District, State of New York.
ness in the property whose value is in question.\(^1\) There is still an enormous amount of misunderstanding, however, in spite—or perhaps because—of the great volume of discussion that the subject has aroused in recent years. To the writer it seems that this misunderstanding is due principally to a confusion of two points of view and this paper is an attempt to clarify the situation by insisting on a clear cut distinction between these two quite different methods of approaching the problem.

The first of the two points of view here contrasted is that which emphasizes the root meaning of the word “depreciation,” a lessening in value. It postulates that nearly all kinds of physical property decrease in value as they grow older, other things being equal, and that it is possible and desirable to measure and state this decrease with approximate accuracy. This concept is the most natural and the one which the mind of the average man, or of the judge who has not made a special study of economics, will usually grasp at when brought face to face with the problem of public utility valuation. It accepts as axiomatic the proposition that second hand property is “worth” less than new property, —although a moment’s consideration will show that this is not universally true even in a period of relatively stable currency values, while, during a period of rapid inflation, as recent experience during the war years abundantly demonstrated, appreciation due to inflation of the medium of exchange may more than offset any depreciation in market value due to deterioration from age. Nevertheless, the concept of depreciation as a gradual lessening in value, when corrected for the obvious factors that affect the general proposition, is not in itself erroneous. But when it is confused with the second point of view hereinafter discussed the result will be, as this paper will endeavor to show, gross injustice and serious economic loss.

The second point of view emphasizes not value but cost. It has come into prominence with the development of cost accounting and it has been the basis upon which have been framed the sections of the Income Tax Law which relate to accounting for depreciation and the regulations of the Treasury Department pertaining thereto. This point of view likewise is not in itself illogical or unjust. It may be stated as follows.

An element in the cost of conducting any enterprise is the loss or expense represented by the excess of the first cost of property em-

ployed therein over the salvage value of the same property at the
time it becomes necessary for any reason to retire it from service.
This excess constitutes actual depreciation or retirement loss which
is an inescapable part of the cost of doing business, however it may be
recorded in the books of account. In order to state the annual oper-
ating cost truly it is necessary to give effect to this loss not only in
the year in which it is realized and definitely determined—that is to
say not only in the year when the property in question is actually
retired—but also in each year during which the loss "accrues." Usually
the loss is considered to accrue in equal annual or other
periodic installments, and the cost accounting theory of accounting
for depreciation is then referred to as the "straight line theory".
It involves two assumptions,—first, that the amount of the loss can
be satisfactorily determined in advance of its realization, and second,
that it must be spread evenly over the life of the property during
its period of service from the date of its installation to the date when
it is retired. Both of these assumptions are matters of practical
convenience and have no necessary logical basis. The exact amount
of the loss never can be known before it is realized and there is no
reason for considering that this loss must be taken up in equal annual
or quarterly or monthly installments instead of being recognized
only as a whole at the date when it becomes realized, other than the
obvious advantages of equalizing the incidence of such losses year
by year or month by month.

A variation of the straight line theory which is sometimes advo-
cated is that retirement losses, being due in most cases where public
utility property is involved, not to wear and tear but to the ne-
cessity of replacing plant and equipment which has become obsolete
or inadequate, should not be considered to "accrue" in advance of
their realization but after they have been definitely determined they
should be charged against future operation,—spread evenly, perhaps,
though this is not necessarily insisted upon, over the life of the re-
placing unit. The advocates of this plan argue with considerable
force that the loss is really a cost of the improved service resulting
from the new plant or equipment, and that their method of account-
ing would place the burden where it belongs, upon the consumer who
gets the benefit of the improved service. It is unnecessary for the
purposes of this paper to discuss whether the straight line theory
in its usual form, or what may be called the post-retirement account-
ing is preferable. However, some corollaries that are supposed to
follow logically from the theory of accounting for depreciation in
advance of its realization, and the fact that these supposed corolla-
ries are due to the confusion of the cost accounting concept with the simpler one of lessening value, are the points that cause most of the trouble in public utility rate-making.

Inasmuch as the straight line theory is essentially a method of accounting for cost, it can be properly applied only when dealing with cost. The amount of straight line depreciation that may have "accrued" upon certain property bears a definite mathematical relation to the amount that is invested in that property by the owners but does not bear any necessary relation to the economic value of the property. No practical business man in his normal senses who was considering the purchase of a plant would ever take the trouble to have a careful estimate made of the probable life of the component parts of the plant and the proportion of that life that had already elapsed, and then use the theoretical depreciation so computed in determining the price he would be willing to pay. He might and probably would arrive at some figure to represent the excess of the cost of a perfectly new plant over the price he would be willing to pay for the existing plant in its present condition. But he would not reach such a figure by any computation of "straight line depreciation". What he would actually do will be discussed hereinafter at greater length. But the point to be emphasized now is that in arriving at the value of the plant to him he would disregard the method that might reasonably have been used by the present owners to account for the cost of the plant to them.

The fact is that thanks to what the present writer considers the most unfortunate language of the United States Supreme Court's opinion in the basic case of Smyth vs. Ames,2 "value" has come to have certain artificial and conventional meanings in rate cases quite distinct from its true economic significance. Although the formula "A fair return on fair value" is now so widely used by courts and commissions that it is often referred to as the fundamental principle of rate-making by regulatory bodies, it is, nevertheless, essentially ambiguous. The economic "value" of any property used as capital is determined by the expectancy of the income that can be derived from it. Therefore, to base rates on "value", in the economic sense, is merely to ascertain probable earning capacity, or, in the phrase that is much more unpopular than it deserves to be if its implications

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2Head note—"The basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public; * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience." 169 U. S. 466, 42 L ed. 819 18 Sup. Ct. 418 (1898).
were clearly understood, "to charge what the traffic will bear." Because few regulatory commissions or courts have conceived it to be their duty to fix rates on the basis of earning capacity the word "value" in the formula "A fair return on fair value", it has been held repeatedly, cannot be taken in the sense in which economists use it but must be given a special and peculiar meaning for "rate-making purposes." Herein lies the root of the difficulty. For, if the concept of "value for rate-making purposes" approximates the concept of cost, or what may be termed "investors' sacrifice", straight line depreciation has a definite part to play; but if the concept of "value for rate-making purposes" approximates the concept of "market value", straight line depreciation has no logical place therein.

Let us take the "investors' sacrifice" or cost concept of "fair value" and see what is the relation to it of "accrued depreciation". It is true that a logical case can be made for the deduction from cost—whether "original cost" or "present day reproduction cost" is immaterial—of theoretical accrued depreciation, if the "fair return" is to be based upon the sacrifice that the investors have made and if certain fundamental conditions are met. Whenever accrued depreciation is deducted from cost or so-called value to determine the "rate-base" for a public utility, it is the necessary assumption, whether recognized or not, that the investors' sacrifice concept predominates in the consciousness of the commission, court, or other rate fixing authority, and that these other fundamental conditions which we are now about to examine are likewise met. It is moreover generally assumed more or less consciously, that the conditions necessary to make a logical case for deducting accrued depreciation exist in the typical and normal case, whereas, as a matter of historical fact, such conditions with public utility properties, at least in recent years, have been the exception rather than the rule.

As the argument for deducting accrued depreciation is usually stated the following is an illustration of its application. A Utility starts business with a given investment, say, to make a concrete case, $100,000. The probable average life in service of the various
units making up the plant is determined to be forty years. The probable salvage value of such units at the end of their useful life is estimated to be $20,000. This leaves an $80,000 retirement loss to be spread over forty years which makes an annual depreciation charge of $2,000, or two per cent on the original investment. Assuming that the Utility's income is just sufficient to pay a fair return on the original investment, in addition to providing for the annual depreciation charge, assets of $2,000 will be set aside each year and added to the Utility's original investment, in the form of cash, additions and betterments to the original plant, or investments in securities or other property not devoted to the Utility's own operation. Let us suppose that this process goes on for ten years and that in each year the investors receive a fair return on their original $100,000 in addition to the $2,000 set aside as a "depreciation reserve". If no retirements of property are made during that ten year period the Utility's balance sheet at the end of the period would be represented thus:

**ASSET SIDE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed and floating capital:</td>
<td></td>
</tr>
<tr>
<td>Original investment</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Additions in new property, cash, or securities</td>
<td>20,000.00</td>
</tr>
<tr>
<td></td>
<td>$120,000.00</td>
</tr>
</tbody>
</table>

**LIABILITY SIDE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital stock and bonds</td>
<td>$100,000.00</td>
</tr>
<tr>
<td>Depreciation reserve</td>
<td>20,000.00</td>
</tr>
<tr>
<td></td>
<td>$120,000.00</td>
</tr>
</tbody>
</table>

If now the rates charged by such a Utility are challenged it can hardly claim that its investment has increased $20,000 merely because of the new assets which have been acquired during the ten years. If the fair rate of return continues to be based on the Utility's investment—not, be it noted, on the *value* of its property, which is a very different concept—it has not, the original investors have not, put up one cent more than they originally put into the enterprise. On the facts above stated there would probably be little serious objection to basing the fair rate of return on the total fixed and floating capital less the amount of depreciation reserve or $120,000 minus $20,000 equals $100,000. Note, however, that the rate-base thus determined is exactly the amount of the original investment. There is no "depreciation" in that. If the investors
had left in the business all or part of the return which they might have been entitled to receive in dividends and reinvested such amount in further additions, that would be a reinvestment of earnings upon which the owners of the property might reasonably claim an additional return. Such reinvestment of earnings, however, is to be carefully distinguished from a reinvestment of the depreciation fund.

Under the circumstances of the foregoing illustration, then, a fair rate-base can be fixed on the theory of "cost less depreciation". But observe what these circumstances are.

In the first place the investors have had a fair return on their investment since the inception of the enterprise. In the second place they have charged and collected in the rates an amount over and above such fair return sufficient to add to the total assets the estimated proportion of the ultimate retirement loss which is chargeable to the first ten years of the plant's life. In all probability there is not one public utility enterprise in twenty where these two fundamental conditions have obtained during the last ten years, certainly not during the last five. It will not do to say, as the extreme advocates of the application of the "straight line" theory in public utility rate cases do say, where it is clear that no adequate retirement reserve exists, that the managers of public utilities either have collected the annual depreciation charge in the rates and paid it out in dividends or that, if they have not collected it, the responsibility for doing so was theirs and the loss is the investors. The fact is that it is only a comparatively recent theory of accounting that requires each year to bear an equal share of the estimated total retirement loss and that this theory has never been so generally accepted or so definitely stated that it can fairly be held that any public utility managers who did not follow it were inefficient. The income even
of public utilities is subject to wide fluctuations from year to year. While there is considerable to be said for the theory that requires recognition of an equal share of retirement losses in each year's income regardless of the earnings, a man is neither a fool nor a knave because he holds that the recognition of such losses should vary with earnings and that payment of regular returns to investors is more important than regular annual accruals to a retirement reserve. Moreover, public utility enterprises have, not only because of regulation, but because of their more direct subjection to the pressure of public opinion, been less able to increase their revenues to meet increased costs than have other enterprises. An increase of rates to take care of theoretical depreciation is as unpopular as an increase of rates to provide a larger return to investors. And the very critics who in a rate case will argue vigorously that it was the business of the managers of a public utility to charge rates for service sufficient to provide an adequate reserve for accrued depreciation, are usually the ones who would have protested even more vigorously if the management had actually adopted any such policy.

To state the argument a little differently, a charge to represent depreciation not yet realized is not a record of an actual loss or expense, like a charge for accrued interest or accrued taxes, but a convenient accounting fiction. It has very definite practical advantages which properly permit it in certain cases to be recognized as a loss or expense. But the question of whether, and if so to what extent, depreciation should be recognized in advance of its realization is not primarily a question of accurate accounting or commercial morality but a question of managerial policy. It may easily be true for certain classes of property and certain types of enterprises that the most practical and in the long run the least misleading statements of earnings and expenses can be prepared by recognizing retirement losses only in the accounting period when they are actually realized. It is the almost universal practice to record the retirement losses on comparatively small units or minor parts of plant and equipment in this way and to measure the loss by the cost of replacing the part without regard to the amount at which the replaced part stood charged in the permanent investment account. The cost of these minor replacements is generally referred to as the cost of repairs or maintenance and looked upon as something quite distinct from the retirement loss on major units. As a matter of fact, there is no logical difference between the retirement loss on a $1,000 transformer and the retirement loss on a ten cent bolt. The distinction is purely quantitative. It is quite conceivable (and indeed there are enter-
prises whose actual condition of operation approximates this conception) that there may be a business in which the retirement of a $1,000 unit is as unimportant, relatively to its entire operations, as the retirement of a ten cent bolt may be to a small concern. There should be no penalizing of enterprises which have been conducted in the past on the theory that their retirement losses could be satisfactorily accounted for at the time of their realization without the device of a depreciation reserve, although it may be a wise policy for a regulatory commission, which has authority so to do, to require all public utilities under its supervision to set up their accounts on a different theory for the future. It is to be noted that the Public Service Commission in New York State has never ordered any class of public utilities to make charges for depreciation not yet realized, although it has strongly recommended that all public utilities do so. Under the decision of the New York State Court of Appeals in the New York Railways case it would seem that the New York statute does not empower the Public Service Commission to issue such an order.

To make a case for taking the amount of a theoretical depreciation reserve from the cost of invested capital in order to determine a fair rate-base, it is necessary to show not merely that the estimated annual proportion of the probable retirement loss is a certain amount and that the accumulation in the retirement reserve on a given date should be so much, but that the enterprise has had revenues in the past sufficient to allow it to set aside such a reserve in addition to a fair return to its investors. Where this is not true it is confiscation of the investors' property to deduct from their actual investment the amount that should, on certain estimates of probable life and salvage values of plant and equipment, be in a retirement reserve at any given time. In a case where no dividends have been paid for a considerable period of years, it is a fair prima facie assumption that the investors have not had a reasonable return. How then in equity can they be penalized, in addition to the loss of income that they have already suffered, on the theory that somehow their invested capital has deteriorated in value because they have failed to collect in past rates enough to offset the theoretical proportion to date of an anticipated future loss?

If a utility happens to have been able, not, indeed, to collect and set aside a theoretically adequate depreciation reserve in addition to paying a fair return on its capital, but, by foregoing just and reasonable dividends, to set aside a small retirement reserve, the amount of

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523 N. Y. 373 (1918); P. U. R. 1918 F 125.
such a reserve cannot equitably be deducted from its invested capital because it has been accumulated from funds which would otherwise have been properly available for dividends. It has therefore been contributed by the stockholders and not by the consumers. This has been clearly seen and definitely expressed by a few commissions, notably in New York State by Commissioner Kellogg in the New York State Railways Case\(^6\) and by Commissioner Fennell in the matter of natural gas rates in Elmira.\(^7\) Such a depreciation reserve does not represent any diminution in the investment. On the contrary, insofar as it is a farsighted provision for a future retirement loss, it is an addition to the value of the plant. Nor can it logically be considered on a theory more or less frequently appealed to, as representing a quasi "trust fund" contributed by the consumers and not by the investors. As clearly stated by Judge Kellogg, in the opinion above referred to, it is not a fund contributed by the consumer but by the investors. Indeed it may reasonably be held to represent a claim of the investors against the community which the utility serves and which has had service at less than its fair cost. The investors have, so to speak, advanced a part of the cost which the consumer should pay, but has been temporarily unable to pay, in the hope of ultimately repaying themselves out of future earnings. They have certainly not decreased the amount of their invested capital by so doing.

The whole theory and practice of rate making by regulatory bodies depends upon the conception that investors who put capital into a public utility enterprise are entitled to payment for the use of that capital. Such payment must be made out of the earnings of the business. These earnings, with reference to their disposition, may be analyzed into three parts:

(i) That which is immediately necessary to meet the cost of running the plant and paying taxes;

(ii) That which is applied to maintenance and replacements; and

(iii) That which goes to the investors as payment for the use of their capital.

Unless there is a reasonable prospect that these three needs will be met, the necessary capital cannot be obtained and while, for any particular period, the earnings of a given utility may be temporarily less than sufficient to meet that period's proper requirement, a long continuance of such a condition inevitably means the impairment

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\(^6\) Matter of fares in Syracuse, P. U. R. 1921C 496 (April 19, 1921).

\(^7\) P. U. R. 1921 D 266.
of that utility's ability to render service because of the impossibility of obtaining new capital, and eventually it is likely to mean the abandonment of the enterprise altogether. The longer such a condition continues the more disastrous are the results not only to the investors in the unfortunate utility enterprise but also to the community which the utility serves. Indeed, the effect on the community of receiving service at less than its economic cost—for that is what happens when the earnings of a utility are insufficient to meet the three needs above described—is far more serious than if, as sometimes occurs, the community pays more than the economic cost of the service. Municipalities and regulatory commissions are likely to forget the fundamental fact that a utility cannot compel a community to pay more for the service which it renders than the service is worth to the community; but that the community can, for a time, force the utility to render service at less than cost, although this must result in deterioration of service and may finally result in its loss.

Let us assume, for the purpose of further illustration, that a certain utility has an invested capital represented in part by stock and in part by bonds. It may be that some or all of the stock is "water", i.e., its par value is greater than the fair cash cost of the property which it represents. However, as no dividends have been paid on the stock for the past ten years the amount of "water" need not concern the community which is questioning the rates charged by this particular utility. The revenues of the utility have been sufficient to pay bond interest and current cost of operation. The stockholders have had no return on their equity and they have not been able to collect from the consuming public anything to set up as a reserve against future retirement losses,—in other words, the rates have not been high enough to cover the full cost of service including a fair return to the investors and the proportionate share of estimated "depreciation". Do the facts when thus stated seem clearly to imply that the investors' capital has been diminished by the amount of the provision for future losses which they have been unable to collect, or that their claim to a fair return on their original investment is in any degree lessened? It is only necessary to state the facts clearly to show the injustice of any such theory. Certainly the property of public utility investors should not be confiscated merely because they have not in the past charged rates high enough to offset the theoretical depreciation on such property. Only in the case too often assumed to be typical, whereas it is in fact exceptional, where the reserve against estimated future retirement losses is represented by property added out of earnings in excess of a reasonable return to
the investors, can the investment entitled to a return be fairly computed by deducting the depreciation reserve from the investment cost.

Now let us take the other horn of the dilemma. Instead of the "investors' sacrifice" conception, let us start with the idea that the "fair value" upon which a return must be allowed is the economic value, the price which a willing buyer would pay a willing seller in an open market. Such a price, as any business man knows, would be the capitalized value of probable future earnings. But in estimating probable future earnings, would an experienced business man compute the theoretical depreciation on a straight line basis? In all likelihood he would do nothing of the kind. He would, however, if he were making a careful investment and not merely indulging in speculation, make some estimate of what he might very probably call depreciation in the property, although he would not base it on life tables or prophecies of future conditions in the industry reduced to a misleading appearance of mathematical accuracy by the simple device of carrying out to the third or fourth decimal place calculations whose unit figures were just an educated—and sometimes not very well educated—guess. When the experienced engineer or practical public utility manager talks about "depreciation" he sometimes qualifies it by the adjective "actual" or "observed" to distinguish what he has in mind from the highly theoretical "accrued" depreciation which assumes fixed life terms for certain classes of property. This is not to say that such assumptions are altogether valueless. Theoretical depreciation, if intelligently estimated and employed, may be of interest and assistance in determining how much of a reserve it would be desirable to raise if conditions permit. Such computations or such reserve if raised, are based almost entirely upon speculation, however, and they bear no more relation to the actual or "observed" depreciation which an informed and practical man would find in the plant at any time, than would the amount in a self-insurance fire fund represent the actual fire losses at any particular date.

Actual, or "observed", depreciation is the diminution in value of the actual property, as compared with the value of perfectly new property, due to physical condition and to any obsolescence and inadequacy which is apparent. It represents the difference between what a capable and intelligent manager, obliged to furnish the service in question, would pay for perfectly new property and what he would pay for the property in question. Such a man, in forming his judgment, would consider whether by purchasing new property he could get something more suitable, efficient or economical. Any
advantages which new property would have in these respects represent obsolescence and inadequacy in the existing property, and would be taken into consideration. Also deterioration in the wearing parts, the repairs which have to be made immediately and the accumulated liability for those which must be made in future, represent a further difference in value as compared with new property.

Mere age plays a small part in real, or "observed", depreciation. Most of the elements in gas, electric, telephone, and telegraph properties and, to a somewhat less extent (if we exclude track and roadway construction), steam and electric railroads, water works and other public utility properties do not wear out. Those minor parts which do wear are renewed from time to time and the physical condition depends upon the state of maintenance. Obsolescence and inadequacy are the chief causes for ultimate retirement of the major units, and these are not functions of age but of developments in the art and in the service requirements. Improved methods, when invented, render obsolete all apparatus or equipment of a particular type whether the units be one, ten, or twenty years old. Until these developments actually occur they cause no real depreciation. Until the wise manager can see the possibility of getting something which is improved in type, he will pay nothing extra for new apparatus because of mere newness. He will pay only for any advantage it has in actual physical condition. Social pride, if there be any, in owning the latest model of gas machine is not translated into dollars by hard headed engineers and business men who are looking only for the most economical operation.

Actual depreciation is not a function of age or susceptible of mathematical computation. It depends upon the type of property, its efficiency and suitability, its state of repair and its general physical condition. These factors can be determined with reasonable accuracy.

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8Since this paper was written an interesting decision has been handed down by the United States Board of Tax Appeals, (The Kinsman Transit Company, January 31, 1925. Decision No. 202, Docket No. 67), which contains the following language:

"The reconstruction cost less actual depreciation sustained is important evidence of value and has in it important elements to prove either the market value or actual value; but depreciation is ordinarily something to be concretely determined by inspection and, in determining the rate of depreciation to be applied to property of the character herein for the purpose of ascertaining value as of a particular date in the past, it is highly important that the history of the vessel, the character of repairs, the actual use to which the vessel has been put, and all relevant facts tending to show the depreciation sustained be placed before us, and upon these facts, assisted by the testimony of such expert witnesses as may be produced, a fair judgment can be exercised as to the amount of depreciation sustained, which will more nearly approximate the actual depreciation sustained than the application of a formula or flat rate of theoretical depreciation which only serves to produce grotesque results."
by those familiar with such property and the attendant conditions. The informed judgment of such men represents actual, or "observed" depreciation. Insofar as depreciation affects the "value" of any property, and is not to be considered necessarily as a measure of the fund that should be maintained against probable future retirements, it is observed depreciation only that can properly be taken as a deduction. And, be it clear, observed depreciation can be logically deducted only from the "value," not the original cost nor the reproduction cost of a plant, unless such cost happens to correspond at any particular time with the market value of an identical new plant at the same time.

It is very important for clear thinking on the much mistreated topic of "depreciation" to carry always in mind the distinction between "cost" and "value" and between "accrued depreciation" and "observed depreciation." Most of us think we know the difference between the first two but there is an unfortunate tendency, in discussions of public utility regulation, either to assume that "cost" and "value" are interchangeable when such an assumption happens to support the speaker's argument, or to assume that the "fair value" of a public utility property has some peculiar esoteric meaning when used by law makers and courts that is different from its ordinary economic sense of the price that would be paid in an open market by a willing buyer to a willing seller. One or the other of these assumptions has to be made as a logical basis for deducting accrued depreciation from invested capital to determine a fair rate-base. As we have seen, if "value" is considered to be practically synonymous with "cost", either historical or reproduction, a case can be made under certain conditions for deducting the theoretical depreciation reserve. But only under those conditions which, in practice, seldom exist. On the other hand, if "value for rate-making purposes" means market value in the ordinary economic sense, observed depreciation can logically be deducted from value new but "accrued" depreciation cannot. "Value new less accrued depreciation" as a basis for determining the reasonable rate-base for a public utility property is, therefore, a purely artificial and illogical formula and ultimately commissions and courts will so determine.

The distinction between "accrued depreciation" and "observed depreciation" is frequently, perhaps generally disregarded; nevertheless, it is fundamental. The amount of "accrued depreciation" at any given time is highly speculative, depending on estimates of future losses which, in turn, depend on the assumption that, for some remote future period, obsolescence (i.e., the necessity for retiring
parts of the plant because of inventions and improved methods), inadequacy (i.e., the necessity for retiring parts of the plant because of the growing demands of the community which it serves), and wear and tear, will all cause losses that in the aggregate will be the same as the losses that have been suffered from these same causes in some more or less arbitrarily selected past period. “Observed depreciation”, on the other hand, can be quite closely determined through an accurate inspection, by one who knows his business. It is clearly possible for such an observer to inspect a gas plant and say, “this part will last a year or two more; that part will last indefinitely unless it becomes obsolete or we have to put in a unit with greater capacity”, and so compute the proportion to date of a definitely foreseen liability for renewals and replacements. This is hard and practical common sense and there can be no question in the minds of intelligent persons that actual depreciation is a factor affecting market value. But it is absurd and it is also unjust, uneconomic and illegal for a regulatory commission to reduce the amount of a public utility’s investment entitled to a fair return, by the amount of a purely hypothetical depreciation reserve which it has never earned and does not possess, however desirable it might be that such a reserve should exist.

We may summarize the foregoing discussion as follows:

There are two points of view from which depreciation may be considered,—that of lessening value and that of cost accounting. Confusion of these two view points works injustice. Straight line depreciation as a measure of diminishing value is highly artificial and bears little or no relation to true value. But as a method of cost accounting it may be employed and from this point of view it is, under certain circumstances, logical to deduct the theoretical depreciation reserve accumulated on a straight line basis from the investment cost to determine a reasonable rate-base, provided the “value for rate-making purposes” is taken to represent the investors’ sacrifice and not the market value of the property. The conditions under which this may properly be done are that the utility shall have had in the past an income sufficient to pay its investors a fair return on their investment and in addition to accumulate a reserve against future retirement losses equal to the proportion of such estimated losses on property at the time in service which would have accrued if the total estimated loss could be spread evenly over the normal life of such property.

If the diminishing value concept of depreciation is retained, then the only kind of depreciation which a practical business man would
consider as affecting the value of a public utility property is "ob-
served depreciation" which is very different from "straight line",
"theoretical" or "accrued" depreciation. Observed depreciation
takes account of the definitely foreseen expenditures for main-
tenance and renewals without much regard to the age or history of the
property. It is practical, not theoretical, and can logically be de-
ducted from the market value of an identical new property to find
the actual present or depreciated value.

In conclusion it may be desirable to emphasize that this paper is
not an attack on the "straight line theory" of accounting for depre-
ciation, per se. It is the illogical misapplication of the theory in
determining "value for rate-making" that is criticized. Uncertain
and approximate as all estimates of retirement loss must necessarily
be, it is, nevertheless, generally the part of prudence to make such
estimates and to include in any statement of operating costs for a
particular period, that period's approximate proportion of the as yet
unknown and unrealized losses. It should never be forgotten how-
ever, that such charges are only approximate and cannot represent
an actual equal apportionment of retirement losses except within
very wide margins. The utmost that any regulatory commission
should attempt to do is to fix maximum and minimum limits for
these margins, stated in very general terms. To go beyond this is
to confuse regulation with management. If thereafter a utility is
fortunate enough to be able to pay its investors a reasonable return
and in addition to accumulate through charges within the limits
recognized as reasonable by the regulatory body a depreciation or
retirement reserve, the owners will not seriously object to the ex-
clusion of the assets represented by such reserve from the assets
that measure their investment in the enterprise. But the notion
that the amount of such a reserve, whether represented by actual
assets or merely by a book liability, is a measure of lost value in
their property, will very properly be resisted until all the courts
and commissions have seen the light as a few of them have seen it
already.