

THE VALUES OF WATER POWERS AND DAMAGES CAUSED BY DIVERSION.*

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Definition of Value.

The following definition of market value was given to the witnesses who were to testify on values in a recent important law-suit.

"Market value" means the fair value of the property, as between one who wants to purchase and one who wants to sell any article, not what could be obtained for it under peculiar circumstances, when a greater than its fair price could be obtained; not its speculative value; not a value obtained from the necessities of another. Nor, on the other hand, is it to be limited to that price which the property would bring when forced off at auction, under the hammer. It is what it would bring at a fair public sale, when one party wanted to sell and the other to buy."

Definition of Damage.

The definition of the damage due to the diversion of water was stated as, "The difference in market value, before and after the diversion."

Method of Determining Value.

The value of an undeveloped water power depends:

First.—Upon its location, the amount and uniformity of flow, head, conditions affecting the cost of construction and transmission, use of exhaust steam and need of water for other purposes than power.

Second.—Upon what the power is to be used for, whether for electric lighting and railway work, through most of the hours in the day with a variable load, for some requiring a fairly steady load for twenty-four hours a day, or for running a textile mill or similar plant with a fairly steady load for about ten hours a day.

Third.—Upon the market, which can be served, whether it is secure and steady or must be built up and is somewhat unreliable.

The value of a privilege should be determined by comparison with the cost of producing power in such quantities and with such regularity as is required for the particular purpose for which it is to be used in a fairly economical manner at any place or places equally convenient for the transaction of the business under consideration. Some times the location is fixed, but oftentimes there can be a choice of locations.

In estimating the value of an undeveloped privilege, the steps followed are as follows:

- (1) Determine the flow including the effect of storage and pondage.
- (2) Determine the net head.
- (3) Determine the horse-power which can be economically developed and used each month in an average year.
- (4) Determine the minimum flow and power and from this the size of supplementary steam plant required if the power is to be developed above the minimum flow.
- (5) Determine the shortage of water power during such months as there is a deficiency.
- (6) Estimate the probable cost of development of the water power.
- (7) Estimate the probable cost of the supplementary plant, using steam, gas, oil, or anything which is best for the location under consideration.
- (8) Estimate the yearly cost of running the water power and supplementary plants, including the fixed charges on both, to produce a combined power suitable for the purpose for which the power is to be used.
- (9) Estimate the cost of a steam, or other kind of plant, necessary to produce the power required.
- (10) Estimate the yearly cost of running this plant, including fixed charges, to produce the power required.
- (11) Subtract the cost of producing the power by water power and the supplementary plant from the cost of producing it by steam power, or some other method, alone. The difference, if positive, gives the apparent yearly saving by the use of water power.

The apparent saving should be modified if necessary for location or any other thing affecting the value.

(12) Capitalize this difference at a rate which seems proper, and the result is the value of the privilege.

There seems to be a great difference of opinion as to the proper rate of capitalization, but in the purchase of water power privileges the buyer of his own free will assumes certain risks, as damages caused by freshets, changes of business, etc., which he will not assume for nothing. He is also basing his comparisons of cost of power upon the present cost of producing power, which cost may be reduced in the future. For these reasons, the yearly saving should be capitalized at a rate not less than 10 per cent.

Where a whole property is taken and the owner is free to move into an equal or more favorable location, the method and rate of capitalization given above should be used.

If the privilege is developed the total value includes the value of the plant.

The value of a plant will be its cost, less depreciation, up to the point where the cost of water power equals that of steam or some other power. Beyond this point, when water power costs more than steam power, the value of the improvements, although new, would not be represented by the cost, but would be something less than the cost. It is the sum which could be paid for it new which would bring the total cost of water power including fixed charges down to the cost of steam power, less depreciation.

Method of Determining Damages.

The damage has been defined as the difference in value of the entire property before and after diversion.

It is usually unnecessary to go through an elaborate estimate of the value of the whole property, before and after the diversion, for the reason that many of the items of value will remain constant. The decrease in value, if there be any, is due to the fact that the running expense is increased by the diversion, and if this increased cost of running be capitalized at the proper rate the capitalized sum will represent the amount which the property is decreased in value, or the damage.

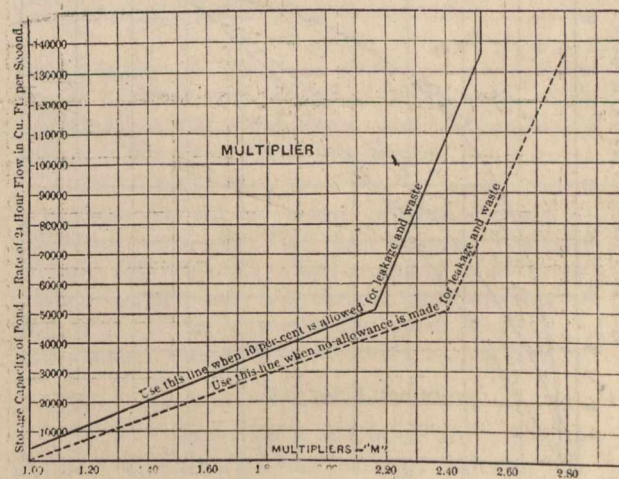


Fig. 1.

$f = 24$ Hour Rate of Flow in c.f.s.

$s =$ Storage in Cu. Ft.

$M =$ the ratio which the amount of Water which can be used 10 hours per day, 6 days in the week bears to the total amount flowing during the week.

Main, C.T.

When M is less than 2.

$$M = \frac{9}{10} \left(1 + \frac{s}{35000f} \right)$$

When M is greater than 2.16 but is less than 2.52.

$$M = \frac{9}{10} \left(2.4 + \frac{s-50400f}{216000f} \right)$$

In estimating the damage to an undeveloped or abandoned power, the value before and after diversion should be estimated as described under the previous heading. The difference represents the damage.

If a privilege is developed and used, a valuable business carried on and a plant established which cannot be easily moved, the definition of damage still holds good, but in such case it is customary to capitalize the yearly loss at a smaller rate than 10 per cent., as this damage is done against the owner's wishes, and as he should receive a sufficient sum from which, in his business or in some other way, he can obtain a sufficient income to make good his yearly

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