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This outline of the treatment in accounts of depletion of mineral deposits emphasizes unusual phases of the subject. Particular reference is made to the commonly accepted view that mineral deposits are fixed assets not subject to revaluation and that depletion sustained should be credited to a reserve account. Any intelligent outline of the subject requires a review of the consideration accorded it in the past, and its purposes, definition and computation.

Professor Saliers, in the preface, dated May 1, 1915, to his book, *Principles of Depreciation,* states ". . . the recently enacted income-tax law makes it quite necessary for business men to study the depreciation question carefully." One is constrained to think that any business man so constituted as to become perturbed over depreciation under the 1913 income-tax law must have reached a state bordering on appoplexy when he contemplated the depletion provisions of the revenue act of 1918.

Prior to the passage of the revenue act of 1917, no phase of accounts had received less attention than depletion of mineral deposits, even though its importance is manifest. Perhaps this apathy formerly existed because depletion is rarely encountered in any but highly speculative industries, such as the exploitation of natural resources wherein the usual accounting procedure was to reckon profits by deducting what was "put in" from what was "taken out." Even this was not always possible as that which was "put in" very often exceeded that which was "taken out." That old method is undeniably accurate but also productive of rude awakenings saddening investors' hearts and depleting their pocketbooks. This same method is in vogue to-day where profits are an unknown quantity, but where profits have been earned and staggering taxes are imminent, study of depletion, its purposes, computation and treatment in accounts has received a great impetus. It is lamentable that such intense interest has been stimulated by an artificial means rather than through recognition of sound accounting principles.

The purpose of injecting the element of depletion into financial accounts is the same as that of every other accounting

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practice, namely, to distinguish capital from income and to accomplish that purpose before the post-mortem. It is true that any computation is an estimate only, because nature has hidden away one of the known quantities necessary to the construction of a formula by which the desired end is attained, that quantity being the ultimate recoverable unit. It is undeniable, however, that even a crude estimate of depletion sustained is better than no allowance whatever. Many other phases of accounts, even the all-important balance-sheet, are approximations only and no objection because of lack of accuracy can be sustained.

For the purpose of stating the principles underlying its treatment, depletion (of mineral deposits) may be broadly defined as the exhaustion of recoverable deposits (not total deposits) through extraction or mining from the natural container or reservoir, while mineral deposits may be defined as bodies with approximate definite chemical composition existing within natural reservoirs or adhering to natural structures. Thus depletion is resultant from the extraction of units of a whole from its natural resting place. These deposits subject to depletion include oil, gas, metal-bearing ores, coal, salt, stone, shale and hundreds of others.

The mineral deposit is analogous to the manufacturer's inventory of raw material, the rawest kind of raw material, but nevertheless it is the prospector's merchandise which he holds for sale. It must be made ready for sale, not by converting it into another form but by extracting or mining it from its natural container or reservoir and making it available for the needs of industry. It is not a fixed asset, for that caption itself indicates an immovable object not the subject of barter. Therefore, it is neither current nor fixed but nevertheless tangible and as such is entitled to a place in the accounts. The logical place, in a formal statement, is probably immediately succeeding the current assets and preceding the fixed.

The value at which the deposit is stated in the accounts presents an interesting study. Being analogous to raw material, depleted by extraction and sale and augmented by purchases of additional deposits, it is subject to inventorying. At what price? Cost, market, or cost or market, whichever lower, at the given date? The latter method, being possible and conservative, should be adopted. Cost will be advocated by many students because it is easy to ascertain. Market, if higher than cost, will be advocated

by the promoter, whose interest is in the sale of stock or the collection of dividends. Cost or "discovery value" is advocated by the internal revenue bureau because the tax computation is based thereon. Cost or market, whichever lower, is the logical and practical method. Objection may be raised that market is ideterminate and therefore not practical. It, being governed by demand, is difficult of ascertainment, but it is not incapable of estimation, as a fairly accurate estimate may be obtained by deducting the probable cost of extraction from the market value, after extraction, of the ultimate recoverable units of deposit.

In order to form a basis for discussion the following chart of accounts is submitted:

Accounts affected by depletion

Assets or Debits	*Liabilities or Credits*
Mineral deposits	Operations (profit and loss)
Developing property	Reserve for decline in value
Undeveloped property	of mineral deposits
	Unearned appreciation

Accounts not affected by depletion

Assets or Debits	*Liabilities or Credits*
Other assets	Liabilities
	Capital
	Surplus

The foregoing chart is not scientifically arranged but rather is so constructed as to set forth the accounts affected and those not affected by the allowance for and treatment of depletion.

Mineral property is subdivided into undeveloped, developing and producing, the first-class ranking lowest in point of realization of profits or return of capital. Newly acquired property should be charged to the undeveloped account until prospecting begins, and then transferred to the developing account, to which also should be charged the cost of prospecting or developing. If a deposit is found, the whole cost, accumulated in the developing account, is transferred to the producing or mineral-deposit account. The effect of so classifying the mineral-property accounts is shown by the following definitions:

Undeveloped property:

> Property whose mineral content is wholly or partly unknown, which has not been prospected in any manner.

Developing property:
Property whose mineral content is wholly or partly unknown, which is in course of development, but not yet producing.
Producing property or mineral deposits:
Property which has a definitely known deposit, the extent of which is capable of estimation and which is yielding mineral.

The undeveloped-property account represents cost of mineral rights, while the developing-property account has added thereto a part or all of the cost of prospecting. These two accounts are more or less intermediate steps towards production of mineral. The producing-property account is composed of two distinct elements: mineral deposits and equipment necessary to their extraction. The latter is subject to depreciation and is therefore eliminated from the accounts and omitted from the discussion.

The mineral-deposit account is intended to record the book value of mineral which can be profitably extracted or mined and is constituted as follows:

Charges

Original cost of deposits—not including any value which will remain in the property after extraction of the mineral (transferred from developing-property account).
Cost of exploration or development—not including any cost of extraction or mining after the deposit has been discovered or otherwise made available for recovery (transferred from developing-property account).
Appreciation injected into the accounts to record "discovery value," "fair market value at March 1, 1913," or for any other purpose.

Credits

Depletion sustained—this should not be represented by a reserve for depletion—the method often adopted.

The original cost of a mineral-bearing property often includes both mineral rights and surface rights. In such cases, some allocation must be made for the two classes of assets, and only that part representing the cost of mineral deposits should be charged to that account. Sometimes an arbitrary allocation is unavoidable, and, even though only an estimate, it must be made, and the two distinct values recorded in the accounts on the basis of the known facts at the date of acquirement. This dual element of value in some properties has given rise to much dissatisfaction among taxpayers who have been required to reduce their depletion charges accordingly.

The cost of mineral rights, as previously stated, is usually augmented by expenditure for exploration and development, particularly in the case of oil, gas, coal and metal-bearing ores.

Unfortunately, a third element, that of appreciation, has been injected into many accounts to conform with regulations promulgated by the commissioner of internal revenue, pertaining to the computation of depletion under section 214 (a) (10) of the revenue act of 1918 and the sections of that and preceding acts relating to fair market values as at March 1, 1913, and other dates. The commissioner's regulations require that values (defined by the regulations as "capital sum") recoverable through depletion deductions must be recorded on the taxpayer's books of account. This third element represents the excess of an estimated value at a given date over the sum of cost of mineral rights and cost of exploration. This element is purely anticipation of profits and, to avoid its inclusion in earned surplus or undivided profits, it is proper to credit the amount thereof to "unearned appreciation," "surplus derived from appreciation," "anticipated profits on mineral deposits" or an account similarly entitled. The first is probably preferable.

It is necessary to reclassify the charges to the mineral-deposits account so that its unextinguished elements may be separately reduced by depletion sustained and so that depletion charges may be properly allocated to operations, the reserve for decline in value of deposits and unearned appreciation. After reclassification, the account is constituted as follows:

Present market value of deposit:
: The sum of cost of mineral rights and cost of exploration reduced by any depletion sustained thereon and further reduced by a decline in the market value of the deposit before extraction or mining.

Decline in value of deposit:
: Representing the decline in value of the deposit before removal from the natural container or reservoir and reduced by any depletion sustained thereon chargeable to the reserve for decline in value. This sum is at all times equal to the reserve.

Appreciation:
: Representing appreciation injected into the account to record a value at some given date in compliance with income-tax regulations or for some other reasons, reduced by any depletion sustained thereon. This sum is equal at all times to the unearned-appreciation account.

Further explanation of the purpose of this classification is offered with other comments concerning the allocation of depletion charges.

Extinguishment of the mineral-deposits account is reflected in the operating account by two distinct charges, namely:

Depletion sustained on present market value of deposits, offset by a credit to mineral deposits, and

Decline in value of deposits consequent upon decline in market value of the mineral, offset by a credit to reserve for decline in value of mineral deposits.

The mineral deposit has previously been stated to be analogous to raw material, that is, stock in trade, representing a number of units of salable wares, capable of estimation as to quantity and value, and therefore an asset to be inventoried on the accepted conservative basis of "cost or market, whichever lower" at a given date. Esquerré on page 171 of his *Applied Theory of Accounts* enunciates the principle that all merchandise should be reflected in the inventory account at cost regardless of its worth at the date of valuation. That principle applied to a long period, say several years, would result in a fairly accurate profit-and-loss account and, under normal conditions, a fairly conservative balance-sheet, but it is notable that most successful business organizations are conservative to a fault and that understatement is more desirable than overstatement. The weight of the argument generally being thrown to the side of conservative values, there is no reason why mineral deposits should not also be valued on a conservative basis, inventoried, in fact, and the loss sustained, if any, absorbed concurrently therewith. Such a basis is not recognized by the commissioner of internal revenue and to gain the desired end, at the same time satisfying tax requirements, it becomes necessary to create a reserve for decline in value of mineral deposits to represent the amount by which the cost of the units remaining unextracted from the reservoir exceeds the market value thereof at a given date. This reserve, taken in conjunction with the mineral-deposits account, sets forth the fact that given numbers of units of mineral are owned at a certain cost, but that, at the given date, the value thereof is less than cost by the amount of the reserve.

The reserve account is constituted as follows:

Credits (offset by charges to operations) of sums representing the difference between the market value of the unextracted mineral, determined on an equitable basis, and its cost.

Charges (offset by credits to the corresponding subdivision of the mineral-deposits account) of sums representing the amount of depletion sustained on that part of the cost of the deposit which had been lost through decline in market value.

This method of accounting reduces the deposits to a proper value and at the same time satisfies tax requirements. For taxation purposes, the effect is to create a reserve, the additions to which are non-deductible, but available for invested capital, while charges thereto are deductible from gross income.

As previously explained, the administration of the income-tax laws has required the raising of an account to represent the excess of a value of mineral deposits at a given date over their cost. It is sometimes deemed expedient to revalue properties for other reasons. Such an account is preferably entitled "unearned appreciation" and is constituted as follows:

Credits (offset by charges to mineral-deposits account) of sums representing the amount of appreciation.

Charges (offset by credits to the corresponding subdivision of mineral deposits) of sums representing the amount of depletion sustained on that part of the mineral-deposits account constituting appreciation.

It is entirely possible that all these elements may appear in a single case. It would seem most improbable that a mineral deposit would have a value greater than cost at one date and less than cost at another, but such has been a fact in many cases in the oil industry. The anomaly often was caused by the fixing of a high "discovery value," say, during 1920, when mid-continent crude oil was posted at $3.50 per barrel, and subsequent declines in the market price reduced the value of the deposit to a point far below cost.

Objection is found to the creation of a reserve for depletion because mineral-deposits account represents a certain number of units of mineral which is reduced by extraction to a lesser number of units. The condition is more clearly stated in another manner, viz.:

When a reserve for depletion has been created, the accounts represent that originally x units were owned from which y units have been extracted, while

When depletion sustained has been credited to the asset account, the accounts represent that z units remain in the reservoir.

It is believed that the latter method is the more logical and proper statement of fact.

Presumably the creation of reserves for depletion is the outgrowth of the theory of reserves for depreciation. The circumstances are dissimilar, for, in the case of the former, the asset has been removed and passed from possession, while, in the case of the latter, the asset has not been removed but remains in use.

The computation of depletion sustained rests upon an algebraic formula composed of three known quantities, two definitely determinable and one an estimate, and one unknown quantity, viz.:

$$\frac{\text{Capital sum}}{\text{Ultimate recoverable units}} \times \text{Units recovered during period} = \text{Depletion sustained.}$$

The formula is simplicity itself, but the accuracy of the computation is contingent upon the carefulness of the estimate of ultimate recoverable units.

A distinction must be made between the total units of mineral deposit and recoverable units. Total-units represent all of the mineral in or adhering to a given structure while recoverable-units represent only the mineral which can be extracted at a profit. There are two classes of irrecoverable mineral deposits: that which cannot be extracted by any known method of mining, and that which cannot be extracted at a profit. The former is exemplified by the oil industry, the producers of which generally assert that some oil remains in every abandoned well; and the latter is exemplified by the lead and zinc deposits near Joplin, Missouri, where large deposits are shown to exist but no mining is done because its cost prohibits profitable competition with other districts. Improved methods of extraction at any time may convert irrecoverable deposits into recoverable.

It is the engineer's duty to estimate the ultimate recoverable units, while the accountant is charged with the task of constructing an intelligent record of transactions based on that estimate.

In order that the charge for depletion sustained may be properly allocated, it is necessary that it be subdivided into three parts corresponding with subdivisions of the mineral-deposits account and charged as follows:

Subdivisions of depletion sustained on	*Accounts chargeable*
Present market value of deposits	Operations
Decline in value of deposits	Reserve for decline in value of mineral deposits
Appreciation	Unearned appreciation

The purpose of the subdivision is threefold, namely:

First. To charge operations with that part of depletion sustained on unextinguished cost. To compute it on a greater value is to distort cost in direct ratio to the increase in value on which computed. The reverse is not true unless we deny the accepted principle that a loss through market decline may be sustained and properly reflected in the accounts even though not actually realized through sale of the property.

Second. To charge reserve for decline in value of mineral deposits with that part of the loss previously realized through a market decline but not reflected in the accounts through extraction and sale.

Third. To charge unearned appreciation with that part of appreciation realized through extraction as provided by tax regulations.

There is objection to the custom of charging the entire depletion allowance to operations, then increasing surplus by sums chargeable against reserve for decline in value of mineral-deposit and unearned-appreciation accounts, as that custom serves to understate the net income.

To sum up, let it be said that the computation of depletion and its treatment in accounts presents at once one of the most difficult but most fascinating problems of accounting.