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THE
DEPRECIATION OF FACTORIES

EWING MATHESON

FOURTH EDITION

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THE
DEPRECIATION OF FACTORIES

MINES AND INDUSTRIAL UNDERTAKINGS

AND
THEIR VALUATION

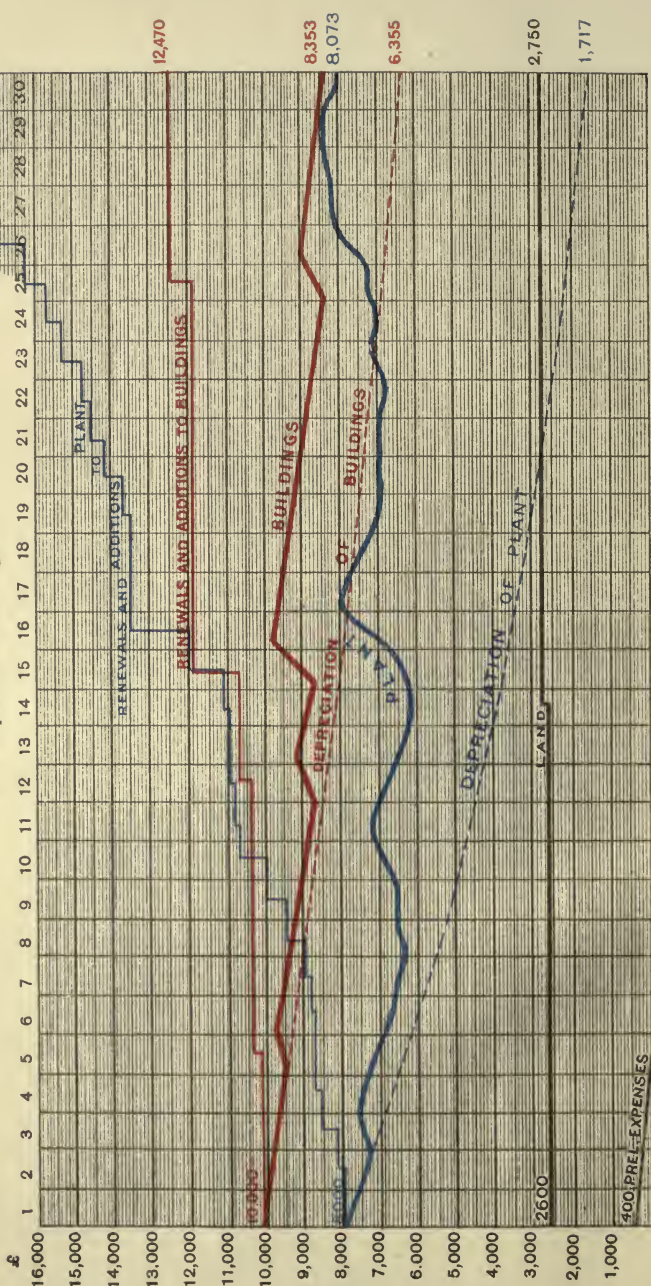


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EXAMPLE OF THE DEPRECIATION OF A FACTORY IN 30 YEARS.

For Explanation see Page 120.



	Value in 1st Year.	30th Year.
Buildings	£10,000	£8,353
Plant	2,600	8,073
Land	400	2,750
Prel. Expenses	—	—
Total ...	£21,000	£19,176

THE
DEPRECIATION OF FACTORIES

MINES AND INDUSTRIAL
UNDERTAKINGS

AND THEIR VALUATION

BY
EWING MATHESON

M. INST. C.E.

FOURTH EDITION, REVISED AND ENLARGED



London

E. & F. N. SPON, LTD., 57 HAYMARKET

New York

SPON & CHAMBERLAIN, 123 LIBERTY STREET

1910

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PREFACE

TO

THE FOURTH EDITION

THE questions dealt with in this book grow in importance. Changes in the methods and machinery of manufacture call more than ever for systematic depreciation or some form of Reserve. New inventions for economising fuel and steam, new systems and plant for the manufacture of steel, machine-tools of increased power and speed, numerous and ingenious methods for the cheaper lifting and transporting of material, have all been assisted by the extraordinary progress during the last few years in the generation, distribution and application of Electrical energy. These events have called for changes in the finances of the undertakings concerned, so that both in regard to Capital and Revenue it is necessary that the accounts shall also show that the interests of all concerned have been duly safeguarded.

Municipal undertakings connected with Gas, Tramways and Electricity are affected by these changes ; and while, both in regard to the capital invested and the application of revenue, circumstances have in such cases to be considered which differ entirely from those affecting private or joint-stock undertakings, the questions of Depreciation and Reserves are of equal importance, if the interests of Rate-payers are to be effectually protected. The official control of Government departments in these respects are dealt with

in this edition, and the Reports concerning Local Loans and the application of surplus revenue are brought up to date.

As the measure and definition of what constitutes Profit in regard to Income-tax Assessments, and the circumstances that determine Rateable value of Plant and machinery have been altered since the earlier editions were published, the Official and Parliamentary reports now included may be useful to private and Municipal traders alike.

The growing circulation of this book in the United States, Japan, and other foreign countries, shows that the principles enunciated here are applicable or useful even when the methods of manufacture and the systems of book-keeping are in some respects different.

As much of the matter in the earlier editions has been reprinted by others, both in England and America, without acknowledgment, it is well to note here, for the information of those concerned, that the Diagrams and Tables in the present volume were first composed, printed and published by the Author in 1884.

LONDON : *January* 1910.

PREFACE

10

THE FIRST EDITION.

—no+en—

IN the Financial administration of a Factory or other industrial undertaking, the Accounts which relate to Disbursements and Receipts are so obviously necessary to the continuous working of the undertaking as to be rarely neglected, and if errors or omissions occur they quickly compel attention. But the Capital accounts are not always deemed to be of such pressing importance; and variations in the value of plant, arising from the wear and tear or other causes, may be left unnoted. The increasing extent of Factories, the subdivision of capital by means of joint-stock companies, and the conflicting interests that arise in regard to preference shares and borrowed capital, enhance greatly the importance of correct systems of account. Qualified book-keepers should be employed to arrange and check factory accounts, and the profession of Accountant and Auditor is rising in importance accordingly. But while Accountants may properly deal with facts and figures presented to them, and may fairly allot to Capital and Revenue actual expenditure or Estimated Depreciation, they must always be dependent for the accuracy of these *data* on those technically acquainted with the operations of manufacture. It is endeavoured in the present short treatise to point out the leading circumstances that must be considered in "Writing off" for

Depreciation, and to tabulate in a simple manner the annual changes that occur in Capital value.

In the Valuation of a Factory for any purpose whatever, the past "depreciations" and additions have to be considered; and the possible modifications which may be necessary are dealt with in the later chapters.

PREFACE
TO
THE SECOND EDITION.

BY WILLIAM CHARLES JACKSON,
Mem. Council Inst. Chartered Accountants.

THE value to the professional Accountant of a standard work on the subject of Depreciation cannot easily be over-estimated. Few of the persons in whose interest his services as an auditor are employed, are fully competent to appreciate that profits of manufacture are not gained until the loss by the wearing out of the machinery of production is provided for ; while many of those who conduct the affairs of Companies are unwilling to acknowledge the necessity of such provision, where apparent profits are cut down and dividends thereby diminished.

The principles of Depreciation, and its incidence under varying circumstances, are clearly laid down in Mr. Matheson's work ; and the guidance, which, as his preface says, must be sought from those technically acquainted with the operations of manufacture, is to be found lucidly expressed in his pages.

To those who honestly and from conviction treat the subject on the only sound basis, it may seem superfluous to urge due consideration of the arguments so convincingly set out in these pages ; but Auditors, and especially those who have to deal with joint-stock or other concerns, where the remuneration of the management is made wholly or

partly dependent upon declared Profits, know in what varied forms resistance to an adequate charge against profits for Depreciation is presented.

The fallacies underlying these objections present themselves again and again with the modifications caused by the lack of apprehension in some, or the ingenuity of others. Mr. Matheson's work provides the Auditor with true antidotes to these fallacies, and it has been in past times used by the writer with satisfactory effect, where his own less-reasoned arguments have failed to convince.

He therefore recommends it afresh to the notice and for the support, where necessary, of members of his own profession, and of those who, untrained in the practice of Auditing, are confronted with unfamiliar and specious pretexts for avoiding the unwelcome charge against Profits.

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PART I.

DEPRECIATION.

CHAPTER I.

THE GENERAL PRACTICE OF DEPRECIATION. PUBLIC AND PRIVATE UNDERTAKINGS COMPARED. RESERVES.

THE deterioration of a Factory by time and use, the appraisalment of the loss and its allotment in the accounts of the undertaking, are matters of great importance in the economy of management; and any neglect or error in "writing down" will, according to its extent, render calculations of cost and profit fallacious. The term "depreciation," though not strictly accurate, was originally applied as a convenient form of expression for the phrase "diminution of value by reason of wear and tear." It covers, however, other and wider contingencies. No fixed rules, or rates of depreciation can be established for general use, because not only do trades and processes of manufacture differ, but numerous secondary circumstances have to be considered in determining the proper course. So also in large undertakings—in municipal as well as private works—the same variety of circumstance occurs, especially that of obsolescence by which a supposed asset may have become valueless before it is worn out. It may, however, be possible to lay down some general principles which

See page 28.

**Fixed rules
cannot be
established.**

Obsolescence.

See page 89

will always apply, or which may with advantage be held in view in deciding particular cases.

**Depreciation
and
maintenance.**

The question of depreciation cannot be separated from that of maintenance, and in theory one may be said to balance the other. In practice it is only in certain cases that this can be acted on. In any particular building, machine, or appurtenance, decay or wear of some sort must take place in the course of time; and repairs, in order to compensate fully for the decline in value, must take the form of renewal. This being the case, the absolute replacement of some portion of the plant every year may thus maintain an average aggregate value. In only two kinds or classes of plant, however, can such an exact balancing of loss by repairs and renewals be ventured on; one, where the plant wears out so quickly as to need replacement at short intervals, affording constant proof, by the mere continuance of working, that not only the earning power of the factory is maintained, but also the capital value; and in a second class, that of undertakings so large and permanent as to afford a wide annual average of deterioration and renewal over the whole plant. The majority of cases are outside both these classes, and a fixed average annual rate of depreciation is an attempt to regulate the burden of what, without some such system, is necessarily irregular.

**Renewals
may balance
loss.**

See page 121.

**See Railways,
page 14.**

Before dealing with the depreciation of factories and other industrial concerns held by private persons or joint-stock companies, reference may be made to national and municipal undertakings of an analogous kind. In large national works there is seldom any specific provision for depreciation, the circumstance that every expense is defrayed out of current public revenue, as it is incurred, taking it outside the rules that apply to ordinary trading concerns.

National works.

**Royal dockyards
and arsenals.**

In the Royal Dockyards and Arsenals, renewals and maintenance are effected out of the annual grant voted by Parliament for the service of the year. The total asked for

is based on estimates prepared for the purpose, which include a provision for new works, and do not specifically take credit for the sale of scrap-materials. As every year's expenditure may be held to cover the renewals due to the waste of previous years, there is no necessity for writing down or depreciating existing plant in the manner usual in a private undertaking, where the capital account must be preserved intact by applying some of the earnings to the purpose. It is only when important new works, such as harbours and fortifications, are carried out by money borrowed against terminable annuities, that there may be said to be a specific writing-down; though, of course, the general sinking-fund of the National Debt has the effect of reducing present obligations to make way for new expenditure and future borrowing.

**Terminable
annuities.**

The Post Office and Telegraphs form the only Government undertaking that works for a profit. It is a monopoly, and the gross receipts are paid undiminished into the national treasury. The expenditure necessary for maintaining the plant and carrying on the service has to be voted annually, and is as narrowly scanned as if for some unremunerative purpose. The expenditure is only about four-fifths of the receipts, but as the former covers not only maintenance and running expenses but generally also the outlay on new works, which in a private concern would be charged to capital, the "profit" is really more than the apparent 20 per cent. shown in the published accounts. This form of indirect taxation, which in 1907-8 produced a net return of more than 4 millions, is too convenient and profitable to be relinquished or diminished by much reduction in the rates, but amelioration of the service has been accorded from time to time as the revenue has increased.

**Post office and
telegraphs.**

**New works
done out of
revenue.**

Profit or tax.

A different course is pursued in the case of Municipal undertakings, where, without dealing specifically with the question of depreciation, analogous provision is supposed

**Municipal
expenditure.**

**Depreciation
avoided.**

to be made. It is sometimes urged that as all such municipal works are fully maintained out of the Rates, there is no need to write down their value or accumulate funds for their renewal. It is, however, well known that no mere system of maintenance will provide for that wasting of assets which takes place from many causes or contingencies. This principle was not always held sufficiently in view in

Municipal loans.¹

the earlier days of municipal borrowing, but was indirectly dealt with in the Local Loans Act of 1875, which imposed with more precision than theretofore the obligations of repayment. In that year the outstanding municipal loans in England and Wales amounted to 93 millions, and they grew so rapidly that the total outstanding in 1901 was about 300 millions. Modifications of the Act of 1875 had

Local Loans Acts.

See page 141.

become necessary from time to time, to meet particular cases as they arose. These cases had generally been dealt with by the committee of Parliament which authorises the particular expenditure and sanctions the new loan. These committees have been largely guided in their decisions by the reports of the Local Government Board, based on the preliminary examination of their inspectors, who visit the town, invite evidence from all ratepayers as to the necessity or desirability of the proposed scheme ; on the sufficiency of the estimates, and on the likelihood of sufficient revenue accruing from them to pay interest on the outlay ; or, when the undertaking is one bearing no revenue, of the public benefit which will justify the expenditure. All loans have to be repaid in a term of years by the operation of a Sinking-fund, although there are different methods of applying it. This in effect is supposed to be a depreciation rate, but by itself it has proved to be not always adequate. The Inland Revenue assessors have been constrained to grant specific allowances from the profits of municipal trading concerns under this head for Income-tax purposes.

**Local Govern-
ment Board.**

See page 134.

Sinking-funds.

See pages 124, 144.

*See FOOTNOTE,
page 30.*

More stringent regulations were accordingly made,

following on the Report of a House of Commons Committee issued in the session of 1902, but after this date the doubts and controversies which still arose in regard to the safeguarding of Municipal expenditure led to the appointment by Parliament in 1906 of a Committee to enquire into and report with regard to the systems on which the accounts of Local Authorities in England and Wales were then kept, and to report on the regulations which should be made on the subject. The Report was published in 1907, and extracts from it are given on a later page.

Report of 1902.

See page 134.

Report of 1907

See page 141.

Many of the works authorised are of a kind not directly remunerative, such as Drainage, Open spaces, Public buildings, and Parks. They are legitimate objects of expenditure, and if the sanitary and other benefits could be analysed they would probably, in almost all cases, repay even in money the expenditure bestowed on them. The considerable reduction in the death-rate of London and the other large towns represents such saving.

Unremunerative works,

justified by results.

Low death-rate.

The income arising from such works as Water-supply, Markets, Tramways, Gas and Electric-lighting, is generally considered to be sufficient after the first few years to pay interest on the loans and to meet the sinking-fund; but the sinking-fund alone is only in few cases sufficient to cover all the contingent risks that would have to be met in a private concern, in order to maintain the assets equal to their nominal value.

Profit-earning works.

See page 9.

It is a plausible proposition, that if a sinking-fund be established to repay the loans, and if, besides, it is intended and agreed to defray the cost of renewals out of revenue, the undertaking will be financially sound and self-sustaining. Not only must there be this intention, but provision must be made for carrying it out. For if the prices, rates, or tolls for the services rendered have been so arranged or reduced as to allow only a surplus revenue or profit suffi-

Inadequate sinking funds.

See page 11.

Risks of loss to
ratepayers.

Examples.

See page 47.

Electricity.

See page 46.

Shareholders
versus
Ratepayers.

Fallacy of
3 per cent.

Reserve-fund
necessary.

See page 45.

Compared
with joint-stock
company.

cient for normal expenditure under the above heads, then the surplus may not be enough to meet the risks and contingencies to which all public works are liable. This is especially the case where, in years when no capital or renewal expenditure has been required, no provision has been made for future contingencies. The storage-reservoir of the water-works may prove leaky, and have to be repaired at great cost ; the track of a tramway may have to be entirely relaid, or a new system of traction established, involving expense quite beyond ordinary renewals ; new methods of lighting may render old plant obsolete and valueless. In joint-stock companies, established to carry out such works, or other industrial undertakings, for gain, the apparent or anticipated profits must be high enough to provide for such contingent losses, which, if they occur, will have to be borne by the shareholders. Capitalists, who may be quite content to accept for a portion of their funds an assured 3 per cent. from a corporation, where all the risks are borne by the ratepayers, and the interest paid half-yearly on fixed dates, will subscribe for shares in a company only if 5 or 6 per cent. is the anticipated rate. The risks have to be borne by somebody in either case, and what may be termed "the fallacy of 3 per cent." does not justify corporations in claiming that they can work profitably because they have cheap capital. The middleman is not avoided ; as an investor in Corporation stock he takes the position of a debenture-holder, with the collateral and unqualified security of the rates.

It may, for the reasons stated above, be urged that a reserve for contingencies is even more necessary for a corporation than for joint-stock companies, for the former is bound to pay interest, whatever the vicissitudes of the undertaking. Let it be supposed that works costing 300,000*l.* have been constructed by a joint-stock company by 200,000*l.* of share capital and 100,000*l.* of 4 per cent. debentures. In

bad times the company may withhold or postpone any dividend on the shares, and have only to pay 4000*l.* on the debentures. On a similar expenditure of money raised at 3 per cent., a corporation must not only continue to pay 9000*l.* a year, whatever happens, but also the additional rate of a sinking-fund.

The system of borrowing has, however, appeared so satisfactory to some corporations that there have been constant attempts, in Bills put forward for parliamentary sanction, to obtain an extension of the usual periods of repayment, and, in order to justify the non-establishment of a reserve, it is sometimes claimed that the goodwill or perpetual monopoly in profit-earning departments should justify the carrying forward to future ratepayers the burden of present expenditure. But, as has already been shown, the tendency of the legislature has been in a contrary direction.

In some towns the municipal auditors interpret very strictly the theory that the sinking-fund covers all charges for renewals out of revenue, and do not recognise sufficiently that renewals or replacements occur at irregular intervals needing special provision in advance. The more prudent among the public bodies have not treated their revenue as net income after repairs and sinking-fund charges have been met, but have in regard to certain departments applied some of their available income to special depreciation funds, or to the establishment of a Reserve, but there is no binding stipulation that the balances so accumulated shall be retained intact till the prescribed purpose arises. The council can at any time apply them to relieve the rates.

Due regard must obviously be given to the interests of present ratepayers, who cannot be expected to bear entirely burdens which are for the benefit of, and should be shared in due degree by, future ratepayers. There is however, on the other hand, the obligation of withholding something

**Period of
repayment
extended.**

*See page 10.
Also Goodwill,
pages 162-4.*

**Municipal
auditors.**

**Reserve-fund
established.**

See page 10.

**Interests of pre-
sent ratepayers.**

**Profits employed
in relief of rates.**

See page 47.

See
Income-tax,
page 30.

Fictitious profit.

See pages 11, 43.

**Periods of
repayment.**

See page 144.

Tramways.

See page 47.

Electric works.

See page 46.

Equation of loans.

See page 134.

from any surplus that may remain after current expenses and sinking-fund charges have been met, when the risk or liability is recognised that the plant, or part of it, may have to be discarded as obsolete or worn out before the estimated time has arrived. The case is, however, worse, if, in order to show a profit in relief of rates, too much of the outlay for what is, in effect, maintenance is charged to new capital. Income-tax is imposed as well on municipalities as on private undertakings, namely, on such public works as Gas, Electricity or Tramways. If too large a proportion of the outlay for renovation or replacement is defrayed out of new capital, the current revenue will be taxed on a surplus or gross income which is fictitious as profit. So also the need for a Reserve—in effect, depreciation—should take precedence of a reduction in the prices, tolls, fares and rates charged to the citizens, and before applying surplus income or so-called profit to the relief of rates. The same prudent thrift is enforced by the modern practice of Parliament in reducing the periods of repayment by the operation of the sinking-fund. In 1903, the following were about the periods enforced, and relaxations were only occasionally granted for special reasons. The acquisition of lands, 60 to 80 years ; for water-works reservoirs, 60 years ; for large water mains, 40 to 60 years ; for other water-works plant, 30 to 40 years ; for the construction of tramways, 30 years ; for tramway plant, 20 to 30 years ; for gas-works, 25 to 40 years ; for new roads, including the acquisition of lands, 60 years ; for electric-lighting works, 20 to 30 years ; for the expenses of promotion and obtaining statutory powers, 5 years.

In order to avoid a multiplication of separate loans, an equated period for the whole loan may be granted ; but equation is not practised where the sums included in each group are large, and where the borrowing authority express a preference for separate loans. The undischarged balance

of one loan is sometimes equated and carried forward with a new loan for another purpose.

The rapid growth of Municipal indebtedness subsequent to 1902, the various methods of applying the sinking-fund system, and doubts which had arisen concerning the soundness and sufficiency of the rules which had been established, led the Local Government Board to appoint in 1906 the departmental committee referred to later, to enquire into and report with regard to the systems on which the accounts of local authorities are at present kept. The question of depreciation is dealt with in the Report which was issued in 1907.

Growth of municipal debts.

REPORT OF 1907.

See page-141.

Doubts having arisen as to whether Local Authorities have power to reserve income for this purpose the following clauses were included in the Leeds Act of 1905 :—*

Leeds Act of 1905.

“(1) Whenever in any year it shall appear from the said accounts that the receipts in respect of any one of the said undertakings exceed in amount the expenses in respect of the same undertaking, the Corporation may, if they think fit, set aside in respect of that undertaking such an amount of money as they think reasonable, not exceeding the amount of the difference between the said receipts and expenditure, for the purpose of providing a reserve fund, and such moneys and the resulting income thereof shall be invested in statutory securities, and accumulated at compound interest until the fund so formed amounts to the maximum reserve fund for the time being prescribed by the Corporation in respect of the undertaking in question, but such maximum shall in no case exceed at any one time a sum equal to one-fifth of the aggregate capital expenditure for the time being by the Corporation.

Investment of Reserve.

“(2) Such reserve fund shall be applicable to answer any deficiency at any time happening in the income of the undertaking in respect of which the reserve fund is created, and the expenses in respect of that undertaking in any year exceeding the receipts in respect thereof for that year, or to meet any extraordinary claim or demand at any time arising against the Corporation in respect of the said undertaking, and so that if the fund is at any time reduced it may thereafter be again restored to the prescribed limits, and so on as often as the reduction happens.

Application of the fund.

“(3) Whenever the amount in the reserve fund shall reach the

* Leeds Corporation (Consolidation) Act, 1905, section 338.

maximum so prescribed as aforesaid, the annual proceeds thereof shall be treated as receipts arising from the undertaking in respect of which the reserve fund is created, and shall be dealt with accordingly."

Whatever be the designation of the fund, it should be obvious that future ratepayers ought to be safeguarded from liabilities arising from the neglect of reasonable precautions in previous years.

The conservative methods suggested here are not supported by all accountants. A former Chairman of the Finance Committee of the City of Leeds and a Fellow of the Institute of Chartered Accountants said at a meeting of his Institution * that he—

Opposing views.

Redemption fund
should be made
sufficient.

Vacillations of
City Councils.

These plausible
views are
fallacious.

See page 7.

"Objected to depreciation in addition to redemption. If the redemption was not adequate it should be made larger. If they had depreciation funds they would have these difficulties. Who were to fix them? After they had been fixed, then who was to govern them? If it was to be the Council, then that changing body might change its mind. . . . That sort of thing had happened in Leeds. The tramways raised a depreciation fund for a series of years to the extent of £118,000, and this year (1907) the Corporation having changed its men, had taken £85,000 away to help keep down the rates. . . . It was possible that Newcastle (where he was speaking) had not provided enough for renewals. That was a matter for expert opinion entirely."

This is a plausible statement, but the remedy proposed of increasing the redemption fund is fallacious. When the original powers of borrowing are sought, the Corporations generally ask for a longer period of sinking-fund than the Local Government Board is inclined to grant, and the latter frequently compromises by extending the terms beyond what technical knowledge and prudence would approve, if no other provision is to be made. The Accountant and Auditor must obviously depend, as stated above, on expert opinion, but that opinion is too often not asked or is disregarded. Present economy to meet obliga-

* Proceedings of the Institute of Chartered Accountants Ninth Provincial Meeting, held at Newcastle-on-Tyne, October 1907.

tions incurred or in view but not yet matured is not popular with ratepayers. Future contingencies are necessarily conjectural, and the various conferences which have taken place to arrive at some standard conclusion have too frequently been dominated by those among the Accountants class who are too sanguine.

The advice or opinion of the Engineer or practical manager has not the weight that would be allowed in a private undertaking, where the proprietors, having their own capital at stake, desire to preserve it intact till it is redeemed or restored to them. The engineer is obviously best able to measure not only the risks to which machinery and plant are liable, but also the trend of scientific discovery and invention that may render the plant obsolete or unprofitable. The ratepayers are a changing body with no individual capital to safeguard. Tempted by those who seek their suffrages by promising to reduce their rates, they too often condone and approve the absorption of every fund that is not protected by Statute, whatever designation—depreciation, reserve or otherwise—may have been given to it. It is not likely, therefore, that those who advocate such a course will consent to an increase in the redemption fund which itself is just what the ratepayers—who already may be suffering under an accumulation of such funds—complain about. Those in authority are sometimes too willing to pass the responsibility to a later generation if they can find accountants who will support and formulate their views, and government departments to approve them.

The mischief largely arises from the misapplication of the word "profit." When once the word is used and shown in the accounts, the ratepayers claim it as their own. As stated later, in regard to private or joint-stock undertakings, no temporary surplus should be designated profit till sufficient provision for depreciation has been deducted. Circumstances will not allow the full application of the

See page 143.
REPORT OF 1907,
CLAUSE 79.

**Expert opinion
disregarded.**

**Ratepayers
change.**

**Absorption of
profits to reduce
rates.**

**Definition of
"profit."**

See pages 18, 43.

principle that renewals should be effected out of current revenue. This can only be strictly applied to repairs and minor replacements ; the greater renewals occur irregularly, and must be provided for by a fund accumulated in advance. It is often sought to justify the more popular course by going back on the original time-bargain of the sinking-fund, and urging that some of the assets—land and buildings, for instance, and even goodwill—have a permanent value which was not fully allowed for ; and this speculative value, it is claimed, may be set against absolute liabilities already in view. It must, however, be remembered that these arguments had, for what they were worth, due weight given them by the tribunal that decided on the sinking-funds and cannot fairly be credited a second time.

*See Goodwill,
page 60.*

**Rates of interest
on local loans
to large cities.**

District Councils.

Temporary loans.

**Wide powers of
local authorities.**

The rate of interest at which Local Authorities can borrow is obviously liable to vary with the state of the money market, i.e. the rates of interest which lenders can command in other investments of equal standing. In Great Britain, rates of 3 to $3\frac{1}{2}$ per cent. embrace the great majority of local loans. London, and after London the principal cities, can borrow at the minimum rates current, and the smaller towns and District Councils have to pay more, but this almost solely for the reason that the large issues command a wider market, and the stock is more easily bought or sold. There have been occasions when loanable money has been so abundant that a rate of $2\frac{1}{2}$ per cent. has sufficed, and on the other hand it has occasionally happened that the current rate is much higher just when the money is wanted. In the latter case, temporary loans from bankers tide over the difficulty. There has often been the apparent anomaly that, at the very time of borrowing, the same Authority will be seeking investments for their own sinking funds. The powers conferred on Local Authorities by Local Acts, Provisional Orders, Stock Regulations or otherwise, have been so various that again,

in 1908, a Select Committee was appointed by the House of Commons to enquire into and report as to such powers, and a summary of their Report in 1909 is given on a later page.

REPORT OF 1909
See page 144.

It will be seen from the rules and recommendations given in the Report here referred to, that the main object in view throughout has been the safeguarding of not only present but future ratepayers, who have to bear the burden of debt, which, though sanctioned by their representatives at the time of borrowing, imposes by statute responsibility for many years to come.

Safe-guarding of
ratepayers.

The facility with which borrowing is authorised by ratepayers is largely due to the apparent remoteness of the obligations, and partly also to the fact that those whose votes permit and encourage the expenditure, are not those who will appear to suffer most from the burden. Notwithstanding the checks imposed by the official regulations, the aggregate demands on ratepayers for sinking-fund payments have grown so rapidly as to become a danger to the ratepayers in the early future.

Obligations
appear remote.

Danger to future
ratepayers.

In the case of Railways, and other undertakings involving considerable cost, but where the public credit is not pledged, no repayment or reduction of capital is required by law, and is hardly ever attempted. While the principle of depreciations is always a sound one, investors are free to subscribe their money on any terms that may be mutually agreed. It is true that in the application to Parliament for statutory powers necessary to such works, the sufficiency of the anticipated revenue to pay interest on the capital is supposed to be investigated, but there is no rigid system by which expenditure for repairs and renewals shall be met out of revenue of particular years. So long as the working of the railway is maintained, no regard is had to a future valuation such as might disturb the accounts of a

Railways.

See also
Local loans,
pages 134-45.

Repairs and
renewals.

manufactory subject to a change of ownership or cessation of trade. When a railway has been in operation for many years, and an average rate of expenditure in relation to revenue has been arrived at, such a method may be sound, but there is a risk that in the earlier years of working the gross revenue may not be sufficiently charged with the outlay for earning it. Nor are terminable debentures often issued by British railway companies, so that advantage can seldom be taken of lower rates of interest to renew on easier terms. American railway bonds on the other hand are generally terminable, and can be paid off or renewed on favourable terms if occasions offer.

Average rates.

Debentures compared with bonds.

See pages 17, 115.

Railway accounts.

Railway companies in England have to publish annual accounts in a form prescribed by law, but these accounts seldom fully disclose the deterioration of the plant, partly because the expenditure of a particular year for repairs or renewals may not represent the deterioration due to the traffic of that year, and partly because expenditure necessary for maintenance may be mixed up with the capital expenditure for extensions.

Maintenance charged to capital.

With the object of maintaining rates of dividend within a moderate range there is often a natural tendency, by postponement of repairs, to regulate the expenditure for renewals according to the balance of revenue available as income, rather than according to the actual deterioration, but on well-managed lines the annual expenditure maintains a fair average. A large portion of the plant of a railway affords by its uniformity facilities for analysis which are wanting in most private undertakings. The Permanent way, for instance, by its extent, generally allows of trustworthy averages; the Locomotives also, being composed of essential parts of a uniform kind, the annual expense due to wear and tear is ascertainable without much difficulty after a few years of working. Although there is no specific depreciation fund, there is as close an analysis

Analysis of railway expenditure.

as possible of the expenditure on different classes of plant so as to bring within the cognisance of the directors any alterations that occur. Thus, the maintenance of the locomotives and renewals is tabulated. While in this way variations on any one railway are noted, it is difficult to compare one railway with another. As example, the average annual expenditure per engine on British railways ranges from £100 to £170, and a minute investigation into the *data* of train miles, and ton-mileage gradients would be necessary to allow of comparison. Results can, however, be so far tabulated, and compared with the traffic of a particular period, as to allow the establishment of fixed rules concerning the cost of maintenance due to special causes, e.g. altered kinds of traffic, increased mileage, and alterations in speed.

But while such conspicuous and essential expenditure as that for the maintenance of permanent way and rolling stock cannot be ignored, the Workshops of a railway, in which much of the expenditure takes place, form an adjunct of an indefinite character, where no such precise proportion of maintenance expenditure to traffic is established. Railways differ in regard to their workshops, some companies making engines as well as repairing them; and it is not always easy to separate and allot the expenditure and establishment charges due to new work and to repairs. Some railway companies, however, go much farther than others in the analysis of their workshop accounts.

Indirectly, the varying value of railway factories is manifested from time to time by the assessments for purposes of Rating, which are made upon railways in common with all other real property. From this point of view a low valuation is in the interest of the company, and deterioration by time and wear ought periodically to be considered to ascertain how far it balances additions and renewals.

The local Rates in the districts traversed are a very

Different classes of plant.

Locomotive charges.

See *ENGINEER*, April 23, 1909.

Rails.

See *ENGINEER*, Nov. 12, 1909.

Railway workshops.

See page 173.

Cost of making and repairing not easily separated.

Rating valuation.

See page 168.

Based on
rental value.

serious burden on railway earnings ; and in estimating the rateable value, the capital expenditure is held to afford a broad basis for the imaginary Rental value on which the rates are assessed. Undue addition to the capital not only dilutes the future net income available for dividend, by spreading it over a larger area, but may also increase the future assessment and burden of rates.

Provision for
renewals.

The omission of any provision in the earlier years for future renewals is often excused by the small earnings ; but the wear-and-tear necessary to such earnings must sooner or later be paid for out of revenue or from new capital. And though, in course of years, the expenditure for repairs and renewals must almost of necessity balance the deterioration if the traffic is to go on, there is room for much error in the accounts of particular years ; and, in the case of constantly changing shareholders, of an unfair allotment of charges. The risks of obsolescence are seldom provided for, specifically, in railway accounts. The larger the undertaking the more likely is there to be a fair annual uniformity of renewals.

Unfair to
changing owners.
See page 112.

Railway capital.

In Great Britain, although there is a natural and unavoidable tendency to increase the capital of a railway as a provision for growing traffic, the original works are generally of a substantial kind to meet the statutory requirements of Government inspectors. All subsequent expenditure that does not increase the earning capacity of the line should be treated as maintenance, and be defrayed out of revenue. This principle may, however, be carried too far, as is illustrated by the system of "betterment" adopted on some American railways. In providing new communications, especially between districts far apart, the utmost economy is practised in regard to such railways, everything being postponed that is not immediately necessary to the running of trains. There may be little or no outlay for land and for charters, and not only may the work

"Betterment"
on American
railways.

Cheap
construction.

be confined to a single line of track, but such important items as ballast, fences, over-bridges, signals and stations may be omitted at the outset. Some or all of these are added after a line is opened, but it does not always suit the purpose or interest of those who control the line to raise fresh capital. The original expenditure has been met by the issue of bonds or debentures, and the raising of share capital at par is not so easy or customary as in Great Britain. Where, therefore, there is available revenue after paying current working-charges, a considerable part of such surplus is applied to "betterment" instead of to the payment of dividend to the shareholders; the betterment being really for what, in Great Britain, would be normal expenditure enforced by law before the railway was opened. This system, though it is sounder than the opposite extreme of unduly increasing the capital, may be nevertheless unfair to existing shareholders, who are tantalised by the anomaly of favourable traffic-returns and large revenue with little or no dividend. In Great Britain, however, it is the opposite extreme that has to be guarded against. Why should it be deemed necessary in the case of a municipal water-works to repay in sixty years the money expended on a storage reservoir, and for a railway to write off nothing from the cost of an expensive bridge? The obvious reason is, that the capital of a railway is subscribed voluntarily, while that for municipal work imposes a public charge, and there is the further justification that many of the renewals out of revenue form permanent improvements.

The temptation to treat as Profit the Surplus of Income over Expenditure, without sufficient allowance for Deterioration, appears to be often irresistible. Thus, in the case of a Tramway Company in its first years of working, a dividend may be possible only by writing off little or nothing from the capital value of the cars and the motive power; or in an Electric-light undertaking, by making

American bonds.

*See also
pages 14, 115.*

**Revenue spent
on improvements.**

**Railways free
from writing-
down.**

See page 139.

**Surplus income
treated as profit.**

See pages 47, 91.



insufficient provision out of income for renewals. This, of course, cannot last without the introduction of new capital, or by undue burdens on the revenue of later years. Such methods lead to epochs of fictitious profits, due to various causes. For instance, there may be neglect of repairs, which, when the necessity for them becomes evident, will involve a heavy outlay for renewals; or it may arise from actual fraud in postponing expenditure so as to show large profits, which will raise the value of shares for stock-jobbing purposes. There have been railways where the dividend income and the corresponding value of the shares have fluctuated considerably, not according to alterations in the real earnings but according to alternate neglect and attention in regard to plant.

Directors are not always courageous enough to reduce dividends by paying for all current renewals out of revenue, and the occasional or annual swelling of the capital account renders it increasingly difficult to pay a satisfactory interest upon it. Even when capital is expended in new works, undertaken to meet a growing traffic, it must be remembered—as it is in well-governed private concerns—that there may be in some districts, owing to diversions of trade or traffic, plant in excess of requirements and earning very little. The new extensions might well be set against this unremunerative plant instead of being added to the capital account. As the first brunt of diminished income falls upon the ordinary shareholders, there is a doubtful future in store for railways whose accounts are managed on such easy-going principles.

The construction of a railway or dock, the establishment of a large manufactory, or the development of a mine, may occupy some years, within which little or no income is available for dividend on the money sunk. Investors accustomed to such affairs take this into account in estimating the prospective profits, deeming the interest sunk

without regard
to provision for
depreciation.

Fictitious profits
on railways.

See page 11.

Capital account
swelled.

Renewals to
balance obsolete
plant.

Dividends
postponed.

as so much more capital invested, on which they will eventually receive interest. Obviously, an enterprise is not really remunerative unless the empty or lean years are thus made up. It is only a further and logical application of this principle to load the capital in advance, and so render it sufficient to conciliate the timid investor by paying interest from the very beginning. This "paying interest out of capital" for a limited period has been legally recognised, and authorised by statute, in works of utility for which Parliamentary sanction is necessary. Notwithstanding the apparent anomaly that an investor may be paying up a call on his shares to provide for the interest he is drawing on the capital he has already paid up, the double transaction may be convenient, and there is no harm in it under reasonable safeguards, so long as all concerned are fully informed. When, however, no such specific arrangement has been made, there is a temptation to so draw up the accounts as to show a profit in the early years of working sufficient for dividend, by omitting any provision for depreciation. Even after the undertaking has begun to earn an income, there may not be enough in the early years to provide for a dividend if the lessening value of the plant and other contingencies are provided for. If a dividend is rendered possible by omitting any provision for depreciation or renewals, and if the writing down of values later on is depended on to restore a proper equilibrium, such a dividend is really a payment of interest out of capital, though unavowed.

The provision of interest on capital expended on works in progress not yet earning anything, is a severe strain on the revenue of a railway, and whatever may be the justification deemed satisfactory by auditors, the funds most readily available are often those subscribed as new capital.

In Industrial undertakings, so long as additions and extensions are being made which absorb the capital ren-

Empty or lean years.

Interest paid out of capital.
See pages 114, 138.

Where justifiable.

In early years of working.

Fictitious dividends.
See page 13.

Interest on works in progress.
See above.

See Frontispiece, and page 120.

dered free by a system of depreciation, shareholders may recognise that such an application of part of the profits saves them from having to find new capital. But where capital outlay is not continuous, and an actual fund is accumulating in money for future contingencies, more or less remote, shareholders are frequently unwilling to see such money invested outside their own undertaking.

Water-supply companies afford another example of permanent undertakings where deterioration of plant is not always dealt with in the accounts. It is not usual to write off in the annual accounts, as presented to the shareholders, anything for depreciation, but renewals as well as repairs are effected out of the current revenue. In very large and long-established undertakings an average expenditure will eventually be arrived at, which, as in the case of railways, serves instead of a depreciation rate, by charging the earnings of each year. But in the earlier years of working, when expenditure for renewals has not commenced, the earnings are often divided as profit, without setting apart a reserve for the replacement of the plant.

In the case of water companies with a capital not exceeding 100,000*l.*, the expenditure for renewals occurs at irregular intervals; but instead of providing by anticipation for such outlays, it is more usual to open a "Suspense account," after the expenditure has been incurred—as, for instance, for a new pumping-engine or boilers—and to divide the cost over a subsequent term of years. Of course, when this system has become well established, and suspense accounts are always running, the effect on any particular year's income will probably not differ much from that of a regular depreciation rate, but the apparent profit of the earlier years has been increased at the expense of later years. A suspense account may be best opened before the actual expenditure occurs, and

**Investment of
reserve.**

See pages 35, 45.

**Water companies'
accounts.**

**Provision for
renewals.**

**Renewals
neglected in
earlier years.**

**Suspense
accounts.**

Reserves.

*See pages 35,
38-48.*

funds set apart for it ; it would then be usually called a Reserve.

In many companies, however, even where no direct provision for repairs and renewals is made, there is an indirect reserve. Water-supply companies are in Great Britain almost always established by Act of Parliament, and the mode of keeping accounts and dividing profits is to some extent prescribed. Subject to occasional modification in the special Acts authorising particular companies, the conditions generally are those of the Water-works Companies Clauses Consolidation Acts of 1845 and 1877, which allow, in the discretion of the directors, a reserve fund to be set apart out of profits to equalise dividends in any future years, when current profits do not allow the maximum dividend permitted by the special Act of the company, the reserve fund being limited to one-tenth of the capital. This reserve fund can only be applied to its prescribed purpose of equalising dividends, and cannot be used directly for repairs ; but it is obvious that if the earnings of a particular year are burdened with some heavy expenditure for renewals, the latter are really paid for out of the fund nominally applicable for dividend. But the establishment of such reserve funds is seldom authorised by shareholders, except out of surplus earnings beyond 5 or 6 per cent., and therefore in the case of struggling or unremunerative companies the renewals are often charged forward. The unsoundness of the system may be disguised ; but it is one which, when adopted in private undertakings, is frequently a cause of illusion and failure. In the case of prosperous companies with large net revenue, and whose monopoly assures a continuance of profits, repairs and renewals are carried out liberally ; and in cases where the rate of dividend is limited by law, there is even a tendency to overstate the expenditure on this account, so as to disguise the real net profit, to increase the value of the

Indirect reserve fund.

Water-supply companies.

Statutory limitations.

Dividends equalised.

Limitation of reserve fund.

Renewals charged forward.

Excessive profits disguised.

property to meet future contingencies, and to postpone that reduction in the price of water which profits beyond a certain limit might render obligatory.

The absorption of water-supply undertakings by municipalities, and the construction of new works by money borrowed on the security of the rates, brings these works of utility under the special restrictions and obligations regarding sinking-funds. Under the Local Loans Act, water undertakings are classed among the works of utility which justify a long period for repayment; but in this regard the exact period depends on the nature of the works. Thus, a sinking-fund divided over 60 years may be allowed for the purchase of land and the construction of reservoirs, while much shorter periods would be prescribed for pipe lines, pumping-engines and other plant more liable to deterioration. Even with these restrictions a sinking-fund may prove insufficient to maintain the value of the assets equal to the capital as it stands in the books of account, unless a reserve be established for special renewals and contingencies. Where additional works are constructed by means of new loans, it is not always easy to separate what should be defrayed out of revenue.

There are extreme cases where certain items should be excluded from those to which the average sinking-fund is applied. Thus, for instance, the filtering-sand in a reservoir should be purchased as a consumable store and paid for out of revenue whenever it has to be renewed. This course has not always been followed.

The acquisition and consolidation of the various systems of water supply in London into the one great financial entity—the Metropolitan Water Board, established by the Act of 1902—is the largest combination of the kind in the world. It acquired the property of the eight large companies, and issued stock to the amount of more than 34 millions. The stock is redeemable at the

Local Loans Act.

See pages 134–55.

See page 143.

See page 45.

See CLAUSE 58,
page 142.

**Water supply
of London.**

option of the Board after 30 years, but the Board is bound to discharge the stock within a period of 100 years from 1903.

With Gas-supply companies a reserve fund for renewals is not always established; and, though in one sense they are permanent undertakings, they have not so secure a future as in the case of water companies. Moreover the plant used in the manufacture of gas differs from that used in water supply—much of it being of a kind to wear out rapidly and to become obsolete. Retorts and other parts of the plant of short endurance are renewed out of current revenue, and with due care these charges bear a fixed proportion to the earnings; but when some considerable renewal takes place, and only the part which extends the earning capacity is defrayed out of new capital, the remainder of the outlay, which only makes good the wear and tear of the past, tells most unfairly on the current year's income. A postponement of the charge to future years is equally unsatisfactory, if the deterioration which has called for it is really due to the work of preceding years. No undertakings have, in Great Britain, been so constantly remunerative to capitalists as gas-works for town lighting, the average rate of interest on the par value of the shares exceeding that derived from railways or any other public works. This success has, in the past, been mainly due to the monopoly enjoyed as just referred to in the case of water companies. When the profits were large, and the dividends were restricted to a prescribed maximum, the expenditure out of revenue for repairs and renewals, and even for what were really extensions, was sometimes very lavish, and the accounts were as fictitious in this direction as in the reverse cases above alluded to. Legislation, however, has been directed towards the ensuring of a fairer system, increased dividends being permitted only in proportion to reductions in the price of gas. The interests of the consumers and the

Gas companies' accounts.

Obsolete gas plant.

Renewals unduly allotted.

Profits due to monopoly.

Lavish renewals out of profits.

Profits limited by law.

shareholders are thus rendered more nearly identical, so far as economy in management is concerned.

Notwithstanding such improvements, the position and prospects of gas-lighting undertakings have been greatly altered by the introduction of Electric lighting, and it is questionable if gas-works will, for the future, be introduced in places not hitherto provided. Existing gas-lighting companies are, however, too firmly established in most towns to be easily superseded; and the new competition has stimulated much invention and improvement in the economy of manufacture and use. Among such improvements are those in the methods of unloading coal from steamships, barges, or railway-wagons, and conveying it through the works by automatic machines; cheaper methods of charging and discharging the retorts; new systems of purifying the gas, and improvement of by-products. There have also been economies by the use of incandescent mantles, which while improving the light allow a lower quality of gas and therefore a cheaper kind of coal, and in the extended use of gas for heating and cooking. Such improvements, while they have ameliorated the working and earning power of gas-lighting companies, have in many gas-works rendered obsolete a considerable portion of the plant before it has been worn out, and before its value has been extinguished by the application of a sinking-fund.

Gas undertakings afford useful examples in the principles of depreciation. On the other hand they have, in the past, been so prosperous, that excessive rather than insufficient reserves have often been established, and on the other hand, the risk, so often ignored in systems of depreciation, has become apparent of the whole purpose and plant becoming obsolete. A new form of enterprise, the manufacture and distribution of cheap producer-gas for heating and power, is becoming rapidly developed, and is stimulated by the acquisition of statutory rights-of-

Future prospects
doubtful.

Improvement
stimulated by
electric
competition.

See page 45.

Incandescent
gas mantles.

Obsolete plant.

See page 49.

Gas undertakings.

Producer-gas.

way which infringe on the older monopoly of illuminating gas.

Leaving now the examples of public or quasi-public undertakings which require special authority or privileges, the case of works carried on by public companies or private firms may now be considered.

In the case of very large Manufactories, where there is a considerable annual outlay for renewals of plant as well as for repairs, such expenditure, if charged to revenue, may fairly balance the average deterioration of the whole. To secure this, there should be an ample margin—say by an obvious increase of the plant every year—for without it there will be a risk that a gradual lessening of the total value of buildings or plant will take place, ultimately involving considerable expenditure to restore its earning capacity. There may be neglect of due provision for deterioration in a new factory without any warning sign, while everything is in full working order. It is true, as in the case of the railway just cited, the earnings may be undeveloped, and no fund may be yet available from which to provide for future repairs, but the omission is none the less unsound, and should be met by some provision out of the first available income before dividends are paid.

It is seldom that any large manufactory can be successful without Extensions of plant, but an increase in capital value cannot be properly assumed unless the earning power is increased in a corresponding ratio and the shortened life of the plant due to past use duly provided for. That is to say, if symmetry in the accounts demands an increase of the capital value for the additions, care should be taken to write off liberally for depreciation of the older plant. In the accounts of a factory it is difficult even for those engaged in its management always to distinguish between the expenditure for renewals chargeable to capital and

**Renewals may
balance
deterioration.**

See page 122.

See page 43.

**Risk of neglect
in new factories.**

**Tendency of
factories to
increase.**

**Difficulty in
allotting charges.**

that due to deterioration ; and, to those outside the management, it is quite impossible without careful investigation rarely attempted. Of course, actual additions to the size of a factory may be duly reckoned as increasing the fixed capital ; but such an increase may be wholly or partially neutralised by the deterioration of the older part. It may be said that the success of the larger and more important industrial concerns, such as steel-works, shipbuilding yards, chemical-works, and steamship-companies, and their survival through the vicissitudes of dull times and during radical alterations in trade, have been due to the liberal charging of extensions to revenue. The variety of new inventions that are proffered for consideration is so great that prudent managers may well hesitate to accept as correct the merits claimed. But when the advantages have become manifest, and the disinclination to adopt the novelty is due to the desire to obtain more service from an old or inefficient plant before discarding it, then the delay needs justification. Those who do take advantage of the new thing gain a start over their competitors which may be valuable, and are able to sell the old plant at a better price than later on when it is more obviously obsolete.

But while manufacturers and others engaged in such enterprises may deduct from the value of their plant the estimated loss by wear and tear, and must in prudence apply part of their earnings to make good the loss in the capital account, the Law has only partially recognised such a deduction from profits in calculating Income-tax. Up to the year 1878 no allowance whatever was permitted, and in the year 1876 the principle of this refusal was confirmed by the case of *Andrew Handyside and Company (Limited)*,* who had set aside a sum out of their net profits, under the articles of association, for the purpose of meeting the depreciation of buildings, fixed plant and machinery. The

* 'Law Journal Reports' (New Series), vol. 45, Common Law, p. 809.

*See Frontispiece,
also page 120.*

**Extensions out
of revenue.**

Examples.

See page 45.

**Old plant re-
tained too long.**
See page 38.

**Deductions for
renewal**

**only partially
allowed in
income-tax.**

majority of the local Commissioners, being of opinion "that persons in trade were equitably entitled to write off from their profits such a sum for depreciation, and that the amount claimed was fair and reasonable," decided in favour of the company. The Surveyor of Taxes, being dissatisfied with this decision, requested that the present case should be stated for the opinion of the Court, whether the company should be allowed the deduction of the £1509 7s. 6d. claimed by them for depreciation. This appeal was tried before three Judges in the Exchequer Division of the High Court of Justice, who decided that the sum so set apart was in the nature of capital, and cannot be deducted from the profits liable to Income-tax under Schedule D. They based this decision on statute of 5 and 6 Vict. c. 35.

**Appealed against
by Surveyor of
Taxes.**

This statute, Schedule D, which imposes Income-tax on trading and other concerns, allows that actual expenditure on repairs and renewals may be deducted from the gross earnings, if they do not exceed "what is usually expended for such purposes during an average of three years preceding," but that according to the decision of the judges, Income-tax was legally chargeable on money reserved to make good deterioration which had already occurred and was growing, but which as yet had not demanded actual renewals.

**Effect of the
above decision.**

**Average expendi-
ture allowed.**

The above decision manifested so clearly a need for an alteration in the law, that in the Customs and Inland Revenue Act of 1878 (41 Vict., chap. 15, section 12) it was enacted—

**The law altered
in 1878.**

"12. Notwithstanding any provision to the contrary contained in any Act relating to Income-tax, the Commissioners for general or special purposes shall, in assessing the profits or gains of any trade, manufacture, adventure, or concern in the nature of trade, chargeable under Schedule D, or the profits of any concern chargeable by reference to the rules of that schedule, allow such deduction as they may think just and reasonable as representing the diminished value by reason of wear and tear during the year of any machinery or plant used for the purposes of the concern, and belonging to the person or company by

Provision as to deduction for depreciation of machinery or plant.

whom the concern is carried on ; and for the purpose of this provision, where machinery or plant is let to the person or company by whom the concern is carried on upon such terms that the person or company is bound to maintain the machinery or plant, and deliver over the same in good condition at the end of the term of the lease, such machinery or plant shall be deemed to belong to such person or company.

Allowance to lessor who maintains plant.

“ And where any machinery or plant is let upon such terms that the burden of maintaining and restoring the same falls upon the lessor, he shall be entitled, on claim made to the Commissioners for general or special purposes in the manner prescribed by section sixty-one of the Act of the fifth and sixth years of Her Majesty's reign, chapter thirty-five, to have repaid to him such a portion of the sum which may have been assessed and charged in respect to the machinery or plant, and deducted by the lessee on payment of the rent, as shall represent the Income-tax upon such an amount as the said Commissioners may think just and reasonable, as representing the diminished value by reason of wear and tear of such machinery or plant during the year : Provided that no such claim shall be allowed unless it shall be made within twelve calendar months after the expiration of the year of assessment.”

Purpose of the 1878 Act.

Buildings excluded.

Surveyors of taxes did not always draw the attention of manufacturers and others to the relief and allowances provided by this Act of 1878. It will be seen that there is no mention of “depreciation” in the statute, but only of “diminished value by wear and tear,” and this definition has been a subject of dispute in claims for replacements for obsolescence. It is to be observed, also, that the Act provides only for an allowance in regard to the depreciation of Machinery and Plant, and does not specifically include Buildings, so that the profits made in a frail structure which will last only ten years, might, by a strict interpretation, be as fully taxed (although the actual current expenditure for repairs is allowed) as those earned in a solid building having a durability of fifty years. It will be seen, also, that the decision of the Commissioners as to the amount to be allowed was left without appeal.

Further appeals.

Numerous appeals have been made to local Commissioners for a more adequate recognition, not only of charges

for depreciation by wear and tear, but also of reserves against obsolescence.

In 1897 a memorial from Leicester to the Chancellor of the Exchequer complained—

**Example at
Leicester.**

1. That the allowances in respect of repairs and depreciation are insufficient, and the methods of calculating such depreciation are unsatisfactory.

2. That no allowance is made for the cost of replacing machinery which has become obsolete.

“The Secretary of the Chancellor replied—As to the first point, I am to say that, as the law now stands, deductions are allowed, both in respect of expenditure incurred in repairs or alterations of machinery according to an average of the three years preceding the year of assessment and also in respect of the diminished value of machinery by reason of wear and tear during the year. As to the second point, I am to say that the Board of Inland Revenue have given instructions to their Surveyor at Leicester that where a claim is made in respect of the introduction of more modern machinery in a factory, no objection is to be taken to the allowance as a deduction from the assessable profits of the year of so much of the cost of replacement as is represented by the existing value of the machinery replaced. Any excess in the cost of the new machinery over the actual present value of the old, is an addition to the capital of the business, and cannot properly be regarded as a charge upon the revenue for the purpose of Income-tax assessment.”

**Allowance for
obsolescence.**

Among the new provisions embodied in the Finance Act of 1907, clause 2, section 26 states that no deduction for wear and tear shall be allowed, which, if added to previous allowances, will exceed the actual cost of the plant plus any expenditure in the nature of capital by way of renewal, improvement or reinstatement. Clause 3 is important to undertakings not making large profits, inasmuch as if profits are not sufficient to cover the allowance, such allowance, or any balance thereof, may be carried forward, and added to the allowance for the next or subsequent years.

**Finance Act
of 1907.**

**Allowances may
be carried
forward.**

There are many industrial enterprises other than factories where such points have to be considered, and where

the increasing burden of Income-tax has naturally tended to a stricter investigation into the allowance that should be made for depreciation. The writing down of values in the track and rolling-stock of tramways, or in the depreciation of steamships, or steam dredgers, are examples. In many of such cases the reported judgments in the appeals that have come before the Courts afford useful guidance for new cases and problems as they arise.

The necessity for a Reserve in Municipal undertakings is shown by the case of the London County Council * against the Surveyor of Taxes, where the Council in the years 1903-4 changed the tramway system from horse haulage to electric traction. Previous to the change they had by Statute,† and by agreement with the Inland Revenue officers, been allowed to deduct for Income-tax purposes certain sums from their profits as expended on repairs and renewals on permanent way and cars. When the electric system was introduced the partly-worn-out rails had to be discarded for stronger rails and the old cars scrapped for new ones. There was no charge for renewals during the first year, but the Council contended that for the whole of the five years following the change of system they were at any rate entitled to the proportion of the new expenditure which they would have been allowed on the now superseded permanent-way and cars. This claim was disallowed by the Court on the ground that there had been no renewal but a substitution of a different plant which the Council had themselves charged to capital, and that at the time they had not asked for an adjustment on the old basis.

For the purpose here, however, the case shows the necessity for holding back from profits a Reserve fund to

* See King's Bench Division. *Profits on Tramways*. The London County Council *v.* Henry Edward (Surveyor of Taxes). Reported fully in *Times*, Feb. 11, 1909.

† Section 12 of the Customs and Inland Revenue Act, 1878 (41 and 42 Victoria, c. 15).

See *Tramways*,
page 47.

See *Railways*,
page 14.

Depreciation and
income-tax.

London tramway.

Change of
haulage system.

Claim for allow-
ance refused.

meet the incidental charges arising out of such a change of system. The judgment is too long to recite here, but it is interesting to all concerned in Municipal undertakings, because the general question of allowances for wear and tear were fully gone into. The case was deemed of sufficient importance to be reported fully—the judgment verbatim—in the *Times*,* where it is available for reference.

Industrial works or undertakings may diminish or waste in value because, from their nature or kind, they are limited in extent or time, but where part of the annual profits is applied to the establishing of a sinking-fund for getting back the capital invested in such undertakings, the reduction in the profits is not allowed by the Income-tax Commissioners. In the case of a Mine acquired by the payment of a capital sum for the minerals instead of, or in addition to, an annual or tonnage royalty on the mineral gotten, the attempt has been made to deduct from the profits assessable to Income-tax the annual reduction in capital value which takes place by the exhaustion of the minerals. This was permitted in the well-known case of *Knowles v. McAdam*,† but was afterwards disallowed, when a supposed contrary decision was given on appeal in the case of *The Coltness Iron Co. v. Black*.‡ There, the sum claimed as a deduction from the assessment did not represent the cost of pit-sinking during the year, but the sum arrived at by calculating 2s. a ton on iron made, and 1½*d.* a ton on coal sold during the year; it being estimated that this would properly represent the amount of capital expended on making bores and sinking pits which had been exhausted by the year's working. The cost of such sinking was charged in the books of the company to an account called "Sunk Capital Account," and was

A notable example.

See page 25.

Sinking fund for wasting properties.

See pages 32-3.

Not allowed from income-tax.

Collieries.

See page 105.

Legal decisions.

Pit sinking.

See page 106.

* See note on previous page.

† Exchequer Division, January 23rd and December 5th, 1877, *Knowles and others v. McAdam*.

‡ House of Lords. Appeal, April 7th, 1881, from the Court of Session *The Coltness Iron Co. v. Black*.

written off annually by a sum computed at the respective rates above specified, on the quantities of iron made and coal sold in a year, as representing the capital expended on pit sinking exhausted by the year's working. The effect of the judgment is that no allowance from this provision is made in calculating Income-tax, nor can a deduction be made if the sum set apart is as "depreciation" to provide funds for the sinking of new shafts to replace those which are becoming useless as the minerals are consumed. The special laws regarding property in Land have probably been held in view in this decision.

Income-tax on colliery earnings.

Allowances for depreciations.

The word "depreciation" being generally applied only to the physical deterioration or wear and tear of machinery, the loss by waste in cases like the above should be clearly separated in putting forward a claim for allowance from Income-tax. And, in regard to decisions of the Courts, previous cases should not be too readily accepted as precedents unless the circumstances are quite alike. Although the Income-tax Commissioners alleged that the Coltness case overruled that of Knowles, that has not (1909) been affirmed by the Courts. The Coltness Co. wished to charge the cost of sinking new pits for replacing old ones to revenue; but it has not been decided that a mine-owner shall not in any case be entitled to an allowance in respect of the cost of sinking a pit, by means of which pit minerals are gotten which are the source of profit for the year in which the pit is sunk.

Legal precedents.

Wasting of capital in mines

recognised in South African gold mines.

The justice of allowing for the wasting of capital in mines by the exhaustion of minerals, which may render the plant and past expenditure for development valueless, was recognised by the South African Government in 1903, when the tax on the net produce of the gold mines was so arranged that such net produce was to be taken as the value of the gold produced, after deducting the cost of production and of the sums allowed for exhaustion of capital.

The following are the terms of settlement arrived at between the Colonial Treasurer and the Chamber of Mines with regard to the tax on gold profits :—

Times Report,
March 16, 1903.

“Accounts are to be rendered within three months from the date on which they are made up. The expenses by shaft-sinking or equipment are admissible for amortization, irrespective of the question whether the outlay is from capital reserve or current revenue. Development outlay is to be omitted from the statement. In regard to capital outlay for further development, the outlay will be treated as working cost for calculating the yearly duty. Shaft-sinking to the point where driving commences will be treated as capital expenditure and not as development. The life of a mine will be computed on the basis of existing stamping-power and the tonnage of payable ore remaining to be worked at that date. The taxation on the life of a mine will be subject of revision if material alterations in the *data* of computation occur. The deduction for amortization will be calculated for the life of the mine, and is to be proportioned to every normal working year. When the taxable profit is less than the yearly allowance for amortization, both sums will be carried forward to the succeeding year.”

Shaft-sinking.

**Deduction
for amortization.**

If the incidence of taxation is thus ameliorated for wasting properties, it must be evident the same principle should be employed in calculating the profits available for dividend.

See pages 11, 40.

There are various methods of estimating the Depreciation of a Factory, and of recording alteration in Value, but it may be said in regard to any of them that the object in view is, so to treat the nominal capital in the books of account that it shall always represent as nearly as possible the real value. Theoretically, the most effectual method of securing this would be, if it were feasible, to Re-value everything at stated intervals, and to write off whatever loss such valuations might reveal without regard to any prescribed rate. By such a plan the deterioration due to a period of arduous working, or to any average or idle year, would be properly allotted.

**The object of
depreciation.**

**Periodical
valuation.**

Such a system, however, is not feasible, and is adopted only in factories where the trade and plant are of so simple

Where adopted.

or uniform a kind as to allow it without difficulty. In some manufactories there are a few chief items of plant which are more important than the rest, and whose condition and value therefore need special consideration. Thus, an iron-smelter may directly estimate each year the value of his blast furnaces and blowing-engines, and for the miscellaneous or subsidiary plant be content to write a percentage off the original cost without a very close examination. On the other hand, iron-smelters sometimes establish a special fund—say of 1s. or more per ton of pig-iron made—and apply the fund to the maintenance and renewal of the whole plant of the furnaces.

Chief items of
plant valued.

Blast furnaces.

Valuation
difficult.

Where there is no
sign of
deterioration.

See CHAPTER III.

The plan of valuing every year instead of adopting a depreciation rate, though it might appear the more perfect, is too tedious and expensive to be adopted. The two leading considerations in such an appraisalment, if made, would be generally the condition of the machine or other appurtenance, and its earning power. In both these respects there may be absolutely no sign of deterioration; a machine may appear, and for all practical purposes be, as good as new, and may show proof of it by actual earnings. Yet none the less its working life is shortening every year, and unless some provision is made for a replacement a severe loss will fall on the future. Changes and improvements in many kinds of manufacturing trades are so frequent as to render machines or plant obsolete before they are worn out; and if, with this circumstance in view, something is written off the value, though no alteration or obsolescence is apparent, then the plan of a reserve or depreciation rate is really adopted.

Manufacturers who abstain in the earlier years of working from writing off depreciation, because they may see no signs of a lessened value, might find it difficult to obtain the full value from an assurance company in the case of destruction by Fire. So, also, if the assets have to be valued

Fire insurance.
See page 195.

as a security for a debenture issue, an independent examination will show a lower value than that standing on the books of account, while if an excessive depreciation has taken place, the proper value is then ascertained and may be restored.

A system of annual valuation is seldom strictly maintained, because of the time, trouble and expense it would involve, and even where a balance of profit and loss is duly struck every year, an annual valuation of the plant may be deemed impracticable. The next best plan, which is that generally followed, and which it is intended now to investigate, is to establish average rates which can without much trouble be written off every year, to check the result by complete or partial valuation at longer intervals, and to adjust the depreciation rate if required.

Before dealing in detail with the various kinds of property in a factory, and attempting to set up a mode of treatment and rate of depreciation appropriate to each, there are certain preliminary questions that need attention. First, the value of any building, plant or apparatus, or aggregation of them, may be largely affected by circumstances outside of their physical condition, and it may be convenient at the outset to separate such circumstances from the wear and tear due to actual use. Among such circumstances are the Tenure under which the factory is occupied; the Permanency or steadiness of profitable employment which may be anticipated; the Exhaustion of minerals or materials of manufacture; the likelihood of New Inventions, processes, or machines coming into use which may supersede and render Obsolete those whose value or depreciation are in question; or vicissitudes and catastrophes which cannot be provided for by ordinary Insurance. Conditions and contingencies such as these, if they are to be estimated and provided for, may be said to demand a Reserve or Sinking fund rather than a rate of depreciation, and in most cases it would be found desirable

Debentures.

See page 45.

Annual valuation seldom adopted.

Average rates of depreciation.

Deterioration other than by wear and tear.

See page 103.

See page 105.

See page 45.

Reserve-fund.

See pages 44-50.

thus to isolate them in the accounts ; but whatever be the precise method of doing it, they must be duly considered.

Tenure.

In regard to Tenure, if the factory be only rented by the occupier, then the sum to be provided for depreciation will depend partly upon the conditions of tenancy ; and if the rent covers fair wear and tear, the occupier need only keep the plant that belongs to the landlord in working order for his own purposes. Such a case occurs, for instance, where a tenant possesses looms or other machines, while the landlord provides the workshop and engine-power, but leaves the current repairs to the tenant. The landlord, on the other hand, should, in dealing with the rent, provide out of it for the deterioration not covered by the tenant.

Rent may cover depreciation.

See pages 113, 171.

Landlord's obligations.

Factory built on leasehold land.

A more usual tenure is that under which the premises are built by the occupier on land held on Lease, with the usual condition that the buildings and the permanent Fixtures become the property of the ground landlord at the end of the term. Without here going into the legal question of what constitutes landlord's fixtures, it may be said that in the case of fixtures added to a building for purposes of trade or manufacture the law leans more to the interests of the tenant than in the case of ordinary house fixtures. Where the circumstances would admit of doubt, proper stipulations in the agreement of tenancy should have been made. There are, however, few trades in which, if the tenant has equipped the factory with plant, all of it can be removed by him.

Fixtures.

See page 174.

CHAPTER X.

In the absence of a stipulation that the landlord must release, or pay for, such additions to the freehold, the provision of a Sinking-fund sufficient to give back the capital expended by the tenant becomes a matter of great importance. When the lease is for a long term, the annual charge or premium, if it begin with the lease, will not be found burdensome, and moreover the annual charge must not be considered as all due to the terminable tenure,

Sinking-funds.

See pages 31, 131.

*See
Leasehold
Assurance,
page 133.*

because a freeholder would incur a considerable proportion of it—even if repairs were duly attended to—to compensate for the reduction in value due to time and use. In other words, a depreciation rate would be necessary to compensate for wear and tear, and in the later years of a leasehold term this would become merged in a sinking-fund to repay all the capital.

But as, under these conditions, the tenant will fall under no obligation to give up more than the terms of his lease compel, he will, while maintaining the plant to the end of the term in sufficient order for his own purposes, abstain from replacing obsolete fixtures by new ones; and, in regard to portions which are seldom used, may even let them wear out before the lease ends. Even if the occupier is to deliver up the factory in good tenantable condition, it does not follow that the repairs shall have been effected with so liberal a view to the future as the occupier might have as owner; nor is it to be assumed that fixtures fairly worn out in the work of the factory should be replaced by new ones. Therefore, as against his sinking-fund, the occupier may, in the last years of his term, reduce the cost of maintenance, unless by arrangement with the freeholder he leaves everything in the best condition for a new tenancy.

The Permanence or steadiness of profitable employment, or the reverse, has to be taken into account in deciding on the depreciation in the value of plant. A factory may be employed in some subsidiary trade, or in supplying some other undertaking which is not certain of continuing; or a patent, or a privilege, or a contract for a term of years may be near its termination. Owing to contingencies of this sort, which are too various to enumerate, the conditions of past successful working may be liable to such serious alteration or actual termination, that it is obvious a high rate of depreciation should be written off the plant, so as to bring down its normal value to that which it will have

**Not all due to
tenure.**

**Renewals by
tenant limited.**

See page 174.

*See
Partners,
page 114.*

**Maintenance in
later years of
lease.**

**Permanency of
employment
affects value.**

*See
CHAPTER XIV.*

**Terminable
undertakings.**

**Removal of
plant.***See page 131.*

under any such anticipated contingency. It will be seen that in such terminable undertakings an ordinary depreciation-rate should really be supplemented by or merged into the Sinking-fund, so that the capital sunk in the plant may be recovered.

**Fluctuation in
trade.***See page 123.*

There are manufactures which, though they may be fairly considered permanent, are subject to violent Fluctuations, rendering plant idle for considerable periods. Such are the lace-trade, certain branches of the textile trades, and others depending on fashion. In calculating the cost of manufacture and the profit obtainable in trades such as these, a higher rate of depreciation should be assumed in years when the plant is in full operation, to make up for idle years when little or no profits are earned ; for though the actual wear and tear during these idle years may be small, the liability to deterioration and waste always continues.

New inventions.*See page 45.*

The possibility of New Inventions, processes, or machines coming into use, which may supersede or render an existing plant Obsolete, is a contingency that presses on most manufacturing trades, principally those which have been long established, but sometimes also in new concerns where old methods have been adopted or imitated just as they were being superseded elsewhere. Invention is constantly being directed to automatic processes, which may perform easily and mechanically what has hitherto been possible only with highly-skilled labour or superintendence. Where such radical alterations and improvements are being made from time to time in plant of a special kind, most of it useless for any other purpose, it would be unsafe to depend solely on depreciation to meet the mere loss by wear and tear unless the rate on such a basis reduced the book value rapidly.

**Depreciation of
obsolete plant.***See***Municipal works,**
pages 7, 11.

In every business, whether conducted by a Company or Corporation, it is not sufficient to charge the revenue with

the cost of current repairs to the plant. Experience shows that a long-established business, with old-fashioned plant, cannot compete with a new business with modern equipment, and a provision should be made accordingly. There are obviously opposing risks; the pioneers who try such methods do not always reap the fruit, and the glamour of anticipated savings must be withstood. Special machines, which may be remunerative in a large concern, may be out of place in a small factory where there is not sufficient employment to justify the capital expenditure involved. But the inference may then be obvious, that the industry can no longer be carried on in competition with those who are working on a large scale with modern equipment. Thus, while prudence and hesitation in the adoption of new inventions may prevail against excessive or unremunerative expenditure, timidity has also its risks of loss. To wait till the experience of others has proved the success of a new invention may leave timid persons always behind, and the adoption of new methods takes place just as they, in their turn, are about to be superseded. A private firm or company may be stimulated to a progressive course by the competition of others, but a corporation having a monopoly is reluctant to acknowledge that plant in operation should be superseded by something new which the rate-payers will have to pay for.

**Risks to
pioneers of new
methods.**

**Timidity
may involve loss.**

See pages 13, 144.

A reserve beyond the ordinary depreciation above described may then become necessary, because the original plant, when once superseded by such inventions, may prove unsaleable as second-hand plant, except in so far as it may have a piecemeal or scrap value. For in such cases no reduction in price of the superseded machinery would balance the expenditure in labour or power its use would involve, or make up for the inferiority of its productions. This risk sometimes arises, not from improvements in the machinery, but from alterations in the kind of product, rendering new

**Obsolete plant
unsaleable.**

See page 191.

machines necessary to suit new patterns or types. Contingencies such as these should encourage an ample reduction of nominal value in the early years of working, so as to bring down the book value of the plant to a point which will allow even of dismantling without serious loss. In such trades, profits should be large enough to allow for a liberal and rapid writing off of capital value, which is in effect the establishment of a reserve-fund as distinct from depreciation for wear and tear. The same security is attained by the constant addition of new and improved machinery out of revenue ; and undertakings in which the profits of prosperous times have been applied in this way, in the renewal of plant rather than in the distribution of high dividends, have a considerable advantage, when trade becomes dull, in competing with rival undertakings burdened with an unrelieved capital account.

Depreciation considered and applied in this way is in effect a Reserve which regulates what without such adjustment is necessarily irregular. For instance, there may be in some years nothing beyond mere repairs or small renewals, which are paid for out of current Revenue ; but at long intervals there may be renewals or changes of an important nature, revolutionising the whole course of manufacture. Revenue from the easier years must be accumulated to provide for such contingencies.

In Municipal undertakings the rule that no depreciation is allowable except that provided by the Sinking-fund, and no reserve except one invested in securities outside the undertaking does, if strictly applied, impede somewhat the establishment of a necessary safeguard, unless prudent managers can arrange to so divide such renewals as to bring the outlay within the compass of a revenue charge which might otherwise be postponed. Fortunately, in private concerns there is no impediment to a proper reserve, or the retention of what appears to be

**Nominal value
should be reduced,**

**or maintained
by additions.**

Reserves.

*See also pages
2, 124.*

**Municipal
undertakings.**

See page 10.

*See
Income-tax,
pages 27, 32.*

profit, a retention which will be found to have been provided and utilised in all undertakings that have survived over a course of years.

But while, as between a few partners, it might be convenient to consider all these circumstances as part of one general system of depreciation, they would, in the case of numerous partners, or of a joint-stock company, be more properly provided for by a Reserve-fund, stated in the accounts, and distinct from the depreciation by wear and tear. For, as it is impossible, by a mere annual writing-off, to exactly balance uncertain contingencies, the grouping of all together may tell unfairly in either direction on the holding of those who have only a fleeting interest in the undertaking, or who cannot afford to stand by their investment to a future day.

With these contingencies in view, the provision for depreciation and reserve should be liberal in the first instance. Life Assurance affords analogous examples. The premiums are based on three main factors, namely, the probabilities of life, as shown by past statistics of mortality, on the percentage of interest that may be earned on the investments of accumulating funds, and on the cost of working the undertaking. But premiums so arrived at are always loaded to protect the assurance company against exceptional epidemics or catastrophes, or against a falling off in the rate of interest earnable, or against some special outlay for litigation or otherwise in particular years. While the solvency of the concern is thus the first consideration, a review is made at periodical intervals of five or seven years. If the special contingencies have not occurred, the excess of premium is returned to those who have paid them as a so-called "bonus" or "share of profit." The return is occasionally made in the form of a money payment, but generally in the reduction of the premium or an addition to the sum assured. So also in the case a too-liberal accumulation of reserve, an

**Reserve-fund
separate from
depreciation.**

*See
Partners,
page 112.*

**Analogy
of life assurance.**
See page 123.

**Loading of
premiums.**

**Returned by
bonus.**

Excessive depreciation recouped.

occasional review or valuation may show that certain contingent risks have not occurred, and one of the above three methods of recoupment may be adopted. That is to say—(1) a money payment in the form of dividend or bonus; (2) reduced rate of premiums for the next few years, i.e. a reduced rate of depreciation or contribution to a reserve fund; or (3) an addition to the capital value of the concern. The last may be deemed the conservative or safe method. In a joint-stock company effect may be given to such assumed increase in value by the higher market-value of the shares; further, the original capital of a company may be increased, under such circumstances, by the distribution to the shareholders of new shares as a “stock dividend.”

Stock dividends.

Accounts made clear to sleeping partners.

See page 112.

Economies disguised by managers.

To those who are concerned in the management, and who know the basis on which a general rate has been arrived at, the name by which the provision is stated may be a matter of indifference; but to partners or shareholders who are unaware of the circumstances, a separate reserve fund will ensure a fairer valuation of their property; and in case of a change or termination of the partnership, or of a cessation of the business, there is then a specific fund in hand which may even render a valuation unnecessary. But those who are responsible for the management sometimes prefer to include in the depreciation rate what is really a reserve or insurance fund, so as to disguise the economies they are practising, and avoid the claims of shareholders who might prefer to divide and appropriate an undiminished income.

Inventory.

See page 72.

Depreciation and reserve should be separate.

On the other hand, it is sometimes the case that instead of actually writing down the value of machinery and plant, the full or original value is retained in the inventory, showing a favourable balance in the profit and loss account, and a separate fund, entitled “Depreciation and Reserve,” is established by the application of part of the profits. The association of these two matters under such a designation

may, however, be misleading if shareholders are led by it to believe that there is an actual fund at their disposal, while the book entry really represents the estimated loss by what is worn out or obsolete. It is true that the writing down of values may to some extent be deemed an insurance or reserve against unknown contingencies, though for convenience included under the name of depreciation. This course is sometimes adopted instead of setting apart a separate fund available in money or money's worth solely as a reserve.

**Insurance
against the
unknown.**

One of the great leaders of industry in the north of England, in propounding a scheme for the sharing of profits between the shareholders and the workmen, proposed—

**Profit-sharing
with workmen.**

“That in dealing with the profits there should not only be first a small minimum dividend paid to the capitalists, but that there should also be something set apart for depreciation, developments and reserve before dealing with the balance, which, only after such a charge, could be considered as net divisible income. These allotments to the fund mentioned, though they may vary from year to year, cannot be dispensed with if any reasonable hope of prosperity is to be expected. A wise management must make provision for the replacement of the plant and machinery, not merely in view of the wear and tear it is constantly undergoing, but also of the possibility that any day portions of it may be superseded by some device more rapid and ingenious—at any rate in some way more economical. Actual losses as well as gains must be estimated. There may be litigation in respect to alleged bad workmanship or by bad debts, and if the concern is to be managed with enterprise, funds must be put by for extensions or other development.”

**Depreciation
comes before
profit.**

It may truly be said that industrial concerns cannot go on and prosper without some of these provisions which should at all events take precedence of dividends.

*See pages 8, 18,
19.*

The current of events may be the reverse of those just supposed. Thus, the value of the site on which the factory stands may be increasing in value by the growth of the town and neighbourhood, or the demand for the products of the factory may be increasing at a greater rate than the competitive supply, or the reputation of the factory may

**Increasing value
of the site.**
See page 65.

be increasing its trade and profit. But circumstances such as these, however much they may increase the real value of the undertaking and may justify a corresponding valuation in the case of change of partnership or sale of shares, cannot safely be set against such contingencies as are referred to on the previous page, nor against actual physical deterioration of the plant. The latter, as a distinct and unavoidable circumstance, should be dealt with on its merits, and improvements in another direction be left to a subsequent valuation, when the real maximum value has to be ascertained.

**Deterioration
of plant still
continues.**

See page 156.

**Proprietors
not impoverished
by
depreciation.**

Although liberal writing-down may, in the books of account, show diminishing values of plant, proprietors are none the poorer merely because of book-entries. The real value of capital invested in industrial undertakings is measured by the income it produces. The income available for division may be diminished for a while, but the capital remains, and if the plant has been unduly depreciated the true value will show itself in improved dividends, or will revive in a new valuation. It is seldom that even the book value is diminished, as the amount written off on one side of the account is generally balanced on the other side by expenditure on new plant.

*See Frontispiece
diagram,
and page 120.*

**Depreciation
sinking-fund and
reserves, each
have their place.**

It is endeavoured in this treatise to show the different functions of Depreciation, Reserves and Sinking-fund. They each have their place, and in large affairs they should be dealt with separately. For more moderate undertakings the provision for meeting them may be conveniently united in the general term of Depreciation, and the application of such a fund to any one of the three divisions or purposes can be made as occasions arise.

*See
SINKING-FUNDS,
page 131.*

In considering the necessity for a Reserve, it is natural, especially in regard to a new undertaking with modern equipment, to regard as a remote risk any further liability to changes beyond those which a usual depreciation rate

for wear and tear will cover, but the history of the past shows too many radical and unexpected events to justify so sanguine an expectation.

The term Reserve has a wider significance than the depreciation of plant for wear-and-tear, which has been described in the preceding pages, and which is referred to in greater detail in later chapters. In all commercial undertaking there are risks that ought to be provided for, some of which may be covered by specific insurance. There is the risk of Fire, or of claims by workmen under the Employers' Liability Act. There are other contingencies which cannot be so defined and insured against, such as bad debts, strikes or lockouts, litigation, or changes of trade by superior inventions patented by others. There are again changes in processes, which may render plant obsolete long before the depreciation fund has brought down its value to such a level. A Reserve provides for these, and may be trenched on for still other purposes. It can even be used for the equalisation of dividends, but where trading-concerns have surplus profits available for this, a special fund is often created for it.

Almost all the industrial undertakings—factories and works—which have lasted and prospered for more than 30 years owe their endurance and success during fluctuations of trade and changing methods to one main condition common to them all. The proprietors have either had spare capital available from the commencement, or have been able and willing year by year to set aside a proportion of their earnings as a Reserve to meet the various contingencies alluded to. This is obviously better, if it be possible, than the raising of capital on debentures, a course which has drawbacks as well as advantages.

Perfection is never entirely attained in a manufacturing business. Not only does every improvement pave the way to another, but competition from those who have better

Reserves defined.

Fire risks.

See page 195.

**Employers' liability.
Debts, strikes, litigation.**

Obsolescence.

Equalisation of dividend.

Lasting success due to setting aside earnings.

Preferable to issuing debentures.

Finality is never attained.

Examples.

machinery at command often compels a similar advance. Some examples may be cited as appropriate to the present purpose, and may suggest caution for the future. There is much scope for, and likelihood of, such alterations.

Excessive consumption of fuel.

The effective power generated by the best steam-engine is still less than one-fifth of the potential heat-force of the fuel consumed. Much of the loss is due to the transmutation of heat through water and steam, but till some rotary form of gas-engine, instead of the present reciprocating motion, is effectively given to such machines, there will be restricted scope for gaseous fuel. Such fuel would render unnecessary the expensive chimneys which disfigure manufacturing towns.

Gas engines and oil engines.**Steam turbines supersede ordinary steam engines.**

The invention of the steam-turbine, particularly with a view to a cheaper and more concentrated application of electric-force, has superseded the ingenious and highly finished high-speed reciprocating-engines which had been so successful, and which have to be sold second-hand at reduced prices for other purposes. The same kind of turbine has, on a larger scale, been applied to steam-ships, and altered much of the subsidiary marine machinery which gave employment to so many engineering factories.

Steel-making.

The processes of Steel-making, which followed the Bessemer inventions of 1850-60, widened the scope for further discoveries. The subsidiary introduction of the basic process utilising inferior ores, and of the open-hearth system of furnaces which allowed finer gradations of kind and quality, were only brought to success by apparatus of an entirely new kind, involving the abandonment of expensive plant, including elaborate brickwork, foundations, furnaces and machinery, which had become useless for the desired purpose.

Steel rails.

The introduction of cheap steel entirely changed the manufacture of rails, and though it created a beneficial industry, the old rail-plant had to be entirely altered.

Steel plates, not only stronger but much cheaper than iron plates, revolutionised the ship-building trade, and also rendered possible the construction of bridges, buildings and structures impossible before, and of boilers which could resist steam-pressures higher than could previously be dealt with. New machinery was required for all these changes. As steel could be made in larger and heavier pieces than iron, more powerful presses and hammers were needed, and these superseded the old machines and rendered them almost valueless.

Steel plates for
shipbuilding
and bridges.

In the heavy trades such as Blast-furnaces, Steel-works, Rolling-mills, not only had new plant to be established, but the arrangement of it was new. In Ship-yards, dry-docks had to replace old building-slips; and these had not only to be covered and well lighted, but had to be equipped with powerful electric cranes to utilise full working-hours in all seasons. Old plant was scrapped.

Old machines
rendered
valueless.

New plant in
rolling-mills and
ship-yards.

New systems of power-transmission have changed the old methods of transport. Modern steel allows of wire-ropes for transporters and conveyors. Compressed-air serves where hydraulic power was slow and inappropriate, and with the adjunct of powerful explosives, makes possible mining operations and mountain-tunnelling impossible before. All these inventions rendered obsolete valuable patterns and special tools which no ordinary system of depreciation had provided for.

Steel wire ropes.

Patterns and
tools rendered
obsolete.

Town tramways have in the course of 30 years changed from horse-traction to small locomotives, then to wire-rope haulage, then to the overhead electric-trolley system, and later to the underground conduit, which is likely in the early future to become obligatory in all large cities. No ordinary sinking-fund will replace the capital lost by such changes. Power-transmission by electricity has superseded shafting and toothed-wheels, and rendered useless the numerous costly wheel patterns included in the assets of

Tramways.

See also page 6.

Changes of
system.

Electric
transmission.

See page 90.

engineering-works, and only partly written-down by depreciation.

Chemical investigations and the advantages obtained from them have, in many trades where scientific methods were formerly unknown, made the laboratory the centre of the organisation, and caused much plant to be discarded.

Portland cement.
See page 212.

The methods of making Portland cement have been almost entirely changed since 1890 ; higher standards of quality have been imposed, and the British manufacturers who had at their command the most favourable combination of conditions in the world, have not only had to discard their old plant, but have had to replace it by more expensive machinery, in order to hold their place against keen foreign competition.

By-products.

Sulphate-of-Ammonia.
Basic slag.

The more extended knowledge of chemistry, has been a principal cause and justification of many radical alterations. In numerous leading trades the whole net profit may depend on the utilisation of by-products requiring special plant. Such, for instance, is the saving of sulphate-of-ammonia from the plant of producer-gas, and basic slag from steel-works. Combinations of this kind may suffer from unsuitable conditions of transport—additional branch-lines of railway may be necessary, or removal of works to places where such facilities are available.

Electro-force from water power.
See page 89.

Melting of Metals.

Electro-metallurgical processes and electro-chemical inventions are already at work, and being rapidly developed. When the electric current can be generated by improved heat-engines as just described, or by natural water-power in countries where rapid streams are perennial, then heat can be developed at less cost, and electro-force transmitted long distances. The melting of metals by heat so generated will, when properly developed, render available various metallurgical trades in countries like Italy and Switzerland which have but little coal.

The examples given in this chapter of the various

circumstances that contribute to a reduction in value, have been selected mainly from works connected with the Engineering and kindred trades. The same principles apply, however, to almost all manufacturing industries ; and the conclusions drawn will show, in the same way, that depreciation to provide for wear and tear as estimated from previous experience, will not cover the many other contingencies to which almost all industrial enterprises are open.

**All trades liable
to change.**

The Textile trades afford conspicuous examples of how, because of new inventions, entire reconstruction is becoming necessary. Old buildings appropriate to the machines and operations for which they were constructed, may be quite unsuitable for the larger machines and sequence of processes which have become essential to a profitable trade. The width between walls or supporting-columns, the headway below roof-beams, the strength of floors, or the small amount of light may, some or all of them, entirely hinder the introduction of modern plant. Not only in regard to buildings but in the arrangement of motive-power and its transmissions to the various machines, radical changes are called for. The removal of steam engines and boilers from a factory, when power can be conveniently and cheaply obtained from a central Electric station, while it may set free much valuable space for the purpose of manufacture, will involve the scrapping and writing-down of such discarded plant as steam engines, pipes, shafting, pulleys, and tooth-wheels.

Textile trades.

**Old buildings
inappropriate.**

**Electric power
purchased,
steam engines
discarded.**

Some of these changes are rendered necessary by new legislation. Factory Inspectors, Sanitary Inspectors, and those who administer the Mines Regulation Acts, or Municipal by-laws, forbid old methods and insist on such alterations or restrictions as involve considerable outlay and even in some cases removal to another site, leaving behind buildings and plant which stand at a book-value quite irrecoverable. Conspicuous examples may be seen

Stringent inspection.

of Railway Companies finding it necessary to dismantle their workshops, scrap much of their plant, and remove to other towns or districts where the conditions are more favourable. Parliamentary powers for the acquisition of fresh capital may be rendered necessary by such changes.

The question sometimes arises whether the values set apart as a Reserve may properly be employed in the business itself, or whether they should be invested outside the business. If the object be to maintain assets beyond the nominal capital, the reserve may often be best employed in the business. The land, buildings, or plant may be extended out of revenue and the increased capital value may be treated as a reserve, and so shown in the books of account, this disclosure affording information alike to outgoing and incoming partners. The redemption of Debentures or Loans is another means of forming a reserve, as presumably the power of again borrowing will be thereby retained. If, however, the object be to have a fund available to meet a sudden call, the reserve may be more prudently invested in securities of a kind easily realisable. The advantages and drawbacks depend upon the nature of the business and its risks.

Private firms and Limited Companies are free to establish Reserves and invest them as the managers deem best, subject only to the approval of their Shareholders and Auditors. But as has already been referred to, Municipal undertakings in Great Britain are subject to the rules and restrictions of the Local Government Board. The periods of the Sinking-funds established under these authorities for repaying loans are supposed to cover the wasting of values from any cause, and while current expenditure for repairs may be made out of Revenue as they occur, any reserve beyond this must be invested outside municipal funds. In other words, the full revenue of any trading undertaking,

Investment of reserves may be employed for extensions.

Redemption of loans.

Realisable securities.

Private firms have free scope.

Municipalities are subject to rules.

Sinking-funds.

See pages 124, 131, 135, 144.

after paying the sinking-fund charges, must be handed back to the ratepayers, i.e. credited to them in reduction of rates or specifically invested with their knowledge and approval in outside securities. This has the inconvenience of preventing prudent managers, who foresee heavy renewals or replacements in view before the capital charge has been extinguished by the sinking-fund, from accumulating a fund specially for the purpose.

This arbitrary rule sometimes induces a thrifty manager, when a good surplus revenue is available, to effect as a departmental and revenue charge, immediate renewals, which might otherwise have been postponed.

Invested in
securities.

Unavailable for
renewals.

Secret reserves
See page 91.

CHAPTER II.

DIVISION INTO CLASSES FOR DEPRECIATION.

PRELIMINARY EXPENSES. GOODWILL.

Valuation as a
basis for
depreciation.

IN order to estimate correctly the alteration in value which the capital sunk in factory plant undergoes from year to year, it is necessary to have some record of the original value or cost as a starting-point. If the factory has been bought, the price forms this basis ; if it has been built and equipped by the occupiers, there will presumably be a record of capital expenditure, or at any rate an inventory of plant. If even this be wanting, which occasionally happens in factories which have grown up by slow and irregular additions, and it be desired to inaugurate a proper system, a valuation will be necessary, to which subsequent depreciation rates can be applied. It may be that each annual review will show a growth of value by mere extension, even after deducting for deterioration ; but it is important to take strict account of the latter, so as not to allow the nominal capital to be unduly swelled.

Inventory.
See page 73.

See page 121.

Prescribed rates
of depreciation.

In some undertakings, not only the method but the rate of depreciation is fixed in the deed of partnership or articles of association. It may have been a wise precaution to agree upon the principle of writing-off, and even to fix a minimum rate, but it is obviously impossible to thus decide in advance on an absolute rate. Sometimes it is prescribed that deterioration by time and use shall be met by applying a fixed proportion of the profits to make good what has been lost. This method is more frequently

Fixed proportion
of profits
written off.

adopted in the articles of joint-stock undertakings in France than in England ; but it is obviously unsound, as deterioration goes on even if no profits are being made. A percentage on the output or cost value of the products would be a better plan, and by referring to the accounts of preceding years a fair rate from this point of view may be established. While however this is useful, and indeed necessary, in estimating the cost of future production, it is not the best for dealing with the past. A percentage on the capital value as it was left at a previous review, is for this purpose the most suitable. The sound plan is to write off this percentage every year, besides charging to revenue the expenditure for minor repairs. It is however permissible, in determining the rates of writing off for any year, to take into account the activity or slackness of certain departments. Credit has also to be taken in the plant account for actual renewals and additions which have been made.

If the depreciation is to provide for contingencies, as well as for current wear and tear, it is obvious that until a factory has been working for some years, any annual rate adopted must be tentative and subject to occasional adjustment. If a very low rate be adopted, and yet after a course of years be shown to have been sufficient, it does not follow that the original adoption of such a rate was prudent. Risks have been run, and should have been properly provided for.

The great diversity of system renders a comparison between the practice in different factories difficult. In one, the greatest attention will be paid to repairs ; renewals and even extensions will be effected out of revenue, and little or nothing written off for depreciation. In another, an ample provision may apparently be made in the capital account for depreciation ; but repairs may be neglected, and a too liberal addition made to capital for so-called new plant.

To facilitate a correct estimate of deterioration, it is

Writing off in proportion to output.

See pages 34, 83

See page 119.

Repairs charge to revenue.

See page 122.

Rates subject to adjustment.

Comparison of factories difficult

Division of plant
into classes.

See local loans,
page 134.

Average rates
subjected to
review,

according to
severity of
working.

Wear and tear
not duly allotted.

Analysis of
profit and
charges

discloses obsolete
methods

and erroneous
estimates of cost

expedient in many undertakings to divide the property into classes, and to deal separately with each. Sometimes it is preferred to write off at one average rate from the whole of the sunk capital ; and, if this average happens to be a fair one, the method has the advantage of simplicity. If, however, this course is adopted, the average should be first arrived at and occasionally checked by an analysis of the separate classes. For the average is liable to be affected by the vicissitudes of particular years, and without modification may lead to considerable error. For instance, the manufacturing work of one year, or a series of years, may have told more severely on certain parts of the plant or buildings than on other parts, and if the wear and tear due to such work have not been sufficiently noted, estimates for future operations of a similar kind, which allow only for the previous depreciation rate, may prove erroneous.

There are frequent instances of joint-stock companies and others engaged in multifarious operations, where a certain total result of profit is obtained, concerning which insufficient analysis is made to ascertain to which branch it is due. A company whose business is the manufacture of iron or steel may be the owners of coal and iron mines beyond the requirements of their own work, and they may sell the surplus output. In addition, they may own adjacent lands and houses from which they derive rents. It is possible that obsolete methods of manufacture may be continued because the latter sources of revenue provide a dividend on the whole undertaking. It is well that the accounts should disclose this, because if not, the wrong system may continue unnoticed by the directors or shareholders. In the absence of a proper analysis, the most remunerative class of operations may be neglected, or contracts may be taken in other branches at prices which would show a loss if the deterioration of plant due to them were properly allotted. As a

corollary to the foregoing, it should be held dangerous to establish an average rate merely because it has been found appropriate in some other factory apparently similar, but where the conditions are really different.

Sometimes an equal instalment is written off every year from the original value of the plant ; sometimes each machine or item of plant is considered separately ; but it is more usual to write off a percentage, not of the original value, but from the balance of the plant account of the preceding year. Thus, if at the end of the first year 5 per cent. had been written off £100, then the 5 per cent. will in the second year be written off £95, and so on. Additions made within the year may, however, neutralise such reductions, and in many cases increase the actual total capital value.

When dividing into classes the capital sunk in manufacturing plant, it may be desirable to have various distinct general categories ; but minute subdivision is generally impracticable or inconvenient.

The following is an example of the classification sometimes adopted in factories as well as in other industrial concerns :—Preliminary expenses ; Goodwill ; Land, including adaptation ; Buildings and wharfs ; Steam-engines, gas-engines, boilers and furnaces ; Fixed plant and machinery ; Electric plant ; Small loose plant and tools ; Horses. To these must be added assets of a Terminable or Wasting kind, such as leases or minerals, and for which special depreciation or a separate sinking-fund is necessary.

In embarking on a new enterprise there is often an outlay of capital for Preliminary expenses, giving no actual asset in buildings, plant, or other tangible property. Such are the legal expenses connected with the formation of a joint-stock company, and in some cases there are the expenses of obtaining an Act of Parliament or other official sanction. Outlay of this kind may be just as necessary to

Equal instalments of original cost written off.

See page 120.

Tables, page 128.

Distinct categories.

Example of classification.

See pages 103, 132.

Preliminary expenses
(*See also pages 120, 139, 158.*)
show no available asset,

the purpose in view as any other part of the expenditure, and may have been foreseen and reckoned on as part of the required capital. While, however, the earnings of the undertaking may, so long as they continue, afford a profit on such preliminary or accessory outlay, the latter may be quite valueless as an asset in the event of a sale or winding-up, and therefore it is a prudent policy to cancel quickly this portion of the capital by writing it off annually out of the earlier earnings. A valuation or sale will disclose the real value.

should be quickly
cancelled.

See page 120.

This course is not always adopted, but in new Municipal undertakings it has been made obligatory. The policy of Parliament in sanctioning local loans, is to require a more rapid repayment by sinking-fund of the costs involved in the promotion of Bills by local authorities than of expenditure, affording some tangible assets. Thus, while periods of repayment by sinking-fund ranging from 15 to 60 years may be allowed for actual works or purchases, according to their nature, parliamentary or promotion expenses have generally to be written off in five years. In Municipal undertakings, however, much of the preliminary work is done by officials whose salaries and expenses are not always sufficiently charged to the particular enterprise in question.

Repayment
by
sinking-fund.

See also page 131.

In five years.

See page 139.

Private
undertakings.

Repayment
optional.

The Legislature, while affording protection to ratepayers, who have to bear the burden and risk of loans obtained on their behalf, does not interfere with private undertakings for which capital is voluntarily subscribed, and in many such cases no preference is given to the writing down of preliminary or promotion expenses. Prudent administrators will write down these charges as soon as possible, but too frequently they are left as a permanent part of the invested capital. For instance, in a case where one-fifth of the capital has been spent on promotion, land, and other items not subject to further waste, then the depreciation rate is applied only to the remaining four-fifths. This is

the principle adopted in some Electric Companies. There is, however, no fixed rule in such cases ; and in joint-stock companies each board of directors, assisted by their auditors, and guided largely by the income at their disposal, act as seems best to them.

In joint-stock companies.

Railways, as already referred to, afford conspicuous examples. In Great Britain very large expenses are incurred before anything is spent in actual works. Preliminary surveys, costly Parliamentary procedure, high prices for land, and compensation for supposed injury by severance or otherwise, have added greatly to the cost of railways and yet have added nothing to their earning power. Rates of carriage may be imposed which will afford interest on such preliminary expenditure, but if competition arises with some future means of communication unburdened by these heavy charges, the earlier company may be compelled to lower their rates to the level of the rival concern. Although investors in railway shares seldom take care to distinguish the different purposes to which the capital outlay has been applied, or to value the available assets, and consider only the annual return they may expect on their shares, still an excessive capital may involve future risk, as above explained. If such preliminary expenses have not been written off, each shareholder has to insure for himself against the risk ; and it is to be noted that the loss will fall primarily on the ordinary shareholder, to the exclusion of those who have a preferential claim on the revenue. Not only has an original inflation of capital to be considered, but periodical additions to capital for similar purposes.

See pages 13-16.

Cost of Railway Bills.

Cause high carriage rates.

Preliminary expenses not written off.

See page 55.

In many joint-stock undertakings, where the necessity is recognised of writing down the value of plant exposed to physical decay, promotion expenses—sometimes coupled with capital invested in land—are specifically excluded from the operation of a depreciation-fund. The argument

Promotion expenses excluded from sinking-fund.

advanced is, that having been necessary to the establishment of a new enterprise, it is not right that present shareholders should, out of income, extinguish a charge for the benefit of their successors. Against this, it may be urged that if the writing down is known to all concerned, the value of the shares will be enhanced accordingly. It should be remembered that undertakings established under statutory powers may have to maintain or extend their rights by promoting further Bills in Parliament, or may have to protect their shareholders by opposing the Bills of rival companies. By writing down the earlier outlay, a fund is formed for such later expenditure without adding more to the capital originally applied to this purpose.

**Special fund for
parliamentary
expenses.**

Where private companies are working under a lease or other limited tenure, which entitles them to some compensation if their undertaking is taken over at the end of the term, it does not follow that all preliminary outlay will be allowed in calculating for compensation purposes the "capital properly expended."

**Expenditure
irrecoverable.**

**Land purchase
expenses.**

Where preliminary expenses have been incidental to the purchase of Land which has since undoubtedly risen in value, such an increment may be held to sufficiently balance the expenses, which may then need no other consideration, as a sale at any future time would recoup the original outlay. Even land is not free from vicissitudes which may reduce its value or render its sale difficult. So long, however, as the facts are correctly recorded in the books—so that in the case of a change in partnership or sale of shares the reduction which has been made in the burden of capital, and the enhanced value of the shares, will not be lost sight of—the writing-off of all preliminary expenses is a distinct advantage.

See pages 63-4.

*See page 120, and
Frontispiece.*

If the undertaking has been purchased as a going concern, and a specific sum paid for Goodwill, somewhat similar considerations will arise. No rule can be set down

for a rate of depreciation for this purpose. If the amount is small, it may be wiped off at once out of the earnings of the first few years, or it may form a legitimate object to which the surplus profits of a good year may be applied.

It is sometimes argued, even by experienced auditors, that to commence the writing down of goodwill immediately, or even a few years after a business has been bought, would be an acknowledgement that too high a price had been paid for it. It might almost as well be urged that if a leasehold property has been purchased, it is not necessary to institute in the first year a sinking-fund to recover the capital at the end of the term. It is true that the wasting nature of a lease is evident, while the durability of goodwill is unknown. But if in any branch of trade a retrospect be made of numerous undertakings profitable fifty years ago, it will be found how few of them remain and continue to prosper. The very fact that goodwill is seldom appraised at more than from one to three years' purchase of past average profits, shows that it is considered to have a doubtful or fleeting value.

In any case it is unwise to let the full book value remain. When a general Reserve is established, it may of course be held that a possible wasting or declining value of the goodwill is one of the contingencies so provided for, and that no specific writing down is necessary. This might be reasonable in a private concern, but even there the best method is to have no such item as goodwill in the capital account, leaving it to be valued only on a sale or re-organisation of the business. Where, however, the item of goodwill appears, or where it is known that the purchase-price was considerably increased because it was a going concern or one earning a high rate of profit, then the goodwill should be specifically written down, otherwise the shareholders may consider that they have

Cost of goodwill
should be
written off.

Expenses of land
purchase.

Wasting values.

As in leaseholds.

See pages 103, 133.

See page 189.

Reserve
against goodwill.

See page 162.

Goodwill, how maintained.

the full value of the goodwill and the reserve also. It is obvious that the stability of goodwill depends on a variety of circumstances which cannot be assured. A change of management, or vicissitudes of trade beyond the control of the proprietors, are examples. Where, however, specific outlay continues to strengthen and maintain the goodwill, as shown by profitable results, the writing down may be relaxed or balanced by additions.

Municipal goodwill.

See page 164.

Goodwill seems hardly to apply to Municipal undertakings, unless to express the statutory monopoly which is enjoyed. It is sometimes endeavoured to set such goodwill as a credit item against the risks other than wear and tear of plant, which in a private concern would demand a reserve-fund. The assured continuance of the undertaking having already been taken into account as an asset in claiming and obtaining long sinking-fund periods for the original loans for capital outlay, can hardly be used again to justify neglect in providing for contingencies which may occur during the repayment period. The risks of the unknown, especially those of obsolescence, are as great with municipal as private undertakings. Electrical and other modern inventions involve such risks, of which examples have already been given. They could not be anticipated, but a reserve accumulated year by year would have provided funds with less burden than by raising fresh loans on each occasion when the old plant was discarded.

Obsolescence

See pages 89, 123, 191.

Electricity.

Advertising.

Advertising in newspapers and otherwise may have been one of the means by which the business of a firm or company has been established, maintained, or extended. Though it may be rightly deemed a prudent and thrifty course to charge all such outlay to the revenue of the year in which it occurs, such a principle needs some qualification. Advertising is hardly ever successful unless it be persistent, and it is a mistake to attribute results in any period to concurrent expenditure. New expenditure main-

Must be persistent.

tains and fructifies the outlay of previous years, and from this point of view it would appear fair to charge some of the outlay to capital. To do this directly might be a dangerous course, as the advantageous effect of past outlay may at any time be diluted and speedily terminated by relaxing or discontinuing such expenditure. That is to say, as there is no tangible asset, it might be imprudent and unsound, unless with special safeguards, to divide as profit an increased income shown in the accounts by charging forward some of the advertising outlay.

Such expenditure, however, has been well compared to the sowing of seed for future benefit, as the effect will survive for a while after the advertising is stopped. On this principle some firms charge two-thirds of their expenditure to a suspense account, which is written off in two subsequent years. When once this system has been applied for two years, the total annual charge is as though all current expenditure were charged to the revenue of the year in which it occurs, but there is always two-thirds of a year's outlay standing in the books as an asset to be paid for by new partners or shareholders who will reap the benefit of it. On this plan, if at any time the advertising ceases, the asset is written off in two years, and the newcomer pays nothing for it, except so far as the goodwill is still deemed to be enhanced by the past expenditure.

It will be seen from the views set forth here, and on other pages, that there may be cases where it would be unfair, as between partners, to write off entirely out of present earnings an outlay for preliminary expenses which was necessary to the establishment of the business, and of which, therefore, future earnings might justly bear a share. Also, that there may be cases where the goodwill forms so real and important an asset that it would be erroneous to cancel it entirely in the capital accounts. Such a case, for instance, occurs when the name, or trade-

**Advertising
affords future
benefit.**

**Methods of
charging cost.**

See page 55.

**Goodwill a
valuable asset.**

See page 163.

Trade-mark.

See page 166.

mark, or brand of a manufacturer has been so long or widely established as to ensure a regular or profitable flow of business. Those who are reluctant to extinguish the asset of goodwill in the accounts, should remember that when a business or share in an undertaking is bought or sold, the real basis of value is the income that has been obtained and which may be expected to continue or increase.

CHAPTER III.

LAND AND BUILDINGS.

LAND occupied by a manufactory generally maintains its full value, and no provision for depreciation is necessary. In Great Britain, especially in large towns, the tendency is towards a growth in value. The factory itself may have become the centre of an industrial population engaged in kindred and contributory trades, while the construction of roads, railways, docks, and other facilities for transport, may largely increase the value of the site. More than this, the expenditure for clearing and preparation of the site, as well as the formation of roads and wharfs, may have added a more than corresponding value to the land.

Land maintains
its value,

especially in
large towns.

Where a factory, originally built in an open neighbourhood, has been long established, it may have become so surrounded by a growing town as to have acquired value as a site for other classes of buildings entirely disproportioned to its original purpose; and in large cities it frequently occurs that a factory may be dismantled, and the site sold for a price high enough to pay for the building of a larger and better factory elsewhere, on a more commodious site.

Site may become
too valuable for
factory.

See pages 156, 192.

While, however, it may be equitable in the case of a change of partners or business to re-value the site, or take into account its prospective value, the possible increment should not be mixed up with the annual accounts of the undertaking farther than to justify the maintaining the capital value of the land itself without depreciation. If

Re-valuation of
site.

**Value of land
kept separate
from plant.**

nothing be written off the value of plant, although obviously deteriorated, on the plea that the increased value of the land balances the loss, a profit thus shown is obviously not due to the manufacturing trade. A division of profits from this source may, however, be temporarily justified in a time of depression, to allow a moderate interest on capital, but even in that case the facts should be shown in the accounts.

**Land may fall
in value.**

See page 155.

Locality.

See pages 155, 211.

See pages 209, 213.

**Factory
dismantled and
land sold.**

See page 210.

**Causes of
removal.**

**Old factories
untenanted.**

Although town lands tend to rise in value, there are occasionally cases where capital so invested cannot be all recovered. For instance the growth of the district, the opening out of railways and roads in a new direction, or a change in the locality of the trade, may leave the factory isolated or unfavourably placed. So, again, when a trade has prospered because of its contiguity to a certain port, a diversion of imports or exports may diminish or destroy the trade of the factory. Again, where a particular industry has flourished where materials or accessories are freely imported, the imposition of import duties may entirely alter the course of trade and reduce the value of the site.

In almost all manufacturing towns old buildings may be seen which have been long unoccupied, the owners being reluctant to acknowledge that they are obsolete and valueless. The factory may have become overcrowded or unsuitable for a particular business, or there may be no room for extension, and removal may be absolutely necessary. Sites which have been occupied by gas-works or other noxious trades may not be suited for general purposes, and the removal of buildings and foundations to render the land available may be costly. Again, in some towns factories will be found which have been left untenanted in the hope that the trade which has become obsolete, or diverted to another district, may be restored. When, after some years of waiting, this hope is abandoned, and when it is resolved to realise whatever value is available, it may be found that the site has been left out of the stream of traffic or without con-

venient access. In order to render the abandoned site saleable, the dismantling and breaking up of old buildings, the demolishing of lofty chimneys may be necessary. The outlay for clearing the site, the removal of massive foundations and adapting the land for some new purpose, may reduce the net sum realised much below that at which the land and buildings stood in the books of account. Even while the manufactory is still a going concern, it might be prudent, with such risks in view, to write off something from the original value of the land, so as not to leave all the burden of the loss to those who might be proprietors at the time of change. Sometimes depreciation is necessary, not because of any real falling off in value, but because the land was bought at a time when prices were temporarily inflated.

Although, as a general rule, it is held that no depreciation rate is needed for the capital sunk in land and its adaptation, a sinking-fund is necessary where the money has been borrowed by some public body. In England outside the metropolis, and in Ireland, the English and Irish Local Government Boards respectively fix within the limit of sixty years the period for the repayment of each loan raised under the general Acts dealing with the Housing of the Working Classes. In practice, these boards usually allow sixty years in the case of loans for land, and forty years for buildings. In allowing forty years for buildings that term is applied not merely to bricks and mortar and other material of long life, but also to a variety of items many of which are from the outset, or may by ordinary wear and tear speedily become, short-lived ; the amount of these items not infrequently bearing a large proportion to the cost of the outer shell. In establishing a rate or forming a reserve, the amount allowed for repairs and renewals should not be based upon the probable cost of repairs during the earlier years of the currency of the loan, when the houses are new, but upon the probable average annual cost during the

**Demolishing
buildings,
chimneys and
foundations.**

**Value should
have been
written down.**

Fictitious prices.

See page 208.

See page 142.

**Administrative
action.**

**Workmen's
houses.**

*See also
local loans,
page 134-145.*

**Allowance for
repairs.**

Leaseholds.

See page 36, 133,
170

whole period. Leaseholds need special consideration, as there may be covenants stipulating that the land must be freed from obstructions when the term ends.

Deterioration of buildings.

Buildings may be considered to include all structural additions to the land; and therefore not only workshops and offices, but wharfs, sidings, railways and tramways, may for the present purpose be placed in one category. It very often happens that in the accounts of manufactories no allowance is made for deterioration of buildings, it being considered that if kept in proper repair they are permanent.

Durability, how determined.

The term of endurance depends primarily on the solidity and quality of the original work, and thereafter on the attention paid to repairs. But besides current repairs, there must also be partial renewals from time to time, at intervals far apart in the early years of the undertaking, but shorter as the factory grows older. This would tell heavily, and perhaps unfairly, on the interest of those who happened at the later period to be proprietors, unless some provision had been made by writing off some of the value in the early years. There are cases where some members of a family who are carrying on a manufacturing business, may pay rent to the other members who own or have a share in the land, buildings and plant. A rent representing a moderate interest on the supposed capital-value may be quite insufficient unless covenants for maintenance or a fair rate of depreciation is provided for.

Necessity for writing off.

See page 113.

Deterioration of buildings.

In estimating the probable life of buildings, an architect or surveyor will naturally regard the strength and quality of the brickwork or other material of which they are composed and their stability against weather and use. These conditions, while they may be sufficient as a basis of value for dwellings or warehouses, are not appropriate for factories, where not only rough usage is to be encountered, but also possible changes of trade and altered methods. As an extreme comparison in this regard, such municipal property

Municipal property.

as a town-hall, or library, or police-station, may be credited with a longer life than the retort-houses of the gas-works, or the engine and boiler buildings of an electricity station. All manufacturing trades are subject to such liabilities, and some have been already referred to.

In many such rough trades as the manufacture of iron and steel or chemicals, changes are so frequent that a permanent staff of bricklayers has to be maintained, not only for effecting current repairs but also sometimes to entirely demolish and rebuild furnaces, chimneys, or foundations. With such contingencies in view, the apparent profits of any particular year must not be deemed divisible as income without considerable reserve for future alteration. It is not sufficient to charge to revenue expenditure for renewals only at the time the expenditure occurs. Alterations come at uncertain intervals, and prudent managers will hold back out of income a reserve for unknown contingencies which past experience tells them will almost certainly take tangible shape in the future. Managers are sometimes reluctant to demolish obsolete buildings, because such a course will involve an inconvenient writing down in the capital account. Not only will a fictitious value then remain in the books, but ground-space will be wasted that might be utilised if unencumbered. Old building-materials seldom fetch more than the cost of demolition, but if there be ironwork and other saleable material, the value of it might be rendered liquid by removal. The concerns which have remained solvent and profitable for long terms of years owe much of their prosperity to a constant writing down of capital value, or of considerable renewals out of revenue, which may be deemed ruthless and unnecessary if based only on the immediate need for it. Actual removal of buildings is allowed for by Income-tax surveyors more liberally than mere book entries for depreciation which may be deemed theoretical or imaginary.

Buildings.

Brickwork of steel and chemical works.

Reserves necessary.

See pages 40-50, 129.

Obsolete buildings should be removed.

Sale of old material.

See page 43.

Income-tax allowances.

See pages 26-32.

See page 2.

*See P. & O.
STEAMSHIP
TIMES REPORTS,
10.12.09.*

**Cheap
construction.**

Local by-laws.

**Wear and tear
of buildings.**

**Rough usage of
buildings.**

**Vibration
reduced by
electric
transmission.**

See page 91.

**Rate of writing
off.**

See pages 121-8.

The question of very large undertakings such as Railways, Arsenals and Dockyards, has been dealt with in an earlier chapter. Steam-ship owners are not allowed enough to balance deterioration.

The general principles involved in the depreciation of buildings having been considered, appropriate rates of writing down depend obviously on the class of buildings and the severity of the operations carried on. Undue cheapness in construction shows itself after a few years of working; or an alteration in the trade of the factory to heavier work than that for which the buildings were designed may tend to weaken and destroy them. A perusal of the local by-laws under which the buildings have been constructed, may afford contributory evidence as to their probable durability.

In reckoning the proper rate of depreciation for buildings of brick, or stone, they may be divided broadly into two classes; as those subject only to ordinary deterioration from time and weather, and those which suffer also from abrasion, concussion, or other special incidents of working. In an engineer's factory, for instance, the pattern-shops, fitting-shops, lofty chimneys, storehouses and offices, might come in the first division; while the foundry, smithy, and, in some heavy trades, the machine-shops and erecting-shops, might, as being liable to rougher usage, be placed in the second. And even in lighter trades, if quickly-running shafting or machinery be attached to the walls or roof-framing, the effect on the building may be injurious. The modern substitution of electric-transmission for shafting has removed a main cause of vibration.

If proper attention be paid to the roof-covering as well as to the painting of ironwork and woodwork—the expenditure being all made out of revenue—a depreciation rate of $2\frac{1}{2}$ per cent. would suffice in the first class, so reducing each original £1000 to £686 in thirty years; and a rate of

4 per cent. might be appropriate for the second class, reducing every £1000 to £665 in ten years. If, then, at the end of these thirty and ten years respectively £200 be spent in a thorough renewal, this new expenditure might be properly added to the capital value, and the writing off for depreciation go on again. In most factories an average of 3 per cent. for buildings will generally be found appropriate, if due attention is paid to repairs. Such a rate will bring down a value of £1000 to £400 in thirty years. Sinking-funds when established on this basis generally afford sufficient protection.

Sometimes, in order to save capital outlay, brick sheds, or buildings of a kind below the standard of municipal by-laws, may have been constructed. Special provision should be made in arriving at an average rate for all such buildings, and before the revenue is considered a net income.

Buildings of wood or iron would require a higher rate, ranging from 5 to 10 per cent., according to the design and solidity of the buildings, the climate, the care and the regularity of the painting, and according, also, to the usage they are subjected to. Thus, strong wooden buildings in a cold dry climate might last almost as long as brick structures, while light wooden sheds in England would not last one-sixth as long. Strong, well-fitted iron buildings will last as long as brickwork if periodically cleaned and painted, but the cheaper kind of iron buildings, on light columns, with loosely-fitted roof-framing and covered with corrugated iron, galvanised but unpainted, would in a damp climate be so wasted by rust and shaken by the wind, that they would be quite worn out in from ten to twenty years, the old materials being then of little value.

The anticipation of probable changes in the nature of the business, or other circumstances limiting their term of usefulness, may justify the erection of temporary structures

Amount written off applied to renewals.

Average rate for buildings.

Sinking-funds.
See page 124.

Cheap structures.

Wood buildings.

Iron buildings cleaned and painted.

Old materials of little value.

Temporary structures.

which can be removed or scrapped with the minimum of loss. So also factory-chimneys are, in increasing numbers, made of steel sheets because such chimneys, if properly stayed, are much cheaper than brick structures and require less-costly foundations. The use of forced or induced draught generated by fans or blowers propelled by electric-motors may considerably reduce the necessary height or capacity of such chimneys.

Steel chimneys.

In factories where such operations as melting, hammering and rolling of iron are carried on, in buildings of the last-mentioned sort, a depreciation rate of 5 per cent. would be inadequate to provide for maintenance; and even substantial brick buildings, subjected to vibration from steam-hammers and the strains of heavily-loaded cranes, might be best included in the category of buildings to be maintained by a permanent staff of workmen, and so remove them altogether from a precise depreciation rate.

**Wear and tear
in iron-works.**

**Depreciation
balanced by
renewals.**

See page 25.

**Small
factories.**

See page 121.

The question as to how far the expenditure on current repairs and renewals would alone meet the case, depends, as has already been stated, a good deal on the size or extent of the factory. Thus, in large and long-established works, a certain proportion of the whole might be renovated and even rebuilt every year, and this, if done out of revenue, might render a depreciation rate unnecessary. But in a small factory, or one recently established, such renewals might not become necessary for many years, and a depreciation rate, or reserve-fund, dividing the loss over many years, would be needed to accumulate a fund to be drawn upon in the future. The risk of error is greater when divided over many years than in those cases where the annual outlay shows clearly the wasting value of the buildings.

Book values.

In any case, the object in view in deciding upon the system and rate of depreciation should be to have always a book-value not exceeding that which a fresh valuation would give; and periodical or occasional valuations may be re-

quired to show whether an increased or diminished rate was necessary for the future.

Furnaces and ovens, which wholly or in part are actually destroyed by the operations of manufacture, may have to be rebuilt so often that if this is done out of revenue no depreciation may be necessary. But where they are too few to give an annual average of renewals, a special system of depreciation or a reserve-fund is required.

Wharfs and railway-sidings should be maintained out of revenue, but unless they be of large extent, thus ensuring every year an average expenditure for renewals, a rate of depreciation will also be necessary, which will, in effect, serve as a reserve-fund. For instance, if there be works of this kind having an original cost of £1000, a rate of 3 per cent. will in ten years reduce the book value to £737. If then £200 be expended on actual renewals, such as sleepers, rails and masonry, this new outlay may be properly added to the book value, and the same rate of depreciation be continued. Where the quantity of rails is sufficient to be classed as a separate item, it is generally considered prudent to write the value down to that of scrap iron or steel, and there leave it, the capital account being maintained at this reduced amount by future renewals. The circumstances which arise from a limited tenure, or in regard to fixtures as between landlord and tenant, are referred to elsewhere, and sometimes involve legal questions which need not be dealt with here.

Furnaces.

See page 2.

**Wharfs and
railways.**

See page 128.

Rails.

Scrap value.

See page 193.

*See pages 172, 182,
201.*

CHAPTER IV.

PLANT AND MACHINERY, INCLUDING
ELECTRICAL PLANT.

Plant kept
separate from
buildings.

FIXED plant and machinery are sometimes included in one category with buildings, and an average rate written off the whole. It is, however, the purpose here to consider them separately, and this is necessary even if an average rate is afterwards to be adopted.

Accord between
manager and
accountant.

A proper system of writing-down obviously requires complete accord between the technical manager and the accountant. Only the Manager can measure the effect which the past year's working has had on each machine or other portion of the plant, and by his technical knowledge estimate how far the trend of trade points to alterations in the early future. The Accountant or Auditor, on the other hand, can utilise his wider financial experience of numerous undertakings in advising how far it is desirable to maintain an established rate of depreciation, although there may be nothing apparently calling for it, or who may point out how an appreciation of value in one direction or a great reduction in another may call for an alteration in the average rate. The manager may be reluctant to discard an old machine, or, on the contrary, may be too ready to buy new plant without writing-down the value of that which will be superseded. The accountant may be following some system or rate of depreciation which is inappropriate or insufficient.

Auditors.

See page 50.

Rates of depre-
ciation need
adjustment.

Such joint consideration is greatly facilitated by an

inventory, in which each separate item—building, wharf, crane, engine, boiler, chimney, machine, electric generator or motor, line-shafting, pipe line, or other transmission system—should be entered, with its name, designation or number, and where possible its place shown by a corresponding mark on a key-plan. In such an inventory, ample space should be left against each item, so that notes can be made from time to time, almost in the form of a diary, in which should be recorded as they occur every expenditure for repairs, painting and renewals. Even where the specific cost of such renovations cannot conveniently be stated and allotted, the fact that the renovation took place at a certain date should be recorded. Further, it is usual for the heads of departments to present an annual report, and, as an amplification of this, each manager or foreman should, in anticipation of stock-taking, append to the inventory notes reviewing and explaining what has happened during the year, such as whether the item in question is in good or bad condition, whether it has effectually and economically served its purpose, or whether, on the other hand, there have been drawbacks. Such a review may show such efficiency and labour-saving results in the plant as to suggest that more of similar appliances may be advantageously installed ; or, on the other hand, that some of them have seldom or never been used, or have needed such frequent repairs or have been so costly in operation that they should be entirely discarded. In some old-established works, the natural reluctance to change accustomed methods may be a cause of continual loss, or it may become apparent that certain buildings, processes or machines, though each effective in itself, are so located as to involve continual loss in the transmission of power to them, or in the transporting of material from one place to another ; in this way hindering that economical sequence of operations on which a profit so much depends.

**Inventory
necessary.**

Key-plan.

**Repairs and
renewals to be
recorded.**

Annual reports.

Stock-taking.

Costly repairs.

**Discarding
obsolete tools.**

**Transmission of
power.**

See page 89.

The chief manager or director should go through the inventory thus annotated before the annual stock-taking, when, being thus prepared, he can at the time of audit turn over each page, and be able and ready to arrange with the auditor whether the existing rate of writing-off needs alteration.

Annual review
of rates.

In simple cases or in an accustomed trade such a review may possibly be done in a few hours, or it may reveal at once the need for more serious examination. On the one hand it may show that an increased depreciation is necessary, or, on the other hand, that the plant is already so written down in value as to justify an amelioration of the burden. It may even reveal an actual growth in the capital value which will serve as a set off to the depreciation, and may be credited in the accounts as a reserve-fund. This course, however, has its dangers, and should be adopted only in special cases and after very full consideration.

Advantages of
revision.

See page 121.

Dull periods and
alternative
activity.

A dull period and a relaxed employment of the plant during the past year may show that a reduced rate of depreciation will meet this slackness ; or a great activity and large output may on the contrary suggest a more liberal allowance for wear and tear. The information obtained by the joint review may serve the entirely separate purpose of confirming or modifying estimated costs of production or the re-adjustment of piece-work rates.

Piece-work
rates.

Extreme limits
of value.

There is a wide range within which values may alter, but a proper estimate may be approached, and the issues narrowed, by regarding first the extreme limits of value. The highest value of any machine will be the cost of a similar machine, ready for immediate use, including the expenses of installation. If invention and skill have been bestowed on any additions, a higher value may have been reached than is represented by the original cost and the subsequent outlay, and this notwithstanding that the machine is partly worn ; for the best proof of efficiency in

The highest
value.

Efficiency proved
by working.

a machine is that afforded by actual working. A proved value may be again increased by surrounding circumstances, such as that, as part of a going concern, profitable employment is assured, or that the readiness of the machine for work needing immediate execution gives it a value above that of a new machine, which would take time to get into working order. These latter considerations, however, while demanding full weight in the case of valuation on a change of ownership, cannot properly affect a scheme of depreciation for wear and tear, or a reserve for obsolescence.

The lowest value is represented by the "scrap" price which may be obtained for the old materials, less the cost of preparing them for delivery. The relation which this lowest value bears to the original cost, mainly depends on the proportionate value of the materials and that of the labour that has been bestowed upon them. Articles of copper and brass may have a scrap-value approaching nearly to the price when new. So also may articles of cheaper materials if of a simple kind. Thus, railway chairs, or old rails, may be worth as scrap-iron and steel two-thirds their original value.

There are, at long intervals, occasions—coinciding generally with a scarcity or dearness of new metals—when high prices are ruling for old materials. Factory-owners should seize these opportunities and look round to see what they can sell, and dispose of it advantageously. Old iron rails have been known to sell as scrap at a higher price than that paid for the steel rails which replaced them, the latter having been contracted for at an earlier date when low prices prevailed. On the other hand, the scrap value of light and intricate machinery may be a mere fraction of the original cost. A considerable rise in the market-price of pig-iron should suggest an immediate gathering together and sale of scrap-metal; a rise in the current price of ingot-copper for a sale of electric conductors and old brass. The value

Readiness for work.

See page 150.

The lowest or scrap value.

Valuable scrap.

See page 97.

When to sell old materials.

Old rails.

Light scrap.

Sale of old copper and brass.

Scrap expensive
to utilise.

See page 96.

Depreciation rate,
how based.

Limits of
depreciation.

Deterioration not
apparent in first
years.

Frequent
renewals of same
machine,
as in loco-
motives.

*See
Frontispiece,
and page 120.*

of old material is sometimes greatly reduced by the cost of preparing it for re-use. Such is the case with the removal and breaking up of cumbrous and heavy ironwork, boilers or steamships, or the breaking up of electric apparatus and removal of buried cables to recover the copper. The name-plates of the original makers, or well-known trade-marks, if still legible, may enhance the second-hand value of steam engines or special machines.

The main factors in arriving at a fair rate of depreciation are—

1. The Original value.
2. The probable working Life.
3. The Ultimate value when worn out or superseded.

Therefore, in deciding upon an appropriate rate of depreciation which will in a term of years provide for the estimated loss, it is not the original value or cost which has to be so provided for, but that cost less the ultimate or scrap value.

With machinery, as with buildings, the first years of working show, in many cases, little or no reduction in value, and yet it is clear that, however long the working life is to be, it begins to shorten from the first, and the value must be depreciated accordingly. But this principle has to be applied with considerable qualification where repairs really renew the life of the machine and prolong greatly its period of useful work. For instance, a locomotive during its life may have its wheel-tires renewed four times, its boiler three times, and be painted seven times, so that before the framework, the wheels and other more durable parts fail, and the engine is broken up, much more than its original cost will have been expended on it. The value of any such serious renewals of this kind should be duly credited in a proper system of depreciation. Another course, followed more often in the United States than in Great Britain, is to prefer the substitution of new

machines with all modern improvements rather than to renew or repair old plant, which even if rendered serviceable may not be so economical in working.

Practice of scrapping in U.S.

In the case of fixed machinery, worn out or superseded, it must always be borne in mind that the adoption of any new machine not only involves the purchase price, some of which may be recovered by an ultimate re-sale of the old plant, but also the expenses of removing the old and installing the new ; some of this outlay being irrecoverable when the final abandonment occurs.

New machines involve cost of installation.

See Electric cables, page 94.

The Deterioration of machinery depends on many circumstances, some of which relate to the Machine itself, and others to the mode of Using it. First, as to the machine itself, its quality and the skill with which it has been set up affect its durability. In the case of a machine which has to withstand concussion or strains, the weight of the framework or other fixed parts must be sufficient to absorb the shocks of impact without undue vibration. Where the inertia of the framework is insufficient for this, oft-repeated strains will render the machine unsteady or untrue, and will destroy its efficiency long before it is in other respects worn out. The same unsteadiness may result, if the machine is insecurely attached to its supports. Severity of working has to be taken into account. A certain margin of strength being given to a machine, there is a moderate range within which it may be forced without actual risk of accident. Thus, a steam-boiler may be worked at a higher pressure than its designer intended, or its condition justifies ; toothed-wheels may be made to transmit greater power ; machines intended to deal with light materials, or to manufacture light goods, may be set to work on heavier materials and goods. In this respect velocity has to be considered as well as the force of the blows. The introduction of high-speed steel for tools and

Durability how determined.

Concussion and impact.

Severity of working.

Undue straining.

Effect of velocity.

See page 91.

**Overload
capacity.**

*See Electric,
page 92.*

**Renewal of
wearing-parts.**

the heavy cuts allowed, have entirely altered the value of old machines incapable of meeting these increased stresses. A frame strong enough to absorb a certain strain may deteriorate, if the strains are rapidly repeated. For slow speeds an approximate balancing of the moving parts may suffice, while for high velocities, when the slightest inequalities are intensified by the speed, exact balancing and the most accurate fitting are necessary to prevent the machine or its supports being shaken loose and destroyed. If wearing-parts have not been properly hardened, or if arrangements for making good the wear or for inserting new parts have not been provided, the effective life of the machine may be limited to that of the wearing-parts.

Hours of work.

**Effect of
overtime.**

Double shifts.

**As on American
locomotives.**

**Great Britain
and United States
compared.**

See page 10.

The hours of actual work have also to be considered in comparing the deterioration of one machine or factory with another. In some factories overtime is the constant practice, and the wear and tear correspond. Some factories work double shifts, or the nature of the business may render continuous working necessary. In Great Britain locomotives are seldom worked for longer hours than the men who drive them. In the United States it is usual for a fresh crew to be put on board the engine and a new journey commenced, so that in some cases a locomotive is allowed to become cold only once a week. The life of the engine may be shortened, but the opportunity is afforded of buying a new engine with all the recent improvements. Chemical and steel works afford examples, as also do the electric generating-stations for public lighting and tramways. All these cases would be duly met, if the reserve-fund or depreciation-rate were proportioned to the output; but under the usual plan of writing off annually a certain percentage of the capital value, the deterioration due to incessant working would not be provided for by a rate appropriate for normal hours of working.

Care in management goes far to determine the dura-

bility of a machine. Protection from dust, dirt or injury, periodical painting, and lubricating with good oil, may render one machine twice as durable as a similar one in which these precautions are neglected. A time of slackness may well be utilised for a general clearing-up and painting. Employment may thus be found for old workmen or pensioners, and everything will be ready when trade revives.

**Cleaning,
painting, oiling.**

See page 90.

Where production is stimulated by a system of piecework or hustling, the deterioration of the plant is likely to be more rapid than in a factory where the workmen are paid according to time only. If advantage is taken of the greater output, the lessening value of the plant should be recognised. Safeguards can be provided against excessive strains, yet, when the labour of the workmen may be lightened, or their wages increased by forcing a machine, special care must be taken that the precautions are observed. Thus, safety-valves in boilers may be locked, registers of speed rendered inaccessible to the workmen, self-registering ammeters for electric lighting or power and other similar mechanical arrangements provided.

Piecework.

Hustling.

**Precautions
against over-
working.**

In very busy times, when there is a pressing demand for the products, and profits are large, it may be expedient and remunerative to work long hours, and to force the plant and machinery to their utmost power, even at the risk of a breakdown, so as to take full advantage of the transient high prices; but in such a case a corresponding rate would have to be written off for insurance or depreciation.

**Forced working
profitable.**

There is often in a factory some large or special machine which, though necessary to the execution of certain occasional work, is seldom used. The deterioration of such a machine is therefore slow, but as a machine seldom needed may become obsolete before it is worn out, it is not so saleable as one of an accustomed kind, and it is best to include it in the general depreciation rate.

**Machines
seldom used.**

*See Cranes,
page 151.*

Depreciation in small factories,

less apparent than in large factories.

Numerous machines afford an average.

Value restored by renewals.

See page 121.

See page 123.

Plant may become obsolete.

See pages 35, 38, 80.

Need for Reserves.

See pages 45-51.

In small factories, where the purchase of new machines seldom occurs, it is particularly important to provide for such outlay by an annual depreciation rate. In large factories, the purchase of new machines and the renovation of old ones may be so frequent that the loss is made manifest ; or the new purchases found to balance the old. The danger in these larger undertakings is, that too much of the expenditure for renewals may be added to the capital value. If in an iron-works there be six steam-hammers, it is probable that each year one of them may require extensive repairs, such as a new piston-rod, or cylinder, or anvil, while every third year a new hammer may have to be bought. Such outlay, if all defrayed out of revenue, might balance the average depreciation of the whole ; but in a small factory, where only one steam-hammer is employed, an annual depreciation rate would be required to provide for the outlay when it comes. Discrimination is needed in allotting these charges, for, while it is prudent and necessary to provide for renewals by an accumulating fund, this, when applied to its contemplated purpose may be fairly considered as tending to restore the capital value. A liberal rate of depreciation in preceding years may have brought down the book value of the plant to a point corresponding with its worn condition. If renovations, replacements and additions have been effected out of the depreciation-fund, the value may equal or exceed the original value. This indeed is the true purpose of depreciation.

The risk of the plant becoming Obsolete before it is worn out has already been referred to. It is for occasions of this kind, outside physical deterioration, that an accumulated Reserve fund proves so useful. A re-instatement of the motive-power may become desirable, and the anticipated saving in the current expense of running may in a short time more than repay the cost of new methods, yet none the less the money has to be found somewhere. Sometimes,

where a machine as a whole may continue serviceable, important parts may become obsolete, and it is well to pay for these at once as a revenue charge. In rolling-mills for steel and iron, the rolls for new shapes may be treated like foundry patterns, which are in some cases charged to one set of castings for which they have been specially made, and in other cases, as stock or standard patterns, are charged partly to capital. There are numerous other industries where a large proportion of the cost of manufacture is for the design and patterns, and a due writing-down in value is always of great importance.

In steel-works and other large manufactories liable to change, the whole cost of some addition or improvement may be defrayed at once out of the revenue of the year, and especially can this course be adopted after a year of exceptional profits ; or half the cost can be so defrayed leaving only the other half to come on the depreciation fund. These are the undertakings that prosper. The too rapid growth of many Municipal debts would have been avoided, if such a method could be applied to the plant of revenue-earning departments, and such a course, if systematically followed, might have been better for the town.

The writing-off for depreciation from the year's gross surplus necessarily reduces the divisible income in any manufacturing concern, and though the Surveyors of Taxes recognise this more equitably than formerly in assessments for Income-tax, they seldom allow all that prudent managers have estimated and applied. The actual expenditure for renewals or repairs in any particular year may be allowed, but an average or estimated rate in years when there is no such expenditure is not always sufficiently acknowledged.

In regard to the proper rate of depreciation for machinery, there is, even in well-managed factories of similar class, a wide divergence of practice. There are often great dif-

Design and size of product may vary,

or foundry patterns.

See page 98.

See page 45.

See pages 10, 142.

Income-tax.

See pages 26, 30, 67.

Systems of depreciation vary.

ferences in the details from which the average rate is arrived at. Thus, there may be plant which has worked successfully for so many years, that a 2 per cent. rate originally instituted would have met the depreciation. On the other hand, in a factory engaged in a profitable business, private partners may, in their desire to be on the safe side, whenever a new machine is installed begin by writing it down 10 per cent. always on the assumption that if it were sold, it would as being second-hand fetch only the lower value. This, however, would not always be fair in a joint-stock undertaking where shareholders have only a fleeting interest in the undertaking.

Low rate may
prove sufficient.

Engineering
factories.

In engineering factories, where the work is of a moderate kind which does not strain the machines severely, and where the hours of working do not average more than fifty per week, 5 per cent. written off each year from the diminishing value will generally suffice for the wear-and-tear of machinery, cranes and fixed plant of all kinds, if steam engines and boilers be excluded. For these also the 5 per cent. rate may be sufficient, if they form only a moderate proportion of the whole, if buildings and chimneys are included, and if current repairs and renewals of parts be defrayed out of revenue. Where there is a diversity of machinery and plant, and the past accounts of twenty years are available for reference, it is not difficult to arrive at an appropriate rate and to make periodical revisions.

Average rates.

Shafting, pulleys
and wheels
superseded.

The loss of heat in long ranges of steam-pipes, and the loss by friction of running-shafts and tooth-wheels, especially bevel-wheels, have led to the substitution of electricity as the distributing power. The discarded plant has seldom more than a scrap value.

Replaced by
electric
transmission.

See pages 89, 161.

Since the year 1900, not only steam-pipes but lines of shafting, with their supports, bearings, accessory pulleys and tooth-wheels, have been in many cases rendered useless by the substitution of Electric transmission, but with some

of the local counter-shafts and pulleys retained. In other cases, these latter parts have been also discarded and the machines worked by separate motors attached to each machine ; while in some electrically-driven machines, belting or cotton-ropes are interposed between the motor and the machine. It would obviously be unsound to take credit for the new appliances without writing off fully for what has been discarded. In some instances the electric-power is generated in the works or factory by specially-adapted steam-engines or gas-engines, while in others electric current is purchased from power-companies or from municipal central-stations having a statutory monopoly. Low rates of from one halfpenny to one penny per horse-power hour afford advantage and profit to each side, and even rates lower than one halfpenny if the hours of working can be arranged to miss the heavy or peak loading of the power-station. Special industries may be established for the very purpose of utilising such reduced cost of current.

Repairs and renewals are sometimes of such a kind as to increase the value of plant, and nothing need be written off ; while in other cases a very low rate will suffice. For instance, in the case of blast-furnaces no deterioration may appear to take place for the first two or three years, and the expenses afterwards will be mainly those due to re-lining. If, as is prudent and usual, such expenses are defrayed out of revenue, a depreciation rate of 5 per cent. on capital value will generally prove sufficient to meet actual rebuilding, but it should take effect from the commencement, leaving any modification of the rate to be considered after a period of ten years. As the deterioration depends mainly on the severity of the working, a rate based upon the output rather than on the capital cost may be appropriate, and a few pence per ton of pig-iron made accumulated as a renewal fund. In some modern steel-works the alterations have been so rapid that no ordinary depreciation

See page 91.

Gas-engines.
See page 87.

Electric power stations.

See page 92.

Repairs and renewals.

Blast-furnaces.

*See TABLE,
page 128.*

Depreciation rate based on output.

rate would apply, and if no reserves are available additional capital must be provided.

New forms of blast-furnaces may render existing furnaces unsuitable, such cases occurring for instance when alterations for the saving of waste gases are decided on. A rate of 5 per cent. would be insufficient for the machinery of a rolling-mill, if that were the only provision for renewals. Even if such a rate be deemed appropriate for the first four years, a valuation at the end of that period may show that some rate between 10 and 15 per cent. should have been applied to meet effectually the depreciation in value due to wear and tear, and if there be no separate reserve to provide against the risk of the machinery becoming old-fashioned. But if, besides current repairs, there are constant renewals and additions out of revenue, no writing-down of the value may be necessary.

Rolling-mills.

See
Reserve-fund,
pages 45, 124.

**Steam-engines
and boilers.**

Steam-engines and Boilers, if classed separately from the other machinery of a factory, would generally require a higher rate of depreciation, and, if again separated, boilers a higher rate than engines. Well-made, slowly-working reciprocating-engines engaged in regular work will, if properly maintained, occasionally last for fifty years, but the great advantages afforded in quick-speed engines by the economical use of high-pressure steam, justify a change before the engines are worn out. In the great majority of cases no such durability can be reckoned on. So wide is the possible variation, that engines and boilers should be examined at least once a year, and the result duly noted in the inventory of plant. The following may be taken as an example. If a well-made non-condensing stationary engine with Lancashire boiler, cost, including foundations, £800, is to be treated separately, it would be prudent to write off $7\frac{1}{2}$ per cent. the first year, and $7\frac{1}{2}$ per cent. annually from the diminishing value, this being sufficient if the minor repairs and renewals, such as new brasses and fire-bars, be paid for out of revenue. At the end of ten

**Wide variation
of durability.**

See page 73.

Rate for engines.

**Repaired out of
revenue.**

years the book-value will stand at £367. If then the cylinder be re-bored, possibly a new piston supplied, and the boiler reinforced by the insertion of a new furnace, at a total cost of £100, this sum might be added to the capital value, the depreciation rate of $7\frac{1}{2}$ per cent. continuing for a further five years till the value is reduced to £316. A new boiler might probably then be required, costing £200, and the rate of $7\frac{1}{2}$ per cent. again applied to the renovated value of £516. Boilers made to work at high-pressure may, by the authority or guidance of official inspectors, be allowed to work at lower pressures till the time comes for discarding them altogether. These instances are given separately as examples, but the nature of the other plant may justify its inclusion in a general average rate for the whole of 5 per cent.

See page 120.

Value partly restored.

See page 123.

In some cases, the more modern boilers composed entirely of tubes, prove better and cheaper than cylindrical boilers as just described. These tube-boilers are composed of smaller parts which can be renewed piece-meal, and the boilers so renovated are convenient for carriage and shipment. Such boilers have a second-hand value and can be renovated. They are occasionally exported when so restored. Tube boilers have, however, the drawback of not withstanding the deleterious action of bad water, and careful consideration on this point is necessary before adopting them.

New kinds of boilers.

Tube-boilers.

Multitubular boilers of the locomotive type are necessary for portable or semi-portable engines, and although these boilers may be maintained for a considerable time by occasional re-tubing, the combustion of fuel is generally more forced than in the simpler boilers, and they have not so long a working life.

See page 102.

Forced combustion.

Portable-engines with multitubular boilers are liable to rapid deterioration, and there is a wide range of difference in durability according to the original quality of the machine and the treatment to which it is subjected.

Portable engines wear out rapidly.

Engines of this sort when taken from place to place and used for temporary purposes can seldom be so well protected and managed as engines permanently fixed in a clean well-ordered workshop. Thus, if they are to be dealt with separately, an annual rate of from 10 to 15 per cent. would be necessary as a commencement. A rate of 15 per cent. would in five years reduce an original value of £300 to £133. If then £50 be spent on repairs, the book value might be increased accordingly, and the 15 per cent. rate go on, so that at the end of another four years the value would be reduced to £95. If then patched up, at an expense of £50, it might at a low pressure of steam last a few years longer.

Temporary use.

Repairs and renewals.

Durable engines.

Causes of wear in portable engines.

Quality of fuel and water.

Contractors' locomotives.

See page 128.

Ultimate selling price.

See page 194.

On the other hand, there are cases where, for well-made, well-managed engines of this class 10 per cent. would be ample, such a rate reducing £300 to £177 in five years. No exact rule can, however, be made for portable steam-engines. The deterioration depends first on the size of the engine—small sizes wearing out quickest; on the care in firing and kind of fuel and water; on whether the working is forced; on the original quality of the engine and the care given to repairs; on the protection from dirt; and on the hours the engine is kept at work. In extreme cases a portable engine constantly worked is quite worn out in five years, and its saleable value would be about one-twelfth part of its original price.

Contractors' locomotives working on imperfect railroads soon wear out, and a rate of 20 per cent. is generally required, bringing down the value of an engine costing £1000 to £328 in five years. Whatever be the exact rate adopted for steam-engines, it should be estimated liberally for the first five years. Revision will then show if the rate needs alteration. The ultimate selling price of portable engines and locomotives will much depend on the name and reputation of the original maker.

In regard to all kinds of steam-engines, another and a wider question arises beyond that relating to mere physical deterioration. The foregoing estimates have been based on the accumulated experience of many years, during which, although improvements have been made from time to time, they have not been so radical or sudden as to render either engines or boilers obsolete or useless before a usual working-life is ended. When, however, as is frequently the case, old-fashioned or badly-designed engines consume an excessive quantity of steam, it may prove profitable to discard them altogether, even to sell them as scrap, and substitute a more economical system which will allow large annual savings. It is not alone the kind of engine or boiler, but the number, irregularity and location of them. An excessive consumption of steam may be due not to the kind or even the condition of the engine but to the distance the steam has to be conveyed in imperfectly-protected pipes. Modern methods of distributing power by electricity may facilitate the concentration of the steam plant. One engine of 1000 horse-power, consuming 3 lbs. of coal per horse-power hour, may do all the work of numerous engines with an aggregate power of 1200 horse-power, distributed by steam-pipes and shafting, consuming 8 lbs. of coal per effective horse-power hour. This is not an excessive estimate of many actual cases. Assuming an average of fifty hours per week, there would be an actual annual saving of 7000 tons of coal, a reduction in the labour of handling it as well as in the removal of cinders. Even greater savings have become possible. The rapid development since 1900 of large gas-engines has altered the conditions hitherto prevailing. A fuel consumption equivalent to 1 lb. of coal is within the reach of those who have waste gases available, or who can buy producer-gas, and who, if they require not less than 500 horse-power can advantageously make the gas themselves. Such ameliora-

Steam-engines.

Excessive fuel consumption,

avoided by new methods.

Electric distribution of power.

See pages 89, 93.

Saving in coal.

Large gas-engines.

Reserves defined.

See page 45.

tions, however, obviously involve much capital outlay. A liberal writing down in past years, or an accumulated reserve, is the soundest method of providing means for such desirable changes.

Transporters.

Runways.

Ball-bearings.

Just as rail-tracks and small locomotives afforded a new and improved means of transport in and about a factory or large works, so they in turn have been superseded or supplemented by transporters or runways by which loads can be transferred—if need be by tortuous routes—from place to place. Ball-bearings and other ingenious fittings allow easy movement, either in the case of turn-tables, track wagons or of small carriers suspended from transporters or runways.

Gas-engines.

Producer-gas.

“Scavenging.”

Dust in waste gases.

Rotary gas-engine needed.

See page 46.

Reserve.

See page 48.

Gas-engines, though more convenient in many cases than steam-engines, are as a general rule more expensive to maintain, and should have a higher rate of depreciation till they have proved their durability. Producer-gas, however well it be made, leaves bituminous deposits, requiring not only good “scavenging” arrangements in the cylinders, but periodic stoppages for repair, especially for engines of more than 200 horse-power. So also the dust in waste-gases from blast furnaces, even with the best of gas-washing apparatus, involves periodic cleaning of the internal parts, and their occasional replacement. In large gas-engines the percussive shocks are more severely felt than in the smoother expansion of high-pressure steam-engines, though improvements have been introduced to reduce such a liability. Rotary gas-engines, when invented, are likely to modify such disadvantages. It is impossible to measure in advance the risks of obsolescence, but the fact that there is not so long an experience in the use of gas-engines on a large scale should encourage the provision of a general reserve.

In crowded cities the concentration at one central electric-power station of all motive-power, whether derived from steam-engines or gas-engines, may be found profitable,

even if the bare comparison of cost may not immediately show it. The tendency is growing of large manufacturing concerns discarding their own steam-plant and relying entirely on the purchase of current from a central station, some such concerns paying as much as £10,000 a year in this way. Boilers need then be retained only for such special purposes as steam-hammers and steam-heating.

Central power-stations.

See page 159.

It is not necessary to describe or even attempt to enumerate the various ways in which Electricity has superseded the older methods of transmuting natural forces and transmitting, distributing and applying the power obtained. The purpose here is only to refer to electrical plant in regard to the lessening of its value by time and use. No branch of industry has shown more clearly the necessity, in regard to new inventions, of separating physical deterioration from the liability to change or that process of becoming obsolete which is sometimes known as obsolescence.

Electricity.

Electrical plant.

Obsolescence.

Electricity can never be more than an intermediary in the generation and application of power, and even when the electrical machine or apparatus itself remains in good condition, its value may be reduced by the failure, alteration, or removal of other plant with which it is connected. On the one hand the dynamo-generators must be adapted to the prime movers which propel them, and on the other hand the motors to which the power is conveyed must be adapted to the purpose or process which they are to satisfy. It follows, therefore, that when some better form of prime mover—steam, gas or pressure-water as the case may be—has been devised which requires different connections or different speeds, the dynamo has had to follow. The adoption of high-speed direct-coupled reciprocating-engines rendered useless the dynamos which had been connected by belts to slower engines; and when these high-speed engines were installed at considerable expense, the still

**Electricity only
an intermediary.**

**Dynamos must
be adapted to
the engine.**

Motors must be adapted to their purpose.

higher speeds of turbines were found profitable, again involve alterations. Besides these changes, the method of utilising in turbines the exhaust-steam from reciprocating-engines may again revive the demand for the latter and find for them an appropriate place. Electric-motors have in many cases, while still in good order, had to be removed because they were not suitable for some new conditions.

Obsolete motors.

Moving machines compared with fixed plant.

Wasting of copper.

Damage from dust.

Durability of dynamos.

See page 121.

Continuous dynamos.

Leaving on one side, however, these contingencies which seem remote when an electric-plant is designed, it is not difficult to arrive at approximate conclusions in regard to ordinary wear-and-tear. It may be said generally that machines in motion, such as dynamos, motors, and motor-generators, deteriorate more rapidly than such fixed plant as static-transformers and cables. On a smaller scale electric-meters wear out more rapidly than such fixed plant as switchboards. Commutators and indeed all apparatus containing copper and brass which are exposed to abrasion and wasting, have a shortened life if exposed to dust, damp, frost or rust, and in some engineering factories and steel-works, dust charged with particles of coke or iron is particularly harmful. The need for re-winding, and the expense of reconstruction frequently arise from such exposure. Slight deterioration from these causes may be disregarded in the rate of depreciation, if the cost of maintaining such parts is fully defrayed out of revenue. So far as physical wear-and-tear is concerned, a well-made continuous-dynamo running at a moderate speed and well protected should last thirty years with perhaps two complete re-windings during that period. Each such re-winding would cost about one-fourth the original outlay, and might properly be debited to an accumulated depreciation fund.

Some of the earlier machines that have run for more than fifteen years show that there is nothing intrinsically abnormal in the risks involved to separate them in regard

to length of life from the average of other machinery—boilers, engines and machine-tools—in an engineering shop.

The anticipated life of a high-speed alternating-machine cannot be taken at more than twenty years, for however well it may have been made, it is liable to certain contingencies, and has no second-hand value except as scrap-metal. To justify so low an inclusive rate as $7\frac{1}{2}$ per cent. which brings £100 to £46 in ten years, all minor repairs should be defrayed out of revenue, and only the purchase of new parts or other radical expenditure be taken from the depreciation-fund. A shorter life must be assumed for motors of less than 10 kilowatts. If obsolescence be the only cause for change, then strictly the expense should be borne by a reserve-fund. Depreciation may however be adjusted to cover all.

The high-speed of the new turbo-generators introduced since 1900, and their very exact fitting, render them liable to certain risks from variations in temperature and other causes. Several changes in regard to speed and methods of blading have occurred since their first introduction, and if these generators are taken separately, only after some longer experience has been acquired can it be said that a depreciation rate of 10 per cent. on the diminishing value will be too much for maintaining a book-figure appropriate to their condition. Such a rate will reduce £1000 to £349 in ten years. Even when a reserve-fund is available, it should be trenched on with reluctance, and it is better by writing-down the value to charge all that is possible to revenue. Such reluctance may be considered at worst as the establishment of what auditors sometimes designate as a hidden reserve. It is the best side on which to err.

In regard to Motors, endurance depends to some extent on whether the driving is through belts or gearing. The interposition of belts between the motor and the machine driven, softens the shocks of running, and experience to guide the choice is constantly accumulating. When there

Alternating-machines.

See page 128.

See page 48.

See page 46.

Repairs to turbines.

See page 119.

Hidden reserves.

See page 51.

Electric motors.

are considerable shocks in the work done which cannot be entirely absorbed by a fly-wheel, as for instance in heavy rolling-mills or in large machines for the cropping or punching of steel cold, then the interposition of belts or cotton ropes generally prolongs the life of the motor.

So also where the work is continuous, as in a machine running ordinary factory hours without cessation. Obviously a machine working 60 or 100 hours per week is more distressed than one working only 20 hours per week, but even with considerable aggregate hours the distress on the machine is softened by occasional cessations. A motor for driving a crane or other machine, intermittently used, may be conveniently attached compactly to the machine it drives with less risk of breaking down than when associated with constant driving. Motors on tramcars and those on the cars of electric-railways deteriorate more rapidly than those on fixed foundations.

All Motors are supposed to have an over-load capacity which in some operations—as, for instance, the passing of steel bars through a rolling-mill—is frequently exercised to the utmost. Excessive working tends to undue heating which consumes much power and, in extreme cases, fuses the copper. But besides this, the normal capacity of a motor should be much above its work. If the original cost, the expenses of working and the life be taken together, it is in the end cheaper to instal a motor of 50 per cent. greater capacity than that required for the purpose in view; to instal for instance a 30-kilowatt motor for a 20-kilowatt job. The consumption of current depends on the work done, not on the size of the motor. In a large works with many motors the sufficiency can soon be measured, and an average rate established which will provide a fund for the regular purchase of new motors. Factory owners who escape the risks connected with the generating-plant when they purchase electric current from a local power-company,

Driving by belts
or ropes.

Hours
of working.

Periods of rest.

Direct driving.

Motors on tram-
cars and trains.

Over-load
capacity.

Undue heating.

Margin of power.

See page 2.

Public power-
station.

still have to bear the risks connected with the motors, except where the motors are hired from the same public body. The greater extent of such public undertakings, the variety of purposes to which the current is applied, and the wider range of working hours, allow economies almost impossible to the private consumer, who, moreover, by buying current gets a large share of the economy and has no concern in the risks of breakdown or obsolescence in the generating-plant.

Municipal supply.

Advantageous to user.

Electric conductors and Cables have been brought to great perfection, and in regard to durability the elaborate precautions for their insulation and conductivity render them long enduring against decay and accident. Standards of purity and strength have been arrived at for the copper, rubber, paper, lead and steel of which they are composed, and these are proved by severe tests, chemical, electrical and mechanical. Not only at every stage of manufacture and on completion but afterwards during use, the insulation and conductivity are tested and only unavoidable and severe accidents can injure them. Even if damage occurs, it is generally confined within a moderate range.

Conductors and cables.

Precautions to insure quality.

Materials tested.

Protection against accident.

Naked copper wires or rods are sometimes allowed to be used for high-tension current and are attached in much the same way as telegraph wires—but with more elaborate precautions—to buildings or poles, from which they are supported by porcelain insulators. Such unprotected conductors are, however, seldom allowed except on private premises or in sparsely populated districts. When removed the scrap-copper is worth about 95 per cent. of the current price for old copper. The metal used is known commercially as “electrolytic” copper, and is generally, worth from 2 to 4 per cent. more than ordinary copper of good merchantable brand (G.M.B.).

Suspended copper conductors.

Value of scrap-copper.

Electrolytic copper.

Aerial cables, such as those which transmit power in and about large steel-works or railway shunting-grounds,

Aerial cables.

How composed.

Mode of covering.

are generally composed of copper wires or twisted strands insulated sometimes with rubber but more usually braided and served with one, two, or three layers of some weather-resisting compound. This covering is sufficient to protect them against accidental contact with telegraph or telephone wires which may fall against them, as the cables depend for their insulation on the porcelain cups to which they are attached. The covering is long-enduring against weather, and when decay begins it is not of immediate importance if the cables have been placed out of reach. If depreciated at a rate of 5 per cent. per annum a few years will bring the book value down to that of the copper they contain, or they may be written down to that value directly they are fixed in place. Conductors with such limited protection, when they are fixed in colliery-shafts or underground roads, cannot be expected to last more than ten years.

**Underground
cables.**

**Insulating
material.**

**Rubber
discarded.**

**Specially-
prepared paper.**

Larger cables for considerable distances, such as are used by power, lighting and tramway undertakings are almost always laid underground. When such cables were first introduced the only available experience in regard to insulation was that afforded by submarine telegraph-cables which had been in use for some years. In these cables the copper conductors are wrapped in gutta-percha and incased in wire. Gutta-percha was, however, found too soft—in any but a cold temperature—to bear the weight of the larger and heavier copper wire or twisted wire strands now required. Rubber and rubber compounds were tried, but these, while effective for an inner coating of suspended cables for a short time, were found to decay from varying atmospheric conditions, and rubber has been abandoned. Specially prepared paper was introduced as a substitute by Ferranti about the year 1880, and subsequent experience has shown that the material, if kept dry and protected from mechanical injury, will endure permanently, or at any rate over a period that

cannot yet be measured. When there is only one conductor or, as in concentric cables, two or more conductors, the insulation is obtained in the way just described.

**Concentric
cables.**

The cable is generally composed of twisted strands, giving a total sectional area of copper ranging from 0.04 to 1.25 sq. inch; additional cables being generally added when larger capacity is needed, rather than increasing the size of any one. The copper conductor is usually insulated by three layers of specially-prepared manilla paper, which, however, only serves its purpose when quite dry, and it is the almost universal practice to enclose the paper-covered cable in lead so as to keep out moisture.

How composed.

The cable is then armoured by steel tape or steel wire as a protection from picks or other excavating operations, with occasionally an outer covering of jute. The cables are further preserved by one of two methods—either by laying the cables in channels formed in blocks of vitrified clay, embedding them in bitumen or pitch, and covering them by a loose brick or tile; or in the case of large cables by drawing them into holes moulded in blocks of vitrified clay. Such underground cables so protected, are generally laid in trenches excavated about two or three feet deep. There are many combinations of materials, so that underground cables, when finally scrapped, may contain copper, paper, steel-wire, steel-tape, lead and jute.

Armoured cables.

**Embedded in
troughs.**

**Laid under-
ground.**

The two methods of fixing or laying cables as just described, while they may be equally enduring, have different results in regard to the value of the scrap in the case of removal. In either of the underground cables there has been considerable outlay in opening the ground, laying the cable and filling-in. When laid in grooved blocks, the cables are so firmly incased that the cost of removing them and separating the various materials will (unless the cost is charged to the new cables) generally absorb nearly the whole sum obtainable from the copper. In the other case

**Scrap-value of
cables.**

Cost of removal.

Difficulty of re-drawing.

of cables drawn through holes in blocks otherwise solid, the cables may be removed by re-drawing them from the blocks, but even this method is feasible only if the cables are free to move and not complicated by various attachments and connections to branch-consumers along the route. These difficulties depend on local circumstances, and no absolute rule can be established for them.

Depreciation of cables.

If after one writing-down of 5 per cent. from the original cost, including laying, a depreciation rate of $2\frac{1}{2}$ per cent. be applied till the scrap-value of the copper, lead and steel is reached less the cost of removal, no other writing-down is necessary, the remoter risks of obsolescence or enforced removal being left to a general reserve fund.

See page 45.

Storage batteries should be fully maintained and replaced out of revenue.

Dealers in old metals.

Second-hand dealers in old metals have become familiar with electrical apparatus of all kinds, and are ready to offer prices for what is presented to them. Indeed it may be said that a market for old electrical material has been established and modes of utilising such material. Prices are based on the weight and proportion of iron, steel, copper and lead. Dealers will break up machines and castings, and in the case of suspended cables burn off the outer covering and tear away the insulating-material. The larger main-cables which have been laid underground as just described are divided into convenient lengths, the lead pipes, steel-tape or armour-wire cut open by special tools, and the paper or other insulating material burnt away. The old metals will then be worth about four-fifths of the current prices of ingot-copper, pig-lead or pig-iron. Dealers will generally estimate the value from a sample.

Separation of materials.**Value of old copper, lead or iron.****Inclusive rates of depreciation.**

Sometimes, for convenience, an inclusive rate of depreciation is adopted for the whole of an electric plant, including buildings, and the permanent nature of the latter is held to justify a moderate average rate for the whole.

It must, however, be remembered that the solidity of buildings does not save them from the risks of obsolescence, if the plant has to be altered, and that the cost of alterations in buildings and foundations may be as great as, or even greater than, with the machinery. The necessity for a reserve to meet such contingencies is specially necessary with the electric plant of power companies or of municipal central stations having no other kind of plant to average with it.

See page 65.

Reserves.

See page 45.

At the time of purchasing new electrical machines or cables there is a convenient opportunity for ascertaining and recording the weight of the different metals, so that their ultimate or scrap value may be correctly estimated when the time of removal approaches. An approximate estimate in advance is assisted by the data which the cable makers will supply, to those who buy from them, of the component parts, showing the weight of copper, steel-tape, steel-wire and lead-pipe which alone have any scrap value.

Ultimate scrap value.

Loose Plant and Tools can seldom be satisfactorily treated in factory accounts by the system just described for buildings and fixed plant. They wear out too quickly, and writing off a percentage annually is not a satisfactory method when the rate would exceed 20 per cent. There are two other methods available. One is to roughly value the miscellaneous loose plant every year by weight or otherwise; the second is to write off nothing, but to maintain and renew entirely out of revenue. If the fixed plant has been considerably increased, a corresponding growth of value in the loose tools may be generally assumed.

Loose plant excluded from average rate.

Renewed out of revenue.

In some foundries the plan is adopted of dividing the loose plant into classes somewhat as follows: foundry-boxes; foundry-patterns; rapidly-wearing plant, such as iron and steel tools, belting, chains, ropes, portable forges, carts, wheelbarrows and ladders.

Classification of loose plant.

Foundry boxes,

written down to
value of pig iron.

Example.

Old and new
boxes averaged.

See page 193.

Machine
moulding boxes.

Foundry
patterns,

Patterns
seldom of
permanent value.

Taking these in their order, a list is kept of foundry boxes, and this is assisted by casting on each box the year in which it is made, and marking on each its weight. The value is, in some factories, at once taken at that of pig iron, but more often is written down to that value in a few years. Supposing one box has been made, weighing 1 ton, at a cost of £12, then, if it is of a shape or size not likely to be wanted again, all the cost—less that of the iron—should be charged to the first set of castings, and the box at once broken up. But if the box be considered useful enough to keep for future use, one-half or even less may be charged to the first castings, and the remainder treated as an addition to capital ; but this remaining value should be written down by depreciation to pig-iron value.

Another and simpler plan is to value all the boxes, old and new alike, at 20s. per ton above pig-iron price—that is to say a moderate average price, and not that which may be current at the time, although of course the current price would need consideration in case of valuation for a change of ownership. This summary method does not apply to the elaborately-fitted boxes specially prepared for the processes of machine-moulding. Such boxes may be properly classed among machine tools, and depreciated accordingly, but at a liberal rate, as they wear out quickly.

Foundry patterns may be taken as a type of the patterns or designs necessary in so many trades, and involving much cost not easily dealt with in the books of account. As a safe general principle or starting point, every casting or set of castings should pay for its pattern ; and where some exceptional or peculiar shape is to be made, with no immediate prospect of using the pattern again, this plan is necessary if loss is to be avoided. There is a natural reluctance to break up costly patterns, and an equal reluctance to treat them as valueless. The storing of them is often continued for many years without return,

and ultimately the patterns are broken up for firewood or scrap-iron, as the case may be. Much depends on the nature of the trade, whether of a repetition or miscellaneous kind. It is often expedient in a repetition trade, where a succession of orders may be reckoned on, to spend much money on the patterns, which may have a value many times that of the castings made from them in the first year. Even, however, if durable iron patterns have been made, they often become obsolete before worn out, and therefore should be quickly depreciated.

**Patterns
Scrapped.**

**Expensive
patterns.**

Toothed-wheel and pulley patterns have in the past had a permanent value; but since the introduction of wheel-moulding and wheel-cutting machines it has become less usual to store such patterns. These and other expensive patterns, especially of an ornamental kind, have a value quite dormant, because they are unknown to purchasers; and it is for this reason that the publication of illustrated catalogues may give life to a stock of patterns otherwise useless. But while this may extend the time over which the cost is to be distributed, the value should generally be written down to one-tenth of the cost in ten years. If not used often they have little value; if used often they soon wear out.

**Wheel and pulley
patterns.**

**Value increased
by cataloguing.**

It is a wise rule that Engineers' Drawings shall be charged to the particular work for which they have been made, and there should be some special circumstance to justify the charging part of the cost to capital. A change of ownership may however render necessary a review of patterns and drawings as they may form part of goodwill.

**Engineers'
drawings.**

**Form part of
goodwill.
*See page 59.***

Copyright designs or patterns protected by patent may of course, have a special value; but, as between partners, this should be written down rapidly, as such rights last only a limited time. In the case of a change of ownership a new valuation should be made. In this category should be included the engraving-blocks used for catalogue illus-

**Patents and
Copyright
designs.
*See page 165.***

**Catalogue
engraving
blocks.**

See page 58.

trations. All these may be sometimes associated with goodwill.

Horses.

See pages 100, 214.

Horses deteriorate more rapidly than the inanimate fixed plant of a factory, and it may be best to exclude them entirely from the depreciation account and simply to charge all purchases to revenue. If, however, they are written down, a special rate or system of depreciation is necessary, for it is obvious that contingencies have to be provided for which would not occur in the case of ordinary plant. Assuming that sound, well-seasoned animals have been purchased, that they are well cared for, and that all veterinary expenses are charged to revenue, an annual depreciation rate of from 20 to 30 per cent. on the diminishing value will be necessary to provide a fund for renewals. Between these wide limits the exact rate will be found to depend on the conditions of working, principally on the kind of roads. On the paved streets of a city the deterioration will be more rapid than on macadamised roads, and especially if the horses have to trot on the paved streets. The experience of omnibus proprietors, tramway companies, and others, shows that the working-life of a horse is from three to five years, according to the care paid to feeding, shoeing, stabling, and moderate working; while the easier conditions under which the carting work of a factory may be performed would allow a life to the horses of from four to six years.

Special contingencies.

Rates of depreciation.

Working life, how determined.

Cartage.

See page 214.

Electric transporters or runways.

Cartage is generally an uncertain and unsatisfactory expense in connection with a manufacturing business, and the tendency in modern factories is to substitute for street work steam-lorries or petrol motor-cars, or to avoid the use of either by constructing branch railways or sidings, by using electric-capstans for haulage, and in the factory itself by narrow-gauge railways supplemented by electric-transporters and runways.

In concluding this chapter on plant and machinery it

may be said that in all kinds of industrial plant there are cases where it is very difficult to apply exact rates of depreciation, and yet where the uncertainty which causes the difficulty increases the need for writing-down. In the large industries such as iron, steel and chemical works, the improved methods that are continually arising render necessary an outlay of a speculative nature for new experiments and plant, which if successful, will render much of the old plant obsolete or of diminished value. A large annual return may alone justify the outlay, and such return cannot safely be treated as profit without a considerable writing down of capital value. Therefore, while in average or normal years of working a moderate rate of depreciation may suffice for mere physical deterioration, advantage should be taken of prosperous years to write down liberally the book-value of the plant. As a matter of book-keeping this may be done as described on page 122, so rendering some of what appears as profit, liquid as resumed capital; or it may be effected by extinguishing debentures or repaying loans. If, however, shareholders are unwilling to regard as cancelled, an outlay which as yet has shown no sign of unprofitableness, new deferred shares (equal in amount to the cancelled debentures) may be created and distributed as a bonus or "Stock dividend." Such an increase in the nominal share-capital is a sounder plan than that of dividing the profit among the shareholders in money and maintaining the debenture or loan indebtedness. Before creating such new capital, it should be clearly ascertained that there are real and tangible assets to represent it. Even additions to buildings and plant, though they may apparently increase the earning power, will not justify the new shares unless it be clear that there is no reduction in the value or usefulness of old plant, to neutralise the addition.

There are cases where, without real addition to plant,

**Iron, steel
and chemical
works.**

See page 47.

**Liberal
writing off in
prosperous years.**

See page 41,
Insurance bonus.

**Stock
dividends.**

See page 42.

**Should represent
tangible assets.**

Betterment.

See page 16.

**New shares
created.**

**Risks of
inflating capital.**

Reserves.
See page 45.

**Rapid decay self-
evident.**

**Slow decay
unnoticed.**

one or more years of large profits, and the assumption that such earnings will be maintained, have led to the creation of new shares. Many industrial undertakings have been burdened in succeeding years by such inflation of capital, and as a remedy the shares have had to be cancelled or a real value created for them by the application of profits to new works and plant instead of to dividend. Examples are continually arising of firms or companies drifting to re-construction or insolvency solely through over-capitalisation from which the earlier shareholders have reaped an illusory profit.

The necessity for a Reserve to meet these contingencies has already been investigated, and examples have been given of numerous industries to which the same principles apply.

In regard to all the plant referred to in this chapter the slower the deterioration, the greater the importance of establishing a proper system. Where the deterioration is rapid, as in boilers and furnaces, the need for renewals forces itself on the attention of users, and the justice of charging expenditure on this account to revenue is so obvious that any other plan, though it might be deemed merely delusive in the case of private firms, would in the case of joint-stock companies be rightly considered dishonest. Where, however, the deterioration of plant is slow, an insufficient rate of depreciation may by mere inadvertence go on for many years before the error becomes apparent; and the loss, when at last it is realised, too often falls upon the wrong shoulders.

CHAPTER V.

WRITING OFF THE WASTING VALUE OF TERMINABLE
UNDERTAKINGS.

REFERENCE has been made to the provision which may become necessary to meet the decreasing or wasting value of factories and kindred concerns limited by lease or otherwise. There are undertakings which by their very nature have only a transient value, and where therefore everything that has been consumed or is irrecoverable at the end of the term must be written off out of revenue, if the capital of the concern is to be preserved intact. Such, for example, are Concessions or Leases for terms of years; Collieries and other Mines; Patents; and in some cases also Goodwill.

See pages
36, 50, 133.

**Undertakings of
transient value.**

**Concessions,
Mines, Goodwill,
Patents.**

See pages
59, 107, 164.

Concessions for national works are seldom granted in Great Britain for terms of years, but in some foreign countries where much British capital is invested, monopolies for railways, mines, water-supply, electric light and drainage-works are so granted. In British cities, the construction of municipal works, such as gas-works, water-works, and tramways on any but a small scale is seldom now entrusted to private companies. Such works are generally carried out in the manner already described, and the Corporations are the permanent owners of the undertakings subject to the repayment within a limited number of years of the money borrowed for construction. The rights and privileges connected with concessions for foreign public works are hardly ever granted in perpetuity, so that the capital sunk

**Concessions for
public works.**

Municipal works.

See pages 5-13.

**For foreign
public work.**

in such undertakings must be recovered by some system of sinking-fund.

**Municipal
concessions.**

**Tramways for
limited terms.**

See page 157.

**Preliminary
expenses.**

See pages 55, 120.

**Sinking-fund to
restore capital.**

See page 124.

**Leasehold
assurance.**

See page 125.

**Mining
speculation.**

In British cities, concessions for Tramways or Electric Lighting are, when granted to private companies, almost always for limited periods. At the expiration of the term the local authorities sometimes have the option of requiring the removal of the works that have been constructed, or of purchasing them from the concessionaires at a price which may or may not include compensation for the loss of prospective profits, or for the compulsory nature of the transfer, or for anything beyond the mere property itself. On such conditions the capital expenditure is not always entirely restored, for the original outlay will have included an expenditure for preliminary expenses and for plant which has become partially worn out. Unless there has been a yearly depreciation or writing-down which shall have provided for the cessation of the privileges, as well as for the wear and tear of plant, loss will obviously result. Even when the concession or lease provides for compensation, the terms on which it is to be granted should be closely scanned. A provision may have to be made by the present holders to reduce the capital value of the assets as they appear in the books, to that which will be received on the transfer. This provision may in some cases take the form of a sinking-fund, or reserve-fund, rather than a rate of depreciation, but the two questions cannot always be easily separated, and must be held in view together. Some system of sinking-fund is the best means of meeting this contingency, and the method and cost of doing so are described in a later chapter. The cost of amortization may be measured by the rates of annual premium charged by the leading assurance companies for what is known as Leasehold Assurance.

Mining enterprises are always more or less speculative, and high prospective profits are necessary to induce investments, profits which must not only give a sufficient interest

on the venture but the return of the capital when the mine is exhausted.

The limitation of tenure may be by the exhaustion of the minerals, or by the termination or lapsing of the right to get them. If the tenure is freehold, and the minerals inexhaustible or so abundant as to last for one hundred years, the contingency may be deemed too remote to require consideration, and little more need be written off for a decreasing value of the outlay for opening out the mine, or for depreciated plant, than would be necessary in a factory belonging to the occupier. Taking the imaginary case of a mine, already equipped or in operation, changing hands ; if the minerals will be exhausted within a limited number of years, it will obviously be necessary for the new-comer or purchaser who works the mine, in calculating the net profit for any year, to write off from the gross-income a part of the purchase money in the proportion which the year bears to the remaining life of the lease or the tonnage of minerals annually gotten to the total tonnage. A provision of this sort may be stated in the accounts in the form of a sinking-fund or amortization. It is well to keep this quite separate from the depreciation-fund for writing-down and maintaining the plant, some of which may have to be renewed more than once during the life of the mine. The depreciation-fund is to regulate the annual burden of renewals which are otherwise irregular, though the average annual expenditure may bear an approximate proportion to the gettings.

The foregoing is a case where the price paid for a colliery or mine includes not only the prospective value of the minerals, but a previous outlay for developing the mine, and for work and plant transferred to the purchaser, most or all of which outlay may be irrecoverable at the end of the term. But more usually the works and the minerals are kept separate. A sum may be paid to the vendor for the former, and the minerals paid for by an annual rent or

Exhaustion of mines.

See page 107.

Leasehold assurance.

See page 133.

Annual writing off.

See page 131.

See pages 119-123.

Collieries, wasting value of.

**Mining rent or
royalty.**

**Collieries in
Great Britain.**

**Cost of sinking
irrecoverable.**

**See Gold Mines,
page 32.**

Sinking-funds.

*See pages
124, 136.*

royalty; or the whole may be merged in the rent or royalty, and no sum charged for entering on the property or for plant, the new-comer bearing the whole cost of working. A sinking-fund is then unnecessary as depreciation, except for the plant added by the new occupier; but the enhancement of rent to cover or recoup the vendor for his capital outlay illustrates the similar provision that must be made by a new tenant in the case where he has paid a sum of money as purchase or premium for coming in. In Great Britain new collieries are generally opened out by the lessees who, as a speculative enterprise, acquire the mineral rights from the owner. The purchasers have seldom to pay a sum of money down, but only an acreage or tonnage rent, in which is often merged a minimum or dead rent. The lessees have then to spend what is necessary to open out the mine and have also to bear the whole risk of failure. Sinking the shafts, making underground roads, erecting winding, hauling and pumping machinery, constructing wharfs and railways, are all properly charged in the first instance to capital; but when the coal face has once been fairly opened out, all afterwards should be defrayed out of revenue as part of the cost of getting. There are obviously exceptions to this rule, where new districts in the mine have to be opened out, or new developments made, with a view to an increased output or future profit; and the exact allotment between capital and revenue may depend also on the system of mining adopted.

The annual investment for establishing a sinking-fund may vary considerably, according as the expenditure has been charged to capital or revenue, and according to the term over which the provision is spread. As an example:—If £100,000 be expended in opening out a colliery, not only must the profit-income provide a remunerative interest on such a speculative outlay and on the subsequent expendi-

ture, but should provide for the amortization of the capital at the end of the term. If the lease or term be for fifty years, or if the minerals are estimated to last that time at the intended rate of getting, then this period forms a basis for such a fund. The stronger or more heroic method would be to write down the capital by instalments at the rate of £2000 a year, in addition to depreciation of plant to provide for renewals during the term. But such a plan presses hardly on the earlier years, while diminishing the capital on which interest has to be paid in the later years. A more equitable plan is to establish a separate sinking-fund, accumulating at compound interest. A sum of £1030 annually, invested at $2\frac{1}{2}$ per cent., will accumulate in fifty years to £100,000, or if invested at 3 per cent. £890 will suffice. If 5000 tons of coal per week be got for fifty weeks each year, one penny per ton set aside will amount annually to £1040. A provision of from a penny to two-pence per ton is not uncommon in actual practice. In Great Britain, not only has income-tax also to be paid, but as has already been explained, no allowance or deduction is made from gross income for the sinking-fund charges.

If the lessees, however, can reckon on a renewed lease or a new lease for adjacent minerals where the earlier expenditure can be utilised, the case is altered; or even where entirely new shafts and machinery may be wanted, the sinking-fund of the first lease may be applied to such expenditure, and the capital value revived for a new term. In other words, the new outlay may be provided out of past revenue, which is the main principle of depreciation in a going concern.

The tendency of modern legislation to impose a small annual tax on the present value of the property in ungotten minerals is a matter for serious consideration for a buyer in arriving at a fair price, for the purchaser would have to con-

Amortization.
See page 133.

**Writing down
by instalments.**

**Invested at
compound
interest.**
*See pages 125,
131.*

See page 131.

**Leases may be
renewed.**

*See
Frontispiece,
and page 127.*

tinue paying the annual tax without any regard to the annual gettings or profits.

**National mines
and forests.**

It is sometimes the case that a government possessing national mines, quarries or forests, may periodically let out for short terms of years to the highest bidder the right to exploit the minerals or timber. During this period the lessees have the right to use existing roads, railways, wharfs and other accessories, and are generally bound to leave the plant in good condition for their successors. It is obvious that besides providing for depreciation and maintenance, the lessees will endeavour by some system of amortization to get back the new capital they may have expended during their term.

*See Sinking-fund,
page 124.*

**Wasting value of
furnaces.**

While the mines themselves afford the most conspicuous instances of temporary or wasting values, other examples may be cited. There are manufacturing industries depending on adjacent minerals which are affected adversely by the exhaustion of particular mines. Thus, blast-furnaces, steel-works, or factories for supplying or repairing plant, may have been established in the vicinity of mines, and may have owed their prosperity not only to the cheap supply of ore and coal but to the mutual employment afforded. The proprietors of such works may find their profits reduced or extinguished when they have to obtain their minerals from a distance, and lose their local customers. A sinking-fund or reserve may be necessary to provide for the cessation of such local supplies. In a similar way saw-mills and wood-pulp factories may be dependent on neighbouring forests.

**Subsidiary
trades.**

See pages 129, 131.

**Analogy of
steamships.**

Property in steamships affords another example of wasting value. Following the custom long established in regard to sailing ships, single steamers are held in shares of one sixty-fourth. It is not usual in such cases to depreciate the value, but, while providing by insurance for losses by storm and accidents at sea, to let each shareholder

**Depreciation
omitted.**

provide a sinking-fund for the wasting value of his share. Investors who favour this form of property are generally disposed to average their risk by taking shares in numerous vessels, writing off as depreciation or setting aside as reserve all income exceeding 5 per cent., and even in dull times debiting their investment 5 per cent. By this means the book-value of their share is written down to a breaking-up value, or to a price attainable by sale.

A different policy is pursued by the large steamship companies who own numerous vessels. It is customary to write down liberally, out of earnings, the book value of each boat, so that, for example, an original cost of £18 per ton may in the course of a few years be written down to half, that is to say, to a price at which the boats may be sold for some inferior service. The capital value of the fleet is not diminished by this means, for the money so reserved from gross income is applied to the purchase of new and improved vessels without an appeal to the shareholders for fresh capital. This plan forms part of the general good management by which the long endurance and prosperity of the leading British steamship companies have been assured. A company owning twenty steamers of the first class, bought at an average cost of £18 per ton will not be deemed financially sound, if the average book value at any time exceeds £12 per ton, and this notwithstanding the defraying all repairs and minor renewals out of revenue. As the boats become old, their final disposal may be at £6 per ton, or even at £2 per ton, for use as harbour hulks or for breaking up.

Manufacturers who take out Patents will prudently abstain from treating their supposed value as an addition to capital which will neutralise the need for a depreciation of plant. If, however, a valuation take place in the case of a dissolution of partnership, or in selling the business, the patent may have a real value which will have to be paid

See also
pages 68, 131.

Reserves.

See pages 45-50.

Steamship companies.

Liberal depreciation of steamships.

See page 68.

See also Plant,
page 121.

Value of fleet maintained.

Scrap value of steamers.

Patents.

Wasting value. for. The purchaser should recognise the wasting nature of the investment in dealing with the question of depreciation. In the years following 1870 large sums have been paid for patents, and there are joint-stock companies which have hardly any other asset. Although, if the business has been well managed, some permanent advantage may have accrued by goodwill or otherwise, the system of a sinking-fund above referred to is applicable here also. Indeed a business may be so dependent on the monopoly afforded by a patent as to be almost valueless when the monopoly has expired, although a trade-mark may extend it. Moreover, processes and methods of manufacture may have been so perfected as to give a great advantage to newcomers and improvements may be patented so as, in effect, to maintain the monopoly for a further period.

See page 59.

Trade marks.

See page 165.

**Sinking-funds
not compulsory.**

In dealing with the capital of joint-stock companies sunk in wasting properties as here described, the contributions to the fund are not allowed to be deducted in the calculation of net profits for taxation, though such a provision is of importance in arriving at net profits available for dividend. While it may be deemed prudent to establish a sinking-fund, the setting apart of an annual sum is not necessarily a revenue charge, for it has been held in the Courts that directors are not bound, in the absence of stipulations in the articles of association, to make a sinking-fund, and may divide the whole of the current profits ; so, in short, treating the income from the shares as a terminable annuity. Where each partner or shareholder is made fully aware of the circumstances, and is therefore in a position to protect himself by reinvesting a portion of his income, such a plan has at any rate the merit of simplicity, and may be permissible ; but in the case of sleeping-partners or a large body of shareholders, the best plan is to establish a sinking-fund for the common advantage. If the principle be acknowledged, there are various methods of applying it. Thus, where

*See Steamships,
page 68.*

there is borrowed money in the form of debentures, the paying off and cancelling a proportion annually may keep down the nominal capital to an amount for which there are equivalent realisable assets. The methods adopted for the repayment of municipal loans afford examples which may be applied elsewhere.

**Debentures
cancelled.**

See pages 134-145

CHAPTER VI.

EFFECT OF DEPRECIATION ON PREFERENCE PARTNERS.
DEBENTURE HOLDERS.Neglect of
depreciation.

DOUBTS and differences of opinion concerning depreciation or reserve are in many cases unavoidable, for it is not always easy to measure the respective advantages and drawbacks of present thrift to meet future and perhaps remote contingencies. In the assumed case of a single proprietor, the penalty for neglect falls on the right shoulders, while an excessive prudence in setting aside a liberal amount from present earnings or income at any rate leaves the future advantages to the person who has borne the burden, or to his successor.

Partners'
rights vary

Partners, however, have sometimes such varying interests in an undertaking as to make the question of depreciation specially important, if the respective rights of each are to be equitably dealt with. For instance, in the case of two partners, one of them may have a preponderance of capital, while the other, because he is more active in the management or for other reasons may be entitled to an equal or even greater share of the annual profits. It may appear advantageous to the managing-partner, who has only a fleeting interest in the undertaking, to treat too much of the gross or apparent profit as available for dividend by not sufficiently depreciating the plant, or by charging to capital outgoings which do not really add to the tangible assets. There is then the anomaly, that as the dividend becomes greater the liquid capital becomes less and bank overdrafts

Partner with
fleeting interest.Different inter-
ests in profits.

increase. On the other hand, it would be unfair to the working-partner to safeguard the future in which he has little concern, by a too-liberal writing-down for future contingencies. Such a case might be met by providing for revaluation when the partnership expires, and there are other methods by which someone technically acquainted with the business or its plant, can adjust equitably the rights of each party.

A managing-partner should be paid for his services, and the fairer plan is to include his salary in the current expenditure of the concern, ranking with other salaries and wages, or at any rate to give it preference after outside obligations have been met. Then only so much of the surplus as remains after all liabilities chargeable to revenue have been allotted and depreciation provided for should be divided as Income. The sleeping-partner, who may for the present purpose be called the capitalist, having thus postponed his claim till the full cost of running the business has been borne, is generally entitled to a preponderating share of the surplus.

There are other cases where the managing-partner is entitled to a bonus on all profits, or dividends beyond a certain rate. The same care must be exercised in determining what is a real profit. A bonus on sales or gross receipts affords many opportunities for error.

One or more members of a family may carry on an inherited business, the capital of which is sunk in buildings and plant, the occupiers taking all the profit after paying to other members of the family rent or interest on their share. There must be strict covenants as to maintenance and reinstatement by the occupying partners, or else the rent must be high enough to provide not only a fair interest to the proprietors but a margin sufficient to pay for dilapidations and waste. If such conditions do not prevail, the occupiers may exhaust the earning-power of the concern, and then leave it on the hands of the owners. Thus, if the

Managing-partner's salary.

Capitalist partner.

Partner's bonus.

Real profit,
See page 17.

Family interests.

See Lessors,
page 124.

Gross rent and net rent.

proprietors are entitled to 5 per cent. interest, the gross rent may have to be 8 per cent. or even more. A survey by some one technically informed may be necessary to arrive at a fair judgment in such a case.

Capital locked-up.

In dull times capital may have to be locked up abroad by carrying out works, or supplying goods on deferred payments or against payment in shares. A return of profit or even of bare cost may depend on the success of such undertaking. The workmen whose employment is

Pre-preference partners.

thus assured are in effect pre-preference partners, as they get their wages without regard to the reimbursement of the sums so advanced. Special partnerships agreements may have to be made in regard to such outside investments.

Joint-stock companies.

Joint-stock companies afford examples of varied interests where there are preference shares or debentures. The ordinary shareholders, if they have the control, may be reluctant to write down enough for depreciation, if such a course absorbs so much of the gross profits as to leave what they may deem insufficient for themselves after the interest on the preference shares has been paid. They may be even inclined to utilise, for the purpose of a dividend, a reserve-fund established for other purposes. Obviously the future dividends on the preference-shares may be imperilled by such a course, which in effect may be a waste of the very capital the preference shareholders have provided.

Varying rights of shareholders.

Errors in the opposite direction may occur, and the ordinary shareholders be unjustly deprived of their proper dividend, where income, properly available, is too much depleted by depreciation in order to safeguard the future of the preference shareholder.

Excessive depreciation.

Errors in the opposite direction may occur, and the ordinary shareholders be unjustly deprived of their proper dividend, where income, properly available, is too much depleted by depreciation in order to safeguard the future of the preference shareholder.

Preference shares.

Preference shares are of different kinds. In some cases they may be non-cumulative, that is to say, they may in each year have a claim only on the profits of that year and may not, when prosperous years occur, be entitled to the

payment of back dividend. Such non-cumulative preference shares are issued principally by railway and other companies established under Acts of Parliament. Since the principle of Limited Liability in industrial and trading concerns has been established, it is usual, in order to induce subscriptions to such shares, to make preference shares cumulative both as to capital and to dividend. In any case the respective rights should be clearly defined.

In industrial concerns, extensions may become necessary beyond the reserve which has been created by past depreciation, for the natural tendency of such undertakings is to increase. If there has been a past prosperity, additional capital may be obtained by the creation of new ordinary shares and offered *pro rata* to the existing shareholders, or by the issue of preference shares as just described. In other cases the shareholders may see their way, by issuing debentures, to increased profit without subscribing more capital ; or the necessity for debentures may be forced upon them by past neglect of depreciation, and because investors, traders or bankers will not be content with any less security.

Debentures attract investors who are content with a small interest where they are fully assured of a first lien on the assets. Inventories and books of account may show ample security for such debentures, but it must obviously depend on the correctness of the valuations. In the case of British railway companies, the issue of debentures is limited by statute to a third or other prescribed proportion of the share-capital which has been paid up and expended. In this respect, debentures differ from railway bonds in the United States. It is there the practice to construct the earlier work of railways almost entirely on the capital subscribed for bonds, while the completion and solidification of the line are paid for out of revenue. Shares, however, are created to an amount generally in excess of the bonds, but they represent only the speculative future profit if the

Cumulative preference.

Cost of extensions.

New shares issued.
See also page 17.

Debentures.
See also pages 14, 35, 45, 117.

Railway debentures.

U.S. bonds.
See pages 14, 17, 115.

Bonus shares.
See pages 112, 113.

Promoters' shares.

expected advantages are realised. The shares are used by the promoters partly as bonus or commission to those who can obtain subscriptions to the bonds, and the remainder are retained by the promoters as their profit.

Excessive Debentures.

In Great Britain, in concerns established under the Limited Liability Acts, there is practically no limit to the debentures that may be created and issued, if subscribers can be found for them, and in such case the debentures may, like American bonds, represent the full value of the undertaking, and, in the case of forced liquidation, more than the value. The latter event may occur where debentures are issued to provide funds for the purchase of new plant to replace obsolete plant which ought to have been sufficiently written down out of revenue in the past, and where the depreciation fund so created should have been available for the new expenditure.

See pages 153, 189.

Directors as trustees for debenture-holders.

The appointment as trustees for the debenture-holders of directors who have been responsible for past neglect sometimes proves inconvenient, as in cases of reconstruction or realisation, they may have divided-interests not always reconcilable.

Debentures vary.

It must be remembered that there are many different forms of debenture, the principal variations depending on whether they have been drawn in the interests of the borrowers or the lenders. In some cases the repayment of debentures can only be demanded by the lenders in case of default in the payment of interest, or in the case of liquidation, while others may give undue power to the company of dealing with the property and varying the security. Others, again, may in effect be only pre-preference shares, and although the holders might take precedence over any class of shareholder in winding up or in a realisation of the assets, they would rank only with other and unsecured creditors. In the opposite direction, debentures drawn up in the interests of the lenders may give extreme rights of

foreclosure and a prior lien on every possible asset, present and future, including uncalled share-capital and goodwill. This may be fair as against shareholders, but presses hardly on trade creditors. The latter, in dealing with limited companies, should not only ascertain what uncalled-capital is available, but should also inform themselves of what debentures have been issued and their terms. Copies of articles of association as well also of all registered liens can be easily and cheaply obtained, and should be filed for reference by all who supply goods to such companies.

**Rights of
foreclosure.**

Trade creditors.

**Liens are regis-
tered and may be
inspected.**

In pledging the whole assets it is desirable to take borrowing-power for a maximum sum, even if some of the debentures are held in reserve and not issued. It is not easy to issue debentures secured only by a second lien.

Some debentures are redeemable in a given period by annual drawings, but more frequently the whole issue is redeemable at one fixed period. In the latter case, provision can be made for the redemption of the debentures by a sinking-fund policy effected with a good assurance office.

**Second
debentures.**

*See pages
125, 133.*

Bankers and others who scan closely the nature of the debentures in which they are interested, or which may have been issued to them as security, regard not only the present sufficiency of the security but sometimes require, under penal clauses of peremptory redemption, that the sufficiency shall be maintained. Such conditions tend to hamper the management, for it may be stipulated that the wasting value of existing plant shall be unduly written-down out of income before the division of profits, and the money so saved either set aside for the establishment of a redemption fund or applied to the purchase of new plant. Further, in some cases, not only must the value of the plant be maintained, but material and stores also kept up to a prescribed amount. The state of affairs may be such as to explain and possibly justify these stipulations, but none the less,

Lien to bankers.

**Onerous
conditions.**

**Unfair to trade
creditors.**

unsecured creditors suffer in the winding-up of such companies, and may find that they have been supplying material and stores on deferred payments more to strengthen the security of bankers who hold the debentures, than to provide for the current and legitimate requirements of the business.

*See RESERVES,
page 45.*

These matters are alluded to here to show how important to shareholders and all concerned is such a writing down out of gross profits as will provide funds for future necessities, and not by excessive dividends put their property in peril of forced realisation by having to raise money on onerous terms.

CHAPTER VII.

EXAMPLES AND TABLES. OFFICIAL AND PARLIAMEN-
TARY REPORTS ON LOCAL LOANS AND SINKING-
FUNDS.

THE various methods of writing down values by Depreciation, Reserve or Sinking-fund, were described in Chapter I, on p. 3, and on the succeeding pages, the plan of writing down each year a percentage of the capital value as it was left at the preceding years. This latter method may be further explained by the following Diagram Tables and Examples:—

Table I., on pp. 127 and 128, shows the effect of different rates of depreciation for any term up to 30 years, and also up to 100 years. The diagram on p. 126 illustrates Table I., by showing graphically the effects of different percentage rates. The vertical lines show divisions of years; the horizontal lines show divisions of values. The curved lines will be seen to cross the divisions of years at points of value corresponding with those in Table I., and the alteration in the curve indicates the decremental reduction in value as the capital becomes less.

Table I.
explained.

Diagram on pag
126 explained.

Examples.—What will be the depreciated value in 12 years at the rate of $7\frac{1}{2}$ per cent. per annum of a machine whose original value is £475? In Table I. the $7\frac{1}{2}$ per cent. column gives 0·392374 as the depreciated value of 1 after 12 years, and this multiplied by 475 gives 186·377, or £186 7s. 8d. Again, what will be the depreciated value in 70 years of a building whose original value of £1550 is written off at the rate of 2 per cent. per annum? The 2 per cent. column gives 0·243124 as the value of £100 after

Examples of
Table I.

70 years, and this multiplied by 1550 gives 376·84, or £376 18s. 10d.

These examples, while illustrating the effects of different rates of depreciation, do not show all that generally takes place, for renewals and additions may go far to balance the depreciation, and in the case of an increasing business may more than neutralise it.

To illustrate this more clearly, an example is given of the alterations in the value of a factory during a course of 30 years, where, owing to the nature of the trade, the buildings are depreciated at the rate of $1\frac{1}{2}$ per cent. per annum, and the plant at 5 per cent. Credit is taken for renewals and additions, but not for current repairs. The altering values are shown graphically on the Frontispiece Diagram, and are as follows :—

The vertical lines in the diagram show divisions of years, the horizontal lines divisions of £100 and £1000 respectively. The factory is constructed at a cost of £21,000, exclusive of loose-plant. Of this sum, legal and other preliminary expenses absorb £400, which is written off in four equal instalments, as shown by the diagonal black line at the left corner of the diagram. Land to the value of £1900 is purchased, but a portion of it, being not at first required, is let off to a tenant, and £700 is expended in adapting the remainder by levelling, draining, fencing and paving it, thus making a total under this head of £2600. As shown by the thick black line, the value is not depreciated, but in the 14th year the portion let off is taken in, and £150 spent on its adaptation, raising the capital value in the books of account to £2750.

The Buildings cost £10,000, and are depreciated at the rate of $1\frac{1}{2}$ per cent. per annum, the fluctuating and diminishing value being indicated by the thick red line, representing the $1\frac{1}{2}$ per cent. curve shown on page 126. If the renovations and additions be left out of the account, the deprecia-

**Example of
depreciation in
30 years.**

**Frontispiece
Diagram
explained.**

**Preliminary
expenses.**

*See pages 55, 139,
158.*

Land.

See page 63.

**Buildings,
*See page 66.***

tion would continue, as shown by the dotted red line, which at the end of 30 years reaches a reduced value of £6355. But, as shown by the upper or rectangular red line, £320 is spent on additions in the 5th year, and as this sum more than balances the depreciation of that year, the mean, or real value, as shown by the thick red line, rises in that year; but the depreciation rate of $1\frac{1}{2}$ per cent. being applied to this increased value, it again declines. During the 12th year an expenditure of £350 is made for structural renewals, and this being added to the capital account, the mean value again rises till in the 15th year, additional workshops are built at a cost of £1200, and again in the 25th year £600 is spent. At the end of 30 years the total expenditure on buildings, including the original outlay, but exclusive of current repairs, has been £12,470, and the capital value in the books of account stands at £8353.

depreciated and
added to.

Renewals
of buildings.

Additions.

The Machinery and Plant, indicated in blue, show greater alterations. Only a sum of £8000 is spent at the commencement, space being left for additional plant. A rate of 5 per cent. is adopted, which if not neutralised by additions would depreciate the value, as shown by the dotted curved blue line, bringing the whole plant down to a second-hand and scrap value of £1717 in 30 years. But, as shown by the upper or rectangular blue line, additions are made from the beginning, and continued, with the exception of a few years, throughout the whole term, the money being applied in three ways, *i.e.* to the renewal of worn-out or obsolete plant by purchasing new, the price obtained on re-sale of the old going to diminish the expense; to the renewal of important parts of old plant, or the enlarging of machines so as to add to their earning capacity; and lastly, to the purchase of additional plant, either to supersede manual operations or to extend the output of the factory.

Depreciation of
plant.

Effect
in 30 years.

Expenditure, how
applied.

Expenditure under any of these heads may be justly added to the capital value, and therefore goes to neutralise

Depreciation
neutralised,

the depreciation, and produces as the actual mean value the thick blue line, which shows by its undulations the upward effect of the additions and the continually depressing effect of the depreciation rate of 5 per cent. Thus:

by expenditure.

in the 2nd year, £250 is spent; in the 3rd year, £520; in the 4th year, £120; in the 6th year, £70; in the 7th year, £130; in the 8th year, £450; in the 9th year, £580; in the 10th year, £680; in the 11th year, £170; in the 12th year, £50.

Trade has then become dull, and in the 13th year there is no expenditure on renewals. In the 14th year £200 is spent, and trade then reviving, and the business of the factory increasing, more land is taken in, and additional workshops are built in the following year. In the 15th year, £940 is spent on plant, and in the 16th year, £1530.

Plant increased.

Result in 16 years.

At the stock-taking at the end of the 16th year, after spending during 16 years £5700 in addition to the original outlay of £8000 the capital value in the books of account stands at £8084. Nothing is spent in the two next years. In the 19th year, £150 is spent; in the 20th year, £350; in the 21st year, £400; in the 22nd year, £400; in the 23rd year, £500; in the 24th year, £320; in the 25th year, £600. In this year a new workshop is added, and in the 26th year, £1060 is spent in plant; in the 27th year, £510; in the 28th year, £600; in the 29th year, £450.

Further addition.

Result in 30 years.

At the end of the 30th year, the total expenditure from the commencement including the original £8000, has been £19,040, while the value of the plant as depreciated appears in the books of account as £8073. There is the apparent anomaly that with a larger factory and an extended business the plant is worth no more than at first. The reduction is true as regards capital value, but the earning capacity is greater. That is to say, the factory and plant would be worth more to a tenant who paid rent, but who had not the burden of maintenance, and would

Capital value reduced, but rental value increased.

have an increased rateable value, while for the owner the plant would have a shorter life.

Assuming that £8280, representing three-fourths of the expenditure during the 30 years, has been for the renewal of worn-out plant, and the replacing of what has become obsolete, and that £2760, representing one-fourth, has been for extensions; then the new value of the plant left in working order at the end of 30 years would be $£8000 + £2760 = £10,760$, but taking the average remaining life of the plant—some of it being 30 years old and some of it almost new—the amount of £8073 as appearing in the books of account would represent a present value.

If the 5 per cent. rate has been a proper one, this remaining value should be correct, as between partners, exclusive of any goodwill; and if the business of the factory be continued, an incoming partner should pay either directly for goodwill, or in a more liberal valuation of the plant, for the advantage of acquiring not only a fully-equipped factory, but the profitable employment attached to it.

The foregoing example shows the effect of depreciation rates maintained without alteration for 30 years, but in practice modifications might be necessary. Thus, the experience of the first 12 years might show that, owing to the durability of the machines and their careful management, 5 per cent. was unnecessarily high, and that a lower annual reduction might suffice. On the other hand, the rapid wearing-away of certain parts of the plant, such as steam-boilers or electric-generators, might have shown that the average rate was insufficient; or, without such physical deterioration, a higher rate might be necessary to replace plant which had become obsolete. This latter risk may be met out of a general Reserve-Fund.

The deterioration of plant being as much an incident and expense of manufacture as the outlay for wages and

Analysis of
expenditure.

Value with and
without goodwill

See pages 61, 162

Rate of writing
off modified.

See Analogy of
Assurance,
page 41.

See pages
84, 92.

Reserve-fund.
See page 45.

material, though less direct and apparent, it is important thus to ascertain, by occasional investigation, what will be a safe but not excessive rate to allow for in calculating the cost of new operations.

**Table II.
explained.**

Table II., on pp. 129 and 130, shows the accumulation of a Reserve-fund with compound interest in a term of years.

Example.

Example.—What will an annual reserve of £250 amount to in 18 years, with compound interest at the rate of $3\frac{1}{2}$ per cent. per annum? In the $3\frac{1}{2}$ per cent. column 24·5 is given as the accumulated value of 1 in 18 years. This multiplied by 250 gives £6125.

**Table III.
explained.**

Table III., on pp. 131 and 132, shows how much must be invested annually as a Sinking-fund to accumulate with compound interest to £1 in a given term of years.

Example.

Example.—How much must be invested annually, at $4\frac{1}{2}$ per cent. compound interest, to accumulate to £1250 in 22 years? In the $4\frac{1}{2}$ per cent. column 0·0275 is set against the period of 22 years; and this multiplied by 1250 gives 34·375, or £34 7s. 6d. as the sum to be annually invested.

**Compounding
of interest not
always
practicable.**

While, however, Table III. shows theoretically the accumulation of sums invested annually at compound interest, it is not always practicable to make the re-investment of small amounts necessary to obtain the advantage shown in the Table. To meet this difficulty, some of the leading assurance companies have established a system of "Leasehold Assurance," by which, in consideration of an agreed annual payment, they are willing to provide for the payment of a fixed sum at the end of a definite period. But assurance-companies cannot safely allow such high rates as can often be obtained in private undertakings, where investments in debentures or otherwise may afford interest at the rate of 4 or 5 per cent.

**Leasehold
Assurance.**

Table IV., on p. 133, shows the rates of premium charged (1903) by the companies doing this kind of business. The rates quoted are—up to 30 years—those of the Atlas Assurance Company which does not state rates for a longer period, though willing to entertain proposals up to 50 years. The rates given for longer periods up to 100 years are those of the Sun Life Assurance Society whose rates for the shorter period are practically the same as those of the Atlas Company. The premiums are given in the form of percentage rates on £100, and, assuming that they are paid annually in advance, it will be seen that they afford an investment at 3 per cent. compounded yearly. In case the insurer desires to withdraw his investment during the term of years, a liberal surrender value is allowed.

Example.—Debentures for £100,000 maturing for payment at par in 50 years, may be provided for by an Annual Premium of 17s. 3d. per £100 = £862 10s.

In regard to Sinking-funds for the repayment of money borrowed by Municipalities and other Local Authorities in Great Britain, the extracts given in this chapter from the Report of a Committee in Parliament in 1902, show the methods then in force or recommended or sanctioned by the Local Government Board. It will be seen how far questions of depreciation and wasting values, as referred to in preceding pages, form the basis on which the terms and periods of the Sinking-funds are calculated.

In 1907 a Report was published by the Departmental Committee appointed to enquire into the Accounts of Local Authorities. As will be seen by the extracts given at the end of this chapter, the main object of the enquiry was to ascertain the various systems on which the Accounts of Local Authorities in England and Wales were then kept, to confer statutory powers on Local Authorities, and to make rules and recommendations accordingly.

**Table IV.
explained.**

**Assurance
societies.**

Examples.

Sinking-funds.

*See page 134,
144.*

**Accounts of local
Authorities.**

See page 141.

DIAGRAM ILLUSTRATING TABLE I. (pp. 127 and 128),
THE EFFECTS OF DEPRECIATION AT DIFFERENT RATES FOR TERMS OF YEARS.

For Explanation, see page 119.

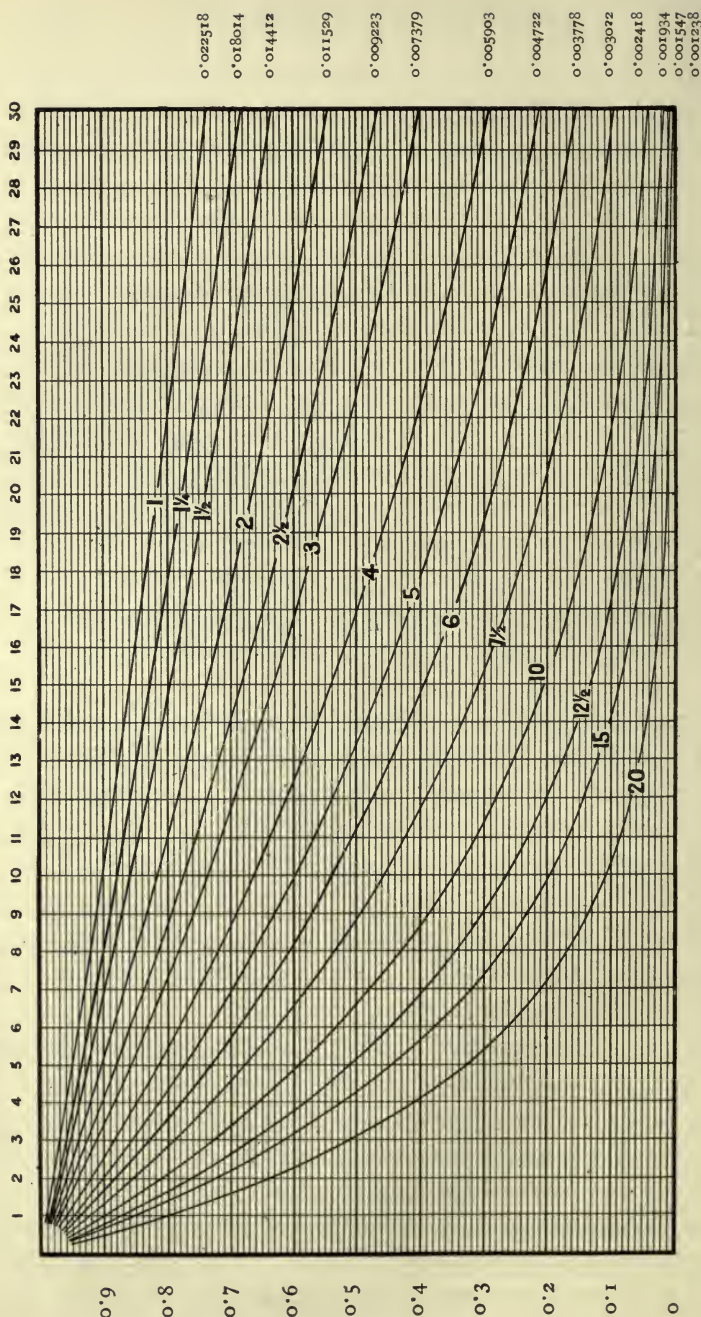


TABLE I.

THE EFFECTS OF DEPRECIATION AT DIFFERENT RATES FOR TERMS OF YEARS.

For Explanation, see p. 119.

Years.	1 per cent.	1 $\frac{1}{4}$ per cent.	1 $\frac{1}{2}$ per cent.	2 per cent.	2 $\frac{1}{2}$ per cent.	3 per cent.	4 per cent.
	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000
1	0'990,000	0'987,500	0'985,000	0'980,000	0'975,000	0'970,000	0'960,000
2	'980,100	'975,156	'970,225	'960,400	'950,625	'940,900	'921,600
3	'970,299	'962,967	'955,671	'941,192	'926,859	'912,673	'884,736
4	'960,596	'950,930	'941,336	'922,368	'903,688	'885,292	'849,346
5	'950,990	'939,043	'927,216	'903,921	'881,099	'858,734	'815,372
6	'941,480	'927,305	'913,308	'885,843	'859,068	'832,972	'782,757
7	'932,066	'915,714	'899,608	'868,126	'837,591	'807,982	'751,477
8	'922,745	'904,267	'886,114	'850,763	'816,652	'783,743	'721,389
9	'913,517	'892,964	'872,822	'833,748	'796,235	'760,231	'692,534
10	'904,382	'881,802	'859,730	'817,073	'776,329	'737,424	'664,832
11	'895,338	'870,779	'846,834	'800,732	'756,921	'715,301	'638,239
12	'886,385	'859,895	'834,131	'784,717	'737,998	'693,842	'612,709
13	'877,522	'849,146	'821,619	'769,023	'719,548	'673,026	'588,201
14	'868,746	'838,532	'809,295	'753,643	'701,559	'652,836	'564,673
15	'860,059	'828,050	'797,155	'738,570	'684,020	'633,250	'542,086
16	'851,458	'817,699	'785,198	'723,798	'666,920	'614,253	'520,402
17	'842,943	'807,478	'773,420	'709,323	'650,247	'595,825	'499,586
18	'834,514	'797,385	'761,819	'695,136	'633,991	'577,950	'479,603
19	'826,169	'787,417	'750,391	'681,233	'618,141	'560,612	'460,419
20	'817,907	'777,574	'739,135	'667,609	'602,572	'543,794	'442,002
21	'809,728	'767,855	'728,048	'654,257	'587,620	'527,300	'424,322
22	'801,631	'758,257	'717,128	'641,171	'572,930	'511,655	'407,349
23	'793,615	'748,778	'706,371	'628,348	'558,606	'496,306	'391,055
24	'785,678	'739,419	'695,775	'615,781	'544,641	'481,416	'375,413
25	'777,822	'730,176	'685,338	'603,466	'531,025	'466,974	'360,396
26	'770,043	'721,049	'675,058	'591,396	'517,749	'452,965	'345,980
27	'762,343	'712,036	'664,932	'579,568	'504,806	'439,376	'332,141
28	'754,720	'703,135	'654,958	'567,977	'492,185	'426,194	'318,855
29	'747,172	'694,346	'645,134	'556,618	'479,881	'413,408	'306,101
30	'739,701	'685,667	'635,457	'545,485	'467,884	'401,006	'293,857
40	'668,972	'604,622	'546,321	'445,701	'363,232	'295,711	'195,366
50	'605,006	'533,157	'469,689	'364,171	'281,988	'218,065	'120,885
60	'547,157	'470,139	'403,805	'297,554	'218,915	'160,806	'086,352
70	'494,839	'414,569	'347,163	'243,124	'169,950	'118,582	'057,410
80	'447,524	'365,568	'298,467	'198,650	'131,937	'087,445	'038,168
90	'404,732	'322,358	'256,601	'162,311	'102,427	'064,484	'025,375
100	'366,033	'284,256	'220,607	'132,620	'079,517	'047,552	'016,870

TABLE I.—continued.

THE EFFECTS OF DEPRECIATION AT DIFFERENT RATES FOR TERMS OF YEARS.

For Explanation, see p. 119.

Years.	5 per cent.	6 per cent.	7½ per cent.	10 per cent.	12½ per cent.	15 per cent.	20 per cent.
	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000	1'000,000
1	0'950,000	0'940,000	0'925,000	0'900,000	0'875,000	0'850,000	0'800,000
2	'902,500	'883,600	'855,626	'810,000	'765,625	'722,500	'640,000
3	'857,375	'830,584	'791,453	'729,000	'669,922	'614,125	'512'000
4	'814,506	'780,749	'732,094	'656,100	'586,182	'522,006	'409,600
5	'773,781	'733,904	'677,187	'590,490	'512,909	'443,705	'327,680
6	'735,092	'689,870	'626,398	'531,441	'448,796	'377,149	'262,144
7	'698,337	'648,478	'579,418	'478,297	'392,696	'320,577	'209,715
8	'663,420	'609,569	'535,962	'430,467	'343,609	'272,490	'167,772
9	'630,249	'572,995	'495,764	'387,420	'300,658	'231,617	'134,218
10	'598,737	'538'616	'458,582	'348,678	'263,076	'196,874	'107,372
11	'568,800	'506,299	'424,188	'313,811	'230,191	'167,343	'085,899
12	'540,360	'475,921	'392,374	'282,429	'201,418	'142,232	'068,720
13	'513,342	'447,366	'362,946	'254,186	'176,240	'120,905	'054,976
14	'487,675	'420,524	'335,725	'228,768	'154,210	'102,770	'043,981
15	'463,291	'395,292	'310,546	'205,891	'134,934	'087,354	'035,184
16	'440,127	'371,575	'287,255	'185,302	'118,067	'074,251	'028,148
17	'418,200	'349,281	'265,711	'166,772	'103,309	'063,113	'022,518
18	'397,214	'328,324	'245,782	'150,095	'090,395	'053,646	'018,014
19	'377,354	'308,624	'227,349	'135,085	'079,096	'045,599	'014,412
20	'358,486	'290,107	'210,297	'121,577	'069,209	'038,760	'011,529
21	'340,562	'272,701	'194,525	'109,419	'060,558	'032,946	'009,223
22	'323,533	'256,358	'179,936	'098,477	'052,988	'028,004	'007,379
23	'307,357	'240,958	'166,441	'088,629	'046,365	'023,803	'005,903
24	'291,989	'226,501	'153,957	'079,766	'040,569	'020,233	'004,722
25	'277,390	'212,911	'142,411	'071,790	'035,498	'017,198	'003,778
26	'263,520	'200,136	'131,730	'064,611	'031,061	'014,618	'003,022
27	'250,344	'188,128	'121,850	'058,150	'027,178	'012,425	'002,418
28	'237,827	'176,840	'112,711	'052,335	'023,781	'010,562	'001,934
29	'225,935	'166,230	'104,258	'047,101	'020,808	'008,977	'001,547
30	'214,639	'156,256	'096,439	'042,391	'018,207	'007,631	'001,238
40	'128,512	'084,162	'044,225	'014,781	'004,790	'001,502	'000,133
50	'076,945	'045,331	'020,281	'005,154	'001,260	'000,296	'000,014
60	'046,070	'024,416	'009,300	'001,797	'000,332	'000,058	'000,002
70	'027,584	'013,151	'004,265	'000,627	'000,087	'000,011	..
80	'016,515	'007,083	'001,956	'000,218	'000,023	'000,002	..
90	'009,888	'003,815	'000,897	'000,076	'000,006	..	..
100	'005,921	'002,055	'000,411	'000,027	'000,002	..	..

TABLE II.

RESERVE FUND.—ACCUMULATION OF £1 PER ANNUM WITH COMPOUND INTEREST.

For Explanation, see p. 124.

Year..	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1'000	1'000	1'000	1'000	1'000	1'000	1'000
2	2'025	2'030	2'035	2'040	2'045	2'050	2'060
3	3'076	3'091	3'106	3'122	3'137	3'153	3'184
4	4'153	4'184	4'215	4'246	4'278	4'310	4'375
5	5'256	5'309	5'362	5'416	5'471	5'526	5'637
6	6'388	6'468	6'550	6'633	6'717	6'802	6'975
7	7'547	7'662	7'779	7'898	8'019	8'142	8'394
8	8'736	8'892	9'052	9'214	9'380	9'549	9'897
9	9'995	10'159	10'368	10'583	10'802	11'027	11'491
10	11'203	11'494	11'731	12'006	12'288	12'578	13'181
11	12'483	12'808	13'142	13'486	13'841	14'207	14'972
12	13'796	14'192	14'602	15'026	15'464	15'917	16'870
13	15'140	15'618	16'113	16'627	17'160	17'713	18'882
14	16'519	17'086	17'677	18'292	18'932	19'599	21'015
15	17'932	18'599	19'296	20'024	20'784	21'579	23'276
16	19'380	20'157	20'971	21'825	22'719	23'657	25'673
17	20'865	21'762	22'705	23'698	24'742	25'840	28'213
18	22'386	23'414	24'500	25'645	26'855	28'132	30'906
19	23'946	25'117	26'357	27'671	29'064	30'539	33'760
20	25'545	26'870	28'280	29'778	31'371	33'066	36'786
21	27'183	28'676	30'269	31'969	33'783	35'719	39'993
22	28'863	30'537	32'329	34'248	36'303	38'505	43'392
23	30'584	32'453	34'460	36'618	38'937	41'430	46'996
24	32'349	34'426	36'667	39'083	41'689	44'502	50'816
25	34'153	36'459	38'950	41'646	44'565	47'727	54'865
26	36'012	38'553	41'313	44'312	47'571	51'113	59'156
27	37'912	40'710	43'759	47'084	50'711	54'669	63'706
28	39'860	42'931	46'291	49'968	53'993	58'403	68'528
29	41'856	45'219	48'911	52'966	57'423	62'323	73'640
30	43'903	47'575	51'623	56'085	61'007	66'439	79'058
31	46'000	50'003	54'429	59'328	64'752	70'761	84'802
32	48'150	52'503	57'335	62'701	68'666	75'299	90'890
33	50'354	55'078	60'341	66'210	72'756	80'064	97'343
34	52'613	57'730	63'453	69'858	77'030	85'067	104'184
35	54'928	60'462	66'674	73'652	81'497	90'320	111'435
36	57'301	63'276	70'008	77'598	86'164	95'836	119'121
37	59'734	66'174	73'458	81'702	91'041	101'628	127'268
38	62'227	69'159	77'029	85'970	96'138	107'710	135'904
39	64'783	72'234	80'725	90'409	101'464	114'095	145'058
40	67'403	75'401	84'550	95'026	107'030	120'800	154'762
41	70'088	78'663	88'510	99'827	112'847	127'840	165'048
42	72'840	82'023	92'607	104'820	118'925	135'232	175'951
43	75'661	85'484	96'849	110'012	125'276	142'993	187'508
44	78'552	89'048	101'238	115'413	131'914	151'143	199'758
45	81'556	92'720	105'782	121'029	138'850	159'700	212'744
46	84'554	96'501	110'484	126'871	146'098	168'685	226'508
47	87'668	100'297	115'351	132'945	153'673	178'119	241'099
48	90'860	104'408	120'388	139'263	161'588	188'025	256'565
49	94'131	108'541	125'602	145'834	169'859	198'427	272'958
50	97'484	112'797	130'988	152'667	178'503	209'348	290'336

TABLE II.—*continued.*

RESERVE FUND.—ACCUMULATION OF £1 PER ANNUM WITH COMPOUND INTEREST.

For Explanation, see p. 124.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
51	100·921	117·181	136·583	159·774	187·536	220·815	308·756
52	104·444	121·696	142·363	167·165	196·975	232·856	328·281
53	108·056	126·347	148·346	174·851	206·839	245·499	348·978
54	111·757	131·137	154·538	182·845	217·146	258·774	370·917
55	115·551	136·072	160·947	191·159	227·918	272·713	394·172
56	119·440	141·154	167·580	199·806	239·174	287·348	418·822
57	123·426	146·388	174·445	208·798	250·937	302·716	444·952
58	127·511	151·780	181·551	218·150	263·299	318·851	472·640
59	151·699	157·333	188·905	227·876	276·075	335·794	502·008
60	135·992	163·055	196·517	237·991	289·498	353·584	533·128
61	140·391	168·945	204·395	248·510	303·525	372·263	566·116
62	144·901	175·013	212·549	259·451	318·184	391·876	601·083
63	149·524	183·264	220·988	270·829	333·502	412·470	638·148
64	154·262	187·702	229·723	282·662	349·510	434·093	677·437
65	159·118	194·333	238·763	294·968	366·238	456·798	719·083
66	164·096	201·163	248·120	307·767	383·719	480·638	763·228
67	169·199	208·198	257·804	321·078	401·986	505·670	810·022
68	174·429	215·444	267·827	334·921	421·075	531·953	859·623
69	179·789	222·907	278·201	349·318	441·024	559·551	912·200
70	185·284	280·594	288·938	364·290	461·870	588·529	967·932
71	190·916	238·512	300·051	379·862	483·654	618·955	1027·008
72	196·689	246·637	311·556	396·057	506·418	650·903	1089·629
73	202·606	255·067	323·457	412·899	530·207	684·448	1156·006
74	208·672	263·719	335·778	430·415	555·066	719·670	1226·367
75	214·888	272·631	348·530	448·631	581·044	756·654	1330·949
76	221·261	281·810	361·729	467·557	608·191	795·486	1380·006
77	227·792	291·264	375·389	487·280	636·560	836·261	1463·806
78	234·487	301·002	389·528	507·771	666·205	879·074	1552·634
79	241·349	311·032	404·161	529·082	697·184	924·027	1646·792
80	248·383	321·363	419·307	551·245	729·558	971·229	1746·600
81	255·592	332·004	434·983	574·295	763·388	1020·790	1852·396
82	262·982	342·964	451·207	598·267	798·740	1072·830	1964·540
83	270·557	354·253	467·999	623·197	835·684	1127·471	2083·412
84	278·321	365·881	485·379	649·125	874·289	1184·845	2209·417
85	286·279	377·857	503·367	676·090	914·632	1245·087	2342·980
86	294·436	390·193	521·985	704·134	956·791	1308·341	2484·561
87	302·796	402·898	541·255	733·299	1000·846	1374·758	2634·634
88	311·366	415·985	561·199	763·631	1046·884	1444·496	2793·712
89	320·150	429·465	581·841	795·176	1094·994	1517·721	2962·335
90	329·154	443·349	603·205	827·983	1145·269	1594·607	3141·075
91	338·383	457·649	625·317	862·103	1197·806	1675·338	3330·540
92	307·843	472·379	648·203	897·587	1252·707	1760·105	3531·372
93	357·539	487·550	671·890	934·490	1310·079	1849·110	3744·254
94	367·477	503·177	696·407	972·870	1370·033	1942·565	3969·910
95	377·664	519·272	721·781	1012·785	1432·684	2040·694	4209·104
96	388·106	535·850	748·043	1054·296	1498·155	2143·728	4462·651
97	398·808	552·926	775·225	1097·468	1566·572	2251·915	4731·410
98	409·799	570·513	803·358	1124·367	1638·068	2365·510	5016·294
99	421·023	588·629	832·475	1189·061	1712·781	2484·786	5318·272
100	432·549	607·288	862·612	1237·624	1790·856	2610·025	5628·368

TABLE III.

SINKING FUND.—ANNUAL INVESTMENT TO PRODUCE £1 IN A TERM OF YEARS.

For Explanation, see p. 124.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1'0000	1'0000	1'0000	1'0000	1'0000	1'0000	1'0000
2	0'4938	0'4926	0'4914	0'4902	0'4890	0'4878	0'4854
3	'3251	'3225	'3219	'3203	'3188	'3172	'3141
4	'2408	'2390	'2373	'2355	'2337	'2320	'2286
5	'1902	'1884	'1865	'1846	'1828	'1810	'1774
6	'1565	'1546	'1527	'1508	'1489	'1470	'1434
7	'1325	'1305	'1285	'1266	'1247	'1228	'1191
8	'1145	'1125	'1105	'1085	'1066	'1047	'1010
9	'1005	'0984	'0964	'0945	'0926	'0907	'0870
10	'0893	'0872	'0852	'0833	'0814	'0795	'0759
11	'0801	'0781	'0761	'0742	'0723	'0704	'0668
12	'0725	'0705	'0685	'0666	'0647	'0628	'0593
13	'0660	'0640	'0621	'0601	'0583	'0565	'0530
14	'0605	'0585	'0566	'0547	'0528	'0510	'0476
15	'0558	'0538	'0518	'0492	'0481	'0463	'0430
16	'0516	'0496	'0477	'0458	'0440	'0423	'0390
17	'0479	'0460	'0440	'0422	'0404	'0387	'0354
18	'0447	'0427	'0408	'0390	'0372	'0355	'0324
19	'0418	'0398	'0379	'0361	'0344	'0327	'0296
20	'0391	'0372	'0354	'0336	'0319	'0302	'0272
21	'0368	'0349	'0330	'0313	'0296	'0280	'0250
22	'0346	'0327	'0309	'0292	'0275	'0260	'0230
23	'0327	'0308	'0290	'0273	'0257	'0241	'0213
24	'0309	'0290	'0273	'0256	'0240	'0225	'0197
25	'0293	'0274	'0257	'0240	'0224	'0210	'0182
26	'0278	'0259	'0242	'0226	'0210	'0196	'0169
27	'0264	'0246	'0229	'0212	'0197	'0183	'0157
28	'0251	'0233	'0216	'0200	'0185	'0171	'0146
29	'0239	'0221	'0204	'0189	'0174	'0160	'0136
30	'0228	'0210	'0194	'0178	'0164	'0151	'0126
31	'0217	'0200	'0184	'0169	'0154	'0141	'0118
32	'0208	'0190	'0174	'0160	'0146	'0133	'0110
33	'0199	'0182	'0166	'0151	'0137	'0125	'0103
34	'0190	'0173	'0158	'0143	'0130	'0118	'0096
35	'0182	'0165	'0150	'0136	'0123	'0111	'0090
36	'0175	'0158	'0143	'0129	'0116	'0104	'0084
37	'0167	'0151	'0136	'0122	'0110	'0098	'0079
38	'0161	'0145	'0130	'0116	'0104	'0093	'0074
39	'0154	'0138	'0124	'0111	'0099	'0088	'0069
40	'0148	'0133	'0118	'0105	'0093	'0083	'0065
41	'0143	'0127	'0113	'0100	'0089	'0078	'0061
42	'0137	'0122	'0108	'0095	'0084	'0074	'0057
43	'0132	'0117	'0103	'0091	'0080	'0070	'0053
44	'0127	'0112	'0099	'0087	'0076	'0066	'0050
45	'0123	'0108	'0095	'0083	'0072	'0063	'0047
46	'0118	'0104	'0091	'0079	'0068	'0059	'0044
47	'0114	'0100	'0087	'0075	'0065	'0056	'0041
48	'0110	'0096	'0083	'0072	'0062	'0053	'0039
49	'0106	'0092	'0080	'0069	'0059	'0050	'0037
50	'0103	'0089	'0076	'0066	'0056	'0048	'0034

TABLE III.—*continued.*

SINKING FUND.—ANNUAL INVESTMENT TO PRODUCE £1 IN A TERM OF YEARS.

For Explanation, see p. 124.

Years.	2½ per cent.	3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
51	0'0100	0'0085	0'0073	0'0063	0'0053	0'0045	0'0032
52	'0096	'0082	'0070	'0060	'0051	'0043	'0030
53	'0093	'0079	'0067	'0057	'0048	'0041	'0029
54	'0089	'0076	'0065	'0055	'0046	'0039	'0027
55	'0087	'0073	'0062	'0052	'0044	'0037	'0025
56	'0084	'0071	'0060	'0050	'0042	'0035	'0024
57	'0081	'0068	'0057	'0048	'0040	'0033	'0022
58	'0078	'0066	'0055	'0046	'0038	'0031	'0021
59	'0076	'0064	'0053	'0044	'0036	'0030	'0020
60	'0074	'0061	'0051	'0042	'0035	'0028	'0019
61	'0071	'0059	'0049	'0040	'0033	'0027	'0018
62	'0069	'0057	'0047	'0039	'0031	'0026	'0017
63	'0067	'0055	'0045	'0037	'0030	'0024	'0016
64	'0065	'0053	'0044	'0035	'0029	'0023	'0015
65	'0063	'0051	'0042	'0034	'0027	'0022	'0014
66	'0061	'0050	'0040	'0033	'0026	'0021	'0013
67	'0059	'0048	'0039	'0031	'0025	'0020	'0012
68	'0057	'0046	'0037	'0030	'0024	'0019	'0012
69	'0056	'0045	'0036	'0029	'0023	'0018	'0011
70	'0054	'0043	'0035	'0027	'0022	'0017	'0010
71	'0052	'0042	'0033	'0026	'0021	'0016	'0010
72	'0051	'0041	'0032	'0025	'0020	'0015	'0009
73	'0049	'0039	'0031	'0024	'0019	'0015	'0009
74	'0048	'0038	'0030	'0023	'0018	'0014	'0008
75	'0047	'0037	'0029	'0022	'0017	'0013	'0008
76	'0045	'0035	'0028	'0021	'0016	'0013	'0007
77	'0044	'0034	'0027	'0021	'0016	'0012	'0007
78	'0043	'0033	'0026	'0020	'0015	'0011	'0006
79	'0041	'0032	'0025	'0019	'0014	'0011	'0006
80	'0040	'0031	'0024	'0018	'0014	'0010	'0006
81	'0039	'0030	'0023	'0017	'0013	'0010	'0005
82	'0038	'0029	'0022	'0017	'0013	'0009	'0005
83	'0037	'0028	'0021	'0016	'0012	'0009	'0005
84	'0036	'0027	'0021	'0015	'0011	'0008	'0005
85	'0035	'0026	'0020	'0015	'0011	'0008	'0004
86	'0034	'0026	'0019	'0014	'0010	'0008	'0004
87	'0033	'0025	'0019	'0014	'0010	'0007	'0004
88	'0032	'0024	'0018	'0013	'0010	'0007	'0004
89	'0031	'0023	'0017	'0013	'0009	'0007	'0003
90	'0030	'0023	'0017	'0012	'0009	'0006	'0003
91	'0030	'0022	'0016	'0012	'0008	'0006	'0003
92	'0029	'0021	'0015	'0011	'0008	'0006	'0003
93	'0028	'0021	'0015	'0011	'0008	'0005	'0003
94	'0027	'0020	'0014	'0010	'0007	'0005	'0003
95	'0026	'0019	'0014	'0010	'0007	'0005	'0002
96	'0026	'0019	'0013	'0010	'0007	'0005	'0002
97	'0025	'0018	'0013	'0009	'0006	'0004	'0002
98	'0024	'0018	'0012	'0009	'0006	'0004	'0002
99	'0024	'0017	'0012	'0008	'0006	'0004	'0002
100	'0023	'0016	'0012	'0008	'0006	'0004	'0002

TABLE IV.

LEASEHOLD ASSURANCE.—ANNUAL PREMIUMS TO SECURE £100
PAYABLE AT THE END OF A FIXED TERM OF YEARS.

For Explanation, see p. 125.

Term of years.	Rate per cent.	Term of years.	Rate per cent.	Term of years.	Rate per cent.
	£ s. d.		£ s. d.		£ s. d.
10	8 9 5	40	1 5 10	70	0 8 6
11	7 11 8	41	1 4 9	71	0 8 2
12	6 16 10	42	1 3 9	72	0 7 11
13	6 4 4	43	1 2 9	73	0 7 8
14	5 13 8	44	1 1 10	74	0 7 5
15	5 4 5	45	1 1 0	75	0 7 2
16	4 16 4	46	1 0 2	76	0 6 11
17	4 9 3	47	0 19 5	77	0 6 8
18	4 3 0	48	0 18 8	78	0 6 6
19	3 17 4	49	0 17 11	79	0 6 3
20	3 12 4	50	0 17 3	80	0 6 1
21	3 8 1	51	0 16 8	81	0 5 10
22	3 4 3	52	0 16 0	82	0 5 8
23	3 0 9	53	0 15 5	83	0 5 6
24	2 17 6	54	0 14 10	84	0 5 4
25	2 13 4	55	0 14 4	85	0 5 2
26	2 10 5	56	0 13 10	86	0 5 0
27	2 7 9	57	0 13 4	87	0 4 10
28	2 5 3	58	0 12 10	88	0 4 8
29	2 3 0	59	0 12 5	89	0 4 7
30	2 0 10	60	0 12 0	90	0 4 5
31	1 18 10	61	0 11 6	91	0 4 3
32	1 17 0	62	0 11 2	92	0 4 2
33	1 15 4	63	0 10 9	93	0 4 0
34	1 13 8	64	0 10 5	94	0 3 11
35	1 12 2	65	0 10 0	95	0 3 9
36	1 10 9	66	0 9 8	96	0 3 8
37	1 9 5	67	0 9 4	97	0 3 6
38	1 8 1	68	0 9 0	98	0 3 5
39	1 6 11	69	0 8 9	99	0 3 4

SURRENDER VALUE.—The Directors guarantee to return the whole of the premiums paid, except the first, with 2 per cent. compound interest, if at any time the assured wish to surrender the policy.

*See page 125.**Extracts from the Report* of the Select Committee of the House of Commons on Repayment of Loans by Local Authorities. Session 1902.***Policy of Parliament, repayment of loans.**

"It has been the policy of Parliament for many years to require that Local Loans should be repaid within a limited number of years, and to prevent the establishment by any local authority of a permanent debt.

"To secure this object each general statute which confers borrowing powers upon local authorities specifies a maximum period for the repayment of loans raised under such powers.

Statutory periods.

"The maximum periods specified in Acts applicable to England vary from ten to sixty years. Many of these Acts deal with a considerable number of subjects for loans.

Severance and equation.*See page 9.*

"The Local Government Board and the Board of Trade hold that the maximum periods mentioned in general Acts refer to the most durable items of the work for which borrowing powers are sought. It is therefore their practice to examine each item of the estimates for such work, and to assign to each group of items an appropriate term for the repayment of the loan required for it. In order to avoid a multiplication of separate loans, the course usually adopted is to grant an equated period for the whole loan, which is arrived at by considering the sums required for each group of items, and the term assigned to that group. The result of this severance and equation is to reduce the periods allowed below the maximum periods mentioned in the Acts, but equation is not practised where the sums included in each group are large, and the local authority express a preference for separate loans.

Probable useful life.

"The Local Government Board, being charged with the general supervision of local finance, takes into its consideration in fixing the period for redemption, not only the probable useful life of each part of an undertaking for which a loan is desired, but also the probable future condition of localities with regard to debt, in order that the

* London : Printed for His Majesty's Stationery Office, and to be purchased from Eyre and Spottiswoode, East Harding Street, London, E.C. ; or Oliver and Boyd, Edinburgh ; or E. Ponsonby, Dublin.

ratepayers of the future may not be unduly burdened, and so rendered less able to discharge efficiently the duties that are likely to come upon them.

“Standing order 172 of the House of Commons provides that ‘In the case of all Bills whereby any municipal corporation, district council, joint board, or joint committee, or other local authority, in England or Wales, are authorised to borrow money for any matter within the jurisdiction of the Board of Trade or the Local Government Board, estimates showing the proposed application of the money for permanent works shall (except so far as the exercise of the borrowing power is made subject to the sanction of the respective Board) be recited in the Bill as introduced into Parliament, and proved before the Select Committee to which the Bill is referred.’

**Estimates
required.**

“In addition to the statutory limitations upon the periods for repayment already mentioned, there is a further provision, acting as a check in the case of some loans. If the borrowing authority obtains the loan from the Public Works Loan Board, the period for repayment is determined by the Commissioners who are empowered by statute to make regulations governing all the conditions of these loans.

**Loans from
Public Works
Loan Commis-
sioners.**

“Section 11 of the Public Works Loans Act, 1875, directs the Commissioners in making such regulations to have regard to the durability of the work and to the expediency of the cost being paid by the generation of persons who will immediately benefit.

“The general policy of the Commissioners is ‘to hold out inducements to accept short periods for repayment, instead of throwing as much of the burden as possible upon posterity.’ One of these inducements is the acceptance of a lower rate of interest for a short term than for a longer one. The rates in force in 1902 were fixed by a Treasury Minute of 31st January, 1900, as follows:—

**Short periods
of repayment.**

Period of Repayment.				Rate of Interest.	
Not exceeding 30 years	..	..	..	3½ per cent. per annum.	
„ „ 40	„	..	..	3½	„
„ „ 50	„	..	..	3½	„

“A matter of some importance in considering whether the period for repayment should be extended is the method of repayment adopted in the particular case.

**Methods
of repayment
considered.**

“The three principal modes of repayment prescribed by the general law and the majority of local Acts are as follows:—

- i. By equal annual instalments of principal together with interest on the sum remaining unpaid, *i.e.* by what is called in this Report the Instalment System.
- ii. By equal annual instalments of principal and interest combined, *i.e.* by Terminable Annuity.
- iii. By setting apart and accumulating at compound interest a Sinking-fund.

By instalments

By sinking-fund
See pages 125, 131

"The amount of the additional pressure upon posterity in the event of an extension of time for repayment would be materially varied by the adoption of one or other of these methods.

The second or third method preferred.

"Most of the municipal witnesses have expressed a preference for either the second or third of these methods of repayment, but some of the witnesses differed from this view, and desired the more general adoption of the first method, which involves a much smaller total payment in respect of capital and interest than either of the others, though the burden imposed by it in the earlier years of repayment is heavier, as is shown in the following figures :—

Example.

Repayment of a Loan of £100 in periods of 30, 40 and 50 years, by (A) the Instalment System, and (B) the Annuity System, at 3 per cent. interest.

				Payment in first year.	Last year.	Total amount paid in period.
				£ s. d.	£ s. d.	£ s. d.
30 years	..	..	{A.	6 6 8	3 8 8	146 10 0
			{B.	5 2 0	5 2 0	153 1 2
40 years	..	..	{A.	5 10 0	2 11 6	161 10 0
			{B.	4 6 6	4 6 6	173 1 0
50 years	..	..	{A.	5 0 0	2 1 3	176 10 0
			{B.	3 17 9	3 17 9	194 6 7

Amount of relief by extension of period.

"The Committee have had tables placed before them, which show the amount of relief which would be given to existing ratepayers by various extensions of the periods for repayment by the annuity system. Special attention is called to the following statement, showing the annual sum required to repay with interest a loan of £10,000 borrowed at 3 per cent. per annum for various periods not exceeding 60 years :—

Period for which loan is borrowed.	Annual sum to be paid.
Years.	£
10	1172
20	672
30	510
40	433
50	389
60	361

Effect of long and short period compared.

"It will be observed that every decade of extension affords a decreasing amount of relief. For instance, taking the figures in the

above statement, an extension from 10 to 20 years reduces the annual payment required by £500; an extension from 50 to 60 years affords relief only to the extent of £28. On the other hand each decade of extension increases, in increasing proportion, the risk of posterity.

"The following statement is also of much interest :—

Table showing particulars as to loan of £250,000 at 3 per cent., repayable at periods of 30, 40, 50, 60, 80 or 100 years.

Financial result of extension.

Period.				Annual payment of principal* and interest.	Total amount of interest paid at end of period.
				£	£
30 years	..	..	..	12,754	132,644
40 „	..	..	..	10,815	182,623
50 „	..	..	..	9,716	235,818
60 „	..	..	..	9,033	291,994
80 „	..	..	..	8,277	412,235
100 „	..	..	..	7,911	541,166

* Omitting fractions of a pound.

"It will be noted that if a period of 100 years had been granted for the repayment of the loan with which this statement deals, the ratepayers during that period would have paid in interest alone more than twice the amount of the sum borrowed; in other words, they would have been called upon to pay in respect of capital and interest more than three times the cost of the works for which the loan was raised.

"If 60 years had been the period allowed, it would have been found at the end of 34 years that the amount then remaining to be paid in respect of principal and interest equalled the whole original cost of the works.

"The result of the above figures, if taken entirely by themselves, would no doubt go far to prove the case for comparatively short periods for repayment, but it is neither wise nor just to place upon the shoulders of present ratepayers too large a portion of the burden of necessary or useful works from which succeeding generations will derive benefit. To do so would be to put a serious check upon the execution of such works.

"Much of the recent growth of local indebtedness is due to the undertaking by local authorities of work which is sometimes called 'Municipal Trading,' but which the Committee prefer to call 'Reproductive Work,' using that term as meaning work from which some pecuniary return is expected. It has not been thought to be within the terms of reference to attempt to ascertain whether, in point of fact, such work generally produces a pecuniary profit.

Period of 100 years.

See page 132.

Repayment in 60 years.

Effect of present periods.

Municipal trading.

Reproductive work.

See page 5.

First instalments.

"The Committee have considered the question of the proper date for the payment of the first instalment of the sinking-fund.

When should repayment begin.

"As a general rule, such instalment should be paid within a year of borrowing. The Committee, however, think that that requirement need not be insisted upon in the case of a loan for new works, from which a cash return may be reasonably expected when they are completed; and that, in that case, the payment of the first instalment may be properly deferred during some portion of the time allowed for the construction of the works. Such works, even if the return from them is not sufficient to make them profitable in the ordinary sense of the word, will be at any rate a lighter burden on the rates when completed than the instalments of repayment cause them to be during construction. Future ratepayers will have whatever return there may be from the works to assist them in the payment of instalments.

Easy terms for productive works.

"Some local authorities desire, in the case of reproductive works not only to defer the payment of the first instalment in respect of capital, but also to pay interest during construction out of the money borrowed. This would relieve those whose representatives decide to borrow for such works from immediate liability to contribute anything in respect of the borrowing, and should not in the opinion of the Committee be ever permitted.

Interest out of capital.

See pages 19, 114, 138.

"During the construction of works, the district has in many cases the advantage of the expenditure within it of much of the money raised by the loan, and this may fairly be taken into consideration as some compensation for the fact that nothing is earned by the works in the interval.

Tramways.

See pages 8, 47.

"The Committee have had their attention called by several witnesses to the maximum period of 30 years fixed by the Tramways Act of 1870 for the repayment of loans raised under the Act, and have been strongly appealed to, to recommend the increase of that period. The fact that the Light Railway Commissioners are empowered to sanction—and do, after full enquiry, sanction—periods for repayment greatly in excess of 30 years, was urged in support of this appeal. In view of the very remarkable progress which has been recently made in methods of mechanical traction, and the probability of still further developments in the near future, the Committee are not prepared to say that the periods which the Board of Trade are able, under the present law, to fix for the repayment of these loans for tramway lines and equipment are too short, and they do not recommend any alteration of that law.

Durability rather than desirability considered.

"It appears to the Committee that it is the duty of a department, in deciding the question of the period for repayment, as apart from the question of whether any loan should be permitted, to consider more closely the *durability* than the *desirability* of the works or purposes for which the loan is required, and to use very considerable caution in fixing such period. In deciding upon the probable duration of the useful life of any work, the officers of a department have to deal with

many points which are purely matters of prophecy ; they are not empowered to superintend the carrying out of the plans placed before them and have no adequate means of ascertaining or controlling the amount of attention given to the maintenance of the works when completed. Several instances have, however, been laid before the Committee in which the money borrowed under the Tramways Act of 1870 has been expended on subjects which have become worn out or obsolete before the loan in respect of those subjects has been completely repaid. The shifting of population, the alteration of accepted standards of efficiency, the variation of boundaries, the progress of science and discovery, exceptionally violent storms, and a variety of other causes, may upset calculations based upon even the widest experience.

"It appears, however, to the Committee that this caution as to the length of term granted for repayment might well be relaxed, if the other conditions of repayment were amended. Evidence has been produced that neither the departments nor Private Bills Committees consider, in fixing the periods for repayment, by which of the three systems described in paragraph 19 a loan is to be repaid. On the other hand the London County Council, in sanctioning the loans of Metropolitan Borough Councils, prescribes not only the term but also the method for repayment.

"The Committee recommend that the sanctioning authority should be empowered and required in all cases to fix the manner in which repayment is to be made.

"In cases in which the instalment system of repayment is enforced or adopted, the term for repayment may well be longer than in cases of repayment by the annuity system. Under the former system the amount required to be found in respect of the debt grows smaller every year, and the difference is available to meet the increasing maintenance charges or the interest on new debt.

"There is, however, one purpose for which sums of money amounting in the whole to a very large figure are borrowed every year, *i.e.* the payment of costs involved in the promotion of Bills by local authorities, upon which the Committee desire to make some observations with regard to the appropriate maximum period for repayment, both because they have received much evidence in connection with it and because the circumstances of each case of loan for this purpose are practically the same.

"It has been for some years past the invariable practice of the Police and Sanitary Committee, and for two years past the general practice of other Committees, to grant a period not exceeding five years for the repayment of the costs of promotion. Many town clerks and other municipal witnesses have suggested an extension of this period to the full term granted in respect of the permanent works provided for in the Bill in the promotion of which the costs are incurred. The Committee regard as a useful check, the existing strict limitation upon

Works worn out before paid for.

Conditions under which caution might be relaxed.

Rules of Met. Borough Councils.

Manner of repayment.

See page 136.

Loans for cost of promoting Bills.

See page 55.

See page 56.

the period for payment of costs which compels present councillors who promote, and present ratepayers who sanction, Private Bills to provide themselves a great part of the costs of promotion.

“The Committee recommend that the period of five years should continue to be the ordinary maximum in the case of these loans, subject to the consideration of exceptional circumstances.”

**Loan period for
promotion
expenses.**

See page 55.

**Main
purpose of rules,
to safeguard
ratepayer.**

See page 17.

It will be seen from the rules and recommendations given in the foregoing Report of a Parliamentary Committee that the main object in view throughout, has been the safeguarding of ratepayers present and future, who have to bear the burden of debt, which, though sanctioned by their representatives at the time of borrowing, imposes by statute responsibility for many years to come. It does not however follow, that such strict rules should be enforced in the case of money voluntarily subscribed for railways, or other undertakings. While the principle of depreciations is always a sound one, lenders are in the latter case free to invest their money on any terms that they may be mutually agreed.

Depreciation and Repayment of Debt.

Extracts from the Report published in 1907 of the Departmental Committee appointed in 1906 to enquire into the Accounts of Local Authorities.*

The main object of this enquiry was to ascertain the various systems on which the accounts of Local Authorities in England and Wales were then kept, to confer statutory powers on Local Authorities and to make rules and regulations accordingly.

See page 5.

(The numbers of the paragraphs are those in the Report.)

17. "It is customary for the local Acts under which certain undertakings of local authorities are established to make regulations as to the application of the revenue. The provisions usually take the form of requiring the revenue to be applied : (1) In payment of the working and establishment expenses, and cost of maintenance ; (2) in payment of interest on loans ; (3) in making the proper provision for repayment of debt ; (4) in extending and improving the undertaking, if the authority think fit ; (5) in providing a reserve-fund, if the authority think fit ; (6) in the transfer of the surplus to a specified fund or rate.

Revenue, how to be applied.

18. "The establishment of a reserve-fund is practically always optional, and the accumulated amount to be set aside is usually limited either to a specified amount or to one-fifth, or sometimes one-tenth, of the aggregate capital expenditure or of the amount of the capital account. The purposes to which the fund is applicable are generally (a) to answer any deficiency in the income of the undertaking, or (b)

Reserve-fund optional.

See pages 9, 30.

* London : Printed for His Majesty's Stationery Office by Wyman and Sons, Limited, Fetter Lane, E.C., and to be purchased also from Oliver and Boyd, Edinburgh ; or E. Ponsonby, Dublin.

to meet any extraordinary claim or demand in respect of the undertaking, or (c) for payment of the cost of extending or renewing any part of the works. Provision is sometimes made in local Acts for the establishment of a separate renewal-fund. In almost every case these funds are required to be invested.

**Separate
renewal-fund.**

Debt redemption.

"The payments out of revenue for the redemption of debt, are, however, usually considered to include adequate provision for depreciation; though a few authorities make provision for depreciation in addition to the redemption of debt, or set aside what they regard as ample depreciation and out of this provide the proper redemption charges."

Depreciation.

56. "Reference has been made, in general terms, to the powers possessed by local authorities of making provision for depreciation in respect of their undertakings. The question of how far the repayment of debt may be regarded as covering such provision is one which, as the evidence shows, has given rise to serious differences of opinion in many quarters.

**Capital only
temporary.**

"The distinguishing feature of the capital out of which the assets of the local authority are acquired is its temporary character. The capital is required to be repaid within a period which is supposed to be not greater than the life of the asset, the calculation of the period including a certain allowance for obsolescence and reasonable contingencies. When the asset is exhausted, further borrowing for its renewal is allowed according to the practice of the Local Government Board, to the extent of the provision which has then been made for the repayment of the capital."

**Assets
maintained till
end of charge.**

58. "The general object of provision for depreciation is to ensure that an asset which ceases to be of value will, at the time of its exhaustion, cease to be represented by a charge upon the revenue; and the question how far this purpose is met by sinking-funds and redemption funds depends mainly on the correspondence of the life of the asset with the period allowed for the repayment of the capital debt. It cannot be maintained that in any given case this correspondence will be precisely accurate. Such assets as lands or buildings may be entirely freed from debt at a period when their value is by no means exhausted and may even have increased; while on the other hand it is possible, or may even be probable, that as regards a new kind of undertaking the period allowed for repayment of debt might have been too long.

**Annual provision
for repayment.**

59. "But this matter is, perhaps, strictly outside the scope of this enquiry. The principle of annual provision for repayment of debt is based on statutory requirement; and for practical purposes of accountancy the general correspondence of the life of the asset with the period of the loan must be assumed. The existing system, though it may be wanting in complete accuracy, is founded on independent authority and prevents arbitrary or capricious fluctuations in the provision made year by year; and it affords at least as much certainty in its operation as could be gained by a standard rate of depreciation fixed by a central authority for general application.

60. "Although in general the loan repayments may provide sufficiently for depreciation, it may in some cases be a matter of prudence to make further provision, to a limited extent, to meet unforeseen expenditure or to equalise the cost of repairs falling on a series of years, or again to provide for renewals in cases where subsequent experience has proved that too long a period was in fact granted originally for the repayment of the debt. But in determining the amount of such additional provision each case must necessarily be considered on its own merits, regard being had to the user of the property, the conditions of its maintenance, and a number of special circumstances. In our opinion it would be quite impossible for a central authority to make regulations or to prescribe a standard or scale which would be generally applicable to such cases. As things stand at present, it may be open to doubt whether local authorities have power to provide definitely for depreciation beyond the amount and the scope of the reserve-funds permitted by their local Acts."

**Further
provision
made.**

By reserves.

See pages 9, 14, 30.

*See Leeds Act of
1905.*

79. "The repayment of debt, so far as it goes, may properly be regarded as provision for depreciation ; but it is possible that the period allowed for repayment may be excessive, and therefore in some cases further provision for depreciation may be necessary."

See page 11.

The Report of 1907 from which the foregoing extracts have been taken, while it is evidently directed towards an equitable adjustment or compromise in arriving at fair periods for public-loans, demands certain qualifications. There are those who urge that as each generation should bear its own burdens, it would be unfair to accumulate from current revenue a fund for renewals ; and they base this view on clause 57 of the Report without giving equal weight to clause 60 which allows such a provision, and this latter clause justifies the view which is urged in an earlier chapter.

See page 11.

Local Authorities and Sinking-funds.

In June 1909 the Report of the Select Committee of the House of Commons appointed to inquire as to the application of Sinking-funds in exercise of borrowing powers by local authorities was published as a White Paper [193]. The conclusions arrived at by the Committee have been summarised as follows :—

- Utilisation of sinking-fund.** 1. "The principle of utilising sinking-funds (including loans funds and redemption funds) for purposes for which local authorities have borrowing powers is, if properly safeguarded, financially unobjectionable; and the power of so using these funds is undoubtedly a great advantage, inasmuch as it affords a convenient and economical method of exercising new borrowing powers.
- Stock extinguished.** 2. "In those cases in which the stock is required to be extinguished at a fixed date, your Committee are of opinion that any amounts withdrawn from the fund should, as a general rule, be replaced by that date, and that any departure from this principle should require the previous consent of the Local Government Board.
- Regulation of Local Gov. Bd.** 3. "While satisfied that the ordinary method, prescribed in local Acts and by the Stock Regulations of the Local Government Board, of utilising loans funds and redemption funds, set aside for the repayment or redemption of loans raised by the issue of stock, is theoretically free from objection, your Committee feel a preference for the system prescribed by the London County Council (Money) Acts, in so far as that system involves the approval of a Government Department as a necessary precedent to the exercise of the power, and requires that all moneys used from the funds must be replaced before the expiration of the life of the stock. At the same time we recognise that this last condition may operate disadvantageously during the latter part of the life of the stock.
- London County Council (Money) Act.** 4. "With regard to the operation of the system prescribed by the local Acts and Stock Regulations, your Committee are of opinion that, while in the majority of cases there may be no real objection to the transfer of stock at par value, nevertheless, there should be some limitation to prevent the transaction working unfairly as between
- Transfer of stock.**

different accounts; and we suggest that with this object the Local Government Board should take such administrative action as we have previously indicated.

Subject to Govt. control.

5. "Your Committee consider that a loans fund set aside in respect of loans raised by irredeemable stock may, subject to proper restrictions and conditions, be utilised for borrowing powers.

Loan fund may be utilised.

6. "With regard to sinking-funds set aside in respect of loans raised on mortgage, the funds should not be used for borrowing powers where the mortgage earmarks the borrowing power under which the loan is raised; and where a loan is by the mortgage charged on specified rates or revenues, the sinking-fund should not be used for any borrowing power under which the loan is required to be charged on different rates or revenues.

Limitation to use of sinking-fund.

7. "Sinking-funds set aside in respect of loans raised under and subject to the provisions of the Local Loans Act, 1875, should not be used in the exercise of borrowing powers.

8. "Returns should in every case be made to the Local Government Board clearly showing

Returns must be made to Local Govt. Bd.

i. The amount of the sinking-funds, loans funds, or redemption funds invested, and the securities in which investments have been made.

ii. The amount of stock or debt cancelled; and

iii. The amount applied in the exercise of borrowing powers.

"The accounts should be audited by an independent Auditor, who should make a special report in every case in which he is of opinion that there has been any irregularity in the transactions of the local authority in regard to the use of the sinking funds, or to the provision made for the repayment or extinction of debt.

Independent Auditors.

9. "The terms of prospectuses should be strictly adhered to, and reasonable information as to the contributions to and management of the sinking-funds should be placed at the disposal of the ratepayers of the locality, and, where stock has been or is proposed to be issued, of the Stock Exchange."

Terms of prospectus must be adhered to.

PART II.

VALUATION.

CHAPTER VIII.

DIFFERENT KINDS OF VALUE DEFINED.

“VALUE” is a term which has different significations according to the circumstances in which it is used. Thus, there may be the value to a vendor of a property taken by Compulsory purchase ; there is the value as between Partners of a factory or business in full operation, or of the same factory as a “Going concern” to a purchaser who will have the advantages of the established management and connection ; there is the Rateable value ; there is the value of the factory as a whole if it has Stopped working ; the value of what has been destroyed by Fire may have to be appraised ; there is again the value of the Land, Buildings, and Plant, if dismantled and sold separately ; and finally there is the value, generally the lowest of all, obtainable by a Forced sale. These various kinds of value are referred to in the succeeding chapters.

The value of anything is sometimes defined as that which it will fetch ; and in the sale of a factory, the price at any particular time will, if there be freedom on both sides, depend not on the original cost or on any arbitrary standard of value—although of course the cost at which a similar factory could be built and equipped is an important consi-

See page 156.

See page 160.

See page 168.

See page 188.

See page 195.

See page 190.

See page 194.

**Price, how
determined.**

Supply and demand.

deration—but on the competition either of buyers or sellers, in other words, on the supply and demand. The element of freedom is wanting in a compulsory purchase; there, the basis of price is the value to the seller, who is compensated for what he loses, and not for what the buyer gains.

Value depends on earning power,

and on past profits.

The real basis of value, however, which generally guides a purchaser, is the estimated earning-power, or the net revenue, past, present, and prospective, so far as it can be ascertained. From this point of view there is often more scope for difference of opinion than would at first sight appear. The rate of profit in the past is a primary basis, but this is not conclusive. A purchaser may see his way to improved methods, to an extended trade, to a better utilization of the plant or site, and so to greater profits. On the other hand, past profits may have been due to special knowledge of the proprietors; much may really have been owing to skilled management, which, if obtainable at all in the future, may require the payment of considerable salaries taking precedence of profits, or the payment of directors' fees. Private partners may not have debited the concern with salaries, but, if they are selling the concern to a company, may claim them when they serve as managers or directors.

Expenses of management.

Gross income and cost of maintenance.

Again, the profits of the past may have been due to favourable circumstances which have been altered; or may have been earned under a limited or wasting tenure; or the past income as shown by books of account may have been unduly swelled or diminished by a wrong estimate of depreciation. The net or divisible profits may have been kept low by a too-liberal writing-off for wear-and-tear; and a new proprietor may see his way to a higher revenue by diminishing this annual charge. On the other hand, if the value of plant be taken too high, the gross profits will in the future have not only to bear the cost of a proper and

See page 123.

higher rate of depreciation, but may have to pay off, in extensive repairs and renewals, an accumulation of past neglect.

There is no fixed rule for the percentage of profit which will induce capitalists to embark in a manufacturing trade. The regularity of the trade, the chances of occasional high profits, the accompanying risks of loss, the locality in which the business is carried on, and the indirect advantages or drawbacks attending it, are all circumstances which may tempt or repel different persons. It may be said, generally, that the tendency of profits in Great Britain has been downwards, and just as the return on the more secure investments in Government funds or railway debentures is by the growth of accumulated capital ever becoming lower, so in a different range, but for the same reason, the profits of manufacturers have tended to diminish.

On the other hand, as during a period of depression certain factories become quite unprofitable or losing concerns and are closed, the recollection of such unprofitableness disinclines investors from embarking in similar undertakings when trade improves, so that the surviving concerns which have been maintained in working order reap a greater profit because the competition is less than formerly. Even if a succession of good years induces competition, so much time is spent in equipping and starting new works that the older undertakings may often reap all the profit of the renewed demand before the new works are ready.

While, however, such considerations have full weight with a prudent purchaser, the selling value of a factory depends greatly on the briskness of trade at the time of sale ; and a seller may legitimately take the advantage of higher prices that are ruling, and of the consequent inclination of purchasers to invest in such property. When the profits have been high, attention is directed to the trade in question ; capitalists are inclined to embark in it ; there

No fixed rules for rates of profits

Profits tend to diminish like interest of money

Previous bad years lessen present value.

See page 150.

Price determined by briskness of trade.

Times of depression.

are more buyers, and competition is favourable to the seller. The reverse occurs during a time of depression, and then, if a sale must be effected, the buyer has his opportunity.

Readiness for use enhances value.

See page 75.

If transferred at a time of high prices, the selling value depends mainly on the readiness of the factory. If because of high prices, capitalists begin to build new works, it will often be found that, by the time they are ready, prices have fallen, probably because new factories have increased the productive power; or even because the mere prospect of new factories induces the existing manufacturers to lower their demands. If, however, a factory or any other undertaking can be bought in full working order, it may be profitable to pay a high price for it, so as to reap the immediate advantage. In the lace-trade, for instance, the whole cost of the machinery may be recovered in one or two prosperous years, and therefore at a time of great demands and inflated prices it is not the intrinsic value of the machines which determines their price, but their immediate readiness for use.

High purchase-price repaid by profits.

Collieries.

See page 105.

So in the coal-trade, when prices are exceptionally good, the owner or purchaser of a colliery in full working order may reap such profits as will recoup him for a high capital outlay; but if the profits so gained tempt others to re-open a disused colliery which has been allowed to fall into disrepair, or which is flooded with water, probably by the time there is coal to sell, prices will be low.

High prices are only transient.

When the nominal or current prices for any product of manufacture are very high, it will generally be found that these high prices are being paid only in a small proportion of cases, because the demand has outrun the supply; and it is because most manufacturers are already occupied with contracts taken at old rates that famine prices can be secured by the fortunate few who are free to undertake

Famine prices.

new work. And directly the others get rid of old contracts and are ready to reap the high rates, their very readiness causes the high rates to vanish. On the other hand, it is in a time of deep depression that prudent purchasers will often find the best opportunity for buying or building a factory.

**Factories cheaply
bought in dull
times.**

The circumstances which determine the Value of a factory are numerous and varied, but they may be broadly divided into two classes, general and particular. The former are of a wide kind and relate to the amount of Capital required and the manner in which it is to be provided; also to the Locality of the factory, the Tenure under which it is held, the burden of local Rates, the cost of Labour and the facilities of Transport as compared with other districts; and to any other advantages or drawbacks which the district or site possesses for the trade in question. The second class of circumstances are those pertaining immediately to the Factory itself, its Buildings and Plant.

**Value of a factory
how determined.**

Locality.
See page 208.

The modern tendency towards large factories in which labour-saving processes are extensively adopted, increases the amount of Capital required for profitable working; and in valuing a factory for a new-comer, there is an opportunity for reviewing the past policy in regard to the purchase of the machinery for such processes.

Capital outlay.

Labour-saving plant affording great advantages when in use will be remunerative or otherwise according to the frequency of its employment. As examples, in an iron-works or factory a slow hand-crane in constant work may be a cause of daily loss not only in wages and repairs, but in waste of time. If such a crane be scrapped or sold for 50*l.*, and a new quick-moving crane worked by power installed at a cost of 500*l.*, the outlay may be entirely recouped in one or two years. If, after a few years' working, trade becomes dull, and the earning of interest on

**Labour-saving
plant.**

**scrapping of
obsolete
machines.**

**Outlay for new
machines soon
repaid.**

capital difficult, it would be unfair to treat as a burden the past outlay on the crane without taking credit for the savings already effected, the profit so earned, and for the permanent saving in time which, even in dull periods of trade, its use allows. Excessive timidity in anticipating adverse conditions would hinder all enterprise. If the past savings, instead of having been all divided as profit, have been partly applied to a liberal system of depreciation, and the substitution out of such a fund of new plant for old, the benefit of the original outlay remains, although there is no increased burden of capital to the present occupiers. The value may prove to be permanent and should be paid for by a new-comer.

Timidity.

Past savings.

Writing down
of value.

Discrimination
needed for
new outlay.

Outlay should
not be measured
by dull trade.

Costly plant may
be a cause of
failure.

As a contrary example, a large or special machine showing great economy when at work, may be so seldom required as not, by its occasional savings, to pay interest on the capital outlay and a proper rate of depreciation. In this case it would really have been better to retain an old and slower machine. As an extreme example, if an operation of lifting a very heavy weight occurs only once in five years, it may be cheaper to erect a pair of shear-legs on each occasion even though the operation itself is much more costly than with a properly equipped crane. In short, while on the one hand it would be fallacious and unfair to judge all capital outlay by the measure of dull times, on the other hand, costly appliances may, as above described, sometimes prove a cause of loss rather than of gain. For instance, a factory may be constructed with an output capacity of one ton of product per week for each 100*l.* invested, as compared with existing and smaller factories which have cost 120*l.* per unit of output. Moreover, the labour in the new factory may be only 3*l.* per ton of finished product as compared with 3*l.* 10*s.* in the older factories. But it is possible that these low costs can only be maintained when the factory is in full work, and that when it is only

employed at one-half or one-third of its capacity, the proportions may be altered. The expensive labour-saving machinery must remain as a burden which cannot well be got rid of, while in the smaller factory, relief may be found by discharging workmen. The expensive plant of the new factory may eventually repay those who can afford to wait; but without a large trade, the burden of capital, especially if some of it be borrowed, is a frequent cause of failure. Ultimately, the profit is reaped by those who take advantage of the failure, to buy the factory for much less than it has cost; and instances occur of a second or even a third change of ownership before the capital can be brought down to a sum on which the earnings will allow a profit. The real provision against such a loss is, when installing a costly improvement, to write off a substantial amount the first year, and to bring the balance within the action of a general depreciation fund for the future.

**Large factories
burdensome when
only half
employed.**

Borrowed capital.

**Reduction of
capital.**

See page 17.

Not only the capital sunk in the factory itself, and in the purchase of goodwill, but the Working Capital which the business will require, is a question of great importance as determining the value of the undertaking to a new-comer. There is a wide range in the proportion which liquid capital bears to sunk capital in different trades. In some the operations of manufacture are speedy, the profits are earned quickly, and the turnover of capital is correspondingly frequent. In such cases, if the cost of material form the chief part of the total outlay, a large business may sometimes be conducted with a small capital, because the material need not be paid for till the finished product is sold. But Wages need ready money, and hence it is that when the cost of labour forms a considerable proportion of the whole, a large liquid capital is necessary, and profits must correspond. Thus, while a miller, or a maltster, or a sugar-refiner may sell his products within a month of purchasing his wheat or barley or sugar, and at a price

Working capital.

Quick turnover.

Wages outlay.

Liquid capital.

only slightly above the cost of the raw material, a maker of locomotives may have to pay for his iron, steel, and copper many months before he obtains repayment; and moreover during that period will have had to pay in weekly wages three times the value of these materials.

Borrowed money.

See page 189.

Risks may be avoided.

See page 114.

The proportion which Borrowed Money may safely bear to the capital of the proprietors is also a matter of great importance, and it obviously depends on ever-varying circumstances for which no rule is possible. The risk of failure from this cause may be minimised by using only those forms of borrowing which, though conceding a higher rate of interest or a preferential share of profit, do not involve any sudden demands for repayment, rather than by borrowing at a low rate, with the risk of repayment being demanded at a short notice.

Tenure limited by lease.

See page 35, 36.

Sinking-fund.

See page 132.

The Tenure of a factory or other industrial undertaking may be limited by lease of buildings or land, or by the terms of a charter or concession, or by the wasting nature of the property, as in the case of mines already referred to. If the earnings, before being applicable to the payment of interest or dividend, have to bear the burden of a sinking-fund for a recovery of the capital, it is obviously the net income alone which must form the basis for calculating the value. Manufactories dependent for their profits on patents or other monopolies of a temporary kind have a limited value accordingly. But if the vendors have already established a sinking-fund according to some system of Assurance, the annual premiums to maintain the Policy may be a much less burden on the purchaser than if the latter had to inaugurate a sinking-fund. The handing over of such a policy by the vendor when transferring the business will go far to make it equal to a freehold or permanent undertaking.

Leasehold assurance.

See page 125.

Locality.

See page 208.

The question of Locality is dealt with in a separate chapter, but it may be remarked here that in dealing with

an existing business the situation of the factory may usually be regarded as no longer an open question, and any advantages or drawbacks which the factory may possess in this respect, though they may increase or diminish its value, cannot be altered. This is so in the great majority of cases ; but when a business is valuable for other reasons—when, for instance, there is an established organisation, an experienced staff, as well as a reputation or connection among customers—it may prove remunerative to buy such a business, if only to remove it wholly or partially to a different locality. Numerous engineering works and other factories have been removed from London to smaller towns, generally on the northern lines of railway or on river sites. Land, labour, coal and iron are cheaper, while the cost of carriage to London as a port may be little more than that paid formerly for cartage and dock dues. Such a change is of course encouraged if the existing factory, or the site, has a realisable value for other purposes ; and the feasibility of a change in case of need is of importance where a factory is held on a lease soon to terminate. The value of a site may, however, be diminished by the outlay necessary for adapting it to a new purpose. Land, if encumbered by useless buildings, is not always saleable at its original or book value.

Factory may be removed.

See page 63.

See page 64.

CHAPTER IX.

THE VALUE OF A FACTORY AS A GOING CONCERN.

IN the purchase of a factory as "a Going concern," or in its valuation on this basis, circumstances have to be considered which do not always present themselves in the annual stock-taking. The Capital value as it stands in the books of account does not necessarily represent the Real Value, which, when measured by the past, present, or prospective Earning Capacity of the undertaking, may be greater or less than the nominal or assumed value. A purchaser is the more anxious to be assured on this point because there is the natural conjecture that if the undertaking were profitable the proprietor would not desire to sell it. An explanation why the factory is offered for sale is generally therefore a preliminary step in the transaction.

Value measured
by earning
capacity.

Reasons for
selling required.

Compulsory
purchase.

In regard to Compulsory Purchase, where the purchaser rather than the vendor desires the transfer, it is the value to the vendor which determines the price. For as in the case of purchase by a railway company or municipality who wish to occupy the site, much of what the vendor loses may have no value to the buyer, as for instance the connection or goodwill, which may be jeopardised or lessened by removal. There is the marked difference between compulsory purchases of this kind by public bodies and purchases by traders, that the seller is free to commence working elsewhere and retains all the goodwill he can in removing to new premises.

Seller retains
goodwill.

See page 59, 162.

Loss by removal.

It is seldom, except in a retail trade, that much of the goodwill is lost by a mere removal to another and adjacent

situation ; but a factory-owner is entitled to Compensation for the expense and trouble of Removal, for the Damage caused to plant and stock, for the cost of Adapting his plant to new premises, for the Storage of his machinery and stock till he has obtained a new site, and for the Loss of Profit till he can recommence working. Not only the past and present rate of profit must be taken into account, but the likelihood of a prospective increase ; and the seller is entitled to the capitalised value of what he is losing, subject to a deduction for what he may be likely to earn under altered circumstances. When all these points have been taken into account and a total sum arrived at, the vendor is entitled to a further sum for the compulsory nature of the sale ; and by practice and precedent in Great Britain 10 per cent. on the total is the amount which judges or arbitrators generally allow, and which sellers always claim.

Compensation for damage.

Prospective profits.

Compensation for compulsion.

A very different basis of value obtains in the sale of public works such as town tramways, markets, and electric-lighting undertakings, where the municipal authorities in granting the original charter or concession, have reserved the right to acquire the undertaking on prescribed terms. Although, in foreign countries, concessions for limited periods of years have long been customary—railways, gas-works, and waterworks being established on such conditions—it was in Great Britain a somewhat new departure when the system of optional purchase was inaugurated for town tramways.

Sale of public works

to municipal bodies.

Concessions for terms of years.

In the 44th section of the London Street Tramways Act, 1870, it was prescribed that the Local Authorities might, on the expiration of twenty-one years from the construction of the tramway, “require such promoters to sell to them their undertaking, or so much of the same as is within such district, upon terms of paying them their value (exclusive of any allowance for past or future profits of the undertaking, or any compensation for compulsory sale or other consideration whatsoever) of the tramway, and all lands, buildings, works,

London tramways.

Option of purchase.

materials, and plant of the promoters suitable to and used by them for the purpose of their undertaking within such district, such value to be, in case of difference, determined by an engineer or other fit person nominated as referee on the application of either party."

**First purchase
under these
conditions by
London County
Council.**

In the year 1891 the London County Council resolved to exercise its right to purchase about $4\frac{1}{4}$ miles, or nearly a third of the company's system, which had been twenty-one years in existence. It was endeavoured to arrange a price, but as the shareholders in the company concerned were unwilling to accept a value based on the worn condition of the plant, or to forego the value of the goodwill and the preliminary outlay on the formation of the company, a referee or umpire was appointed to adjudicate. As the first occasion on which such a principle of valuation was to be applied, considerable interest was taken by all those who had embarked capital in similar undertakings.

The umpire, appointed under the Act, issued his award in March 1893, as follows:—

Terms of award.

I determine and award that the sum of £64,540 is the value of the purchased tramways and the works thereof (other than such works as are comprised in the annexed agreement), exclusive of any allowance for past or future profits of the undertaking or any compensation for compulsory purchase, or other consideration whatever, except the consideration of the values to the Tramways Company or to the County Council, measured by what it would cost either the Tramways Company or the County Council to establish the purchased tramways if such tramways do not now exist, but taking into account a proper deduction in respect of depreciation. And, accordingly, I determine and award that the value of the purchased tramways, and of all lands, buildings, works, materials and plant of the tramways company, suitable to and used by them for the purpose of the undertaking of the purchased tramways, as such purchased tramways, lands, buildings, works, materials and plant are defined by the annexed agreement, is the sum of £64,540, together with the further sum or sums payable under the annexed agreement, and that such sum or sums together form the "then value" of the premises within the meaning of the 44th Section of "The London Street Tramways Act, 1870." And I award and direct that the County Council do pay to the Tramways Company the costs incurred by the Tramways Company of, and incidental to, the reference, and this award, including the proper expenses of the

**Basis of
valuation.**

**Costs of the
award.**

**Preliminary
Expenses.**
See pages 55, 120

Tramways Company of, and incidental to, negotiating, preparing, and executing the annexed agreement.

The agreement referred to in the above award provides *inter alia* for the Council acquiring certain depôts for sums in addition to that awarded, and also provides for the Council purchasing cars and equipment at a price to be determined "by some person practically acquainted with the value thereof."

Somewhat the same principle of compulsory expropriation was embodied in many of the Acts authorising Electric-lighting undertakings, the same reason prevailing, that it is to the general advantage that the roadways of a city shall be wholly under the control of the local authority, and that private companies shall not possess proprietary rights of any description in the public highway. But while this principle has been accepted as equitable, the length of term is a question for arrangement, and in the case of electric-lighting a longer period within which the right of purchase may be exercised has been allowed, than was at first proposed.

Since 1890 the conditions of purchase have become of less importance, because Corporations and other Local Authorities have acquired most of the private undertakings in towns, and monopolise the supply of electricity for lighting and power, and while using the current for municipal tramways, sell also on reasonable terms to factory-owners. The terms under which money can be borrowed for such purposes on the security of the rates have been already referred to.

Outside the cities, Electric-supply companies have established large generating-stations, and, under statutory powers, sell current at moderate prices not only to collieries and factories, but also to small tramway and lighting undertakings within their district. Such supply companies generally obtain a right-of-way for their main-cables

**Purchase of
electric-lighting
works**

**by local
authority.**

**Within a limited
period.**

**Conditions
changed since
1890.**

See page 12.

**Electric-supply
companies.**

Dismantling.*See page 192.*

dismantling; and loss in this direction may go far to balance the natural advantages of the site. A purchaser who intends to continue the business will be mainly guided by the earning power of the factory, and will not pay much regard to a prospective and problematical increase in the value of the land.

Excessive price paid for site.*See page 64.*

As an opposite case, a high price may have originally been paid for the land because of anticipated advantages which have not been realised; and an investigation may prove that for the particular purpose of the factory the book value of the land is excessive and must be diminished. It may be that an undertaking efficient in all other respects has been so burdened by the excessive capital account from this cause, or from a high ground-rent, with consequent high rating, that it has not proved profitable, and a reduction in capital or rental value may be the condition of future prosperity.

Heavy burden of ground-rent.*See page 171.***Factory sold as a going concern.****Goodwill.***See page 61.*

In the sale of a factory as a Going concern, if not only are there orders on the books, but also a list of customers who regularly buy at prices which afford profit to the manufacturer, in other words, if there be a "Goodwill," it is obvious that a certain live value is given to the undertaking, which it would not possess as a mere aggregation of buildings and plant. The special value from this cause must obviously vary. It may be that better prices are obtainable than in other and less known undertakings, or that in dull times the factory is likely to be fairly well employed when others are idle. And as, in calculating the net revenue obtainable from a business, it is the Average Profits which have to be considered, the probability of constant employment is of great importance. Advantages of this sort are not always directly represented in the books of account nor in the capital accounts of the partners, but they have a value to new purchasers as assuring a regularity of income. As, however, the permanence of such favourable conditions

Goodwill valued by average profits.**Value of goodwill not shown in accounts.**

depends upon many future and unknown contingencies, their capitalised value must be calculated moderately.

The fact that a business is old-established, while going to prove a connection among buyers, may suggest also that the plant may possibly have become old-fashioned.

Old-fashioned plant.

The Value of Goodwill depends to a considerable extent on the amount of capital required to carry on the factory ; for, however well a business may be established, yet, if in order to obtain the promised advantages, a large amount of capital is required, the addition which the goodwill may be expected to make to the average revenue will be depreciated, even if interest on capital be deducted before reckoning the annual revenue. The plan is often adopted in the sale of a manufacturing business, of stating no separate price for goodwill, but of valuing the plant liberally on the assumption that profitable employment in the future is assured, while sometimes a premium is paid in addition for entering on the business.

Value diminished if large working capital required.

See page 153.

Premium paid on valuation.

Goodwill, whether paid for directly or not, generally represents much past expenditure in the making of the business, and this, though it may have been prudently written off by the proprietors, as being represented by no material assets, may yet be legitimately charged to new-comers, who will reap the advantages of it, if at the time of re-sale the reputation and profits of the concern have been maintained. Where, for instance, such goodwill has been partly created or extended by advertising or other form of publicity, the past expenditure for such purposes must receive consideration. On the other hand, the value of goodwill to a new-comer must not be reckoned without taking due account also of the future expenditure which will be required for maintaining it, and also as to how far the personality of the vendor was the cause of success, or his power and readiness to influence business from other concerns which he has controlled. Such a link may

Goodwill valuable though written off.

See page 58.

Advertising.

See page 60.

Past, present and future.

How far can vendor's influence remain.

Dismantling.*See page 192.*

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**Goodwill valuable
though written
off.**

See page 58.

Advertising.

See page 60.

**Past, present and
future.**

**How far can
vendor's influence
remain.**

be severed when he is no longer interested in the business he is selling. Obviously only that which can be transferred to the buyer must be considered. Where goodwill is separately valued it seldom exceeds from one to two years' purchase of the net profit, after deducting 5 per cent. interest on the capital employed in the business.

The reckoning of goodwill as a specific asset justifying the prolongation of a sinking-fund period is a new feature in Municipal undertakings. The advantage which a monopoly may give to the locality was no doubt an important element in obtaining the original statutory powers, but it may be argued that the same asset is being used a second time. The question is associated with the view that municipalities have a right to carry on profit-earning departments and not merely to provide at cost-price for the wants of the community.

In the formation of a Joint-stock Company to take over a business heretofore carried on as a private firm or partnership, there are necessary legal charges and other outgoings that may be summarised as promotion expenses. The vendor should pay these, and take the expenditure into account in the price he has to receive. Sometimes, however, it is not convenient to augment the price to allow of this, and the expenses are met by including them in an additional charge to the purchaser, entitled goodwill.

If all that is assured to the purchaser is a normal profit, and the business is one not likely to increase, then a small sum, not exceeding one year's net profits after paying interest at 5 per cent. on the actual capital to be embarked in the concern, can be fairly claimed, and may be deemed a sufficient premium for the advantage of acquiring a "going concern." The income earned in the past must, however, be shown to have been a real profit to justify any premium whatever, and it must be clearly shown that due depreciation has been charged in the past before the word

Limit of value.

Municipal goodwill.

See page 60.

Profit-earning departments.

Joint-stock companies.

Promotion expenses.

See page 139.

Only normal profits assured.

Value as a going concern.

Past depreciation.

profit has been applied to the balance in the profit and loss account, or until a new valuation of the plant has superseded any question of "writing down." A premium for goodwill restricted in this way will, on investigation on these lines, hinder the inclusion of excessive promotion expenses as above referred to.

In regard to Monopolies arising from Patents, where a manufacturer is merely a licensee, his advantage depends upon the amount of competition by others who also have licences; and sometimes such competition is as severe as if no patent existed. But when the manufacturer has a monopoly of a patent, his profits may be large, and indeed are limited only by the demand of the purchasers. The cost or purchase price of a patent must be written down as the term of it approaches completion; but even when the patent monopoly is at an end, the manufacturer whose name is associated with the goods, and who by years of use has his plant and processes well adapted, can often work more cheaply than his competitors and retain in this way a partial monopoly for many years. In the case of a widely known and important invention, like that of Bessemer steel, ^{Edison's} Edison lamps, Bell telephones and Parsons turbines, the advantage does not entirely end with the term of the patent, because, although outsiders are ready to use the invention immediately, the original patentees, so long as they continue to manufacture, undoubtedly obtain some preference because of their original connection and presumed knowledge. In fact, the patent rights have merged into goodwill which remains with the purchaser of the business, if the name of the firm is retained.

A Trade-mark may give a more permanent monopoly to the maker than a patent right limited to a term of years, because while, after the term expires, the right of manufacture becomes common, the monopoly of the trade-mark will remain. It is therefore generally advantageous to

Value of patent right limited.

See page 99.

Valuable monopolies.

Monopoly may outlive patent.

Examples.

Patent rights merge into goodwill.

Trade-marks.

See pages 61, 110, 165.

Value, how limited.

establish a trade-mark or brand while the patent is in force. Obviously, however, its value will continue only so long as the seller can induce the belief that his mark or guarantee is a more trustworthy certificate of quality than any appearance of similarity which may be given by others. Where the trade-mark is recognised in foreign countries, it often is valuable to the proprietors long after its value has lapsed in the country of manufacture.

Value of trade-mark abroad.

Sometimes a Monopoly depends neither on a patent nor a trade-mark, but on Secret processes of manufacture, or on the skill and experience of a limited number of workmen. The permanency of such a monopoly will then of course depend on the retention of such workmen, or the transmitting of their knowledge to others. The goodwill of a business may be entirely lost to the successors where the vendors have failed to leave behind them a record of their methods.

Secret processes.

Vendors must give full information.

Patentees as manufacturers.

Causes of non-success.

The profits arising from the manufacture, and the advantages which may be expected to remain to those who have acquired experience in it, even after a patent has expired, sometimes induce patentees who are not manufacturers to establish a factory for carrying out their invention. This, however, frequently results in loss, for the functions of inventor and maker are quite distinct. The management of a factory as well as the operations of making, buying, and selling require a special commercial experience; and the manufacture is generally carried on best by those who have other and kindred operations or branches of trade which utilise the same plant and organisation.

Depreciated plant may have revived value to new-comer.

See page 123.

The capital accounts of a factory which has been successfully managed, should show in the books a value less than the real value to a new-comer who is to continue the business. Past depreciation if applied prudently should have been on the right side in providing for estimated wear-

and-tear, and if there has been a separate reserve-fund, have provided for contingencies. It is one of the advantages of a separate reserve that it can be dealt with as a tangible asset, and not necessarily transferred to the new-comer. Partners, as between themselves, may have prudently written off on this basis, yet if when the property is transferred, these contingencies have not occurred, the future risks no longer concern the vendors. For instance, the value of patterns, drawings, and other accessories may have been written down to little or nothing, because of a possible cessation in their usefulness, but if these accessories are still in use, the value to a new-comer revives, and a new departure may be taken in the way of depreciation.

Reserves form tangible asset.

See pages 99, 167.

In view of certain scandals in the over valuation of private undertakings sold to joint stock companies a Bill was introduced in the Parliamentary Session of 1888 for amending the laws under which limited-liability companies are formed, and amongst other reforms it was proposed that in any sale of a manufacturing undertaking, past depreciation should be inquired into and notified. No enactment, however, was made. Other restrictions and precautions for the safeguarding of investors were included in the Companies Act of 1900, which should be carefully followed by all who desire to sell a factory or business to a limited-company, and obviously also by those who are disposed to buy. If the vendors offer to take part payment in debentures, the terms of these liens and the names of the trustees should be carefully considered. Full information on these points has to be furnished to the Registrar of Joint-stock Companies, and may be perused by anyone on payment of one shilling.

Past depreciation inquired into.

Safeguarding of investors.

See also page 205.

CHAPTER X.

THE RENTAL AND RATEABLE VALUE OF FACTORIES.

IN the valuation of a factory or other industrial undertaking as a going concern, it is sometimes desirable to arrive at its Rental Value. Different classes of buildings are supposed to give a certain return in the form of rent or interest on capital, or annual profit according to the trouble and risk attending their maintenance and management, and whatever may have been their original cost, purchasers or tenants will only value them on this basis. Owing to local changes and the vicissitudes of trade, the rental value may be much more or less than that which was in view and obtainable when the buildings were erected.

Rental value.

Interest required
varies with risk.

See page 6.

Rateable value.

See page 171.

Occupying
owners

allow for rent as
interest on
capital.

The Rateable Value also depends to a large extent on the same considerations, but, as will be seen, does not, even when there is a tenant paying rent, bear any fixed relation to the actual rent that may be received.

Dwelling-houses and shops are usually let to tenants, and the amount paid in rent is, to the occupier, a distinct charge, which can be kept separate from all other outgoings. But in the case of Factories, the buildings are more often the property of the occupier, who in his annual accounts may either set down a sum for rent, or, including together all his outlay for land, buildings and plant, may charge "interest on capital" on the whole; all of the net earnings which remain, after a sum has been set apart for depreciation, being treated as profit. Where one partner

is the owner of a factory, a sum may be paid or set apart as rent; where the partners are equally the owners, "interest on capital" is the usual method.

In the case of a factory where the occupancy is assured for a term of years, and the rent is a first charge on profits, the rate of interest, to be an appropriate rate, should, so far as it applies to the buildings, be equal (including the depreciation rate) to the rental which a landlord who owned but did not occupy a factory would let it for. For assuming that in either case the occupier, whether tenant or proprietor, did the repairs and paid for insurance against fire, then if $1\frac{1}{2}$ per cent. per annum were reserved for depreciation, this with 5 per cent. interest would be equal to a rent of $6\frac{1}{2}$ per cent. on the value. A capitalist, however, will seldom build houses on such a narrow basis if he looks for a return on rent payable by a tenant, for there are other risks, notably that of the house being occasionally unlet. But when a factory is built for the use of the owner, then such a proportion is a fair one, as the owner will naturally have built a factory exactly appropriate to his wants.

In certain trades where small factories or workshops are let out to working tenants there is also a need for a higher rate of interest or rent than $6\frac{1}{2}$ per cent. on the cost; but this is generally because of special risks, such as of having the premises unlet in dull times, or of the occasional non-payment of rent, or of expenses in collecting it. There is in that case no assurance of a permanent tenant, for there is a more restricted demand for such special buildings than there is for a dwelling house. There may be risks of changes in trade which might render the factory less suitable, and therefore less secure as an investment, than ordinary house property. These circumstances do not weigh with equal force in the case of an occupying owner, but when they are incidental to the property, allowance would be made

Partner's rent.
See page 113.

Gross rent must allow for depreciation.

See page 127.

Houses unlet.

Factories let to working tenants.

See page 45, 46.

Rateable value.*See page 171.*

for them in determining the net rental value, just as in assessing for rating purposes.

Power included in rent.

*See
Electricity,
page 89.*

In some manufacturing towns, factories or blocks of workshops are let out on rent; sometimes power sufficient for one or more looms or other defined machinery is included in this rent; sometimes a constant power is specified, or that which can be transmitted by a shaft or belt or pulley of certain size, running at a certain speed. In Switzerland and other countries where rapid streams or those from neighbouring hills are available, hydraulic and electric force have been sold to factory-owners and occupiers at an annual rate. Hydraulic force (water at a pressure of about 700 lb. per square inch) has been distributed and sold in London and other towns since 1880. Since 1900 Corporations and Power Companies in Great Britain distribute and sell electric current to all who require it, and the price of such power tends downwards. The rental value of any building or factory may be increased because of the convenient contiguity of such power.

High rates discourage new factories.

The severity or lightness of the local Rates has a considerable influence on the letting or selling value of a factory. If because of extravagant expenditure in the past or an undue carrying forward of new obligations, the rates are high, and tending upwards, new-comers prefer to keep outside the boundary of the borrowing authority. So strong has this reluctance become that in some cases municipalities desiring to absorb contiguous townships, have agreed that for a certain term of years the new-comers shall pay only a reduced rate.

Value of leases, how determined.

In valuing a factory, the buildings may, if taken separately from the plant, be reckoned on the rental basis as above. If the property is freehold or on a long lease, an addition may have to be made for prospective increase in value, and a tenant may be inclined to pay a higher rent if it be for a long term which secures to him the goodwill

which he may establish. If the property is held on lease only, then its freehold value must be diminished by the sum sufficient, if invested as a sinking-fund, to repay the purchase money at the end of the term, and to pay the expenses of removal. The freehold value may be diminished by the sum sufficient to buy a deferred annuity of the annual or net rental value, commencing at the end of the lease and continuing on in perpetuity. The cost of any obligations specified in the lease must also be provided for, and the burden of the rates must be held in view. Even with these allowances leaseholds do not fetch so high a price as freeholds. The convenience afforded by the system of leasehold assurance has been already referred to, and the annual premiums are given in Table IV.

Sinking fund.

See page 131.

Leasehold assurance.

See page 125.

Factories, mines, railways and other undertakings are Rated for the Relief of the Poor on their Net annual Value. To arrive at this value, the gross Rent that a tenant may fairly be supposed to pay is ascertained or estimated, and a certain proportion of it is deducted for the cost of repairs, maintenance, fire insurance, and other charges which, taking an average of years, would have to be provided for before an annual net profit can be reckoned.

Factories, mines, railways.

Rateable value, how arrived at.

The proportion of the gross rent which should be so deducted must of course vary with the nature of the property and the burdens upon it. In the case of land, the net value may approach very nearly to the gross rental; in the case of buildings, if they are old, and the cost of repairs and maintenance heavy, the deduction should be greater than with new and well-constructed buildings. But even in the latter case, eventual rebuilding must be held in view, and a depreciation rate or reserve allowed for which will maintain or replace the net income.

Deductions from gross value.

Repairs and maintenance.

The principle of assessment on the net rental value is generally easy of application when, as in the case of a dwelling-house, the property is let to a yearly tenant, whose

Assessment based on actual rent.

rent, confirmed by that paid for similar houses in the locality, forms a basis of calculation. To avoid trouble in investigating each case, general rules are established by which the net rateable value bears a certain proportion to the gross rent. Two-thirds is a general proportion. The actual rent paid by a tenant is not, however, always conclusive, because it may happen that, owing to special circumstances, such rent is more or less than that which would be paid under ordinary conditions. Thus, there may be obligations on the tenant in regard to repairs or reinstatement, which may make the rent more nearly approach the net annual value than is usual, or the tenant may be occupying under an old lease at a rent much below the current value. On the one hand, the cost of maintenance and repairs, if it falls on the tenant, may greatly reduce the net rent obtainable, and therefore the rateable value. On the other hand, there may be certain privileges or indirect advantages in connection with the property which may induce a particular tenant to pay more than the property would fetch if let upon its own merits.

**Rent not always
a fair basis.**

See page 113.

Two main questions, sometimes involving considerable difficulty, have arisen in estimating the rateable value of Factories. One, where the factory, the fixtures and the plant belong to the Occupier, and there is no separate sum charged for Rent, and where, therefore, the rental value has to be estimated; and the second, where it has to be determined which, if any, of the fixtures and plant are to be included in the "net rental" valuation.

**Difficulties in
rating of
factories.**

See pages 173-4.

In regard to the first of these suppositions: where there is no tenant and therefore no actual rent paid, it is necessary to estimate what annual sum an imaginary tenant would be willing to pay for the use of the factory in question. The profits of the tenant earned by his own skill and capital are not rateable, and it must be considered merely what rent a tenant who bore the general risks of the

**Tenant's profits
not rateable.**

business would pay. In estimating this, the cost of the factory and of similar factories, and the interest on the capital invested in them, are important aids to the calculation, but they are not conclusive. There are cases where the original owners have erected showy or ornamental buildings or offices unnecessarily expensive for their purpose. A business so loaded often fails, and a new-comer will not pay rent proportioned to the cost, nor will Rating assessors value on such a basis. Owing to alterations in the trade in question, or in the methods of manufacture, or in the cost of building factories engaged in such trade, the value of the factory may have fallen, and the rent which a tenant would be willing to pay may be less than the interest usual on building investments of a similar class.

The cost of factories not a conclusive basis

Falling values.

The reverse may be the case. Since the factory was built, its value may have risen, either through a general rise in the values in the locality, or from an increase in the cost of building such factories, or from local or trade causes which have increased the profits derivable from such concerns, and have increased therefore the rent which an occupier would be willing to pay for the opportunity of earning such profit. Old buildings, possibly out of repair, may have, from a tenant's point of view, a high rental value.

Growth of value.

The difficulty of arriving at a rental value where there is no tenant and no rent to be paid, is increased where the factory is carried on as part of a larger undertaking, and with no direct profit arising from it. Such is the case in Government or municipal workshops, or those attached to water or gas supply undertakings, where the value of the workshops is only a portion of the larger capital invested in street mains and other property; or in the case of railway workshops, where locomotives and wagons are repaired for use on the railway. The difficulty is sometimes solved by the rating authorities agreeing with the occupiers to accept

Factories not earning a direct profit.

Railway workshops.
See page 15

Assessment based on capital value. as the rating value an agreed interest on the capital shown to have been invested in the workshops ; but in the event of difference, the method referred to above has to be adopted of estimating what an imaginary tenant would pay, giving full consideration to the original cost and the rate of interest that would be remunerative as rental.

Imaginary value.

Rateability of machinery and plant.

Trade fixtures.

See page 204.

Fixtures removable by tenant.

Plant, as tenant's fixtures, not rateable.

Engines and boilers rateable.

In regard to the second point previously referred to, of how far Machinery and Plant should be included in the Rateable value, considerable changes have from time to time taken place in the application of the rules laid down for the rateability of machinery. It has sometimes been sought to exclude trade fixtures from rateability. Although it is clear on the highest authority that chattels as such are not rateable, yet trade fixtures are in general clearly to be rated. In a well-known text-book * on the subject it is stated—

“That they are part of the freehold and would pass under a mortgage, and though in the case of a factory a tenant is allowed to remove them during his term, it is not in the same way as he might remove his furniture from a house, but only because the Courts were induced to relax the strictness of the old rules of law in order that the commercial interests of the country might be enhanced by the encouragement given to a tenant to employ his capital in making improvements for carrying on trade from the certainty of having the benefit of the expenditure secured to him at the end of his term.”

It became usual in many parts of the country, apparently on the supposition that machines and plant removable as above by the tenant were not landlord's fixtures, to include in the rateable value only those fixtures which by the narrower view of the law, or by usage, clearly pertained to the freehold. Therefore, while boilers, furnaces, steam-engines, lines of shafting, and other apparatus for providing and transmitting the motive power were included, machines

* See ‘A Practical Treatise on the Law of Rating,’ by Edward James Castle, Barrister-at-Law. 1879. London : Stevens and Sons.

which were attached only by their own weight, or were only steadied by bolts, or which could easily be removed by a tenant without damage to the premises, were excluded from the rateable value. In fact, much the same separation into classes prevailed as is prescribed in the Bills of Sale Act, passed for an entirely different purpose.

Bills of Sale Act.

See page 203.

But, although as a matter of usage this method of classification became established in certain districts and prevailed generally throughout England till about the year 1865, the principle of excluding machinery has, since that time, been entirely altered in all cases where disputes have come before the Courts. The diversity of practice during these years arose mainly from the fact that the valuation is in the first instance in the hands of local overseers or parochial assessment committees, who apply in different ways rules that had become established for other kinds of property. Such local valuations, however, took effect, and have been followed as precedents in the district, unless appealed against in the superior Courts of law. Appeals have sometimes been made by occupiers who deem themselves too heavily rated, but as often by those who consider that their neighbours are insufficiently rated. It is in the decisions of the judges on these appeal cases, rather than in any statutes easy to be understood, that the law on the subject is to be found.

**Machinery not
always excluded.**

**Diversity of
practice.**

**Appeals to the
superior Courts.**

**Law to be found
in judges'
decisions.**

Some of the earlier cases were appeals from assessments, where the plant omitted was of a kind generally included even when removable fixtures are excluded. Thus in the case * of the Phoenix Gas Company, in 1866, it was held that the retorts, purifiers, gas-holders, steam-engines, and boilers, were to be taken into account in assessing the rateable value, because they were fixtures which added permanently to the value of the premises; and that also

**Case of the
Phoenix Gas Co.**

* *Regina v. The Inhabitants of the Parish of Lee*, Law Reports, 1, Q. Bench Cases, 241.

the mains in the public street were rateable ; but that the meters which were the property of the company in the private houses of the consumers were not rateable, because they were not indispensable to the manufacture of gas for which purpose the works were established.

It still appeared, and was so acted on in many parts of the country, as if machinery of a kind more easily removable should be excluded, and this was apparently confirmed in the case of the Halstead silk factory,* where it was held by the Court of Queen's Bench, on appeal in 1867, that while the value of the steam-engines, boilers, and shafting must be included in the assessment, the looms and other machines merely screwed to the floor were not to be included. In this case the machines were treated as the furnishing of a mill, which could be easily removed. The judge said—

Case of the
Halstead silk
mill.

Looms not
rateable.
See page 177.

Because not
permanently
fixed.

“These machines are common things in Lancashire. They are carried from one manufactory to another, and can be removed from one room to another. They are not so permanently fixed to the building as in the case of the gas-works.”

Case of Laing,
shipbuilder.

Machine tools
held to be
rateable.

This decision had the effect of confirming the system which prevailed in many districts in the assessment of all kinds of manufactories, but in 1868 what appeared to be a stricter interpretation of the law again opened up the question of rateability. The Overseers of Bishopwearmouth, in a new assessment of the premises of Messrs. Laing, the shipbuilders, included in the valuation not only the steam-engines, steam-hammers, boilers, and shafting, but also the lathes and machines for planing, drilling, punching and riveting ; and against this assessment Messrs. Laing appealed to the Court of Queen's Bench, where the assessment on this wider basis was confirmed.† Chief Justice Cockburn, in his judgment, stated—

* *Regina v. Overseers of Halstead.* The Justice of the Peace, February 22, 1868.

† *Laing v. Overseers of Bishopwearmouth*, Law Reports, 3, Q. Bench Div., p. 299.

"It appears to us, after having carefully considered the character of the machinery in question, that the whole of it, though some of it may be capable of being removed without injury to itself or to the freehold, is essentially necessary to the shipbuilding business to which the appellant's premises are devoted, and must be taken to be intended to remain permanently attached to them so long as the premises are applied to their present purpose."

This case,* though it attracted much attention, and as an authoritative declaration of the law was adopted in some other localities, was reluctantly acknowledged and keenly contested up to 1900. The decision was generally considered to have gone too far; if logically applied to factories in general, it might be held to include all machines; and the less rigid interpretation of the law which includes only undoubted fixtures in the rateable value continued to be generally applied in most of the manufacturing districts in England. It has been confirmed by statute in Scotland.

In comparing the decision with that in the Halstead case the question arises as to where the line is to be drawn in including plant and machinery in the rateable value of a factory, because some of it may be as easily removable as is the furniture of a dwelling-house. An operative watch-maker would remove his lathe if the tenancy of his house and workshop expires; a Nottingham lace-maker removes his loom from the workshop where he rents floor-space and power; and the looms are, therefore, not rated.

The question in regard to machines and machine-tools seems, therefore, to be this†—Would they be landlord's or tenant's fixtures in an occupation from year to year? Are they of such a perishable nature as not to outlast a yearly tenancy? Are they of a kind which so quickly wear out

* Full particulars of this and previous cases are given in a book entitled 'Local Taxation and the Rating of Machinery,' by T. F. Hedley, of Sunderland (Knight and Co., Fleet Street, London), who supports the decision in the Laing case. The opposite view is maintained by James Pott, jun., of Sunderland, in a pamphlet 'Remarks on the Assessment of Machinery,' published by E. and F. N. Spon, Ltd., London. (*Now out of print.*)

† E. J. Castle. See footnote, p. 174.

Laing's case not generally approved.

See page 180.
Royal Commission Report.

See page 180.

As tending to make all tools rateable.

See page 170.

The real question as to fixtures.

that a yearly tenant would find it worth while to attach them to the building? Would structural alterations be required to allow the machinery to be attached to the premises? and other circumstances which would in an ordinary yearly tenancy determine whether the machinery should be supplied by the landlord or tenant.

Machines removable by tenant.

It is not necessary to consider whether a tenant would, as a matter of fact, remove his machinery and plant, but whether by usage, and as appropriate to the trade in question, he would have the right to remove them or sell them to a new tenant. There are many kinds of house fixtures, such as gas-fittings, and blinds, which, though the property of a tenant, are generally left behind and sold to the incoming tenant. Still, as tenant's fixtures they would be excluded from the rateable value, and the machine-tools of an engineer are generally regarded in this light, notwithstanding the decision in the Laing case. But according to this decision, if a factory were so constructed as to be useful for no other purpose than that for which the machinery and plant had been fitted to it, such a circumstance would affect the decision as to the rateability of the plant.

Engineer's tools deemed to be removable.

It is to be noticed that in the Laing case the judges did not investigate the facts, but merely decided on facts presented to them; and in the case it was stated that the machines were intended to be permanently used.

Scotch decision.

Although there was no difference between Scotch and English law in this respect, a different decision which tended to uphold the practice was given in 1887 in the case of the workshops of the North British Railway at Cow-lairs.* In this case it was held that unless the machinery was so attached that it could not be removed without destruction to itself or the building it was not rateable.

See page 180.
Act of 1902.

* Court of Session, Bill Chamber, September 26, 1887, before Lord Fraser. *The North British Railway Company v. The Assessor of Railways and Canals in Scotland.*

It will be seen that though certain principles of law had been declared by the judges, no actual enumeration of plant or machinery had till then been made. The principle having been agreed upon, the knowledge of engineers or others acquainted with the necessities and usage of particular trades is required to apply the rules to the factory whose rateability is in question.

The inconveniences arising from the different interpretations and applications of the law became so serious, that on several occasions subsequent to 1885 Bills were introduced into Parliament for settling the question. The purport of these Bills was not the formulating of any new views, but rather a declaration that the old usage was the right one, namely that only landlords' fixtures were rateable. The Bills failed to pass into law, at first rather for want of time than from opposition, which arose principally from the representatives of agricultural districts who feared that the burdens on land might be increased if those on manufactories were lightened. But in 1890-1 some representatives of urban constituencies also joined in the opposition, influenced no doubt by the fear that the rates of shopkeepers and private residents, who had no apparent interest in manufactories, would be increased if factories were relieved by the proposed legislation.

Attempts to
arrive at
uniformity.

Bills in
Parliament.

See also page 18.

In 1896 a Royal Commission was appointed—

“to enquire into the present system under which taxation is raised for local purposes, and report whether all kinds of real and personal property contribute equitably to such taxation ; and, if not, what alterations in the law are desirable in order to secure that result.”

Inquiry into
local taxation.

It will be seen that the inquiry as constituted had a much wider scope than that of the problem here in question, and the investigation was so protracted that a final Report* was not issued till 1901. Meanwhile, in 1899, a Bill was brought into Parliament again embodying the

Report of 1901.

* Final Report of Royal Commission on Local Taxation, 1901. Eyre and Spottiswoode (Cd.), price 1s. 6d.

view of the manufacturers who sought relief by re-establishing the old system of assessment.

The following conclusion of the Report of 1901 showed that the views set forth in the Bill were adopted by the Commissioners :—

**Recommendation
of Royal
Commission.**

"We therefore recommend that in estimating the rateable value of any hereditament occupied for trade, business, or manufacturing purposes, there shall be excluded from the assessment any increased value arising from machines, tools, or appliances which are not fixed or are only so fixed that they can be removed from their place without necessitating the removal of any part of the hereditaments. But the value of any machinery, machine or plant used in or on the hereditament for producing or transmitting first motive power, or for heating or lighting the hereditament, should be included."

**Royal Commission
recommends
exclusion of
machinery from
rating.**

It will be seen that the opinions which thus became available for the guidance of the Legislature were no longer confined to the interested and opposing parties, but that the claims of the manufacturers were upheld and endorsed by an impartial tribunal after exhaustive inquiry. Manufacturers in Scotland took immediate advantage of these recommendations, and in 1902 succeeded in passing into law a Bill of two short clauses embodying them.

**Scotch Bill of
1902 passed.**

The Act * dated August 8, 1902, recites as follows :—

**Provision as to
what is
"machinery fixed
or attached."**

"1. Section forty-two of the Valuation Act, 1854, shall be read and construed as if the following proviso were inserted after the words 'and all machinery fixed or attached to any lands or heritages,' that is to say, provided that in any building occupied for any trade, business, or manufacturing process the expression 'machinery fixed or attached' shall be construed as including all machinery, machines, or plant in or on the lands or heritages for producing or transmitting first motive power, or for heating or lighting such building, but save as herein provided shall not include machines, tools, or appliances which are only so fixed that they can be removed from their place without necessitating the removal of any part of the building.

**Construction,
short title, and
extent.**

"2. This Act shall be read and construed as one with the Lands Valuation (Scotland) Act, 1854, and any Act amending the same, and

* To be purchased in London, Edinburgh or Dublin, or through any bookseller (price 3d.).

may be cited separately as the Lands Valuation (Scotland) Amendment Act, 1902, and shall apply to Scotland only."

In the Session of 1903, a Bill was again brought into Parliament to give effect to the recommendation for England, and in order to avoid new complications the exact words of the recommendation as given above were repeated. The opposition had however become keener and the Bill did not pass into law.

The question was still depending on past decisions of the Courts, and in the absence of any new legislation further disputes arose between manufacturers and rating authorities. In April 1904,* the Recorder of Leeds dismissed an appeal brought against the assessment of a small engineering works in the Hunslet Union. This decision was affirmed by the King's Bench Divisional Court, and again affirmed on Dec. 19, 1905, on a last appeal to the House of Lords.

The Earl of Halsbury moved :—

"That the appeal should be dismissed, and said that a good deal of difficulty had arisen in these cases by the distinction which parties often sought to draw between what was and what was not attached to the freehold. But for half a century or more the Judges had recognised the fact that though the machinery were not so affixed as to become actual part of the land, yet if the whole premises were occupied with the machinery in such a manner that the whole became a factory, the entire concern became a suitable subject of rating, and the machinery ought not to be disregarded in fixing the amount of assessment. There was no reason to speculate on the particular form of contract which had been or which might have been made between the parties. The overseer had a comparatively simple process to go through. He looked at the premises, the necessary furniture and equipment, and regarded them as a whole subject to be rated. It was no part of his duty to occupy himself with hypotheses or to analyse what were or might have been the initial arrangements. His task was already often a difficult one. It would be intolerable if he had to enter into such questions as these. He examined the premises as they stood and formed his opinion as to what should be rent and rating of such or such an establishment.

English Bill of 1903 failed to pass.

Rateability of machinery confirmed.

Legal decision in H. of Lords.

* See George Allen, F.S.S., on Rateable Machinery, etc. London : Philip Allen and Co., 87 Chancery Lane.

He could not inquire how much the landlord and how much the tenant had contributed towards the provision of machinery. . . . The only question was how far the machinery enhanced the letting value and the valuation."

Lord Macnaghten and Lord Robertson concurred.

Since that date the opposition of the general class of ratepayers—shopkeepers and private residents—who are rated on the rental value of their premises, to any legislative alteration of the law as above declared has continued, and it seems unlikely that the old method of excluding machinery in factories will ever be restored.

Scotland has an advantage.

Manufacturers in Scotland have a distinct advantage over their competitors south of the border, though as citizens they have still to share in the cost of local administration.

In one of the Bills (1893) introduced during the controversy about the rateability of machinery, it was agreed in regard to motive-power (concerning which there has throughout been no dispute as to its rateability)—

Rateable value of motive power.

"and provided further that such machinery, machine or plant, used for producing or transmitting first motive power, shall not be assessed for the purpose of rating at less than fifty pounds for each nominal horse-power, unless in any particular case there shall be laid before the rating authority reasons which in their judgment are sufficient to warrant them in adopting a lower assessment."

Rateable value of machinery, how arrived at.

Assuming that machinery is to be taken into account in arriving at the rental value of the premises, the valuation should be made on the same principle as for buildings, but it is almost always necessary, so far as the value is based on the cost of the machinery, to allow a wider margin between gross and net value. The cost of repairs and renewals is generally greater than with buildings, for the deterioration is more rapid, and assuming a tenant who pays rent for the use of such plant, but who had not the burden of reinstatement, the landlord would have to apply a considerable proportion of the gross rental to such charges. Therefore, to take the case of an engineering

Gross and net rental value.

factory or steel-works, while one-sixth might be a sufficient allowance from the gross annual value of buildings, one-fourth or even more might have to be allowed from the machinery to arrive at the net rental value.

In districts where there are many factories engaged in the same industry, the assessment is sometimes made according to certain broad rules, by which a minute investigation of every case is avoided. The output capacity of the concern affords a basis for arriving at a rental value. Thus, in regard to steel-works, the capacity of each furnace may be so taken, and 3*d.* to 4*d.* per ton on the annual product deemed to be the rateable value. In some parts of Lancashire the annual rateable value of cotton-spinning factories will be reckoned at so much per spindle (even though the spindles themselves are not included in the value), on the assumption that the number of spindles determines with sufficient accuracy the size of the mill and its value to a tenant. Again, in the engineering trades, the engines, boilers, and shafting, or whatever in the particular districts is included in the rateable value, may be and generally are assessed broadly at so much per horse-power. It is obviously undesirable to fix a positive rate either for manufacturing plant or for motive power. Thus, in a modern cotton-mill, arranged after an improved method, the same number of looms or spindles as in an older mill may afford a greater or more valuable output, and the rental and rateable values are, therefore, greater than in an older mill; or, in an engineering factory, there may have been a large capital outlay in improved steam-engines which consume a minimum of fuel. An engine of 100 horse-power which consumes only 2 lbs. of coal per horse-power per hour would presumably have a higher rental value than one of similar power which consumes 6 lbs. per horse-power.

An increase or decrease in the rental and rateable

Broad rules for rating.

Based on annual product.

Cotton-spinning factories.

Motive power valued.

See page 174.

Fixed rates not always applicable.

Value of engine according to fuel consumption

Altered values

value owing to additions or deterioration has sometimes to be considered. In an old factory, if the buildings and plant have been fairly maintained, the annual value to a tenant may be undiminished even though the capital value to the proprietor may have decreased. But if the plant has become old-fashioned, or be no longer capable of producing so good or so much work as formerly, the rental value is obviously less, and an abatement may be claimed.

Notwithstanding the settled law and practice of rating valuations as upheld by the Courts, and here described, there are still many points which demand attention in particular cases. Assessors and valuers cannot be acquainted with the methods and vicissitudes of the numerous industries they may have to deal with. They may see an old factory or workshop in operation, and on the supposition that it is therefore appropriate to its purpose, may value it in the same proportion to its capital cost as they would a new factory of an accustomed kind. It may be, however, that much of the machinery or equipment is old-fashioned, and not earning a fair percentage on its original cost. Investigation may show that it is being employed for some inferior purpose, or as a mere storehouse, the plant not being used at all. Expensive chimneys may have been rendered useless by the adoption of induced draft, and old furnaces within the building may have been discarded as useless although they have not been removed.

On the one hand, it is due to the neighbouring proprietors of a district who are properly assessed, that owners of factories shall contribute their full share to the public burdens; and on the other hand, care is necessary to prevent overcharge to factory owners, and especially to large corporations like railway companies, whose shareholders are widely spread and who do not always meet with the same consideration from the local authorities as do private owners.

Deterioration.

See page 15.

See page 122.

Antiquated plant.

Expensive chimneys.

See pages 65, 70.

Burden of rates equally allotted.

Railway companies unduly rated.

See page 173.

The difficulty of arriving at a rateable value increases with such undertakings as Railways and Canals, and particularly so because of the separate assessment for every parish or rating district traversed.

**Rating of
railways.**

**Separate
assessment in
each parish.**

It is only possible here to glance at this question, which, while so important to all railway proprietors, may possibly afford by analogy some guidance to the assessment of other kinds of property. One plan, generally known as the "profits" principle, is that a tenant would give as rent a sum equal to the receipts from the property, less the expense of earning them, and less the ordinary profit which a tenant would expect. This plan, as based on profits, differs from the "contractor's rent" principle, *i.e.* rental value based mainly on capital outlay. Little or no regard is on this plan had to the capital expended on the railway, and there may be in some cases the apparent anomaly of a railway paying no dividend, and yet being heavily rated. There is in this case obviously the difficulty of allotting to each district or parish its fair proportion of the total rateable value of the railway, and various methods based more or less on train mileage have been attempted.

Profit systems.

**"Contractor's
rent" system.**

Train mileage.

In the Report of 1901 it is stated :—

"The plan of making independent valuations of small sections of each railway cannot, we think, produce entirely satisfactory results, and we therefore now propose that a central authority should be appointed whose duty it should be to value rating areas. Besides being much simpler than the existing system, this plan would, we think, entail less expenditure upon valuation and appeals by both railway companies and local authorities, and would also secure that different railways and different parts of railways should be valued on uniform lines."

**Central authority
proposed.**

**Appeals avoided
by uniformity.**

Railway stations and workshops are generally rated on a rental value based on the actual capital outlay on site, buildings and plant, with a fair allowance for depreciation, but as in the case of houses, neither the cost nor an actual rent paid entirely determines the assessment.

Railway stations

*See REPORT,
page 179.*

In the case of workshops belonging to railways and

Rating based on
capital value.

other corporations, where no direct profit is earned and where an agreed rate of interest on the capital outlay is accepted as a fair rateable value, the ordinary rules have to be observed in discriminating between a gross and net rental. Thus, if 5 per cent. on buildings be agreed upon as a fair rateable value, this would represent 6 or 7 per cent. as a gross rental from a tenant. If the land be taken separately, interest at 4 per cent. on the capital outlay is usual as an annual rateable value.

Depreciated
value.

It may be important to show in any such investigation how far the value of buildings and plant has deteriorated in such a way as to reduce their earning power and that a corresponding reduction in rateable value is necessary. On the other hand, if the earning power remains, the fact that the buildings and plant have a less life, while it reduces their capital value or the price they would fetch if sold, does not necessarily reduce the rent a tenant from year to year would pay. Surveyors and rating assessors do not always care to show the methods by which they have arrived at a value, and it is only by appealing against their decision that their systems are elucidated.

Surveyors and
assessors.

Mines rated on
Capital outlay.

There is no uniformity of practice in the rating of Mines. In some districts the amount of capital that has been spent on the undertaking forms the basis of assessment, but this method, unless qualified, tells unfairly on mines unfavourably placed. In a colliery, for instance, the cost of reaching and developing the coal may have proved greater than anticipated, but the rental value to an occupier is not necessarily increased thereby. In other cases elaborate and expensive pumping machinery may be required to cope with an unexpected excess of water. This expenditure, though it increases the capital sunk in the concern, may actually reduce the rent that would be paid by an occupier who has to bear the current expenses of pumping, which reduce his profit. In other districts neither capital value nor dividend are taken

Unfairness of this
system.

into account, but only the gross annual output and so much per ton, varying according to circumstances from 3*d.* to 9*d.* on this output, is taken as the rateable value. A colliery working 200,000 tons per annum would at 6*d.* per ton be chargeable for the Poor rate on a supposed annual value of 5000*l.* It is obvious that a fixed system like this may tell very hardly at times when the selling price of coal is low ; and in some of the coal districts of the North of England the rateable value is for this reason adjusted every year according to the current prices of coal that have prevailed. This system of a sliding scale, though apparently equitable and convenient, seems to depart from the usual principles of rating, which is generally the net rental which would be obtainable from a tenant who has to take the chance of varying profits.

**Assessment
based on annual
output.**

**Irrespective of
coal prices.**

**Sliding-scale
method.**

CHAPTER XI.

THE VALUE OF A FACTORY THAT HAS STOPPED
WORKING.

IN the valuation of a factory as a whole, but not as a going concern, the preliminary question arises, as alluded to in a preceding chapter: why, if the undertaking has been profitable or capable of producing profit, has it been stopped? There may be answers to this, such as the death of the proprietor, a temporary falling-off in trade, or want of skill or attention in the management. Some industries are liable to periodical stoppages from economic causes—such as a falling demand for the products, or by a lowering of the market price below the cost of production, two circumstances not necessarily associated. As an example of the first are trades dependent on fashion, such as the lace-trade, which returns a high rate of profit when trade is brisk.

Just as a falling-off in the demand may cause factories to be closed, so the dormant value revives when the condition of trade improves. The value then depends not only on the suitability of the factory, but on its readiness. Mining and metallurgical operations are often stopped because the selling price has fallen below the cost of production; and yet the plant may have been kept ready for future working. In some competing district the local advantages may overcome all competition, or the discovery of uses for by-products may so increase the total net return as to allow the chief or staple product to be sold at a lower rate than formerly; or the staple article of manufacture

See page 156.

**Periodical
stoppages.**

**Trades dependent
on fashion.**

**Mining and
metallurgical
operations.**

By-products.

itself may be produced elsewhere as a by-product at a low price. The mining for lead and silver, or for copper and sulphur, and the carrying on of numerous industries connected with these or other minerals, are examples. The profit on the manufacture of Steel, made by the basic process, is largely and sometimes entirely derived from the slag (phosphate of lime) which is valuable as a fertiliser. Where the purchase of a mine or factory or other industrial undertaking that has stopped working is in question, investigation may disclose causes of this sort which are not immediately apparent.

Silver and lead.

Copper and sulphur.

A manufacturing business may have proved unsuccessful because of an excessive burden of capital. Where a factory and the capital necessary to work it are the unencumbered property of the occupiers, it may be expedient to continue working for a time for little or no profit, or at any rate till the profits become less than would be obtained as interest on the price of the factory if sold. Where, however, the occupiers are working with borrowed money, or have to pay a preferential rent or interest, they may be unable to continue, and it will probably then be necessary for some of the capital to be cancelled to allow a profit on the remainder.

**Excessive capital
a cause of
non-success.**

Borrowed capital.

Assuming that a re-starting of the factory under new conditions appears justifiable, a stoppage may not have been altogether a disadvantage, for there is now an opportunity of resuming work clear of past mistakes and engagements. There may indeed be a loss of "goodwill," but this depends greatly on the nature of the trade and on how far profits have depended on old connections. The value of the foundations, attachments, and other accessories to plant and machinery already installed, of course remains good, and there is the advantage that repairs and re-arrangements can be made, which in a going concern would be difficult or impossible. But when machines have stopped, an allowance may be necessary in the valuation to provide for

**Opportunity for
rectifying past
mistakes.**

Goodwill.

See pages 61, 162.

Allowance for
risk in
recommencing.

risks or uncertainties attending a recommencement, while in a still going concern the machinery might be seen in operation. Most kinds of machinery are liable to deterioration by remaining idle ; some kinds suffer more during such a period than by the operations of working.

Factories
engaged in
staple trade.

If a factory has been engaged in a staple trade and in a suitable locality, it will almost certainly retain a substantial value, though a favourable opportunity may have to be awaited to obtain a purchaser. The sale of a factory sometimes discloses that it has a value to some persons for reasons not affecting ordinary purchasers who look only to direct profit. Thus, a purchaser may have land or produce in the neighbourhood which is enhanced in value by the working of the factory or which would suffer loss by its stoppage ; or he may have some manufacturing business complementary to that in question which will work well in connection with it. A public sale sometimes, for reasons such as these, elicits an unexpected competition.

Special value to
particular
persons.

Public sale.

Factory may
afford indirect
profits.

The stoppage of a factory may have caused such loss in its neighbourhood, that the owners of property, or tradesmen who have available capital to invest, may be willing to share in the risk of re-establishing the business, even with the foreknowledge or probability of only a small return in interest, because they will benefit by the local expenditure in wages and the consequent effect on rents of houses, and other direct or indirect advantages.

Value of
machines, how
arrived at.

See pages 121-3.

If the Machines in a factory are appropriate for their purpose, then their value will be arrived at by adding to their original cost the expenses of installation, and deducting an amount for depreciation proportioned to their age and wear, and a further amount for any actual repairs they may require. It sometimes happens that a machine or apparatus has been so strengthened, improved, or added to, that it is really worth more than when new.

Value of Factory that has Stopped Working. 191

There is often, in or about a factory, plant which is so old or worn that it would not bear removal, but which is likely to last for a considerable time if left undisturbed. Although the necessity for renewals when this time shall have expired may be obvious, it is often an advantage that the immediate capital-outlay for the purchase of the factory is thus reduced, and the purchase of new machines spread over a term of years.

Old plant
valuable if
undisturbed.

Sometimes the machines may be too worn to do the best work in the factory, and yet be useful for second-class operations. But a distinction must be drawn between what is merely partially worn and what is obsolete. In trades where new labour-saving processes have been introduced, the free gift of certain machines, even though they be in good condition, would not prevent loss in using them if the labour attending their use much exceeded that in competing factories, or if they produced goods of an inferior quality. Such machines should be got rid of at whatever apparent loss.

Obsolete machines
valueless for use.

See page 39.

See page 151.

Assuming that the factory in resuming work is to be employed in the same business as before, the value of the plant may be arrived at by the same process as in a going concern, but with this difference, that while in the latter a premium for goodwill may have to be paid, there may be, in the case of a factory that has stopped working, the need for some deduction to compensate for the time which may elapse before it is all employed, and for other risks that must always attend a new start.

Allowance for
risk.

Deduction for
loss of time.

If a change is to be made in the kind of goods manufactured, the value of the plant to a purchaser will be diminished by the cost of any alterations needed to render it suitable. Of course, a seller may elect to refuse a price so diminished, and may prefer to wait for a purchaser who can use the factory for its proper purpose. But on the other hand, if any of the machines have become obsolete

Allowance for
alterations.

for their original employment, it will generally be to the seller's advantage to close a bargain as soon as possible.

Value of plant
enhanced by past
reputation.

or diminished by
contrary cause.

A new-comer, if he continues the same trade, will be largely guided, in estimating the value of the plant, by the reputation of the factory for good work during its previous occupancy. So also, if the occupiers have had a character for skill and judgment, plant chosen and arranged by them will be deemed to have a value accordingly. On the other hand, if the stoppage of the factory is supposed to have been due to inefficient management, the plant may be liable to disparagement.

Dismantlement.

Foundations and
accessories.

Loss by
removal.

See page 65.

Special machines.

Loss by
alteration.

If a factory is Dismantled the plant almost necessarily loses by removal, the extent of the loss depending on the nature of the plant and its mode of attachment to the premises. In the first place, the capital sunk in foundations and attachments to the buildings is generally all lost; and from the value which the plant would then have for re-erection elsewhere, must be deducted the cost of taking down, and the expenses and risks of removal. In the case of a self-contained machine depending very little on special attachment, the removal may be easy and the loss slight; in the case of machines or apparatus composed partly of brickwork, such as boilers and furnaces, the loss is [very great and only a scrap value for the saleable part is obtainable.

A further depreciation is likely to occur if the machines have been made of special form or size to suit local peculiarities of land or buildings. Such special form may involve not only cutting to waste to allow of re-use, as in the case of shafting, piping, and belting, but actual alterations to suit a new situation. Original simplicity of design minimises the loss from such causes.

As a rule, that plant sells best which is in common use

for many trades. Thus, a portable-engine or an ordinary drilling-machine or screw-cutting lathe will generally find more bidders than an air-compressor or a deep-well pump. There are, however, exceptions to this rule, there sometimes being a keen competition for special machines not easily procurable new, such occasions arising oftenest when the trade in question is brisk. Manufacturers who see their way to immediate profit by adding to their plant, may be eager to buy what is at once available, when a similar, but new machine could not instantly be got ready. Thus, it is sometimes expedient to await a favourable opportunity for the disposal of old plant, rather than to force an immediate sale.

The minimum value of any second-hand plant is that of the old material it contains, less the cost of removal and breaking up. The maximum value is that of a similar article new, immediately obtainable. In the range between these two extremes, the actual price depends on collateral circumstances. Thus there is the locality of the sale. If it is in a town or district where there are numerous persons engaged in the same or kindred trades, there are likely to be more bidders than under contrary conditions, for a large or important sale is necessary to tempt purchasers to a distance. It may even be expedient to remove the plant to a more favourable locality, or to a dealer's store, but this is generally expensive and is rarely adopted.

The best prices are generally offered by those who intend themselves to use what they buy. Failing such purchasers, the sale depends on Dealers, who buy to sell again, and a new set of circumstances determines price, for a dealer requires an intermediate profit. He has also to consider not merely the cost of removal, but that of storage, the loss of interest while waiting for a customer, the risk of deterioration by time, or of improvements being introduced which will render the plant he has purchased

Machines in common use sell best.

Readiness of second-hand plant is sometimes valuable.

See page 150.

Minimum and maximum value

Locality of sale.

Removal of plant for sale.

Value to users and dealers.

Scrap materials.
See pages 71, 96.

obsolete, and the ultimate contingency of having to realise only the scrap or old-material value.

**Name of original
maker affects
value.**

In a sale to dealers, the name and reputation of the original maker of the goods have a special value. For, while the first purchaser sees the machine in place with evidence of its having been usefully at work, a chance purchaser from the store of the dealer will have to be guided to a greater extent by the name or brand or trade-mark of the maker. This circumstance should not be lost sight of by purchasers of new plant, who may with advantage choose what will retain the best value in case of re-sale. Contractors for public-works who buy plant for use in one contract only, and who, from its commencement, look forward to a re-sale, in which indeed much of their profit or loss is involved, have generally this circumstance in view when they purchase locomotives, steam-cranes, or other important plant.

**Re-sale of
contractor's
plant.**

See page 86.

**Dealers can
sometimes pay
more than users.**

On the other hand, dealers can sometimes afford to pay more than users. They may command a wider circle of purchasers than are present at the sale ; they may know of customers seeking what is now offered ; or they may see their way by a moderate expenditure to give a more than corresponding improvement to their purchase.

**Sale without
reserve.**

A sale without reserve may involve heavy loss to the sellers, and it is generally endeavoured to avoid it by placing a reserve-price on what is to be sold. The postponement of a sale is, however, rendered difficult when the articles are heavy or cumbrous, and when a peremptory removal is necessary. In cases of this sort, as also in that of improper collusion among bidders, much depends upon the ability and experience of the auctioneer.

The auctioneer.

CHAPTER XII.

THE VALUATION OF LOSSES BY FIRE.

THE principle of Fire insurance, according to the practice of all British offices, is that of Indemnity, and not, as in the case of either marine or life insurance, the payment of a fixed sum agreed upon beforehand. For example, if a factory which has been insured for £1000 be wholly or partially destroyed by fire, the amount of the loss will have to be appraised, and only the actual amount of loss, with a maximum of £1000, will be paid. The assured have to produce as particular an account of their loss as the nature of the case permits, according to the terms of the policy; and, in the case of a factory containing plant of fluctuating value, the making-up of an equitable claim for loss by fire needs considerable care.

Indemnity the
basis of insuran

Loss must be
appraised.

It is often difficult after a fire to make up an exact estimate of loss. If the books and papers are preserved, invoices and other vouchers will probably be available to show the cost of the plant, material, and stock as they entered the factory. If these vouchers have been lost in the fire, then outside evidence from those who supplied the plant and goods will have to be collected as the basis of a claim.

Difficult to
estimate loss

Vouchers to
prove loss.

The value of the property immediately anterior to the fire is that on which the estimate of loss must be based, and as it is the current or market value of the articles consumed, and not the original price of them, any rise or fall of value takes effect, and the assured is paid accordingly.

Value defined
limited.

Depreciation. Thus the question of Depreciation necessarily arises, for
See pages 119, 128. an insurance office does not undertake to reinstate or to
Reinstatement. provide new buildings and plant in the place of old ones.
 An analogous case arises in marine insurance, where, if a
Analogy of ship be damaged, the underwriters in paying the cost of
marine insurance. repairs deduct, unless the ship be new, one-third, on the
 ground that the substitution of new for old material is a
 benefit to the shipowner.

Subject to the total amount recovered not exceeding
 that on the policy, the assured is entitled to the value
 of plant equipped as at the time of the fire, and therefore
 all cost of foundations and attachments, as well as the cost
 of installation, have to be included. The assured is also
 entitled to the cost of removing the *débris*. On these bases,
 and allowing for possible deduction for depreciation, the
 sum paid should be sufficient for the reinstatement of the
 factory. In regard to deductions which may be claimed
 by the insurance office on account of the worn condition of
 the buildings or plant, the assured may be called upon to
 furnish information as to the length of time the factory
 and plant, or any part of them, have been in operation ;
 and in this respect British offices generally deal liberally
 with the assured.

Those who have an old factory, and who have written
 off little or nothing for depreciation, may find that the
 sum recoverable leaves them deficient of the capital value
 recorded in their books of account. If any of the plant
 has become obsolete, such a fact will also be taken into
 account as reducing its original value ; and patent-rights
 which may have increased the original cost, but which have
 since lapsed, will not be allowed for.

On the other hand, if it can be shown that the plant
 which has been destroyed was, by reason of its kind or
 arrangement, of greater value than when first purchased,
 the assured will be entitled to a corresponding compen-
Increased value
paid for.

sation, limited of course by the total value named in the policy and for which premiums have been paid. Where plant has been regularly written-down, it does not follow that only the value as so lessened can be claimed. Depreciation is, after all, but an estimate of what may be necessary to meet contingencies, some of them of a speculative kind, and as the losses provided against may have been escaped, a review of all the circumstances, so far as they can be ascertained, may show a higher value than is stated in accounts drawn up for a different purpose. Surveyors or engineers accustomed to the class of property destroyed are generally employed to appraise the loss, and in case of dispute, arbitration is resorted to, the right to such a mode of settlement being generally reserved by the insurance office in the policy.

Sometimes, the valuation is assisted by the fulness of the description of the property which has been furnished to the insurance office at the time the policy was issued, but in the case of a factory with a constantly-fluctuating amount of plant, it is seldom that everything can be set down in advance, nor can the absence of such a detailed description bar the claim of the assured.

There are, however, certain kinds of property which must be classed separately, and a maximum value set upon them at the time of insurance. Such, for instance, are drawings if they exceed a trifling amount, patterns, models, and moulds, which in the engineering and other trades may have a special value. Not only must a maximum total value be stated, but the insurance office will limit the sum payable on any one such article.

In the case of finished or partly finished goods in the hands of the manufacturer, the cost of production is the measure of damage, exclusive of profits and without any addition to the cost for interest on capital employed either in plant or machinery.

Past depreciation revised.

See page 123.

Value may be more than shown in books of account.

Valuation assisted by description supplied by assured.

Drawings and models classed separately.

See pages 99, 100

Goods in course of manufacture

One important respect in which the conditions of fire insurance differ from those in marine insurance is in regard to partial loss. Thus, if in the case of a factory consisting of one building, constituting one "risk" worth £10,000, the owner chooses to insure it only for £8000, and if part of the factory be burnt to the extent of £8000, the insurer can, according to the general British practice, recover that sum, while in marine-insurance if only 8-10ths of the total value had been covered only 8-10ths of the partial loss would be paid.

This rule of British fire-offices extends also to property in the Colonies insured by them, but as in most Foreign countries the condition just described as usual in marine insurance prevails for fire-risks also, British fire-offices generally adopt it in the policies they issue in such countries.

The British practice of "specific assurance," as it is called, does not, however, apply when several buildings are insured together in one sum. When the property lies in more places than one, so as to form a plurality of risks, it is required either that a distinct sum shall be insured upon the property contained in every separate building or place, or that the assurance shall be subject to the condition of average, or "average clause" as it is termed.*

For instance, if a factory consisting of two or more separate blocks of buildings be insured in one sum for £5000, and if one block be burnt, only the proportionate value which this one building bore to the whole is recoverable, even though its value may be £5000. Were it otherwise, two or more blocks of buildings might be insured for the premium of one, on the presumption that the risk was remote of more than one being burnt at the same time. In this respect rooms or workshops separated by fireproof

Partial loss.

Fire insurance
differs from
marine.

Colonial and
foreign losses.

Specific
assurance.

Each building
deemed a
separate risk.

Example of
separate
buildings.

Fireproof
divisions separate
the risk.

* See 'The Law of Fire Insurance,' by Charles John Bunyon, M.A., Barrister-at-Law. London : Charles and Edwin Layton.

doors, in the manner prescribed by the Building Acts for structures of a certain size, are deemed separate buildings and must be separately insured. There are also special rules in this respect for merchandise stored in public warehouses or on wharfs during transit.

It is desirable, for the foregoing reasons, that any considerable addition to or redistribution of the plant in different workshops should be notified to the insurance office, even if the value is still within the amount of the policy. If such alterations have in any way increased the risks of fire, either by circumstances inherent in the factory itself, or by contiguity to other buildings, then the neglect of such intimation may imperil the claim for compensation. Equitable treatment may be reckoned on by those who are themselves acting fairly, even if the information they have furnished does not fully come up to the conditions imposed by the insurance office, yet in many cases difficulties, which might have been avoided, arise from an insufficient conformity to such conditions.

Although, as has been said, Indemnity for what has been destroyed is alone recoverable, and Reinstatement cannot be claimed, the insurance offices always reserve the option of reinstating instead of making a money payment if they deem the estimate of loss to be excessive.

Consequential damage for losses by fire cannot be insured in British fire offices, but some of the underwriters at Lloyd's who undertake fire risks arising in connection with marine risks, will occasionally insure such losses. Such, for instance, are the loss of time and profit which a fire may cause, and in the same category would be the contract value of, or the expected profit on, goods which are ready or in course of preparation for delivery. If the insurer can show that he was about to receive a certain sum for goods which have been damaged or consumed, such a fact, while it may assist in arriving at

**Alterations in
factory affect
the insurance.**

**Conformity to
conditions.**

**Insurance offices
reserve option of
reinstatement.**

**Consequential
losses are not
insurable.**

**Lloyds'
insurance.**

**Contract values
or profits not
insurable.**

the true value, will not be accepted as the basis of a claim. The current wholesale value must be appraised, and it may be more or less than the contract price.

The leading principle of all fire-insurance offices is to afford no opportunity for the insured to derive profit from a fire ; and it is for this reason that profits on goods and consequential damages, which are difficult to appraise, are excluded. To the implied rule, that only tangible losses are insurable, there is the exception of Rent, which as having a precise value that may be defined, and that is not so liable as other indirect loss to be varied after the policy has been issued, is insurable. A landlord may insure the rent he would lose by reason of a fire ; an occupier may insure the rent which, after a fire, may continue to be payable under the terms of a lease ; and an occupier who owns his factory may insure the rent which he might have to pay for the use of another factory during the reinstatement of the one destroyed or damaged. But, a maximum of one year's rent is generally prescribed, and, as in the case of direct loss by fire, whatever amount for rent may have been insured, the compensation is limited to the amount actually lost. Of course when it is desired to insure rent this must be specifically stated in the policy.

Losses appraised
at current value.

Rent may be
insured

if stated in the
policy.

CHAPTER XIII.

TRADE FIXTURES—BILLS OF SALE—DEBENTURES.

IN the preceding chapters, the question of Fixtures has been dealt with in regard to the rateable value of factories. Similar questions may arise between Landlord and Tenant, or between Freeholder and Occupier, or in the sale or transfer of a factory ; for, although there are certain kinds of factory plant which are clearly the personal chattels of the tenant, and others which as clearly pertain to the freehold, there are often in or about a factory appliances or structures which cannot readily be placed in either category.

Fixtures attached to the land either directly or indirectly become part of the freehold, but as has already been shown it is generally held, by a relaxation of the law in this respect, that many of the additions made for the purposes of trade may be removed by the tenant during his term. But the mode of attachment is an important element in the case, as well also as the exact purpose. Thus a boiler firmly built into brickwork, or a steam-engine on massive foundations, would be considered as permanent fixtures, while a machine placed without fastenings and held in position merely by its own weight, or one fastened by screws, allowing of removal without damage to the structure, do not generally become part of the freehold.

Disputes may, however, be best avoided by making precise stipulations in the lease or other agreement. A tenant may anticipate the necessity or desirability of making additions, which, in the absence of an agreement to the

**Landlord's and
tenant's fixtures**
See page 172.

**Fixtures attached
to the land.**
See page 174.

**Steam boilers
and engines.**

Machines.

**Disputes
avoided by
agreements
beforehand.**

contrary, might be claimed as landlord's fixtures, and he will, if possible, stipulate that he may remove them at the end of his term, if damage to the ground and buildings be avoided or made good, the option being sometimes left to the landlord to retain such fixtures on paying their value. Where one of several partners in a factory is the freeholder, the ultimate right to the fixtures and plant which have been bought or added at the expense of the firm should be clearly declared in the partnership deed or agreement of tenancy. Where the additions or improvements so relate to the land or buildings that they cannot easily be removed, compensation, and not removal, may alone be feasible ; but for such additions the consent of the landlord is generally necessary.

Where one partner owns the freehold.

See page 169.

Classification as in Bills-of-Sale Act.

See page 203.

Rateable value.

See page 179.

The classification given in Section 5 of the Bills-of-Sale Act, though made for a different purpose and not binding for any other, indicates very nearly the kind of distinction which prevails in the absence of agreement to the contrary, and this same classification follows that which was formerly adopted as the basis of valuation for purposes of rating, and still so exists in some districts.

Creditors and mortgagees.

There is another aspect of this question of fixtures directly affecting the owners or occupiers of factories, which though it has been much simplified by legislation, often gives cause for dispute, namely, the respective rights of Mortgagees and unsecured Creditors against the property in "trade machinery" of a Debtor.

Factory plant assigned.

Until the year 1878, a judgment creditor, or the general creditors of an insolvent estate, often found, on attempting to realise the property of a debtor, that much of the plant and machinery which they had looked upon as available in case of need for payment of their debt had been already assigned. Thus, while by examining public registers or the lists issued by trade protection societies, traders are kept aware of assignments by Bills of Sale, it was

repeatedly found from the uncertainty of the law in regard to fixtures, or by the ingenious application or perversion of the law, or from the various constructions put upon the law by different judges in the varying circumstances that arose, that machinery and plant could be secretly pledged or assigned to certain persons, to the exclusion of all other creditors. The opportunities thus afforded for fraudulent preference and for collusion between a debtor and favoured creditors, were greatly limited by the "Bills-of-Sale Act, 1878," entitled—"An Act to consolidate and amend the law for preventing frauds upon creditors by secret Bills of Sale of personal chattels." By this Act, no assignment of trade-machinery can be made except by a registered bill-of-sale, and regarding these, the Act declares in section 5 :—

Uncertainty of the law.

Fraudulent preference.

Bills-of-Sale Act, 1878.

"5. From and after the commencement of this Act trade machinery shall, for the purposes of this Act, be deemed to be personal chattels, and any mode of disposition of trade machinery by the owner thereof which would be a bill of sale as to any other personal chattels shall be deemed to be a bill of sale within the meaning of this Act.

"For the purposes of this Act—

'Trade machinery' means the machinery used in or attached to any factory or workshop ;

Trade machinery defined.

1st. Exclusive of the fixed motive powers, such as the water-wheels and steam-engines, and the steam boilers, donkey-engines, and other fixed appurtenances of the said motive powers ; and

2nd. Exclusive of the fixed-power machinery, such as the shafts, wheels, drums, and their fixed appurtenances, which transmit the action of the motive-powers to the other machinery, fixed and loose ; and,

Motive powers and shafting excepted.

3rd. Exclusive of the pipes for steam, gas, and water in the factory or workshop.

The machinery or effects excluded by this section from the definition of trade machinery shall not be deemed to be personal chattels within the meaning of this Act.

'Factory or workshop' means any premises on which any manual labour is exercised by way of trade, or for purposes of gain, in or incidental to the following purposes or any of them ; that is to say,

Factory or workshop defined.

(a.) In or incidental to the making any article or part of an article ; or

(b.) In or incidental to the altering, repairing, ornamenting, finishing, of any article ; or

(c.) In or incidental to the adapting for sale any article."

Classification of trade fixtures

limited in application.

See pages 180-1.

It will be seen from the above clauses that steam-engines, boilers, shafting and other fixtures are excluded, but it must not be assumed that they necessarily pass with the freehold. In the absence of a precise agreement between the parties, the kind, purpose, and mode of attachment would have to be considered ; as also, in regard to a mortgage, would its terms and all the surrounding circumstances. On the other hand, while for the particular purposes of the Bills-of-Sale Act, and to prevent frauds upon creditors, trade-machinery is deemed to be personal chattels, it does not follow that they are so for all intents and purposes, as has already been seen in the case of rateable value. Nor would the classification of the Bills-of-Sale Act necessarily apply between mortgagor or mortgagee where there are no other creditors. Factory plant is of such various kinds, and is connected to the ground in so many ways that it is difficult to lay down any precise rules for general application.

Bills-of-Sale Amendment Act of 1882.

In 1882 was passed the "Bills-of-Sale (1878) Amendment Act," which does not affect the main principles of the original Act, but amongst other amendments adds in sections 4, 14, and 17, the following :—

Schedule necessary.

"4. Every bill of sale shall have annexed thereto or written thereon a schedule containing an inventory of the personal chattels comprised in the bill of sale ; and such bill of sale, save as hereinafter mentioned, shall have effect only in respect of the personal chattels specifically described in the said schedule ; and shall be void, except as against the grantor, in respect of any personal chattels not so specifically described."

Rent and taxes have precedence.

"14. A bill of sale to which this Act applies shall be no protection in respect of personal chattels included in such bill of sale which but for such bill of sale would have been liable to distress under a warrant for the recovery of taxes and poor and other parochial rates."

See page 17.

"17. Nothing in this Act shall apply to any debentures issued by any mortgage, loan, or other incorporated company, and secured upon the capital stock or goods, chattels, and effects of such company."

It will be seen from these clauses that taxes and rates take precedence, as also does rent, of claims under a bill of sale.

There was until the year 1900 the marked difference between Debentures and Bills of Sale, so far as general or outside creditors are concerned, that the debentures were not filed or registered in a public office where any one could inspect them, and were not therefore published in the weekly lists that are issued by private trade protection societies. It is true that under the Companies Act of 1862, debentures, to be valid, had to be registered in the books of the company that issues them, the omission of such registration rendering the directors personally liable; and all persons concerned could claim to examine the register on payment of a fee of one shilling. Since 1900 however, a list of shareholders and the debentures issued, with the amount of share-capital paid up and uncalled, has to be filed every year at the Registry Office, at Somerset House, London, and can be inspected by any one on payment of a fee of one shilling.

Debentures.
See page 115.

**must be
registered.**

The following extract from the Companies Act of 1900, 63 & 64 Victoria, chap. 48, shows that there is now full information regarding debentures available to all who seek it :—

**Companies Act
of 1900.**

Companies Act, 1900, Section 14, Clause 1. Every mortgage or charge created by a company after the commencement of this Act being either—

- (a.) A mortgage or charge for the purpose of securing any issue of debentures; or
- (b.) A mortgage or charge on uncalled capital of the company; or
- (c.) A mortgage or charge created or evidenced by an instrument which, if executed by an individual, would require registration as a bill of sale; or
- (d.) A floating charge on the undertaking or property of the company,

**Mortgages or
charge defined.**

shall so far as any security on the company's property or undertaking is thereby conferred, be void against the liquidator and creditors of

Debentures void unless registered.

the company unless filed with the registrar for registration in the manner required by this Act within 21 days after the date of its creation, but without prejudice to any contract or obligation for repayment of the money thereby secured.

Manufacturers and dealers who have limited companies amongst their customers may well avail themselves of the facilities referred to on page 205 so as to obtain and file for reference all the particulars there described.

In the case of debentures issued by any incorporated manufacturing company, the extent to which the security mortgaged includes machinery and plant has to be carefully considered by all concerned. A debenture is supposed generally to be a form of mortgage, but the word is applied to securities of very different kinds. Without a knowledge of the exact terms of a debenture it must not be assumed that it constitutes a first charge or security. Debentures are in Great Britain issuable by most companies, whether "limited" or not, and in many the powers in this respect are defined and restricted by general or special Acts of Parliament.

Debentures vary.

See page 116.

Restricted by Acts of Parliament.

Trade fixtures mortgaged.

See page 117.

Some debentures mortgage the property of a company in a way which affects greatly the security of the general creditors, and this in regard to more than the trade fixtures, for loose plant and tools, goods in course of manufacture, as well as stock and stores of every kind, may be pledged to the debenture holder. Such debentures are often created to serve as security to bankers for overdrafts, but while they serve this purpose, they tend also to damage the credit of the borrowing company, as ordinary creditors are reluctant to sell on deferred payments when all assets are already pledged. So strong sometimes are the special debentures created to satisfy bankers that stock and stores have to be maintained at a certain level, and in case of liquidation, an ordinary creditor may find that he has been supplying goods on credit, not for immediate use, but to

maintain at a prescribed level the security to the banker. Such debentures are often so sweeping in their application, that not only are all the material assets of the company assigned to trustees for the benefit of the debenture holder, but the goodwill and in some cases even the uncalled part of the share capital are included in the assignment. Such debentures may hamper greatly the management of a manufacturing company, for the directors may be restrained from selling, exchanging, removing, or otherwise dealing advantageously with the plant of the factory. So also if debentures include assets of every possible kind as above described, the credit of such company may be considerably restricted. Care and skill are necessary in the framing of a debenture to give a proper security to the debenture holders, with the minimum of restriction on the management.

**All assets
included.**

CHAPTER XIV.

THE LOCALITY OF FACTORIES.

See page 155.

Locality of a
factory affects its
value.

IN a previous chapter reference was made to the circumstances of Locality, which, apart from any general estimate of buildings and plant, go to determine the value of a factory for a particular trade. Whether or not these circumstances should have been considered in the first establishment of the undertaking, they are obviously an important factor in estimating value at a change of ownership. What was but conjecture or calculation before the factory was built, will now have been tested by actual experience.

Conditions of
value vary for
different trades.

It is as impossible as it would be presumptuous to set up rules for guidance in the infinite number of circumstances and combinations that present themselves, or to say precisely which are the conditions in regard to locality and site which must determine value. It is only attempted here to enumerate some of the leading points that should be considered. It is always dangerous to follow precedent unless dissimilarity in the circumstances is also duly taken into account for what may have proved of the first importance in one branch of trade, or at a particular period, may be of secondary or no importance in another case. It is impossible to combine all advantages in any one factory; care should be exercised therefore in observing due proportion in estimating their value.

Chief incidents
of locality.

The choice of locality depends mainly on the contiguity to Material, Fuel and Water, on the cost of Transport, on the abundance of Labour, and on contiguity to the

Consumer. Taxation, local rates, and other public burdens have also to be considered ; for these vary in different localities, and in some cases it is cheaper to establish a factory outside a certain district or town.

Taxation.

The importance of contiguity to suitable materials depends on their weight or bulk, on the cost of carriage, and the proportion which this bears to the whole cost of production. In trades where the cost of material bears a small proportion to the total expenses of production, distance may matter little ; for instance, a maker of cutlery and firearms is not—other circumstances being favourable—weighted much even if the iron and steel are brought from a considerable distance.

Contiguity to materials.

Cost of carriage sometimes unimportant.

A locality near the material might be chosen where the latter was much heavier than the finished products, as in the smelting of iron, while if the products were also heavy, contiguity to the consumer or to a port of shipment might determine the choice. The effect which transport and storage may have on the quality of the material or finished goods has also to be considered.

Carriage of heavy goods.

The cost of Carriage to the port often amounts to as much as, or more than, the freight by sea to a distant country ; and this circumstance, of course, is of increased importance for those commodities in which the expense of carriage bears a considerable proportion to their total selling price. In Great Britain the favourable situation of the coal and iron mines near to the sea, allows manufactories to be established with both the above advantages, but nearness to a port is not always best for an inland trade.

Carriage to shipping port.

Factories are often established in the neighbourhood of ports at which the materials for manufacture arrive ; or the factories having been established, the materials come there. Thus, for example, there are sugar-refineries on the Clyde, seed-crushing mills at Hull, jute factories at Dundee, cotton mills in Lancashire, and metal refineries at Swansea.

Coal and iron near seaports.

Factories at ports where materials arrive.

Inward and
outward freights.

Engineering works are established to supply the necessary machinery for these various trades. But whether the factories follow the cargo, or the cargo the factories, cheap freights inward depend upon the vessels obtaining return cargo, and when this facility is wanting the materials are burdened with higher freights. The docks at Barrow have proved unremunerative for this reason. The docks and railway accommodation at Middlesbro' afford equal facilities for the importation of ore and for the exportation of finished steel and the other manufactured goods of the midland and northern counties.

Contiguity to a
port.

While, however, the contiguity to a port may be advantageous where the goods are heavy, and may more than compensate for drawbacks which the locality may have in other respects, the choice and value of any particular port depend on various conditions. Where the goods are shipped in large quantities, as is often the case with coals, iron, or railway material, a vessel may be sent to the nearest port to fetch the cargo instead of the cargo being sent to a port which suits the vessel. Even where the goods offered are not sufficient to fill a vessel, they may be enough to induce a shipowner to send his vessel to call at a particular port to fetch them, to complete a cargo commenced or finished elsewhere. Mail steamers whose port of departure is London or Southampton will be sent to Middlesbro', Antwerp or Hamburg for the first and heavy part of their cargo.

Suitability of a
port, how
determined.

A port or harbour must be suitable for the particular trade and for the vessels which go to the foreign countries whose commerce is desired. Thus there must be sufficient draught of water, safe navigation, railway communications, facilities for wharfage and handling of goods, and moderate dues. In regard to the export of manufactured goods there must be inducements for vessels to enter. Such inducement may be in the abundance and variety of goods

Inward and
outward freights

to be exported, but if it be a brisk import trade which brings vessels to the port, it may be an advantage to a manufactory that its products afford the only available outward cargo ; as, in the absence of competing cargo, low rates of freight outward may be obtained.

Before the time of steamships and railways, much capital was expended on ship canals, as at Gloucester and Exeter, and on the canalisation of rivers, as in Holland and Germany. These improvements brought coal and material to local factories and carried the manufactures to the ports. The construction of the Manchester Ship-canal affords a notable example of a direct aid to manufacturers. The rental from factory-sites and long water-frontage is likely to form a greater source of revenue than the canal dues. The Trafford Park Estate adjoining is laid out with ample space for factories, all of which have available, on moderate terms, connections with railways and inland canals, and with also a cheap supply of electric power from central generating-stations.

Ship canals.

Manchester Ship-canal.

Trafford Park.

See page 89.

Some trades indeed depend entirely on cheap rates of freight, only rendered possible by the necessities of the shipowner. Thus, ores, iron, and other rough goods are carried from Europe to New York at very low rates because ballast-cargo is wanted and because the American tariff limits the import of general merchandise. So also iron ore is shipped at Lisbon, and brimstone from Sicily, at low rates to the United States. The real cost of freight is in these cases partly paid by the shippers of light goods westward, but mainly by the shipper of produce from America, who must pay enough to remunerate the shipowner for the double voyage. On the other hand, if there is not much inward trade, then an abundance of outward cargo may be necessary to attract vessels. Therefore, although vessels to any foreign country may sail indifferently from any British port, it has become the custom, either because of the

Ballast cargo.

**Inward cargo
to balance
outward cargo.**

Customary ports.

exigencies of the homeward trade, or because certain harbours are suitable for the vessels in question, or for other economical reasons, that particular trades or destinations are associated with particular ports of departure, and factories connected with these trades are established in the vicinity.

Perhaps there is no better instance anywhere of the

Trade localised.

localisation of a trade than that of the manufacture of Portland-cement in the neighbourhood of London, on the rivers Thames and Medway. The chalk and clay from which the cement is made are found close together, on or near the river bank, and yet quite separate, so that the proper proportions can be exactly measured; the by-product coke from the large gas-works of London, also on the river-side, affords a cheap and plentiful supply of suitable fuel; and the situation of the factories allows the cement to be loaded into barges, coasting vessels, and export ships at a trifling expense. As vessels leave London for almost all foreign ports, the cement as weight or ballast-cargo has the advantage of very low freights, while the chalk from the Thames is taken by the collier-steamers returning north at ballast-rates to the cement-works of Hull and Newcastle.

**Example of
Portland-cement.**

See page 48.

By-product cargo.

**Inland water-
carriage.**

Inland Water-carriage affords many advantages, as goods once embarked may be carried long distances at a much less cost than by road or railway; and in case of bulky, heavy, or fragile goods the risks of carriage are generally less. For, however much competition or other causes may reduce rates of railway freight, the bare cost of haulage must at least be paid. Canals and navigable rivers can generally compete with railways in the cheapness of carriage, except when a very prompt delivery is of great importance.

Canal carriage.

The advantages of canal carriage are, however, often restricted by their narrow gauge and neutralised by artificial restrictions, as for instance, when they are controlled by the railway companies.

Not only are freights to be considered but customs duties. Freedom in this respect and the absence of custom-house restrictions and delays have been a great advantage to British manufacturers in competition with less favoured nations. The impediments elsewhere have proved so serious in international competition that relaxations have had to be made at ports like Antwerp and Hamburg, where goods are manufactured or the earlier processes performed in works erected in large bonded areas. In another way, materials and goods are dealt with *in transitu* in the large British ports of Hong-Kong and Singapore and partially also at the Dutch port of Batavia. These facilities go largely to compensate for the absence of the primary advantages of materials and local customers.

Customs duties.

Goods in transit.

Cartage is a serious item of expense in some trades, and may be onerous enough, if competition arises with other factories more favourably situated in this regard, to stop the business, or to absorb nearly all of what without the cartage would be a remunerative profit. Thus, an iron foundry at the top of a hill, or at a distance from a railway station, is heavily burdened in regard to the cartage of pig-iron, coal, sand, and castings. Even a small distance may render necessary the keeping of horses and carters, as well as an expense of loading and unloading, which would be avoided if the factory were situated on a railway siding or canal. Sometimes the expense lies not in constant cartage but in the occasional moving of very heavy goods, as where a boiler-maker, or marine engineer, or locomotive-builder may have to hire special teams of horses to drag heavy loads to a wharf or railway station. Cases of this sort are rapidly diminishing by the closing of unprofitable factories or by the opening of new railways, or by the use of steam-lorries, cheap motor-wagons or wire-rope transporters.

Cartage.

See page 100.

expensive for
heavy goods.

Horses.

See page 100.

Occasional heavy
loads.

See page 88.

But while cartage may be saved by building a factory immediately on the railway, canal, river, or harbour which

serves for transport, the convenience offered should not be over-estimated and allowed too great a weight against the opposing advantages of another site. The proportion which the expense of cartage bears to the total cost of production and delivery, differs of course with the nature of the trade. A manufacturer of light and valuable goods, if there be the general advantages of railway or canal carriage into the town or district, might find no sufficient inducement in the saving of cartage to draw him from an otherwise desirable site to one adjoining a railway.

A manufacturer can load and pack his goods more carefully or systematically at a railway siding in or adjoining his own factory than would be feasible at a common railway station, and in the case of heavy goods can utilise special cranes of the factory which do not exist at the station. Railway companies, however, do not always allow a reduction of charges corresponding to the duties of which they may be so relieved. Narrow-gauge rail-tracks, wire-rope transporters and distributing conveyers for carrying coal and ores have largely diminished these difficulties.

The utilisation of Waste Products, which are necessarily localised, often determines the position of a factory ; or the profits of the factory itself may depend upon the sale of its own by-products. Thus, in large cities, factories find profitable employment in dealing with various kinds of refuse ; and, if coal be cheap, old scrap-iron may be worked up into new iron bars, while similar factories in less populous places would be quite unremunerative. Illuminating-Gas can be made cheaply when the coke, pitch, oil, and ammonia find a ready sale ; and as these sell best in considerable quantities, large cities like London have an advantage in the lower price of gas.

Contiguity to the Consumer is the circumstance that determines the locality of most factories, especially those of moderate extent. There are certain trades that are

**Cartage costs
little for light
goods.**

See page 100.

Railway sidings.

Special cranes.

See page 151.

See page 100.

**Utilisation of
waste products,**

**as in
Gas making.**

See also
Steel making,
page 46.

always necessary, and unless there be special difficulties in obtaining material or workmen, factories become established as the population reaches a certain point. This contiguity to the consumer is, in such cases, of greater importance than contiguous material, for the convenience to the purchaser of ready conference with the manufacturer, of examination of the goods, and of speedy delivery, may outweigh the mere saving in money which purchasing from the more distant factory might allow. The more successful or enterprising of such local manufacturers gradually acquire a trade with distant towns or with foreign countries; and, as the local customers thus become of less importance the question of removal to a locality more favourable for a wholesale or export trade arises. Sometimes manufacturers combine both methods, by retaining their offices and a small factory in the town where they are known, and establishing their principal factory in a more suitable place.

**Contiguity to
consumer.**

Skilled Workmen may generally be best obtained in localities where there is a congregation of similar or kindred trades, as numerous factories create a good labour market and induce workmen to seek employment there. Such a congregation of factories also brings purchasers to the locality.

Skilled workmen

It is expedient sometimes, in the case of certain trades, to choose a locality remote from a town, because labour may be obtained cheaply there, or because the workmen are less influenced by trade unions; but skilled workmen not unfrequently dislike factories remote from large towns, and prefer places where comforts and amusements are more abundant. A site otherwise desirable may be rendered useless for lack of Workmen's Houses, and if these have to be built for the purposes of the factory the capital expenditure becomes greatly increased. An expenditure for workmen's houses often proves a profitable investment of capital; but if the houses depend entirely on the new

**Cheap labour
remote from
towns.**

**Workmen's
houses.**

See page 169.

industry for tenants, a heavy pledge for its continuance is added to the general risks.

Subsidiary trades.

Contiguity to Subsidiary Trades is sometimes of more consequence than at first appears. Thus, if a Birmingham gun factory, a Sheffield cutlery works, or a Nottingham lace mill could be transported with all its workmen to a district where materials were plentiful and a demand brisk for the commodities, but where no other similar factory existed, it might fail for want of the preliminary trades which perform cheaply, because exclusively, the earlier processes with the raw material or certain finishing processes usually performed separately. They would suffer also for want of the adjunct or contributory trades for repairs and renewals, and for want of the various minor purveyors who surround the numerous similar factories in the original district, but which a single factory could not alone support. In other words, this subdivision of labour requires a large trade and a busy population ; thus industries needing such contributory trades are difficult to transplant.

Preliminary trades.

Works situated on mineral areas.

Iron, steel, or clay works are sometimes established on mineral fields, subject to subsidence and other damage from underground mining operations. The value of land, works or factories, may be diminished by the risk of such damage or by the liability to pay for way-leave or damages to neighbouring landowners or occupiers.

Mining rights.

The mineral rights, which are often quite separate from the ownership of the land, do not, however, include the right to let down the surface, even if compensation be offered, unless this contingency is specifically included in the title.

Surface damage.

Water-supply.

Water is necessary to most trades, Quantity being important in some cases, as for washing ores or refrigerating ; Quality in others, as for paper-making and brewing ; while the Pressure from elevated-reservoirs or from rapid streams is valuable as power. The Water-power of rivers or water-

Water-power.

falls is in some cases used with advantage instead of fuel-power, and where a gratuitous source is available such an alternative is worth consideration. But where coal is cheap, as in Great Britain, it is only in rare cases that the advantages of water-power balance the drawbacks to its use. Thus, the locality may be inconvenient; and if in order to utilise water-power, a factory has to be built in a place badly situated for materials, transport, subsidiary trades, workmen's houses, or customers, such power, even if costing nothing in money, may be dearly bought. In order to render water-power available, considerable expense in dams, reservoirs, conduits, and sluices may be necessary; and the expense of these may quite outweigh the capitalised equivalent of fuel consumed in a steam-engine. Tidal ponds with sluices for turbines or water-wheels, were tried as long ago as 1850 on the large area of marsh land below London, but were found unremunerative.

Value restricted
by cheaper fuel-
power.

Expenses of
water-power.

If transmission of cheap water-power by electricity is considered, the distance to be traversed on the one hand, and the cost of competing fuel on the other, may render the water-power unremunerative. It is for this reason that in South Africa the water force of the famous Victoria Falls on the Zambesia river cannot be utilised at the Rand mines 500 miles distant, because local coal is purchasable there at low prices.

It is for the above reasons also rather than from inherent difficulties that the further utilisation of tidal-forces is postponed.

Tidal forces,

There is no lack of experience in regard to it.

The tide in the River Thames from the sea to above London and Westminster has a daily range of about 17 feet, and for centuries past has been availed of without any other propelling power unless expedition is needed, and merchandise is conveyed up and down the river in barges to the extent of thousands of tons daily.

as at London
from the Thames.

Water-power is liable to stoppage in dry seasons;

and if a supplementary steam-engine has to be provided much of the advantage of the water is lost. It is also liable to diminution by operations of drainage, or increased consumption higher up the stream, involving possible disputes. The above remarks do not touch on the question of the local distribution by the accumulator or other hydraulic system, of power produced by a steam-engine or other original motor, nor of water-power from elevated sources brought in pipes, as from the Alpine slopes of Italy and Switzerland.

Transmission of power by water.

Contiguity to fuel or power.

Contiguity to Fuel or Water Power may be absolutely necessary to allow of competition with rivals similarly favoured, but fuel is so cheap in Great Britain that except in metallurgical or chemical manufactures the cost does not greatly affect the choice of locality if other circumstances be favourable. In the smelting of iron and other ores, contiguous coal is generally of more importance than contiguous ore.

Electro-chemical processes.

See page 48.

In smelting and other metallurgical trades, the exclusion of countries having no coal is likely to be modified by the modern inventions which allow heat to be generated by electricity. The cost—hitherto prohibitive—of this process is becoming cheaper. In countries like Switzerland and Northern Italy, where there is a constant supply of pressure-water from melting snow or other high-level sources, these supplies are likely to become still more valuable for electro-metallurgical and electro-chemical processes.

Producer-gas.

See page 88.

Natural Gas.

Fuel may be transported 20 miles or more in the form of Producer-gas. The value of land or sites for factories is enhanced where such supplies are available. Natural gas has been conveyed under pressure still greater distances in the United States for use in furnaces and kilns and even as fuel for steam boilers.

The advantages afforded by Electricity for transmitting power long distances and distributing it in factories have already been described.

See page 89.

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