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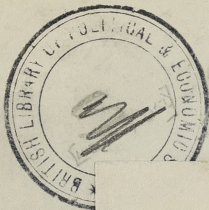
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FINAL REPORT  
ON THE  
Third Census of Production  
of the United Kingdom (1924)

THE IRON AND STEEL TRADES,  
THE ENGINEERING TRADES,  
AND  
THE NON-FERROUS METALS TRADES

*Presented to Parliament in pursuance  
of the Census of Production Act, 1906*

[6 Edw. 7. Ch. 49]

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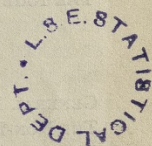


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## PREFATORY NOTE.

As explained in the Prefatory Note to the volume on the Textile Trades, the Final Report on the Third Census of Production (1924) is, for convenience, being issued in a series of volumes, each covering one or more groups of trades, together with a volume dealing with the results of the Census as a whole. The present volume is the third of the series and relates to three groups of trades, viz. (i) the Iron and Steel Trades, (ii) the Engineering Trades, and (iii) the Non-ferrous Metals Trades. It contains a separate report on each individual trade and, for each group of trades, a General Report which brings together the results for all the trades in that group.

### Arrangement of Reports on Individual Trades.

To facilitate reference, the contents of each trade report are arranged according to the uniform plan described below, though the greater relative importance of some trades has led to a rather more detailed treatment than that adopted for others.

*Introductory section.*—This section sets out the main results of the different Censuses and discusses the comparability of the figures.

*Production.*—The section on Production shows output under the principal headings appropriate to the trade concerned, with the addition of similar goods produced in other trades, and gives any available comparative figures of production recorded at the previous Censuses; it discusses the amount of duplication involved in the recorded value of the gross output of the trade in 1924 and the extent to which the recorded cost of materials used covers goods produced by other firms in the trade; it compares production with exports and imports of similarly described goods so far as the data allow; and it summarises the voluntary information received in response to the questions included in the Census schedules for certain trades as to the quantities of different kinds of materials used in those trades in 1924.

*Wages.*—A brief section records the available information relating to the amount of wages paid in the trade in 1924.

*Employment.*—The section on Employment shows the numbers employed (excluding outworkers) in the different censal years classified by sex, age and character of employment; the number of male and female outworkers, if any, and the amount of the monthly variations in the number of operatives employed in 1924.

*Power.*—The section on Mechanical Power summarises for the different censal years the equipment of the trade in (a) prime movers, classified according to kinds, (b) electric generators, classified according to the kind of prime movers by which they were driven, and (c) electric motors (except 1907), classified according as they were



actuated by purchased electricity or by electricity generated in the same works ; and it distinguishes between the power equipment in use and that in reserve or idle during 1924.

*Machinery equipment.*—This section includes the voluntary information received in response to the questions included in the Census schedules for certain trades as to the machinery equipment of those trades in 1924.

*Tables.*—The tables with which each trade report concludes summarise, for the trade in question, the data furnished in reply to the compulsory questions on the schedule for that trade. They follow the same order of arrangement as the sections of the report, namely, Summary, Production, Employment and Mechanical Power. Separate figures are given for the various divisions of the United Kingdom (England and Wales, Scotland, and Northern Ireland) in so far as this is practicable without disclosing particulars relating to the business of individual firms.

#### Arrangement of General Reports.

The sectional arrangement described above has been followed in each of the General Reports, though they contain a much fuller discussion of the subjects of Employment and Mechanical Power than the individual trade reports. These reports also include summaries of the voluntary information received in response to the questions in the Census schedules as to electricity generated and fuel consumed in 1924.

#### Index and Tables of Contents.

The volume is provided with a table of contents and with an index of commodities which contains references not only to the reports on the trades in which any given commodity is mainly produced, but also to the other trade reports in the volume which record production of the same commodity. A detailed table of contents is also prefixed to each of the reports in the volume.

#### Relation to Preliminary Reports.

For the most part the Preliminary Reports on the trades dealt with in the present volume were confined to summarised statements of those particulars for each trade which were required compulsorily in 1924, together with the available comparative data for 1907 and, in a few cases, for 1912. The results given were provisional and the figures shown in the Final Reports embody a number of amendments and adjustments. The main causes of these are the receipt of certain returns that were outstanding and the revision of returns that were the subject of correspondence at the time when the preliminary figures were published ; the transfer of returns to trades with which they are more appropriately grouped ; and the revision of calculations and changes in method of treatment resulting from a later and closer scrutiny of returns.

The particulars for 1924 which were given in the Preliminary Reports, moreover, did not, as a rule, extend to Northern Ireland. The Census of Production in that area was taken by the Board of Trade on behalf of the Government of Northern Ireland, and the Preliminary Reports on the results were published separately from those relating to Great Britain. The present series of Final Reports include the particulars for Northern Ireland as well as those for England and Wales and for Scotland.

Further, it was not generally possible in the Preliminary Reports to bring into conjunction with the products of a given trade the particulars of similar goods produced in other trades, nor was it possible to discuss the amount of duplication involved in the recorded output value of the various trades or the extent to which the recorded cost of materials covered products of other firms in the trade. Both these matters are dealt with in the Final Reports.

As indicated above, the Final Reports also record the voluntary information (not shown in the Preliminary Reports) which was received in reply to questions in the 1924 Census schedules relating to electricity generated and fuel consumed in all trades and to the quantities and kinds of materials used and the machinery equipment of factories in certain trades. The particulars shown in the Final Reports regarding Employment and Mechanical Power are also fuller than those given in the Preliminary Reports.

#### Inclusion of Results of Second Census.

The examination of the results of the 1912 Census of Production was in progress at the outbreak of war in August, 1914, and the particulars now available for comparison with the figures relating to 1907 and 1924 are not complete. Many of the returns furnished to the Census office in 1913 were defective and correspondence directed to securing the omitted particulars could not be continued. Moreover, at the 1912 Census, firms employing, on the average, not more than five persons (excluding the proprietors) were exempted from making detailed returns, being required to state only the average number of persons employed by them during the year. The incompleteness in the case of the larger firms and the exclusion of the small firms, made the 1912 results for the most part unsuitable for comparison with those of 1907 and 1924. In a limited number of trades, however, it was found that the proportion of output represented by those firms from which full information was received, was sufficiently large to allow of effective comparison between the results for 1912 and those for the other two censal years ; in the reports on these trades detailed particulars for 1912 are given. In certain other trades, where the proportion of persons employed in 1912 by the firms from which detailed returns were not received was not in excess of 10 per cent. of the numbers employed by the other firms in the trade, summarised particulars only are given for 1912.



The absence from the 1912 results of a considerable proportion of the output of many trades obviously precludes the use of those results in the General Reports, which therefore deal only with the particulars for 1924 and 1907. An exception is made of the figures relating to power equipment in 1912, which are less likely to be rendered seriously defective by the omission of small businesses. These particulars of power equipment are therefore inserted in the General Reports, but it must be emphasised that they are, nevertheless, considered to be too incomplete to form a trustworthy basis of general comparison. Their main interest lies in the indication which they afford of the increase that has occurred since 1912 in the use of electricity, particularly electricity purchased from public supply companies, as a source of power.

## INTRODUCTORY NOTES.

These Notes are intended, in the first place, to summarise the instructions which were given to firms in order to guide them in filling up the schedules issued in connexion with the 1924 Census of Production, and, secondly, to discuss certain matters common to all the reports contained in this volume, including the comparability of the results of the three successive Censuses. The Notes are essential to a full understanding of the reports and should be regarded as forming an integral part of each report.

## A.—Census of Production, 1924.

(1) *Period covered.*—In accordance with the practice followed at each of the preceding Censuses, firms were given the option of making returns either for the calendar year 1924 or for the business year of the firm most nearly corresponding thereto and ending not later than 30th June, 1925. If a firm commenced or went out of business in the course of the year 1924, it was liable to make a return in respect of that part of 1924 during which production was carried on.

(2) *Number of returns.*—The report on each trade states the number of separate returns which formed the basis of the figures tabulated in the report. The number of returns, however, should not be taken as necessarily representing the number of establishments engaged in the trade in question. Firms that owned several establishments in which the same trade was carried on, and desired to make combined returns covering all these establishments, were generally permitted to do so; in many such cases, the owners preferred to make a separate return for each of their establishments. On the other hand, many large enterprises engaged in several distinct trades were asked to furnish separate returns for each of those trades, and in these cases a single industrial undertaking was responsible for several returns.

(3) *Exclusion of merchanting.*—Where firms, in addition to their manufacturing business, also bought goods and re-sold them in the same condition as that in which they were purchased, they were instructed to exclude particulars of such transactions from their returns; i.e., to omit such goods from their statements of output and of materials, and to exclude from their statements of persons employed those members of their staff who were wholly or mainly required in connexion with their merchanting business.

(4) *Classification of output.*—Section 3 (1) (c) of the Census of Production Act, 1906, provides that:—"Particulars as to the quantity of output shall not be required except in the case of articles the quantity of which is on their importation into or exportation from the United Kingdom required by the official import or export list to



be entered, nor shall such particulars be required in greater detail than in those lists." For the purpose of classifying output in the Census schedules, the headings in the current Import and Export List were adopted so far as they were applicable, and firms were then required to state both quantities and values if both were specified in the Import and Export List. In certain cases, however, the classification followed in that List was found to be more suitable for merchants doing an export or import trade than for manufacturers. In such cases a different classification was adopted and values only were then required to be stated except where (after consultation with the Trade Association concerned) firms were requested to furnish voluntary particulars of quantities in respect of some of the headings.

(5) *Distinction between goods made for sale and total make.*—In general the output which is stated in the reports for any particular class of goods represents goods in the form in which they were sold during the censal year or held in stock at the end of the year. It thus falls short of the total make of the goods concerned to the extent that any such goods were used, by the firms that made them, for the production of other ("more finished") goods. In the case of some classes of goods, a special return of total make was required in addition to the output for sale.

(6) *Valuation of output.*—The values of goods shown in the returns to the Census of Production were required to represent the net selling value of all deliveries of the goods (as packed for sale) within the year of return, plus stocks of the same goods at the end and less stocks at the beginning of the year. In determining the net selling value, firms were instructed to deduct from the amounts charged to customers such items as discounts, payments to cartage firms, railway companies, etc., for carriage outwards, and allowances for returnable cases, etc. Where separate returns were required for different departments of the same firm, goods produced in one department and used in another department in the production of more finished goods had to be recorded by the first department at the value at which they were booked to the second (using) department.

(7) *Valuation of work done by firms working "on commission," etc.*—Firms working "on commission" or "for the trade" on materials given out to them by other firms were required to state as the value of their output only the amounts received by them for the work, less discounts and payments to cartage firms, railway companies, etc., for carriage outwards, and to exclude the value of the materials supplied to them. Hence, in the case of goods made on commission for merchants or other persons not required to make returns, the values recorded in the Census of Production show less than the total selling value of the goods, since the sum returned to the Census office represents only the amount paid for the work done on the materials supplied and does not include the profits of the giver-out or the cost of his materials, part of which may have been

imported while part may have been included in the output recorded in the Census. This defect does not arise in the case of commission work, etc., done for manufacturing firms, since the value of the output recorded by such firms covers the selling value of the goods after the work in question has been applied to them.

(8) *Materials.*—The materials of which the cost was required to be stated included all raw and other materials purchased and used in the production of the output recorded in the firm's return; all fuel, oil, gas and electricity purchased; packing materials; and materials for repairs to the firm's own buildings or plant carried out by their own workpeople. The figure of cost to be stated under this heading was the amount spent in the purchase of such materials, etc., in the year, plus stocks at the beginning and less stocks at the end of the year. The figure was not to include wages, salaries, rent, rates, insurance, depreciation, and similar charges, or the cost of new machinery and plant, nor was it to include any payment included in the return under the heading of *Work given out*.

Where a firm made one return covering goods at several stages of manufacture, instructions were given to include as "materials" only the materials *purchased* and not the value of the goods at the intermediate stages. On the other hand, where separate returns were made for different departments of the same firm, goods produced in one department and used in another department in the production of more finished goods had to be treated as purchased at the amount charged (and included in its return of output to the Census office) by the delivering department.

Firms working on commission or for the trade were instructed to return, as materials, only goods which they themselves had purchased and used, and not the goods given out to them by the firms for which they worked.

Under the provisions of the Census of Production Act, 1906, the cost of materials was required to be stated in one sum only, without any details.

(9) *Work given out.*—Firms giving out work to other firms were required to state the aggregate amount paid to such firms for work done. The amount thus returned was not to include the cost of any items accounted for under the heading of *Materials*, nor the amount of any wages paid to outworkers who were simply workpeople employing no one outside their own families.

(10) *Persons employed.*—Firms were required to classify persons employed by them under the two headings of (1) Operative Staff (Wage-earners), and (2) Administrative, Technical and Clerical Staff. The term *Operative Staff* was defined as including all workpeople employed by the firm in connexion with the output returned to the Census of Production, including foremen, carters and warehousemen; and the term *Administrative, Technical and Clerical Staff* was defined



as including the office and management staff (i.e., working proprietors, managing directors, managers, designers, clerks, salesmen, travellers, etc.), all clerks and other persons engaged primarily in office work being recorded under this heading and not as operative staff. In those cases in which outworkers were employed, the numbers of these were recorded separately and were not included in the number of operative staff.

The particulars required related to the persons employed (i.e., on the pay sheets) in certain specified weeks with the proviso that, in the event of a strike, holiday or special cessation of work in any of these weeks, the nearest ordinary week (of which the ending date should be stated) was to be taken.

Firms were required to state—

(a) The numbers employed in the week ended 18th October, 1924, divided under the two main headings described above, and also according to their sex and to their age (i.e., over or under 18 years of age).

(b) The number of male and of female operative staff actually at work in a specified week (one of the middle weeks) in each month of 1924.

(11) *Outworkers*.—In those trades employing outworkers (i.e., workpeople doing work off the firm's premises on materials supplied by the firm) firms were required to report the numbers of outworkers employed, as "given on the half-yearly list of outworkers sent to the Local Public Health Authority" on or before the 1st February and 1st August, 1924. The total numbers so reported are shown under the headings *January* and *July* respectively in the Tables appended to the reports in this volume.

(12) *Engine Power*.—Firms were instructed to give particulars of the prime movers, electric generators and electric motors (exclusive of converters and transformers) in their works, classifying the prime movers by kinds, the electric generators according to the kind of prime mover by which they were driven, and the electric motors according as they were driven by purchased electricity or by electricity generated in the firms' own works. For prime movers, firms were instructed to show the effective horse-power which the engines could develop; for generators, the kilowatt capacity; and for electric motors, the rated horse-power.

In recording the particulars of engines in their works, firms were required to show separately those ordinarily in use in 1924 and those in reserve or idle. These terms were intended to cover respectively engines in use for the greater part of the year, even though not working to their full capacity, and engines not in use, or only occasionally in use, during the year.

(13) *Wage-bill*.—The particulars contained in the reports on individual trades as to the aggregate wage-bill of certain firms in those trades relate to the amounts of wages paid to operatives and not to

the total payments made to employees of all kinds. For the purpose of the enquiry as to wages (which was conducted by the Ministry of Labour) the term *operatives* was defined in the same manner as in the Census of Production schedules (see paragraph (10) above).

(14) *Meaning of signs "—" and ". . ."*.—In the tables contained in the present volume the sign — is used as meaning *nil* and the sign . . . is used to indicate that figures are not available for insertion in the space so marked.

#### B.—Comparisons between Results of Successive Censuses.

(15) *Differences in geographical scope*.—The Censuses of 1907 and 1912 covered Great Britain and the whole of Ireland, but as a result of the establishment of the Irish Free State in 1922 the Census of 1924 applied only to Great Britain and Northern Ireland, the enquiry covering Northern Ireland being carried out by the Board of Trade on behalf of the Government of that division of the United Kingdom. The effect of the exclusion of the Irish Free State from the 1924 Census is discussed in each of the General Reports and in the reports on the individual trades concerned.

(16) *Other differences*.—The more limited range of the 1912 Census and its effect on comparisons between the results for that year and those for 1907 and 1924 is discussed in the Prefatory Note (see page v). Other differences between the Census of 1924 and those relating to 1912 and 1917 as regards the trades included or the methods followed in conducting the Census in individual trades are explained in the reports on the trades or trade group concerned.

(17) *Changes in the purchasing power of money*.—The comparability of figures relating to value or cost in the different censal years is affected by the changes which have taken place in the general purchasing power of money.

(18) *Changes in hours of labour*.—The reductions in normal weekly hours of labour which were made in nearly all industries in the early post-war years should be borne in mind in comparing the figures for 1924 with those for the pre-war years.

(19) *Comparisons of numbers employed (excluding outworkers)*.—The nature of the information required in 1924 is explained in paragraph (10), from which it will be seen that firms were required to classify the persons employed by them under the headings of *Operative Staff (Wage-earners)* and *Administrative, Technical and Clerical Staff* respectively, and to give details, by sex, age and character of employment, of the persons employed in one specified week, together with the numbers of male and female operatives employed in each of twelve specified weeks, one in each month of the year. At the two previous Censuses firms were required to classify the persons employed by them under the two main headings of *Wage-earners* and *Salaried Staff* respectively, and to give details,



by sex, age and character of employment, of the persons employed on four specified days (one Wednesday in each quarter of the censal year). Having regard to the definitions of *Wage-earners* and *Salaried Staff* in 1907 and 1912, and of *Operative Staff* and *Administrative, Technical, and Clerical Staff* in 1924, it may be assumed that these categories correspond closely enough for the purpose of comparisons between the three years.

Where the reports show the *average* numbers of employed persons divided between the two age-groups (under and over 18) the figures for 1924 have been arrived at in the following manner. The averages of the actual numbers of operatives of each sex recorded for the twelve specified weeks have been divided between the two age-groups in the proportions shown by the detailed returns received for the week ended 18th October, 1924; and the numbers of administrative, technical, and clerical staff returned for that week have been added to the calculated averages for operatives in order to obtain the total average numbers shown in the tables referred to. For the earlier censal years the average numbers shown under each heading are the averages of the numbers actually returned for the four specified days.

#### C.—Notes on Duplication, Net Output, etc.

##### *Value of output and cost of materials for a trade regarded as a unit.*

If the aggregation of firms which constitutes a trade for the purposes of the Census of Production be considered as a unit, the value of the output consists of the value of the goods produced in the trade which are available for sale outside the trade, together with the value of any work done for firms outside the trade; and the cost of the materials used consists of the cost of all materials purchased from outside the trade, with which may be associated the cost of any work given out to firms outside the trade. For the reasons explained in the next two paragraphs, the output value or the materials cost for the trade considered as a unit (in the sense defined above) will not always be the same as the totals reached by adding together the output values and materials costs recorded on the Census schedules by all the separate firms in the trade, which totals are shown in the trade reports as *gross output* and *cost of materials* respectively.

(i) *Multiple records of goods within a trade.*—The output recorded in the Census of Production represents goods in the form in which they were sold during the censal year or held in stock at the end of the year. When such goods (referred to hereinafter as “less finished” goods) were purchased by another firm in the same trade for use in the production of other (“more finished”) goods, their value is not only included in the output recorded by the firm which made them, but is also covered by the value of output recorded by the firm which bought them. Their value is thus duplicated in the aggregate gross output value of the trade; and in a trade which includes several stages of production, the value of the same goods may be recorded several times in the gross output value.

It will be clear that, whenever duplication occurs in the gross output value of a trade, owing to the use as “materials” by some firms of goods produced by other firms in that trade, such duplication of products involves a corresponding addition to the total amount recorded as “cost of materials” by all firms.

(ii) *Multiple records of work done for other firms in the same trade.*—The gross output value of a trade includes the value of all work recorded by firms in the trade as having been done during the censal year “on commission” or “for the trade”. Hence, in so far as such work may have been done for firms making returns on schedules for the trade in question, its value is duplicated in the gross output value of the trade through being covered also by the returns of the firms that gave out the work. Such duplication will not as a general rule affect the aggregate recorded as the cost of materials used by the trade, since firms that gave work out were required to return the amount paid for such work separately from their return of cost of materials.

(iii) *Value of output free from duplication.*—In order to determine for any trade the value of the output of the trade considered as a unit, it is necessary to exclude from the gross output value the duplication arising either from the sale and purchase of goods within the trade or from the double record of work done and work given out as explained in the preceding paragraphs. In the absence of information as to the quantities of the “less finished” products that were purchased by other firms in the same trade, the amount of duplication arising from this cause is usually difficult to estimate. In so far as “less finished” goods exported can be identified with the goods recorded in the Census of Production as made for sale, the amount of such goods available for purchase by other firms within the trade, and therefore the amount of possible duplication, is reduced by the factory value of such exported goods. As regards the remainder, even if it is possible to estimate the value of the “less finished” goods required to be purchased by firms in the trade for use in their production of “more finished” goods, this value will not necessarily represent the amount of duplication; for supplies of the “less finished” goods may be available from sources outside the trade, viz., either from other trades or from abroad, and no duplication in the trade aggregates is involved in the purchase of supplies from such outside sources. Failing information as to the sources from which, in fact, firms drew their supplies, the amount of duplication has ordinarily to be stated, not as a definite amount, but as lying between certain limits which represent different possibilities as to the quantities of “less finished” goods purchased from within the trade and from outside respectively.

As regards duplication arising from the double record of work done and work given out, the amount of this duplication corresponds to the value of the work given out by firms in the trade to other



firms *in that trade*; but as already indicated in paragraph (9) the value of work given out is returned in one sum, and the amount (if any) given out to firms in the same trade cannot be distinguished. Hence, the amount of duplication has to be estimated in each case from the information available, e.g., as to the different classes of work done by the firms that worked on commission or for the trade; and in practice it has usually to be stated, not as a definite amount, but as lying within specified, sometimes rather wide, limits.

(iv) *Cost of materials purchased from outside a trade.*—In order to determine for any trade the cost of the materials used by the trade considered as a unit, it is necessary to exclude from the aggregate cost of materials returned by the firms in the trade all those materials which were produced by other firms in the same trade. It follows from the explanations already given that, if the amount of the duplication in gross output arising from the sale and purchase of goods within a trade can be determined, the deduction of a corresponding amount from the aggregate cost of materials returned by all firms will yield the cost of the materials purchased from sources outside the trade by the trade considered as a unit. (See also final paragraph on p. xv.)

*Multiple records of goods made and work done as between firms in different trades.*

As goods produced by one trade may be sold to another trade for use in the production of other goods, and work may be done by firms in one trade for firms in another trade, the aggregate gross output value recorded for a group of trades among which such transactions take place involves duplication, the evaluation of which is subject to difficulties of the character noted above; and the aggregate cost of materials recorded for the group is also increased in the manner described above for an individual trade.

*Net output.*

All duplication, whether arising from the sale and purchase of goods within a trade, or from the recording of the same process both as work done and as work given out, is eliminated when, for any trade, the total recorded cost of materials used and the amount paid to other firms for work given out to them are deducted from the value of the gross output. The figure resulting from this operation is described as the *net output* of the trade concerned, and, after deduction of a value sufficient to cover the depreciation of plant and equipment during the censal year, it constitutes for that trade the fund from which wages, salaries, rent, royalties, rates and taxes, advertisement and sales expenses, and all other similar charges have to be provided, as well as profits.

In ascertaining the net output in the manner described above, the cost of materials which is deducted from the gross output value represents the cost of those materials as received by the firms which

used them and not necessarily their value as included in the statements of output made by the firms which produced them. As explained in paragraph (6) above, the values of products as recorded in the Census are not intended to include payments to cartage firms, railway companies, etc., for carriage outwards, nor do they include the charges of merchants, etc., through the agency of whom the goods may be sold. Hence, their recorded value as "products" will coincide with their recorded value as "materials" only in cases in which they are sold directly by the producing firm to the using firm and no payments for transport are made by either firm to outside agencies. When payments to such outside agencies are made or the transfer of the goods takes place through the agency of merchants or brokers, the recorded cost of the goods as materials of the using firm will exceed their recorded value as output of the producing firm. This circumstance, however, does not alter the character of the net output considered as a fund, or the nature of the charges specified above as charges on that fund.

In the absence of information as to the amount, in any particular trade, of merchants' or brokers' charges and payments to transport firms, no attempt has been made in the reports contained in the present volume to allow for such items, either in computing the net output of a trade, or in calculating the cost of the materials purchased from outside the trade, a calculation to which it is clear that the considerations explained above also apply.