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INDEXES OF FACTORY PRODUCTION



1949-50 TO 1965-66



COMMONWEALTH BUREAU OF CENSUS AND STATISTICS
CANBERRA, AUSTRALIA

INDEXES OF FACTORY PRODUCTION, AUSTRALIA1949-50 TO 1965-66CONTENTS

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INTRODUCTION

This bulletin presents series of annual indexes of factory production for the years 1949-50 to 1965-66. Tables 1 and 2 present indexes on 1955-56 and 1959-60 bases respectively for classes and combinations of classes of manufacturing industry. Tables 3 and 4 present indexes, also on 1955-56 and 1959-60 bases, for selected sub-classes (i.e., individual manufacturing industries). The bulletin reproduces, with some minor changes, the text and tables contained in previous issues, with the addition of figures for the year 1965-66 which is the latest year for which complete factory census statistics are available. The indexes should be interpreted in conjunction with statistics of the annual factory censuses published by the Bureau. For a brief description of these censuses, and for definitions of terms used, reference should be made to the Appendix to this bulletin.

2. The title - "Indexes of Factory Production" - is in general accord with international nomenclature in which the standard term "indexes of industrial production" relates to the combination of mining, manufacturing, gas and electricity, and building and construction industries. The indexes have also been compiled by methods which are commonly adopted, the all classes index comprising in fact indexes of the output of factory sub-classes at constant prices combined by the use of base period value-added weights.

3. Indexes of this type are subject to a number of limitations in that the concepts involved cannot be rigorously defined independent of the formulae used to compile them. In addition, limitations of the available statistical data, many of them unavoidable and irremediable, make any formula hard to apply consistently, or even determine to some extent the nature of the formula to be adopted. These points are discussed at some length in this bulletin, and it must be emphasised that an understanding of the problems is essential if inappropriate use of the indexes is to be avoided.

4. The annual censuses of factories in Australia provide a very much greater range of statistical information than is available in monthly production statistics. The problems involved in compiling annual indexes are correspondingly less difficult to handle statistically, and within the limits indicated the resulting indexes can be taken as more soundly based than monthly or quarterly indexes could be. When sufficient monthly or quarterly information is available, it can be summarised into indicators which are useful for short term analysis or as preliminary projections of annual series. It has not been possible as yet to develop current monthly or quarterly indexes of factory production.

CONCEPTS AND USES

Quantity as an economic concept

5. The fundamental problem to be faced and overcome in compiling any index of factory production, or of other types of production, is that of finding a satisfactory basis on which to combine quantities of a great variety of goods and services. For example, it might be possible to express the output of goods from all factories in terms of tons weight or tons measurement (volume). Such a compilation might have some limited use in a consideration of (say) transport requirements but would clearly have little significance in any general economic sense. For general economic purposes the only practicable way in which quantities of diverse commodities or services can be aggregated is in terms of money values. For some purposes such aggregations are satisfactory, as for instance when one wishes to compare two aggregates in respect of one period of time. For example, current money values could provide one basis on which to judge the relative importance of two industry groups. But for many purposes one wishes to compare economic aggregates in respect of different periods of time and is faced with the problem that such comparisons are affected not only by changes between periods in the quantities of the goods and services being measured but also by changes between periods in the relative prices of these goods and services.

Naturally this leads to attempts to devise measures from which the effects of changes in prices have been removed, and which reflect as far as possible only changes in the quantities of the goods and services included in the aggregates to be compared. That any such measures must be hypothetical and based on a number of assumptions is almost axiomatic, and certainly they cannot constitute a measure of quantity in any physical sense.

Averaging quantity changes

6. Indexes designed to meet this sort of purpose can be thought of in several ways. When details are available of the quantities of various commodities produced it is possible to think in terms of an index which summarises the available data in the form of an average change over a period. In a very crude way this could be done by taking an average of the percentage changes for all items for which output statistics are available. Such an index, however, would almost certainly be useless in practice: it would give equal weight to all commodities for which information happened to be available (e.g., steel, wire nails, flour, motor-car tyres, golf balls, etc.). Some attempt must be made to weight the individual series in accord with their relative importance. The value of output is the most obvious choice as a measure of relative importance and conventional methods of compiling indexes frequently make use of the device of revaluing quantities of output of particular commodities at prices of a convenient base year, adding the results and expressing the aggregates obtained in the form of an index. (This is, of course, equivalent to weighting figures of percentage changes in proportion to values of output.) There are theoretical objections to attaching any real significance to price weights and regarding them as being, in fact, measures of the relative importance of the commodities concerned. In practice the problem is further complicated because changes in prices relative to each other in conjunction with changes in outputs result in the choice of base year normally affecting the trend of an index. Therefore, even if the practice of weighting by prices is accepted as reasonable, it only remains satisfactory so long as these changes are not such as to cause widely divergent movements over the relevant period as between indexes having different base periods.

Revaluation of quantities at constant prices

7. There is a second way of looking at such indexes. As well as being a convenient summarisation of the available data about quantities of output, they can be thought of in some circumstances as an indicator of change in the value of output at constant prices, or as an estimate of change in the value of output from which the direct effects of price changes have been eliminated. If information is available for quantities of all commodities produced by an industry and all its products are sold to other industries or to final consumers the procedure described provides a result which can be regarded as an index of the value of output at constant prices. These conditions are approximated in the rural industries in Australia for which this type of (gross output) formula is used in compiling the published indexes. Even in this case, however, a modification has to be made in order to omit from the "all farming" indexes that part of the output of seed and fodder crops which is not sold outside the rural sector.

8. In the manufacturing sector the problems are greater. In the first place there are important but unavoidable gaps in the quantity data available because many commodities cannot be measured in terms of homogeneous or standard units. In those sub-classes where these gaps exist it is possible to regard an index as measuring the value of output at constant prices only if that part of output for which quantity information is available can be regarded as representative (in terms of changes over time in the level of output) of the whole sub-class, or if some other method can be devised for measuring the remainder. Secondly, in many cases, factories do not produce completed products for sale outside the factory sector. Even within individual sub-classes there are cases where output of one factory becomes the input of another within the same sub-class, or of a further process within the same factory, which then adds value in the process of transforming this input into a new commodity for sale.

When this happens there will be duplication if all commodities are revalued and added together. The only satisfactory way to deal with this problem within a sub-class is to identify and eliminate the duplication (see the reference to the "all farming" index above). In the Australian factory indexes published in this bulletin, the quantities of output of commodities for further processing in the same factory have been omitted wherever possible, but in general it has not been possible to identify output sold to other factories within the same sub-class so that some duplication remains in the value of output, at current and therefore at constant prices.

Value added at constant prices

9. This problem of sales from one factory to another becomes very much more important as soon as one tries to combine sub-classes, and consideration of the problem suggests yet a third way of looking at these indexes, namely as indexes of value added at constant prices since value added is free of duplication. The use of indexes of output (or materials) at constant prices as indicators of value added at constant prices requires for its justification that the proportion of value added in all commodities produced in a sub-class should be the same, or that there should be no significant changes in the "product-mix" over the period of the index: it requires too that there should be no important changes in the efficiency with which materials are used (i.e., in the amount of output obtained from a given quantity of materials). If indexes of output at constant prices for sub-classes are accepted as reasonable approximations to indexes of value added at constant prices and are combined using value-added weights, the combined index is subject to the further qualification that there should not be significant changes in the relative importance of individual sub-classes as measured by their value added as a proportion of total value added. As individual industries normally grow at different rates, this creates yet another "index-number problem" as the change shown by a combined index will in these circumstances vary according to the choice of base year.

10. Value added is the difference between the value of output and the value of materials and fuels used. It can be expressed only in money-value terms, but unlike most money values cannot be defined and measured in terms of quantities and prices. It is accordingly impossible to estimate value added at constant prices in a way strictly analogous to the estimation of output at constant prices, since value added cannot be separated into elements of quantity and price. However, the difference between a revaluation of output on the one hand and of materials etc. on the other may be conceived of as value added at constant prices. At first sight a net output formula, as this is usually called, does appear to be the closest approximation to an ideal formula for the purpose but, in addition to the above theoretical qualification there are severe practical limitations. Application of such a formula requires a much greater range of information on both outputs and inputs than is normally available even from a factory census such as is carried out annually in Australia. In practice, imperfections in the available data appear to have a greater effect on a net index than they do on a gross output index. This is a particular difficulty when the difference between output and materials used (value added) is relatively small. Such data imperfections are difficult or impossible to control in many cases.

Nature and uses of the Australian indexes

11. As will appear from the description of methods below, the Australian indexes are indexes of output at constant prices for individual sub-classes, which are combined by the use of value-added weights into indexes for each class and all classes combined. They provide a convenient summary, for purposes of economic analysis, of a great variety of detailed statistics, and can be used as broad indicators of growth in manufacturing industry. Although the sub-class and class indexes are different in nature, in certain circumstances both can be thought of as indexes of value added at constant prices. Naturally, in view of the many assumptions involved, the imprecise concepts, and the limitations of data, they should not be interpreted as precise measures.

In particular the indexes, both for sub-classes and classes, have limitations in connection with productivity studies which attempt to express the quantity of output or of production per unit of labour or other input. The sub-class indexes, as has been pointed out above, only measure output at constant prices and that subject to some duplication; they could only be used in measuring changes in productivity subject to the same qualifications. If any of the indexes are thought of as measures of value added at constant prices it should be borne in mind that value added does not represent any physical quantity.

METHODS OF COMPILATION

Scope of factory census data

12. The indexes published herein have been compiled on the basis of information collected in the annual factory census, supplemented to some extent by relevant price and other data available to the Bureau. From all factories covered by the definition adopted for the census, information is collected regarding the total value of output, the total value of materials and fuel used and the total value of production (value added). This information is classified and published for individual industries (sub-classes). In addition a considerable amount of information is collected on the quantities and values of articles produced and a smaller range of information on quantities and values of materials used. This information on individual commodities is the basic source material for the indexes. Details of quantities and values were used for approximately 63 per cent of the total value of output in 1959-60 and additional information used, relating to values of particular articles produced or to materials used, covered a further 9 per cent of the total value of output. This 72 per cent in 1959-60 compares with 67 per cent in 1955-56. The increase mainly reflects extensions and improvements in the basic statistics.

Problems of homogeneity and quality

13. The information on commodities was tabulated in the greatest possible detail according to the sub-classes which produced them. For every commodity for every year a unit value was calculated by dividing the total value by the total quantity, and these unit values and other relevant information were carefully examined to ensure as far as possible that the items as collected were homogeneous and sufficiently uniform in quality from year to year. This was an important part of the compilation process but there were considerable areas of judgement and data limitations which inevitably resulted in some lack of precision in the final indexes. Two main difficulties had to be watched carefully. Commodities are specified in considerable detail for collection purposes with a view to ensuring that each item as collected covers a narrow range of fairly homogeneous commodities. The amount of dissection has been steadily increasing but there are limits to the number of divisions which can be made and in practice the limits frequently fall short of the point which would ensure true homogeneity. Where complete homogeneity is lacking, changes in the proportion of particular types from year to year affect the comparability of an item from year to year. The second difficulty concerns the question of quality. Even where an item as collected is reasonably homogeneous at a particular time there can be changes in quality which affect the comparability of the figures from year to year. Some of the available commodity statistics were affected to such an extent that they were not used for index purposes and it is not claimed that those used fully overcome the quality problem. Difficulties arose also from changes in the classification of some items collected and methods had to be devised to deal with them.

Methods of revaluation

14. The methods used to summarise the commodity data once they had been examined as to reliability were:

- (i) to revalue quantities produced at the unit values (or prices) of a base year;
- (ii) to divide values of output by an appropriate price index.

The first method was the most common. The second method was adopted for the range of output for which it is not possible to specify standards in sufficient detail for useful quantity collections, but for which value of output figures can be collected. This includes, for example, furniture and many types of industrial machinery. Although the items included in such groups are too numerous and diverse to be suitable for quantity collections, their values can in most instances quite rightly be thought of as products of quantities and prices. If a reasonably representative index of price change for specified products or groupings of products is divided into relevant original value series, the series can be regarded as having been converted to a constant price basis. Adoption of this procedure involved a close examination analogous to that described for quantity series in the previous paragraph because questions of homogeneity and of the uniformity of quality are shifted to the price or unit value series. Neither of these methods should be regarded as uniquely "correct" nor even as invariably superior to the other.

15. The procedures described in the preceding paragraph are devices for summarising an constant-price form the available information on quantities and values of individual commodities produced. Use of an index based on this information as an indicator of change in the total output of a sub-class would only be justified to the extent that changes in the output of recorded items were representative of changes in all output of that sub-class. If the current values of the recorded and unrecorded parts of the value of output have changed in significantly different proportions it does not seem reasonable to assume that the quantities of the unrecorded items (if they could have been measured) would have shown the same average change as that actually shown by the recorded items. Therefore, where information of the total value of output is available, as it is from the factory census, it is usually considered better to revalue by use of price indexes that part of the value of output for which commodity detail is not available than to take the recorded items only as representative. The problem is to find a suitable price index. To meet this problem for purposes of the Australian indexes "implicit price indexes" were calculated for sub-classes and classes by dividing the value of recorded items at current prices by their value at constant prices. In any sub-class for which the original coverage of recorded items was half or more of the total value of output the balance for which details were not available was divided by the implicit price index for that sub-class; in other cases the implicit price index for the whole class was used. This process is referred to as a "coverage adjustment". It is of course simply a method of revaluing the balance of the value of output and, together with the revaluation of the recorded items as in paragraph 14 (referred to as "direct coverage") in effect achieves complete coverage of the output of each sub-class.

16. In a few of the industries for which information on output of commodities in quantity or value terms was inadequate, sub-class indexes based on materials used were constructed where it could be assumed that output would vary in fairly close proportion to materials used (e.g. newsprint used in the production of newspapers). In these cases, commodity data on materials used was summarised using the two methods described for output in paragraph 14 (i.e. by revaluation of quantities of materials used, or by dividing values of materials used by a price index). A "coverage adjustment", as described for output in paragraph 15, was then applied as a means of revaluing the balance of the total value of materials used.

17. Brief reference may be made to another method sometimes used to obtain an indicator of output, but not used in the Australian indexes. This is the use of an index of employment or man-hours worked. Use of such an index without adjustment implies an assumption that there has been no change in output per unit of labour input.

Combinations of sub-class indexes

18. Once indexes of output for sub-classes have been obtained it is necessary to find a suitable way of combining these into indexes for industry classes and for all manufacturing. As has been pointed out above there is a considerable measure of duplication in statistics of value of output because the output of some factories passes into other factories for further processing, emerging again as outputs to be separately valued. To avoid duplication in current-price statistics the values of production (generally referred to herein as value added) in the various sub-classes are added together, not the values of output. By analogous reasoning, it is not satisfactory to add together the estimates of values of output at constant prices for the various sub-classes. Accordingly, the published indexes for each class and all classes combined have been compiled by the commonly used method, namely that of combining indexes for sub-classes using value-added weights.

Implications of methods adopted

19. The methods adopted in compiling the indexes appear inherently reasonable, and are generally accepted as leading to useful measures. Nevertheless, it must be emphasised again that they necessarily carry many assumptions and implications and thus leave many problems without fully satisfactory solutions. The more important of these may be summarised as follows:

- (i) the relevance of price weights for combining commodities cannot be established theoretically and must be assumed;
- (ii) where changes in relative prices occur in conjunction with changes in outputs, indexes will be affected by choice of base year;
- (iii) quantity data involve problems of quality and homogeneity which necessitate subjective judgements: similar problems are involved in judging the suitability of price deflators;
- (iv) the method of making the coverage adjustment implies that the price change relevant to unrecorded items of output is the same as that estimated for recorded items: while this can be shown in many instances to be more reasonable than a corresponding assumption based on quantities, it is nonetheless true that the unrecorded part of output frequently contains elements distinctly different from the recorded (for example, job-lots as against mass-produced items, commission and repair work);
- (v) the use of indexes of output at constant prices as indicators of changes in value added at constant prices is subject to the complex effects of the factors referred to in paragraph 9;
- (vi) changes in the proportions of total value added contributed by individual sub-classes mean that the class and all classes indexes depend in part on the choice of base year in the same way as sub-class indexes are affected by changes in relative prices.

20. It is possible to make some empirical checks. Comparison of indexes on a net-output formula (see paragraph 10) with the indexes based on gross output and value-added weights would provide some check on the importance of the factors mentioned in points (v) and (vi) of the previous paragraph. Net output formula indexes were in fact calculated for those sub-classes where available information on both outputs and materials was considered adequate. These accounted for approximately 40 per cent of the total value of factory output. Although for some sub-classes the two indexes showed different movements, a net-output index for the combination of the available sub-classes was

similar in its overall movement to a gross output index with value-added weights for the same sub-classes. This, of course, does not imply that, had it been possible to compile a net-output index for the remaining 60 per cent of the field, similar overall correspondence would have occurred. Another area in which some check is available is in respect of the base year problem (see points (ii) and (vi) above). Reference to tables 1 and 2 indicates that the index for all classes combined with 1955-56 as base increased by 30 per cent between 1955-56 and 1959-60 while that with 1959-60 as base increased by 27 per cent. Differences of this magnitude are not unusual and indeed larger differences are sometimes found in indexes of this kind. The direction of the difference is that which is normally found mainly because products whose output is expanding rapidly tend to be those whose prices are rising less than the average (or falling more than the average) so that a later base year gives them lower relative price weights. The combined effect of all the approximations and assumptions is likely to become more important the further the indexes are from the base year. It is proposed therefore to make fairly frequent changes of base year and so to provide a series of overlapping indexes which are never far away in time from the base year. The indexes presented herein are not linked because there is no theoretical reason to prefer one year to another as the basis for the link. Nor is there any theoretical justification for any particular average of the movements shown by the two indexes. Those who wish to use the indexes in relation to a longer period will need to decide whether a range of movement is best suited to their particular purpose, or whether to link at some particular period, bearing in mind that the choice will in some measure affect the movement shown by the linked index.

PUBLICATION OF INDEXES

21. Tables 1 and 2, on 1955-56 and 1959-60 bases respectively, show indexes for each class (except classes V, XIV and XV which are combined) and for all classes combined (including and excluding class XVI). Tables 3 and 4, on 1955-56 and 1959-60 bases respectively, show indexes for a considerable number of sub-classes.

22. The publication of indexes for sub-classes has been limited to those for which:-

- (i) the coverage by the methods described in paragraph 14, before applying the coverage adjustment, has been 60 per cent (approximately) or more at both base periods;
- (ii) the value added in the sub-class was at least 0.1 per cent of total value added by all factories at both base periods: 0.1 per cent of total value added was more than \$4 million in 1959-60;
- (iii) re-classification of factories or changes in basis of reporting etc. are unlikely, as far as is known, to have significantly affected comparability over the period;
- (iv) publication was possible having regard to the provisions of the Census and Statistics Act preventing disclosure of the operations of individual factories.

23. All the tables show the proportions contributed by the various sub-classes and groupings to the total value added in manufacturing industry. They also show the proportions of value of output revalued by use of the methods explained in paragraph 14 and called "direct coverage" in the tables. (The remainder of the value of output is also revalued as explained in paragraph 15.) Although it will not necessarily apply in all cases, there are grounds for presuming that indexes with high direct coverage will be more reliable, having due regard to the general conceptual framework, than those with low direct coverage. Users of the indexes should therefore attach some weight to the proportions as shown.

24. Figures in the tables incorporate revisions made to the series since publication of the preceding bulletin. These arise from amendments to the annual factory census figures or from application, in the light of further information, of altered methods of revaluation in some sub-classes.

TABLE 1
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

GLASS AND ALL CLASSES INDEXES

(Base of each index, 1955-56 = 100)

Class	Title	Direct coverage (c) in 1955-56	Proportion of total value added 1955-56	1942-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60
		per cent	per cent											
I	Treatment of non-metalliferous mine and quarry products	88	2.3	63	72	76	73	81	94	100	104	112	121	141
II	Bricks, pottery, glass etc.	78	2.1	76	78	86	78	89	96	100	92	96	103	117
III	Chemicals, dyes, explosives, paints, oils, grease	84	7.9	51	59	61	58	69	85	100	111	123	132	146
IV	Industrial metals, machines, conveyances	45	39.8	63	74	78	75	83	93	100	102	114	122	137
VI	Textiles and textile goods, (not dress) (d)	87	5.5	83	89	79	78	99	97	100	111	116	114	132
VII	Skins and leather (not clothing or footwear)	84	1.1	106	101	97	98	103	104	100	100	99	105	105
VIII	Clothing (except knitted)	43	6.8	87	93	89	84	96	97	100	99	102	104	109
IX	Food, drink and tobacco	91	13.2	87	89	89	90	95	98	100	103	104	109	111
X	Sawmills, joinery, boxes, etc.	59	5.2	79	85	89	79	89	98	100	96	93	102	110
XI	Furniture of wood, bedding, etc.	72	1.7	83	95	89	78	87	97	100	102	113	119	136
XII	Paper, stationery, printing, etc.	82	6.6	71	74	72	64	79	90	100	108	111	124	140
XIII	Rubber	79	1.7	66	74	73	58	84	96	100	102	111	118	127
	Other (Classes V, XIV, and XV) (e)	42	2.6	64	76	72	71	81	93	100	109	111	120	144
	Classes I to XV (combined)	65	96.5	71	78	80	76	86	94	100	103	110	117	130
XVI	Heat, light and power	96	3.5	62	68	73	76	83	92	100	108	116	123	132
	ALL CLASSES (COMBINED)	67	100.0	71	78	79	76	85	94	100	104	110	118	130

(a) The indexes in this table are combinations of sub-class indexes of value of output as estimated at constant prices. Indexes for all sub-classes within the respective groupings (whether or not these sub-classes are published separately in Table 3) have been combined according to the value-added weights of 1955-56. (b) Excluding factories in Northern Territory and Australian Capital Territory. (c) The proportion of value of output which has been revalued by the methods described in paragraph 14 on page 5. The remainder of value of output has been revalued by the method described in paragraph 15 on page 6. (d) Includes Hosiery and other knitted goods sub-class. (e) Combination of Class V, Precious metals, jewellery, plate; Class XIV, Musical instruments; and Class XV, Miscellaneous products (includes plastic products).

TABLE 2
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

CLASS AND ALL CLASSES INDEXES

(Base of each index, 1959-60 = 100)

Class	Title	Direct coverage (c) in 1959-60	Proportion of total value added 1959-60	1955-56	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66
		per cent	per cent								
I	Treatment of non-metalliferous mine and quarry products	86	2.5	72	100	113	114	122	137	149	153
II	Bricks, pottery, glass, etc.	73	2.2	87	100	101	97	104	116	129	124
III	Chemicals, dyes, explosives, paints, oils, grease	84	8.6	70	100	104	113	123	136	151	159
IV	Industrial metals, machines, conveyances	58	40.9	75	100	104	102	116	130	143	149
VI	Textiles and textile goods (not dress) (d)	84	5.2	76	100	98	100	111	121	128	130
VII	Skins and leather (not clothing or footwear)	85	0.9	97	100	94	95	100	99	102	98
VIII	Clothing (except knitted)	60	5.7	93	100	103	105	111	116	121	125
IX	Food, drink, and tobacco	90	12.5	90	100	103	108	113	118	127	133
X	Sawmills, joinery, boxes, etc.	58	4.7	90	100	100	96	100	107	117	119
XI	Furniture of wood, bedding, etc.	73	1.6	74	100	97	100	105	112	121	126
XII	Paper, stationery, printing, etc.	83	7.2	72	100	107	106	117	129	146	151
XIII	Rubber	80	1.6	80	100	102	99	118	128	134	135
	Other (Classes, V, XIV, and XV) (e)	45	2.5	77	100	102	106	120	139	157	168
	Classes I to XV (Combined)	71	96.1	79	100	103	104	115	126	138	142
XVI	Heat, light and power	96	3.9	77	100	107	112	127	135	149	158
	ALL CLASSES (COMBINED)	72	100.0	79	100	104	105	115	126	138	143

(a) The indexes in this table are combinations of sub-class indexes of value of output as estimated at constant prices. Indexes for all sub-classes within the respective groupings (whether or not these sub-classes are published separately in Table 4) have been combined according to the value-added weights of 1959-60. (b) Excluding factories in Northern Territory and Australian Capital Territory. (c) The proportion of value of output which has been revalued by the methods described in paragraph 14 on page 5. The remainder of value of output has been revalued by the method described in paragraph 15 on page 6. (d) Includes Hosiery and other knitted goods sub-class. (e) Combination of Class V, Precious metals, jewellery, plate; Class XIV, Musical instruments; and Class XV, Miscellaneous products (includes plastic products).

TABLE 3
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1955-56 = 100)

NOTE. For the basis of selection of the sub-classes listed in this table see paragraph 22 on page 6.

Class	Sub-class	Title	Direct coverage	Proportion	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
			1955-56 (c)	of total value added 1955-56 (d)											
			per cent	per cent	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59	-60
I	1	Coke works	99	0.2	58	74	78	87	93	95	100	107	113	111	147
	5	Fibrous plaster and products	97	0.3	82	90	93	84	91	99	100	91	99	104	105
	7	Cement, Portland	97	0.5	56	59	59	69	81	92	100	105	111	119	126
	8	Asbestos cement sheets and mouldings	99	0.3	60	70	80	81	85	100	100	96	100	108	127
	9	Other cement goods	99	0.6	47	60	70	63	70	85	100	107	119	141	175
II	1	Bricks and tiles	98	0.9	71	80	84	83	95	98	100	96	102	107	120
	2	Earthenware, china, porcelain, terra cotta	72	0.3	85	86	85	82	101	106	100	106	115	135	147
III	1	Industrial and heavy chemicals and acids	64	1.6	45	59	58	52	69	84	100	115	121	142	161
	2	Pharmaceutical and toilet preparations	71	1.0	63	77	83	76	89	96	100	102	125	130	155
	4	Paints, white lead, varnish	93	0.9	68	76	79	66	82	96	100	101	101	105	113
	6	Mineral oils	93	1.8	15	19	21	20	28	61	100	129	146	156	177
	8	Boiling down, tallow refining	89	0.3	78	86	76	97	94	100	100	102	114	152	157
	9	Soap and detergents	95	0.5	80	86	88	85	90	98	100	103	115	120	137
	10	Chemical fertilisers	97	0.7	65	68	70	72	79	91	100	100	110	107	117

For footnotes see page 15.

TABLE 3 - continued
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1955-56 = 100)

Class	Sub-class	Title	Direct coverage in 1955-56 (c) per cent	Proportion of total value added 1955-56 (d) per cent	1949 -50	1950 -51	1951 -52	1952 -53	1953 -54	1954 -55	1955 -56	1956 -57	1957 -58	1958 -59	1959 -60
IV	1	Smelting, converting, refining, rolling of iron and steel (e)	82	3.4	55	64	67	75	82	88	100	115	121	142	155
	3	Plant, equipment and machines (incl. machine tools)	60	6.6	67	77	83	73	78	88	100	107	113	119	141
	6	Electrical machinery, cables and apparatus	75	3.8	50	65	65	58	83	99	100	106	120	135	152
	19	Cutlery and small hand tools	61	0.4	57	66	76	62	74	90	100	67	75	44	48
	21	Non-ferrous metals - rolling and extrusion	91	0.6	59	70	74	62	72	107	100	101	120	130	156
	24	Sheet metal working, pressing and stamping	61	2.0	80	90	96	78	83	95	100	105	115	128	149
	25	Pipes, tubes and fittings - ferrous	87	0.7	51	64	69	76	81	97	100	95	106	110	127
	26	Wire and wire working (incl. nails)	88	0.9	58	64	69	84	81	91	100	102	118	113	138
	32	Wireless and amplifying apparatus (inc. television)	84	0.6	73	105	83	74	90	97	100	112	243	284	378
VI	2	Cotton spinning and weaving	93	0.8	82	92	88	73	98	100	100	110	112	108	118
	3	Wool - carding, spinning, weaving	95	1.6	111	108	83	82	103	94	100	114	112	108	126
	4	Hosiery and other knitted goods	93	1.8	69	78	75	78	100	100	100	108	112	114	128
	8	Rope and cordage	89	0.3	89	100	99	78	90	96	100	98	100	124	133
	9	Canvas goods, tents, tarpaulins, etc.	65	0.1	85	108	107	83	108	107	100	88	114	92	106
VII	2	Woolscouring and felmongering	89	0.3	121	109	94	107	102	105	100	109	99	110	109

For footnotes see page 15.

TABLE 3 - continued
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1955-56 = 100)

Class	Sub-class	Title	Direct coverage in 1955-56 (c) per cent	Proportion of total value added 1955-56 (d) per cent	1949 -50	1950 -51	1951 -52	1952 -53	1953 -54	1954 -55	1955 -56	1956 -57	1957 -58	1958 -59	1959 -60
VII	3	Tanning, currying and leather-dressing	98	0.4	109	108	107	103	113	109	100	98	98	98	91
	6	Bags, trunks and other goods of leather and leather substitutes	61	0.3	83	88	86	88	93	95	100	96	105	116	130
VIII	5	Shirts, collars, underclothing	71	0.8	86	87	82	66	84	99	100	103	114	118	129
	6	Foundation garments	86	0.2	74	83	87	70	95	90	100	98	108	116	115
	7	Handkerchiefs, ties, scarves	71	0.1	81	102	83	95	107	100	100	98	103	108	104
	8	Hats and caps (not millinery)	86	0.1	122	125	112	109	117	103	100	90	83	84	92
	10	Boots and shoes (not rubber)	93	1.4	90	94	94	88	99	97	100	98	101	103	106
IX	1	Flour milling	99	0.5	97	107	109	108	102	98	100	107	91	89	100
	2	Cereal foods and starch	95	0.5	69	74	76	78	94	92	100	100	104	119	121
	5	Bakeries (incl. cakes and pastry)	98	1.8	94	95	100	95	92	96	100	99	100	104	104
	6	Biscuits	99	0.5	74	81	92	89	94	95	100	102	104	109	111
	9	Confectionery (incl. chocolate and icing sugar)	96	0.6	100	95	92	89	95	95	100	104	105	110	115
	10	Jam, fruit and vegetable canning	93	0.9	88	92	101	88	98	96	100	119	125	117	129
	13,14,	Butter, cheese, condensed and dried milk factories	92	1.3	85	86	75	88	85	93	100	98	90	101	104
	15	Meat and fish preserving	89	1.0	87	85	82	101	94	98	100	101	93	113	96
	17	Aerated waters, cordials, etc.	98	0.5	91	98	99	88	91	98	100	98	111	111	122
	21	Breweries	99	1.0	62	69	74	80	90	97	100	96	101	101	105
	22	Distilleries, winemaking	94	0.2	118	105	129	107	116	101	100	123	133	118	130
	23,24	Maltine	99	0.1	71	75	80	86	91	97	100	102	106	103	107
	25	Tobacco, cigars and pipe-stems	100	0.6	60	63	66	72	86	94	100	108	113	117	125

TABLE 3 - continued
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1955-56 = 100)

Class	Sub-Class	Title	Direct coverage in 1955-56 (c) per cent	Proportion of total value added 1955-56 (d) per cent	1949 -50	1950 -51	1951 -52	1952 -53	1953 -54	1954 -55	1955 -56	1956 -57	1957 -58	1958 -59	1959 -60
X	1	Sawmills	75	2.9	81	85	93	84	92	100	100	96	90	101	107
	6	Boxes and cases	82	0.3	85	93	87	69	83	94	100	72	77	77	76
	10	Wall and ceiling boards (not plaster or cement)	97	0.2	44	53	62	56	77	89	100	104	113	110	140
XI	1	Cabinet and furniture making (incl. upholstery)	89	1.1	95	105	98	83	90	98	100	102	115	123	140
	2	Bedding and mattresses (not wire)	77	0.2	67	80	71	71	84	93	100	103	110	106	128
XII	1	Newspapers and periodicals	92	1.6	80	79	65	70	88	96	100	101	102	113	124
	2,3	Printing, (incl. bookbinding)	74	2.1	77	81	82	72	78	89	100	105	110	117	133
	7	Cardboard boxes, cartons and containers	91	0.6	54	58	68	53	76	87	100	100	104	122	148
	8	Paper bags (incl. cellulose bags)	94	0.2	49	56	56	43	61	63	100	116	126	143	183
	9	Paper making	97	1.2	56	60	64	55	78	95	100	111	119	133	141
XIII	1	Rubber goods (incl. tyres made)	77	1.4	70	77	75	56	85	98	100	102	110	119	128
	2	Tyre retreading and repairing	90	0.3	47	58	64	68	77	86	100	104	115	116	122
XV	4	Brooms and brushes	81	0.2	88	95	84	78	88	99	100	93	103	106	111
XVI	1,2,3	Electric light and power	97	2.9	57	63	69	72	81	90	100	110	120	128	139
	4,5,6	Gasworks	92	0.6	88	93	94	96	96	100	100	104	97	102	97

- (a) The indexes in this table are measures of value of output by sub-class as estimated at constant prices.
 (b) Excluding factories in Northern Territory and Australian Capital Territory.
 (c) The proportion of value of output which has been revalued by the methods described in paragraph 14 on page 5. The remainder of value of output has been revalued by the method described in paragraph 15 on page 6.
 (d) The contribution by the sub-classes to total value added in manufacturing industry. The selected sub-classes listed in this table contributed 62.4 per cent of this total for the year 1955-56.
 (e) Value of output at current prices, as published, has been adjusted before revaluation to reduce the effects of duplication within this sub-class.

TABLE 4
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1959-60 = 100)

NOTE:- For the basis of selection of the sub-classes listed in this table see paragraph 22 on page 8.

Class	Sub-class	Title	Direct coverage	Proportion of total	1955 -56	1959 -60	1960 -61	1961 -62	1962 -63	1963 -64	1964 -65	1965 -66
			in 1959-60 (c) per cent	value added 1959-60 (d) per cent								
I	1	Coke works	91	0.3	66	100	115	121	118	123	134	132
	5	Fibrous plaster and products	98	0.2	95	100	94	86	97	102	103	95
	7	Cement, Portland	100	0.5	79	100	108	107	113	126	144	142
	8	Asbestos cement sheets and mouldings	100	0.3	79	100	103	99	104	111	114	121
II	9	Other cement goods	97	0.7	57	100	123	125	142	168	183	193
	1	Bricks and tiles	85	0.9	84	100	103	92	102	118	127	123
	2	Earthenware, china, porcelain, terra cotta	71	0.4	68	100	95	96	106	111	132	132
III	1	Industrial and heavy chemicals and acids	75	2.0	66	100	102	121	148	177	216	223
	2	Pharmaceutical and toilet preparations	74	1.4	65	100	106	109	110	115	130	138
	4	Paints, white lead, varnish	95	0.7	88	100	94	98	108	117	124	122
	6	Mineral oils	89	2.1	57	100	109	116	124	131	143	156
	8	Boiling down, tallow refining	92	0.3	64	100	89	119	138	137	139	132
	9	Soap and detergents	92	0.7	78	100	104	105	110	115	120	125
	10	Chemical fertilisers	95	0.6	87	100	102	107	117	128	144	162
	1	Smelting, converting, refining, rolling of iron and steel (e)	85	4.2	64	100	109	103	121	133	149	143
	3	Plant, equipment and machinery (incl. machine tools)	65	6.7	73	100	103	103	113	128	146	155
	6	Electrical machinery, cables and apparatus	70	4.4	65	100	103	102	110	127	143	152
IV	19	Cutlery and small hand tools	72	0.2	200	100	101	105	135	157	175	175
	21	Non-ferrous metals - rolling and extrusion	95	0.7	65	100	94	102	113	132	152	164
	24	Sheet metal working, pressing and stamping	59	2.3	67	100	106	106	116	128	146	155
	25	Pipes, tubes and fittings - ferrous	89	0.9	81	100	93	96	96	108	122	110
	27	Pipes and wires working (incl. 6-10)	87	1.0	73	100	98	92	107	116	125	119

15.

TABLE 4 - continued
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)
SELECTED SUB-CLASS INDEXES
(Base of each index, 1959-60 = 100)

Class	Sub-class	Title	Direct coverage in 1959-60 (c)	Proportion of total value added 1959-60 (d)	1955 -56	1959 -60	1960 -61	1961 -62	1962 -63	1963 -64	1964 -65	1965 -66
			per cent	per cent								
VI	2	Cotton spinning and weaving	95	0.8	84	100	94	101	105	118	126	126
	3	Wool - carding, spinning and weaving	92	1.4	80	100	92	95	106	108	106	106
	4	Hosiery and other knitted goods	91	1.7	78	100	101	101	115	125	131	139
	8	Rope and cordage	89	0.2	77	100	111	97	106	115	128	106
	9	Canvas goods, tents, tarpaulins, etc.	77	0.1	96	100	109	123	117	118	143	153
VII	2	Woolscouring and fellmongery	87	0.2	94	100	87	96	102	96	100	91
	3	Tanning, currying and leather-dressing	97	0.3	110	100	97	99	100	100	96	89
	6	Bags, trunks and other goods of leather and leather substitutes	72	0.3	79	100	97	90	99	101	109	112
VIII	5	Shirts, collars, underclothing	62	0.7	81	100	93	95	103	105	115	124
	6	Foundation garments	87	0.2	88	100	103	119	129	143	155	169
	7	Handkerchiefs, ties, scarves	80	0.1	96	100	120	121	127	111	124	144
	8	Hats and caps (not millinery)	85	0.1	110	100	88	75	76	61	60	52
	10	Boots and shoes (not rubber)	96	1.2	94	100	106	109	114	120	118	117
IX	1	Flour milling	98	0.5	101	100	105	103	99	113	107	102
	2	Cereal foods and starch	91	0.5	84	100	103	104	112	118	126	125
	5	Bakeries (incl. cakes and pastry)	99	1.6	96	100	100	100	102	105	111	120
	6	Biscuits	100	0.4	91	100	102	101	105	112	117	125
	9	Confectionery (incl. chocolate and icing sugar)	97	0.7	87	100	103	103	108	116	123	130
	10	Jam, fruit and vegetable canning	98	0.8	77	100	102	134	136	151	169	196
	13,14,	Butter, cheese, condensed and dried milk factories	90	1.2	97	100	97	107	110	113	118	120
	15	Meat and fish preserving	86	0.7	101	100	102	115	120	123	124	128
	21	Aerated waters, cordials, etc.	98	0.6	82	100	107	100	110	118	126	135
	22	Breweries	100	0.9	95	100	105	110	116	123	131	131
23,24	23,24	Distilleries, winemaking	90	0.2	77	100	108	112	105	113	135	124
	26	Malting	99	0.1	93	100	107	119	121	140	142	155
	28	Tobacco, cigars and cigarettes	100	0.8	81	100	108	105	107	107	112	107

For footnotes see page .

TABLE 4 - continued
INDEXES OF FACTORY PRODUCTION (a) : AUSTRALIA (b)

SELECTED SUB-CLASS INDEXES

(Base of each index, 1959-60 = 100)

Class	Sub-class	Title	Direct coverage in 1959-60 (c)	Proportion of total value added 1959-60 (d)	1955-56	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66
			per cent	per cent								
X	1	Sawmills	75	2.5	94	100	95	91	93	98	103	103
	6	Boxes and cases	73	0.2	132	100	100	99	95	94	98	105
	10	Wall and ceiling boards (not plaster or cement)	94	0.2	68	100	103	115	135	176	221	254
XI	1	Cabinet and furniture making (including upholstery)	89	1.1	72	100	96	97	105	111	121	125
	2	Bedding and mattresses (not wire)	74	0.2	78	100	97	104	105	116	127	126
XII	1	Newspapers and periodicals	91	1.5	81	100	103	95	100	108	117	119
	2,3	Printing (including bookbinding)	74	2.2	74	100	111	109	118	130	151	155
	7	Cardboard boxes, cartons and containers	95	0.7	68	100	108	119	132	140	153	163
	8	Paper bags (including cellulose bags)	90	0.2	55	100	108	116	124	144	169	171
	9	Paper making	99	1.4	71	100	104	103	120	134	152	156
XIII	1	Rubber goods (including tyres made)	77	1.3	79	100	101	95	113	124	127	129
	2	Tyre retreading and repairing	94	0.3	82	100	106	121	140	148	160	162
XV	4	Brooms and brushes	84	0.1	95	100	105	104	117	120	119	117
XVI	1,2,3	Electric light and power	97	3.3	72	100	107	114	129	140	156	167
	4,5,6	Gasworks	93	0.6	104	100	103	102	103	106	108	108

- (a) The indexes in this table are measures of value of output by sub-class as estimated at constant prices.
- (b) Excluding factories in Northern Territory and Australian Capital Territory.
- (c) The proportion of value of output which has been revalued by the methods described in paragraph 14 on page 5. The remainder of value of output has been revalued by the method described in paragraph 15 on page 6.
- (d) The contribution by the sub-classes to total value added in manufacturing industry. The selected sub-classes listed in this table contribute 65.1 per cent of the total for the year 1959-60.
- (e) Value of output at current prices, as published, has been adjusted before revaluation to reduce the effects of deflation within this sub-class.

APPENDIXANNUAL FACTORY CENSUS - TERMS AND DEFINITIONS

A full description of the statistics obtained from the Annual Factory Census, from which the indexes shown in this bulletin have been derived, is contained in the annual Secondary Industries bulletins. (As from 1964-65, publications relating to the annual factory census have included particulars for the Northern Territory and Australian Capital Territory. The indexes of factory production have been continued on the basis of the six States only).

TERMS AND DEFINITIONS

1. Factory. - A "factory" is defined as an establishment in which four or more persons are employed or where power (other than manual) is used in any manufacturing process. This definition includes factories in educational and charitable institutions, reformatories, and other public institutions (except penitentiaries), but does not cover smallgoods makers, laundries, farriers, photography studios, florists and seedsmen, or most abattoirs. The figures do not include details relating to small establishments not classified for statistical purposes as factories. If a manufacturing business is conducted in conjunction with any other activity, particulars relating to the manufacturing section only are included in the statistics.
2. Class and sub-class. - According to the nature of their products factory returns are classified into sub-classes, the basic units in the classification of manufacturing industries. Combinations of sub-classes constitute classes. The classification is set out in the Secondary Industries bulletins. Where two or more activities related to different sub-classes are conducted in the same establishment, a separate return is obtained for each activity if practicable. In cases where this is not practicable, factories are classified according to predominant activity.
3. Value of materials used. - This is the value of the materials used, stores used, containers, tools replaced, and materials used in repairs to plant. In general, it does not include the value of customers' articles or materials repaired, assembled or treated by the factory.
4. Value of power, fuel, light, etc. used. - This is the cost of the electricity, gas, coal, brown coal briquettes, coke, fuel oil, firewood, other fuels, light, lubricants and water used.
5. Value of output. - The value of factory output is the value of the goods manufactured or their value after passing through the particular process of manufacture and includes the amount received for repair work, work done on commission and receipts for other factory work. The basis of valuation of the output is the selling value of the goods at the factory, exclusive of all delivery costs and charges and excise duties, but inclusive of bounty and subsidy payments to the manufacturer of the finished article.
6. Value of production. - (or value added*) - The value of production is the value added to materials by the process of manufacture. It is calculated by deducting from the value of factory output the value (at the factory) of the materials used, containers and packing, power, fuel and light etc. used, tools replaced, and materials used in repairs to plant (but not depreciation charges).

In the process of manufacture, many goods are treated in several industries, the output of one becoming the materials of another, so that such commodities are counted more than once in the aggregate value of output and of materials. Examples are raw sugar passing from the mills to the refinery, metals from the smelters which become materials in establishments producing metal goods, and timber from the sawmills used in furniture factories and in joinery. On the other hand, the aggregate value of production is assessed without duplication, the value added by each industry being taken into account once only.

* This latter term has been used generally in this bulletin.

There are many miscellaneous expenses, such as maintenance of buildings, etc., depreciation, workers' compensation insurance, other insurances, pay-roll tax, income tax, advertising, interest on borrowed money, bad debts and many other sundry charges, which are not taken into account. Consequently it must not be inferred that, when wages and salaries are deducted from value of production, the whole of the surplus is available for profits.

7. Period covered. - This is, in the main, the twelve months ended 30th June in the respective years. There are, however, a comparatively few cases where returns on the basis of some other accounting period are accepted.

K.M. ARCHER
COMMONWEALTH STATISTICIAN

COMMONWEALTH BUREAU OF CENSUS AND STATISTICS

CANBERRA, A.C.T. 2600.

27 JUNE 1968

NOTE. - Inquiries concerning these statistics may be made in Canberra by telephoning 63 9111 Extension 2052 or, in each State capital, by telephoning the office of the Bureau of Census and Statistics.