

## MANUFACTURING INDUSTRY

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### NATURAL RESOURCES AND LOCATION

#### **Natural resources**

Victoria's temperate climate and its rainfall, soil, and water resources have been used to develop the production of wool, grains, fruit, dairy products, and timber. On these the State's early secondary industries were based. There are extensive fuel resources of brown coal in the Latrobe Valley. Of special importance to the industries of the State are the oil and natural gas fields in Bass Strait, the first of which was discovered in February 1965. On 14 April 1969 natural gas was made available to the first domestic consumer in Victoria at Carrum. In March 1969 natural gas for commercial use flowed from the Barracouta field. This was supplemented in 1970 from gas from the Marlin field. Oil in commercial quantities became available from the Barracouta field in October 1969 and from the Halibut field in March 1970. Reserves of gas and oil are known to be present in the Snapper and Kingfish fields, respectively.

The Latrobe Valley brown coal deposits, and to a much lesser degree those of south Gippsland and a number of small basins west of Melbourne, are the most important mineral deposits in Victoria. The open cuts of the Yallourn-Morwell area produce about 21 mill. tons of brown coal annually for briquette making and electricity generation. Small quantities of black coal (35,000 tons annually) were mined in south-western Gippsland until the end of 1968.

Clay deposits for brick, tile, and pottery industries are worked east of Melbourne and near Ballarat, Bendigo, Colac, Shepparton, and Wangaratta. Sand, for the concrete and glass industries and for use in foundries, is obtained in the Port Phillip and west Gippsland areas. Stone and gravel quarries are worked in many parts of the State. The main market for quarry products is the metropolitan area and as these products are bulky and expensive to transport, most quarrying is located within a 50 mile radius of the capital. Local limestone deposits attracted the establishment of cement works at Geelong and Traralgon while the Lilydale limestones are used in the manufacture of agricultural lime.

Other mineral resources of Victoria include gold mining in the Castlemaine district; salt production from deposits of the Mallee and Wimmera lakes and the western shores of Port Phillip; gypsum in the

north-western Mallee; and bauxite deposits in south Gippsland.

The forests of Gippsland and the Central Highlands form the basis of important forestry activities, especially in Gippsland where paper is produced at Maryvale. Victorian forests provide approximately one quarter of Australia's timber.

Power supplies are essential for industrial development. The lack of black coal once necessitated significant imports from New South Wales. During 1967-68, the State Electricity Commission generated 90.6 per cent of Victoria's electricity, mostly from steam plants fired by briquettes or brown coal in the Latrobe Valley; the balance is brought in, or produced in factories. Electricity is now transmitted throughout the State by the high voltage grid network shown on the map on page 425.

Recent discoveries of large offshore reserves of oil and natural gas in the Gippsland Basin (the potential of which has not been fully determined) make Victoria's power and chemical outlook promising. Estimates from exploratory drilling rank the Gippsland, Bass, and Otway Basins as having great oil and natural gas potential.

Other sources of power for industry are gas, produced in Melbourne and principal country centres, and brought by pipeline from Morwell to Melbourne, and oil and liquid petroleum gas from the refineries at Altona, Geelong, and Crib Point.

Water, needed in large quantities for industry, is available throughout the State from the dams and storages in the catchment areas of the main rivers (see map on page 478 of *Victorian Year Book* 1966). In most years Melbourne is well supplied with water from the storages to the north and north-east of the city in the Plenty, Upper Yarra, Maroondah, and O'Shannassy river catchments. However, severe water restrictions were imposed during the 1967-68 summer due to State-wide drought conditions. To meet future requirements, preparations for extending the water supply have begun. (See page 250.)

#### Location

The early concentration of industry in Melbourne has continued although power supplies now come largely from the Latrobe Valley. Of Victoria's 18,030 factories in 1967-68, 72.7 per cent were located in the Melbourne Statistical Division, which also had 83.0 per cent of the State's factory workers. Melbourne's factories contributed 80.6 per cent of the value added in manufacture. This concentration of manufacturing in the metropolitan area is partly due to the fact that Melbourne is Victoria's main port and the hub of the transport network. It is also the largest market in the State and the centre of commerce and finance; has a large labour force; and is the administrative and educational centre of Victoria.

Many types of secondary industry are well represented in Melbourne. There are particularly high concentrations of the State's chemical, metal processing, textile, paper, furniture, food, and building materials industries in the capital. In terms of numbers employed, the engineering and metal processing industry is the major industry of Melbourne. Initially, industries developed in the inner areas of Port Melbourne, South Melbourne, Richmond, Collingwood, Spotswood, Fitzroy, and Footscray. The more recently established industries such as the motor vehicle, chemical, rubber, and refining industries, have taken up land in the outer industrial areas of

Altona, Broadmeadows, Moorabbin, Oakleigh, and Dandenong, where considerable areas of flat land are available for future expansion.

Outside the metropolitan area, Geelong is the most important industrial centre, with port facilities, close proximity to the Melbourne market, and rich surrounding rural areas. Industries established in the area include petroleum refining, and the manufacture of agricultural machinery, motor vehicles, aluminium ingots and extruded products, textiles, chemical fertilisers, clothing, carpets, foodstuffs, cement, fertilisers, sporting ammunition, and grain storage.

The other country urban areas in which more than 1,000 persons are employed in factories (ranked in order of the number of persons employed in factories) are the Latrobe Valley, Ballarat Urban Area, Bendigo Urban Area, Warrnambool City, Wangaratta City, Shepparton City, Maryborough City, and Castlemaine City. Apart from the Latrobe Valley, which is primarily engaged in power generation and ancillary activities, the factory population elsewhere is engaged in the production of food, textiles and clothing from locally produced raw materials, in engineering plants, which sometimes had their origin in the gold mining era of the nineteenth century, and more recently, in decentralised plants with defence significance.

#### AUSTRALIAN INTEGRATED ECONOMIC CENSUSES, 1968-69

##### **Meaning of integration**

For the year ended June 1969 censuses of mining, manufacturing, electricity and gas production and distribution, retail trade and selected services, and wholesale trade were conducted for the first time on an integrated basis.

The manufacturing and mining censuses for 1968-69 were part of the series of regular annual censuses conducted for these industries, but the mining census was being held for the year ended June instead of the calendar year as in the past. Electricity and gas production had previously been included in the manufacturing census; for the year 1968-69 they were treated as a separate census and the scope of the returns was extended to cover distribution as well as production. The retail census had been held every four or five years, the previous retail census being for the year 1961-62. Wholesale trade had not been the subject of a census before, although there had been an exploratory partial wholesale census for the year 1963-64. In future, censuses of retail and wholesale trade will be held about every five years, the other censuses annually as in the past.

The integration of these censuses meant that for the first time they were being collected on the basis of a common framework of reporting units and data concepts and in accordance with a standard industrial classification. As a result the statistics for the industries covered by the censuses are provided with no overlapping or gaps in coverage, and in such a way that aggregates for certain important economic data such as value added, employment, salaries and wages, fixed capital expenditure, and stocks can be obtained on a consistent basis for all sectors of the economy covered by the censuses.

To make this integration possible, it was necessary to revise all the forms used in previous censuses to bring the items of data to a common basis of definition in all censuses. This revision was made after extensive

investigations of business record-keeping practices conducted by the Bureau over a period of years. For most businesses in the scope of the censuses—businesses which operate at one location only—this was the principal change brought about by the integration of the censuses. For businesses operating at more than one location the other principal change was that the census returns for all industries covered were collected through the head offices of the enterprises, each of which was asked to report in a consistent way for each of its establishments covered by the censuses and for the enterprise as a whole.

### **Purposes of integration**

The integration of the economic censuses was undertaken as a major re-organisation of a large part of the Bureau's work, designed to increase substantially the usefulness and comparability of the kinds of statistics already being collected and published, for purposes of general economic analysis and market research.

#### *Aggregation of economic data*

The economic censuses of manufacturing, mining, and retail trade were introduced originally—many years ago—and subsequently developed in order to provide statistics for particular industries with special definitions of units and data adopted to suit the requirements of users interested in statistics of those industries. (The same is true of the annual agricultural and pastoral census—but this is not among the economic censuses integrated in 1968–69). More recently there has been a growth of interest in statistics describing activity in the economy as a whole—reflected, for example, in the post-war development of employment and earnings statistics, surveys of capital expenditure, stocks, and wages, and the whole field of national accounts statistics.

For such purposes economic census statistics in the past have had serious limitations despite the fact that they covered a broad area of the whole economy. Because of the special-purpose nature of each of the censuses, there were no common definitions of data, and there was no common system of reporting units, and therefore aggregation of statistics from different censuses was not possible. As no standard industrial classification existed, industry boundaries were not defined in ways which would prevent overlapping or gaps occurring between the industrial sectors covered by the censuses. This was a further reason why aggregation across industry boundaries was not possible. For estimation of the national accounts, therefore, little use was made of the results of the economic censuses, except the agricultural census, and there was much reliance on statistics compiled from income tax assessments. Employment and earnings statistics for the economy as a whole have been derived mainly from monthly returns of pay-roll taxpayers.

#### *Benchmark data for surveys*

For these reasons the economic censuses in the past have provided no basis for designing or adjusting the sample surveys which supply current economic statistics from quarter to quarter, particularly those of capital expenditure and stocks which are important components of the quarterly national income and expenditure estimates. To be accurate, such statistics

should be backed periodically by comprehensive benchmark data of the kind normally available only from censuses. The previous censuses of manufacturing, mining, and retail trade covered large and important sectors of the whole economy, and they included many of the same broad types of data as those needed for current economic indicators. However, because of the specialised nature of the units and data concepts on which the censuses were designed, and the lack of standard industry boundaries, it was not possible to use the results of these censuses as benchmark data for improving the accuracy of the surveys.

Similarly, the employment statistics derived from the censuses could not be used to improve the accuracy of the monthly employment and quarterly earnings series. The basic benchmark for these series is the population census, but the annual manufacturing and mining censuses, and the periodical retail trade census, were potential sources of data for checking the movements of these series.

The units employed in most of the surveys and for the private sector in the employment and earnings series are pay-roll taxpayers, broadly consisting of businesses (or the parts of interstate businesses operating in one State) whose pay-roll amounts to more than \$20,800 a year. The unit employed in the censuses is the establishment. In the manufacturing censuses prior to 1968-69, this was a unit engaged in manufacturing activity and employing four or more persons or using power (other than manual) in any manufacturing process. Any part of a business (or of a particular location at which a business operated) which met this definition was treated as a manufacturing establishment, and the form required that "manufacturing activity" should exclude selling and delivery. The value of output was to be reported exclusive of delivery costs, and employment was to exclude sales and delivery staff. The retail census covered the retail trading activities of establishments which normally sold goods to the general public from fixed premises. It omitted any wholesaling, manufacturing or other non-retailing activity carried on at the same location. Many types of repair activity, however, such as repairing of motor vehicles, shoes and watches, were included in the retail census, and were also included in the manufacturing census. The retail trade census also included any retailing activities carried on at locations primarily engaged in other activities such as wholesaling or manufacturing. The establishments from which mining census returns were collected were confined to units engaged in mining activity, including crushing and ore-dressing at or near the mine. All censuses (except the retail trade census, in respect of chain stores) excluded separately located head office staff, while including administrative staff located at the establishment. They also excluded any staff at separately located units providing ancillary services to the establishments, such as delivery fleet depots, research laboratories or storage warehouses.

Thus there were serious obstacles to the reconciliation of statistics from economic censuses on the one hand and the economic surveys and the employment and earnings series on the other, which would have been necessary if the censuses were to provide benchmark data and a sample framework for the surveys, and satisfactory interim data for checking the movements of the employment and earnings series.

### *National Accounts*

Like employment statistics and the surveys that have been discussed, the national accounts have to be comprehensive for the whole economy. They run across all industries and, in the industry dissections they provide, all economic activities must find a place. The national accounts are partly based on actual statistics, and partly on estimates. This will probably always be the case, but progress in national accounting requires that the part based on actual statistics should progressively increase. A major step in this direction would have been achieved if consistent and integrated statistics were available, both for censuses and surveys, from businesses themselves. The main broad aggregates required for each industry are gross product (that is, contribution to Gross National Product), wages and salaries, capital expenditure, and stocks. The economic censuses were potential sources of this information.

Although it has always been desirable to have consistent figures of this kind as a basis for national accounts estimates, two developments in recent years have made the need urgent. One is the development, in response to strong demand, of quarterly estimates of national income and expenditure. Dependent as they are on the available current figures of wages and salaries, capital expenditure and stocks, the publication of these estimates in Australia has increased the significance of the lack of correspondence between the current survey-based data and the potential benchmark information available in the economic censuses—and between these and the tax-based statistics from which many of the annual estimates of national income and expenditure are derived.

The second development which has enhanced the importance of integrated economic statistics is the strong move in advanced countries towards the development of new types of national accounts: input-output tables, flow-of-funds tables and national balance sheets, and the obvious advantages of being able to present these accounts (together with the national income accounts themselves and the balance of payments) in a single co-ordinated framework. These efforts have led to the appearance of the new proposals by the United Nations Statistical Office for an integrated system of national accounts \* which have now been endorsed by official statisticians throughout by the United Nations Statistical Office for an integrated system of national accounting concepts and frameworks must be co-ordinated, but in addition the basic data on which the estimates are based need to be fitted as closely as possible into the specified concepts and frameworks. The best hope for success in this objective is to integrate the conceptual framework in which the statistics are collected as closely as possible with the framework of the national accounts themselves. To give an example from the work being done in Australia at present: input-output tables are being prepared for the year 1962–63 on a conceptual framework consistent with the national income accounts. But many of the conceptual cells in the input-output table can only be filled for each industry by data obtained from the manufacturing and other economic censuses. These are the cells of the table showing what the industry buys from, and sells to, other industries and sells to end-users. In effect, these yield new estimates of the gross product of

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\* *A System of National Accounts*, Studies in Methods, Series F, No. 2, Rev. 3 (New York, 1968).

the industry which in present circumstances conflict with the estimates already published in the *Australian National Accounts*, based as these are mainly on tax statistics. To make them agree in future, a common set of concepts and a common set of statistical reporting units are needed for both the economic censuses and the national accounts.

The needs of national accounts statistics here do not conflict with those of the statistics for particular industries. On the contrary, the national accounts can provide the common conceptual basis needed for comparability of data between industries, without restricting the scope for the variation in detail which is necessary in order to provide each industry with its own statistics in the most suitable form. The interest of businesses themselves can be met by this common conceptual approach too, as there is no major conflict between national accounting concepts and the accounting concepts familiar to businesses themselves.

*Comparability of statistics for different levels of unit*

The national accounts illustrate a fact which underlies all economic statistics : that different levels of unit are appropriate for different kinds of statistics. In the case of the national accounts, statistics are required for items such as capital expenditure and stocks in some industry detail, and for items such as wages and salaries in geographical detail as well. To be classifiable in this way, such statistics should be collected and tabulated for a particular stratum of business unit, usually called the establishment. Statistics for national accounting items such as profit and interest receipts and payments, on the other hand, can only be collected and tabulated for a legal entity type of unit, which may be broader than the establishment. Commodity statistics are needed for estimates of input-output transactions, personal consumption expenditure, and aggregates at constant prices. For these statistics the unit being tabulated is narrower than the establishment ; it is, so to speak, the commodity itself : for example, the tonnage of ice-cream produced, whether made in establishments classified to the ice-cream industry class or not—although the statistics must of course be collected from a business unit. On the other hand, for studies of the sources and uses of capital funds, including overseas investment, the statistics needed are best collected and tabulated for units broader than the legal entity. This type of statistics would relate to business units of ownership and financial control, including groups of legal entities under common ownership and control. Although these examples are drawn from national accounts, there are similar relationships between types of unit and types of statistics in other forms of economic statistics.

This means that comparisons of industry detail cannot be made between statistics corresponding to different levels of unit, even if they are based on a common industry classification, unless something has been done to integrate the units at the various levels. This is one of the most important objectives of the integration of the economic censuses. It requires collecting data in such a way that reconciliation is made between the different levels of detail in each return, or set of returns, collected from each enterprise : commodity sales with establishment sales, establishment sales with enterprise sales, and so on. It also requires the facility to recast statistics collected and published for one level of unit to make them comparable with those for

a higher level unit. Salaries and wages, for example, would normally be published for establishments, and the salaries and wages for, say, the basic chemical industry group, would be those paid by all establishments classified to that industry group. If it were desired to compare the salaries and wages of this industry group with its operating surplus, for example, it would be necessary to use the statistics of the salaries and wages paid by all *enterprises* classified to the industry group. For a comparison with capital raisings or overseas investment it would probably be necessary to use the statistics of the salaries and wages paid by all *enterprise groups* classified to basic chemicals. The figure of salaries and wages would be different in each case, because the business unit classified to the industry group is progressively broader at each stage. Being classified on the basis of its main activity, it would tend to include progressively more salaries and wages paid to employees engaged in activities other than basic chemicals, because of the mixed nature of the activities of enterprises and enterprise groups. On the other hand, it would tend to exclude progressively more salaries and wages paid to employees of basic chemical establishments owned by enterprises predominantly operating in other industries.

#### *Enterprise statistics*

The establishment as used in economic censuses is defined mainly in terms of location, rather than in terms of ownership or management. With the growth of multi-establishment enterprises, especially those cutting across several industry boundaries, there has been increasing interest in statistics about enterprises as economic entities. These are the statistics relevant for comparisons with such things as the financial performance of companies, derived from company accounts or from taxation statistics, and in studies of the competitive position of firms. Size-distributions based on establishments can give only a partial picture of the structure of industries; they have to be supplemented by size-distributions of the enterprises engaged in the industry.

The enterprise statistics needed for these purposes must relate to all forms of business units—unincorporated enterprises as well as companies. For some purposes the need is for statistics based on operating legal entity units; other purposes require statistics based on groups of such legal entities operating under common ownership or control.

#### *Provision for extension of economic censuses into other industries*

The problems referred to earlier which have arisen from the specialised nature of the units and data concepts used in the existing economic censuses are likely to increase with the extension of economic censuses into other industries. A census of wholesale trade could not have been introduced without close attention being paid to its boundaries with manufacturing on the one hand and retail trade on the other. The treatment of the sales branches of manufacturing enterprises had to be determined, and the treatment of wholesaling activity by retailers. Similar problems arise with the planned future introduction of a census of construction. This industry, like wholesale trade, has areas of overlapping with manufacturing which have required special attention in the new standard industrial classification, in order to avoid the possibility of gaps or overlapping.



*Steps in integration*

To meet the purposes of integration, as they have been described, it was therefore necessary to take four major steps, which will ultimately affect most, if not all, of the economic censuses and surveys conducted by the Bureau :

1. Standardisation of census units : defining business units at standard levels, corresponding to the strata in the business structure for which various types of economic statistics are required and can be collected ; devising standard rules for identifying such business units.
2. Establishment of an integrated register of business units : identification of the standard units for all businesses to be covered by economic censuses and surveys, and recording them in a register to be used in the running of the censuses and surveys.
3. Standardisation of the industrial classification : adoption of a common system of classification suitable for all censuses and surveys, to which all the standard business units to be covered would be classified without gaps or duplication.
4. Standardisation of data concepts : defining in common terms the basic items of data for which statistics are required across all industries covered by economic censuses and surveys, to permit comparison and aggregation.

**Standardisation of census units***Types of unit*

The business units, as standardised for purposes of the integrated economic censuses, are at three levels :

1. the establishment (and associated administrative offices and ancillary units),
2. the enterprise, and
3. the enterprise group.

The central unit from which statistical information is collected is the *enterprise*, defined broadly as an operating legal entity. Where a number of legal entities operate as a group, owned or controlled by a single company, the enterprise is not the group as a whole, but each individual operating legal entity in the group.

The group of legal entities owned or controlled by a single company is recognised as a separate type of unit—the *enterprise group*. This is to be used not for collection of census returns but subsequently for aggregation of certain census data. The enterprise group, in addition, may be appropriate as the collecting unit for certain types of survey, such as overseas investment and local capital raisings, for which the enterprise would be too narrow. The census data aggregated for enterprise groups will provide a body of statistics directly comparable (when classified by industry) with the results of surveys conducted among enterprise groups.

The basic unit for which most data are to be tabulated is the *establishment*, defined in general as a unit covering all the operations carried on under the ownership of one enterprise at a single physical location—such as an individual factory, shop or mine. Enterprises operating more than one establishment report the data for each of their establishments on an establishment return. They report summary data for all their establishments on

enterprise returns, together with some additional data for the enterprise as a whole. Enterprises operating only one establishment supply a combined establishment-enterprise return. For small businesses a special short form is used.

*Administrative offices* and *ancillary units* are units such as head offices, storage premises, transport garages, and laboratories serving or administering establishments within the same enterprise and located away from them. They do not supply separate returns. If they administer or serve only one establishment their figures are included in the total for that establishment, in the establishment return. If they administer or serve more than one establishment their figures are included in the enterprise return. To enable geographical details to be published, certain figures for individual administrative offices or ancillary units are separately specified in the establishment and enterprise returns; these figures are confined to employment, wages and salaries, and capital expenditure.

*Manufacturers' sales branches* located away from establishments are included among the ancillary units, but only if they are of the kind which do not distribute goods to customers from stocks held by themselves. Any which do distribute from stocks in this way are treated as establishments, to be included in the wholesale census.

The word "operating", in the definition of the enterprise as an operating legal entity, is intended to exclude the numerous "paper companies" which may exist as parents, subsidiaries or associates of operating companies for various reasons. In general such non-operating companies are attached in the Bureau's lists to individual related operating companies in the enterprise group, for purposes of identifying the enterprise unit. Holding companies without employees are attached to the principal operating company in the group of companies owned by them.

However, subsidiary companies performing financial services for other companies within the group, such as instalment credit companies or companies operating superannuation funds, are recognised as separate enterprises, even though they might have no separate employees of their own. These belong to a different sector of the national accounts from that of trading companies. They are not in the integrated censuses but are covered in separate inquiries.

Some holding companies without operations of their own perform administrative services for some or all of their subsidiary companies and have staff of their own for this purpose. These companies receive a special abridged enterprise return for "ancillary enterprises". This abridged return is used also for property-owning companies in an enterprise group which own property used by more than one other enterprise in the group; such companies may be responsible for the capital expenditure of the group.

Some operating companies are found to have the accounts they use for management purposes inextricably mixed with those of a related operating company; in such cases the two companies are amalgamated for statistical purposes to form one enterprise.

The above description of the types of units used in the integrated economic censuses is necessarily abbreviated. For a more extensive description see *The Australian Standard Industrial Classification (Preliminary Edition)*, 1969, Vol. 1.

## **Establishment of Integrated Register of businesses**

### *Integrated Register*

In order to provide and maintain accurate records of the enterprises and establishments to be covered in economic censuses and surveys it was necessary to set up an *Integrated Register* of businesses. In this register the units of each business corresponding to the three standard levels—establishments (and administrative offices and ancillary units), enterprises, and enterprise groups—are identified and numbered in such a way as to record the links between the units at the different levels. The register is recorded on magnetic tapes and provides the means for operating an automated system for addressing and dispatching census forms for enterprises and establishments and for handling the subsequent receipt and processing of completed returns.

Much of the information about the parent-subsidary relationships of companies embodied in the register was originally obtained by means of questionnaires addressed to Group Employers registered with the Commonwealth Taxation Office under the pay-as-you-earn system of income tax deductions. The questionnaires related also to the activities carried on at the various locations of the Group Employers, and the results were used together with the lists of establishments used for previous censuses of manufacturing, mining, and retail trade, to build up the original integrated register.

The lists recorded in the register are kept up to date by regular checks from a wide variety of sources. In addition to sources used for updating the previous lists of mining, manufacturing, and retail establishments (such as factory registrations, lists of retail shops compiled by postmen, etc.) the Bureau collects questionnaires from new Group Employers, and periodically updates the information on larger companies by referring listings produced from the Bureau's current records back to the companies themselves for amendment.

### *Changes in the establishment concept*

The adoption of a new establishment concept in each of the economic censuses entails an unavoidable break in the continuity of the statistics in comparison with previous years. Special analyses are being made from which it is hoped to derive some estimates of the order of magnitude of the changes, for publication along with the results of the integrated censuses. The main changes in the establishment concept affecting the continuity of statistics can be summarised as follows:

1. In general the establishment in each census now consists of the whole of each physical location, operated by one enterprise, whose main activity is within the scope of the census. There is usually one return only for each establishment, classified to the industry of its main activity. This is in contrast to the previous censuses, in which an establishment could be the part of a location engaged in an activity covered by one of the censuses, and separate returns were required, where practicable, if the activities at the location corresponded to different industries in the same census, or different censuses. From the viewpoint of businesses completing census returns, the new establishment concept requires much less apportionment of data between returns than was necessary in previous censuses. There are still some

locations which are divided between different censuses, or between different industries in the same census, and which accordingly supply more than one establishment return each. However, such cases are restricted broadly to those where the "secondary" activity produces a substantial revenue. With some specific exceptions described in *The Australian Standard Industrial Classification, Vol. 1*, no separate return is required for such "secondary" activity unless the gross receipts from its activity amount to \$1m or more.

2. A particular effect of the new concept in manufacturing statistics is that establishments in the manufacturing census now include selling and delivery activities at the location, which were formerly excluded from the scope of the factory establishment. On the other hand, the statistics of factory establishments now exclude manufacturing activity carried on as a minor activity of predominantly retail establishments, such as the making up of blinds to customers' orders, dressmaking at frock shops, etc. However, the continuity of the statistics of commodity output will not necessarily be affected by this change. Manufacturing by retailers and wholesalers is reported in the retail and wholesale trade censuses, and commodity detail for this activity is being collected, at least for the larger establishments.

3. The treatment of outlying parts of an establishment has been standardised: if the outlying part is in the same local government area it is merged with the establishment. Thus, a factory which had extended its operations to a neighbouring location for lack of space would include the extension in its return if it was in the same local government area. Similarly, if two locations in the same local government area and industry (for example, used car lots at different addresses) have common employees and combined accounts, they are treated as a single establishment.

4. Administrative offices and ancillary units located away from establishments (apart from some owned by chain stores) were formerly outside the scope of the censuses, although stocks at such locations were to be included in the manufacturing and retail trade returns. As previously mentioned, they are now included in the census return of the establishment they serve, or if they serve more than one establishment they are included in the return supplied for the whole enterprise. In either case they appear in the census statistics for the local government area in which they are located, and for the predominant industry of the establishment or establishments they serve. From the viewpoint of businesses supplying returns this treatment is likely to minimise the need for special adjustment and dissection of data in accounting records, and to produce more homogeneous and meaningful statistics of the industry in which the business operates than before. The inclusion of administrative or ancillary activities in a census is no longer dependent on their being carried out at an establishment; instead they are treated as an integral part of the industry's statistics wherever they are located. Nevertheless, some published tables will show certain data separately for administrative offices and ancillary units. This treatment of ancillary units is expected to cause some former manufacturing establishments to become ancillary units: for example, engineering workshops doing maintenance and repair work on the plant and equipment of establishments in the same enterprise, and located away from them. The statistics of those items which are still reported for ancillary units (that is, employment, wages and salaries, and capital expenditure) will be included in the statistics for

the industry of the establishments served by the ancillary units, instead of the industry to which the workshops were classified. If the establishments served are outside the scope of the integrated censuses, the workshops, of course, will disappear from the scope of the manufacturing census.

5. The establishment concept used for the electricity and gas industries is an exception to the general concept. Because of the nature of their activities, the single operating location is not suitable as a basis for the establishment engaged in producing or distributing electricity or gas. The establishment unit used consists of all locations operated by the enterprise in the one State.

### Standardisation of the industrial classification

#### *Australian Standard Industrial Classification*

The Australian Standard Industrial Classification (ASIC), which is a prerequisite to the integration of the economic censuses and surveys, is described in a publication of the Bureau: *Australian Standard Industrial Classification (Preliminary Edition)*, 1969, Vol. 1. The classification system described in that publication defines the industries for which statistics are collected in the economic censuses, thus permitting the scope of each census to be marked out without any gaps or overlapping between them. It also defines the statistical units (establishments, administrative offices and ancillary units, enterprises, etc.) which are classified by industry, and lays down standard rules for identifying them and coding them to the industries of the classification.

Besides being used in the 1968–69 economic censuses, the ASIC will be used in other economic censuses and surveys, population censuses and surveys, and other statistics (national accounts, etc.) derived from the basic statistics. Data classified according to the ASIC can be converted to conform essentially with the International Standard Industrial Classification. It is proposed to publish summary tables of census results converted in this way to facilitate international comparisons.

The structure of the ASIC comprises four levels. The broadest of these is the "division" level, which relates to wide categories such as "manufacturing", "wholesale and retail trade", and "community services". The structure may be illustrated by the following example. A factory mainly engaged in making aluminium window frames would be classified to:

Division	C	Manufacturing
Sub-division	31	Fabricated metal products
Group	311	Fabricated structural metal products
Class	3112	Architectural aluminium products

The fundamental concept of the ASIC is that an industry, that is an individual class, or group, etc., in the ASIC is an entity composed of the establishments, administrative offices and/or ancillary units which have been classified to it.

Each ASIC class is defined in terms of a specified range of economic activities, designated as primary to it. (Manufacturing aluminium window frames, as shown in the above example, is primary to class 3112.) Similarly, each ASIC group is defined in terms of the economic activities designated as primary to the classes within that group, and so on. An establishment which is engaged mainly in economic activities which have been designated

as primary to a particular class is classified to that class whether or not that establishment is also engaged in other "secondary" activities. An administrative office or ancillary unit will be classified to an ASIC class according to the predominant industry of the establishments it administers or serves, while an enterprise will be classified according to the predominant industry of its establishments and ancillary units.

#### **Standardisation of data concepts : establishment statistics**

In previous economic censuses much of the data asked for in one census was broadly similar to data asked for in others. All asked for employment, and the manufacturing and mining censuses asked for value of output and the cost of materials, fuels, etc., used, from which value added could be derived—somewhat similar to the gross margin that could be derived in the retail trade census by subtracting the value of purchases from the value of sales and adjusting for stock changes. Value of stocks was asked for in manufacturing and retail trade censuses, and fixed capital expenditure (in the form of "additions and replacements" to fixed tangible assets) was asked for in manufacturing and mining censuses.

With integration of the economic censuses it became necessary to seek a common conceptual basis for the items of data of this kind, not merely in order to suit the needs of the Bureau in compiling national accounts estimates or deriving benchmark statistics for monthly or quarterly surveys or employment and earnings series, although these were important reasons for doing so. It was also necessary to find such a common basis in order to enable the returns to be completed more readily and accurately by the enterprises responsible for them. As the enterprise is the basic unit from which statistics are collected in the censuses, the data for the establishment returns had to be capable of being drawn from the records of the enterprise in such a way that they could be reconciled with the corresponding totals for the enterprise as a whole. The establishment returns for a single enterprise with more than one establishment might belong to different economic censuses, but they would need to balance with a single enterprise return for the whole enterprise. This enterprise return is common to all industries and all economic censuses.

The key items of data entering into this reconciliation, and therefore requiring a common conceptual basis, are turnover, stocks, purchases and selected expenses, employment, salaries and wages, and fixed capital expenditure.

These key items also encompass the main benchmark data required for improving the accuracy of quarterly sample surveys and employment and earnings series, and the data needed from establishments for consistent estimating of the main national accounts aggregates.

In order to provide for the inclusion of these key items in all censuses, questions on fixed capital expenditure, wages and salaries, and selected expenses were added to the retail trade census forms, and questions on stocks to the mining census forms.

The following table sets out in skeleton form the content of the establishment forms and the enterprise form for an enterprise with more than one establishment, to illustrate the inter-relationships among the forms and among the data items in the 1968-69 economic censuses:

MAIN ITEMS ON INTEGRATED ECONOMIC CENSUS RETURNS, 1968-69 (a)  
(For enterprises with more than one establishment)

Establishment returns		Enterprise return
Factories, mines, electricity, gas	Retail, wholesale, selected services	
<b>SALES, ETC.</b> Sales of goods produced by this establishment (ex-tax) (b) Sales of goods not produced by this establishment (ex-tax) Subsidies  All other income from outside the enterprise <i>except</i> rents, leasing revenue, interest and dividends Capital work on own account	<b>SALES, ETC.</b> Sales of goods (owned by the enterprise) (ex-tax) (b) (Sales of goods produced in this establishment, included above)  Commission received on sales of goods for other enterprises (wholesale only) All other income from outside the enterprise <i>except</i> rents, leasing revenue, interest and dividends Capital goods withdrawn from stock on own account	
Total sales, etc.	Total sales, etc.	Sales, etc. (c)
<b>STOCKS</b> At 30 June 1968 At 30 June 1969	<b>STOCKS</b> At 30 June 1968 At 30 June 1969	Stocks at 30 June 1968 (c) Stocks at 30 June 1969 (c)
<b>PURCHASES AND SELECTED EXPENSES</b> Purchases of materials, fuel, etc. (d) Purchases of goods for re-sale Repair and maintenance expenses  Charges for sub-contract and commission work Outward freight and cartage Motor vehicle running expenses Sales commission payments	<b>PURCHASES AND SELECTED EXPENSES</b> Purchases of goods for re-sale  Purchases of materials for manufacturing Purchases of wrapping and packaging materials and electricity and gas; repair and maintenance Charges for sub-contract and commission work Outward freight and cartage Motor vehicle running expenses Sales commission payments	
Total above purchases and expenses	Total above purchases and expenses	Purchases and selected expenses (c)
<b>TRANSFERS</b> Transfers of goods out (to other establishments of the enterprise) Transfers of goods in (from other establishments of the enterprise)	<b>TRANSFERS</b> Transfers of goods out (to other establishments of the enterprise) (wholesale only) Transfers of goods in (from other establishments of the enterprise)	
Rent and leasing charges	Rent and leasing charges	Rent and leasing charges (c)
Depreciation	Depreciation	Depreciation
Wages and salaries (e)	Wages and salaries (e)	Wages and salaries (c) (e)

MAIN ITEMS ON INTEGRATED ECONOMIC CENSUS RETURNS, 1968-69 (a)—continued  
(For enterprises with more than one establishment)

Establishment returns		Enterprise return
Factories, mines, electricity, gas	Retail, wholesale, selected services	
Sales tax	Sales tax	Sales tax
Fixed capital expenditure	Fixed capital expenditure	Fixed capital expenditure (c) (e)
Employment (e)	Employment (e)	Employment (c) (e)
		Land tax, rates and pay-roll tax Interest payments Royalty payments Employer contributions to superannuation schemes All other expenses (f)
		Rent and leasing revenue Interest receipts Revenue from royalties
		Value of fixed tangible assets

- (a) The outline omits some details. For example, stocks are shown by stage of processing in the enterprise return and in the establishment returns for factories, mines, electricity and gas; capital expenditure is shown in all returns by type of asset and distinguishing new and secondhand assets, and purchases and disposals; employment and salaries and wages are broken down by type in establishment returns. However, the reconciliation between establishment and enterprise returns makes use only of the summary totals shown in the last column of the table.
- (b) To agree with total of sales in detailed commodity part of return.
- (c) Separate totals for these items are shown in enterprise return for: all establishments in the intergrated censuses combined, all administrative offices and ancillary units reported on enterprise returns, all units of the enterprise in industries not covered by the integrated censuses. These three totals add up to the enterprise total.
- (d) To be compatible with total value of materials, etc., used in detailed commodity part of return (along with transfers in).
- (e) The return has an additional figure for this item for each separately located administrative office or ancillary unit reported in the return; this is to permit tabulation in fine geographical detail.
- (f) A single total, including travelling expenses, insurance premiums, accounting and legal costs, postage and telephone charges, office supplies, advertising, bank charges and the like, but not "provisions".

*Value added*

The fundamental measure of the "magnitude" or importance of an establishment, in economic censuses, is its *value added*.\* This measure can be aggregated for all establishments and industries covered by the censuses without duplication and is the concept generally accepted throughout the world as the measure of the relative importance of industries in economic censuses. It means the value added to materials in manufacturing, the value of minerals mined less that of the materials used in mining, and the value added to merchandise in retail and wholesale trading.

\*See below for discussion of the allied concept of gross product.



In the integrated economic censuses the common measure of value added in all industries is as follows : *value added* equals *turnover* plus *increase in stocks* minus *purchases, transfers in, and selected expenses*.

*Transfers in* are goods transferred from another establishment of the same enterprise, either for further processing or for sale. (*Transfers out* are included in turnover.) The *selected expenses* do not include salaries and wages, interest, rent, depreciation, or overhead expenses usually recorded only for the enterprise as a whole. Broadly speaking, therefore, the value added is the source from which establishments derive the surplus to meet salaries and wages, interest, rent, depreciation, and overhead expenses of the enterprise (that is, those not specified as *selected expenses* on establishment forms), and to provide a contribution to the profits of the enterprise.

Value added is the concept corresponding to value of production in manufacturing and mining censuses in the past, although it is derived in a different manner. Value of production was obtained by deducting the cost of materials, fuel, etc., used from the value of output at the factory or mine. Further points of difference appear below in the detailed explanation of items of turnover and purchases, etc.

#### *Turnover*

This item includes the components listed below.

1. Manufacturing, mining, electricity and gas censuses:
  - sales of goods produced by the establishment ;
  - sales of goods not produced by the establishment ;
  - transfers of goods out to other establishments of the same enterprise ;
  - bounties and subsidies on production ;
  - all other operating income (that is, excluding revenue from rent and leasing, interest other than hire purchase interest, dividends, and sales of fixed tangible assets) ; and
  - capital work done for own use or for rental or lease.
2. Retail and wholesale trade censuses :
  - sales of goods (owned by the enterprise) ;
  - transfers of goods out to other establishments of the same enterprise (wholesale only) ;
  - selling and purchasing commissions received (wholesale only) ;
  - all other operating income (with the same exclusions as above); and
  - goods withdrawn from stock for own use (as fixed tangible assets, or for rental or lease).

It will be seen that, despite the differences in the terms used for its components, the concept of turnover is identical in all the integrated economic censuses. In all these censuses, similarly, the details shown in the section of the form for sales of individual commodities are required to agree with one of the items of turnover : sales of goods produced by the establishment, for factories and mines ; and sales of goods (owned by the enterprise), for retail and wholesale trade. The commodity details in the manufacturing census now relate to the value of sales instead of the value of output, as formerly, although the output of individual commodities is still asked for in terms of quantities, along with the quantity and value of their sales.

In the case of the mining census, the value of output (valued at or near the mine) will be calculated or estimated, as a supplementary series, and will continue to be published.

### *Stocks*

The main change to statistics of stocks brought about by the integration of the censuses is due to the use of the new establishment concept: the statistics will relate to total stocks of the establishment, not merely those associated with the main activity covered by the census. Thus manufacturing establishments now include in their returns any stocks of merchanted goods held, and retail establishments include any stocks of materials held for wholesaling or manufacturing. For mining there is a division in the "finished-goods" category between "minerals produced in this establishment" and stocks of "other goods and minerals purchased for re-sale". This is to enable a reconciliation to be made between the aggregate stocks figures and the commodity details of stocks, production, and sales of minerals.

### *Purchases and selected expenses*

#### *Purchases, etc., items in manufacturing and mining*

1. The new way of deriving value added (that is, as compared with the previous way of deriving value of production) has required that value of purchases be asked for instead of the value of materials, etc., used. The commodity detail in the manufacturing census form is still in respect of usage of materials, etc., but the total figure is on the basis of purchases.
2. The value of purchases on the form is supplemented by the value of transfers in from other establishments of the enterprise.
3. In accordance with the broadened establishment concept, purchases of goods for resale are included as well as purchases of materials for use in manufacturing or mining.
4. Because sales by manufacturing establishments are now valued at actual sales value, whereas factory value of output as asked for in previous censuses was valued on a "factory-door" basis excluding delivery expenses, some additional expense items are now collected. These are: "outward freight and cartage" and "motor vehicle running expenses". "Sales commission payments" is also included. These three items are among those deducted from turnover in deriving value added.
5. In the mining census, output was formerly valued at point of sale, with transport costs shown separately, to enable value at mine to be calculated within the Bureau. In the new census the point-of-sale basis is retained for sales, but the transport cost item is replaced by the standard three items included in all censuses: outward freight and cartage, and motor vehicle running expenses. Sales commission payments are also asked for. As in the other censuses, these relate only to payments made outside the enterprise, as any employees of the mining establishment engaged in transport or selling the mine's products (with certain exceptions for major own-account rail and sea transport operations above a certain traffic limit) are treated as part of the mining establishment.
6. Charges for commission work and sub-contract work are specified as separate items of expense.

*Purchases, etc., items in retail and wholesale trade*

1. Because of the extension of the establishment concept, purchases in the retail trade census now include goods purchased for wholesale sale as well as those for retail sale. (Similarly the purchases item in the wholesale trade census includes purchases for retail as well as wholesale sale.)
2. For the same reason, there are items "purchases of materials for manufacturing" and "charges for commission and subcontract work" in both censuses.
3. The items "outward freight and cartage", "motor vehicle running expenses", and "sales commission payments" are included for the same reasons as the corresponding items in the manufacturing and mining censuses.
4. To complete the range of expenses of retail and wholesale establishments in order to enable value added to be derived consistently, there is a "residual" item: "purchases of wrapping and packaging materials, electricity and fuel, repair and maintenance expenses".

*Transfer values*

As mentioned earlier, turnover in all censuses except the retail trade census includes transfers of goods out to other establishments of the same enterprise. (Any transfers between retail establishments are provided for by having purchases reported inclusive of transfers in, and net of transfers out.) Similarly transfers in from other establishments of the same enterprise are included among the items of purchases, etc., deducted in deriving value added. Transfers, both in and out, are confined to transfers of goods. Services provided by one establishment to another in the same enterprise, in general, are not included among transfers (or sales) even if a charge is made. (However, in certain cases described below a commission is imputed to establishments selling or doing manufacturing work, on behalf of other establishments of the enterprise.)

In particular, transport services provided by one establishment to another within the same enterprise are not treated as transfers. Any charges made by the establishment are not to be treated as income, or as freight and cartage by the other establishment. An exception is made only for shipping services within an enterprise, and rail services above a certain minimum ton-mileage, where the transport services are treated as separate establishments of the enterprise (outside the scope of the censuses) but charging the other establishments freight and cartage.

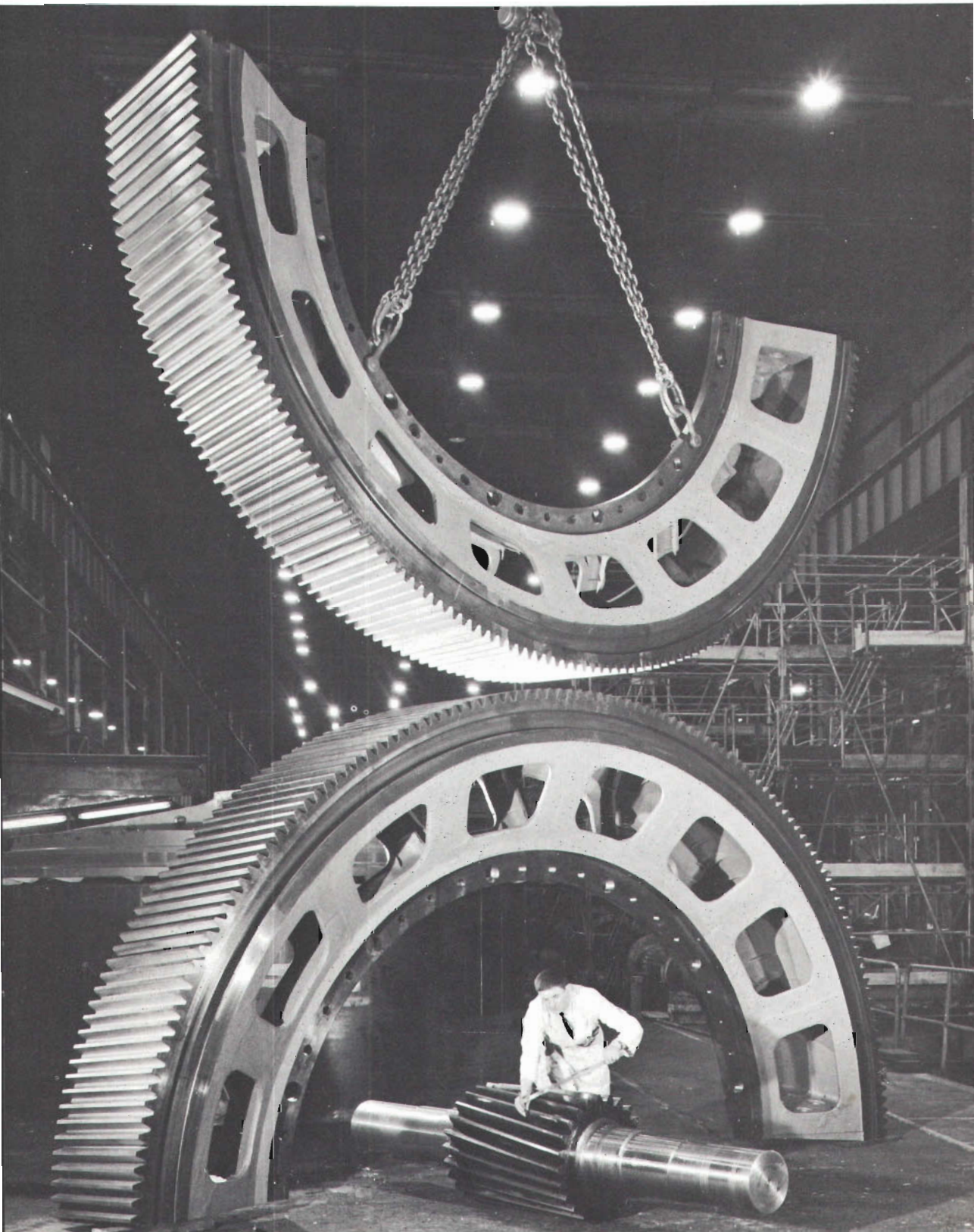
The integrated censuses adopt a new approach to the valuation of transfers. In the previous censuses of manufacturing and mining, transfers out were to be included by implication in the value of output, and valued at selling value excluding delivery costs in the same way as goods sold independently. Transfers in were included in the value of materials used, with no special instruction about valuation. In the integrated censuses, the transfer value sought is the value for which the goods would have been sold to the establishment to which they were transferred if it had been under separate ownership, i.e., commercial value. However, if such a transfer value cannot be given or estimated, alternatives are provided.

In large important cases where the goods cross State or industry boundaries, estimates of commercial transfer values are worked out in

## *Victoria Today*

This 19 foot diameter single helical steel girth gear, weighing 33 tons, was manufactured in Melbourne for an Adelaide cement mill. The matching pinion weighs 4.2 tons.

*Vickers Ruwolt Pty Ltd*





Lamb marking and weighing as part of a Department of Agriculture experiment on a grazing property in western Victoria.

*Department of Agriculture*

Clearing operations at Heytesbury showing a ball and chain.

*Rural Finance and Settlement Commission*





The Arthur Rylah Institute for Environmental Research in Heidelberg, opened by Her Majesty the Queen in April 1970.

*Fisheries and Wildlife Department*

The interior of the bulk wheat storage at Dunolly, in the Wimmera, which has a capacity of 10.5 million bushels. The roof is supported by 1,320 imported timber poles.

*The Herald and Weekly Times Ltd*





A flock of sheep on a grazing property near Hamilton in the Western District.

*Ernest Cameron*

The original part of this homestead, Murndal, was a stone cottage built in the 1840s which was panelled in 1891 to become the library. Extensive additions and alterations were made in the 1850s, 1870s, and 1890s until the homestead reached its present form in 1906.

*Ernest Cameron*



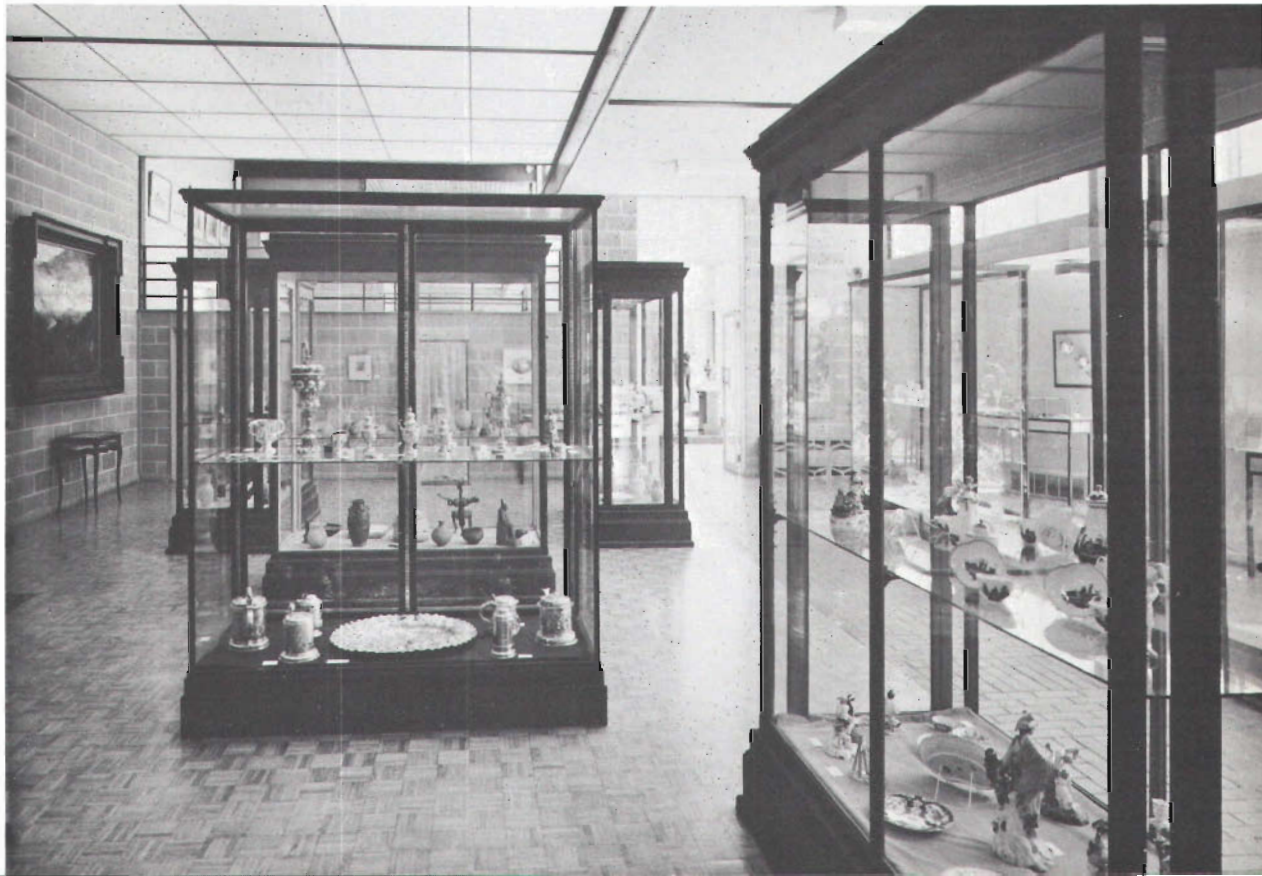


The civic centre of the City of Hamilton incorporates a library, art gallery, administrative offices, and the Town Hall.

*Ernest Cameron*

The Shaw collection of decorative arts in the Hamilton Art Gallery.

*Ernest Cameron*







The second stage of Melbourne's South Eastern Freeway shown under construction in October 1969.

*Herald and Weekly Times Ltd*



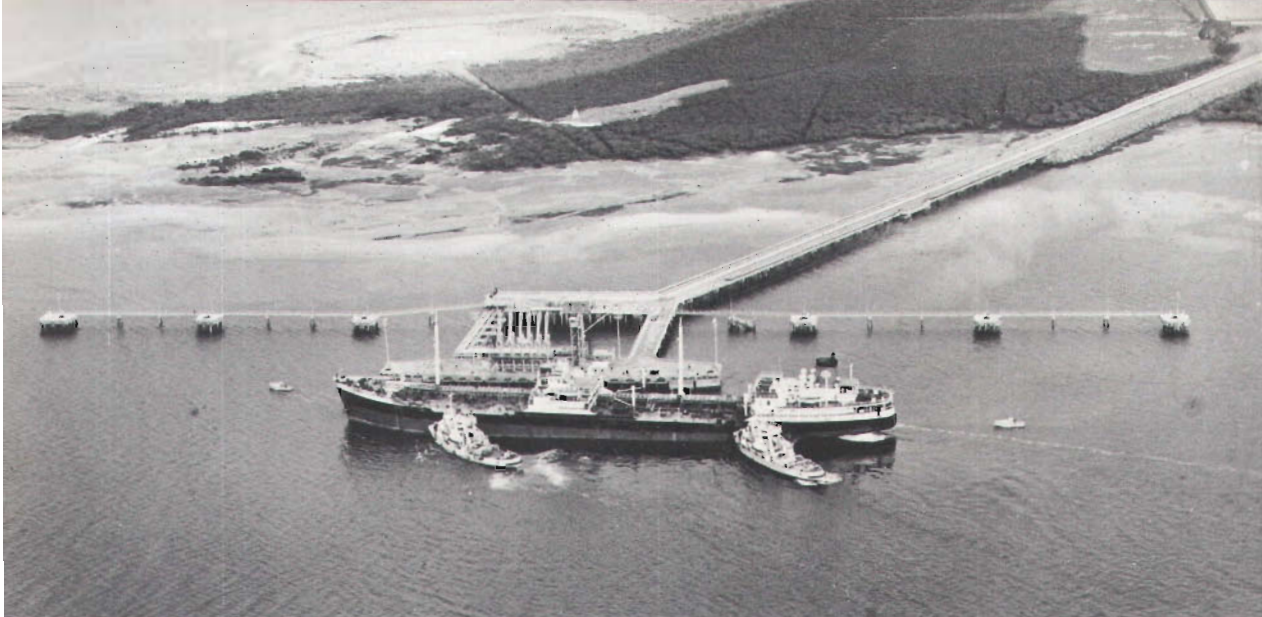
Laying the Gas and Fuel Corporation's 30 inch Dandenong to West Melbourne natural gas pipeline along Dandenong Road, Clayton in October 1969.

*M. A. Stratton*

(Below) Laying the 7 mile long 42 inch Esso-B.H.P. crude oil pipeline connecting the Long Island Point and Crib Point liquids piers and supplying the B.P. Refinery, Crib Point, in January 1970.

*M. A. Stratton*





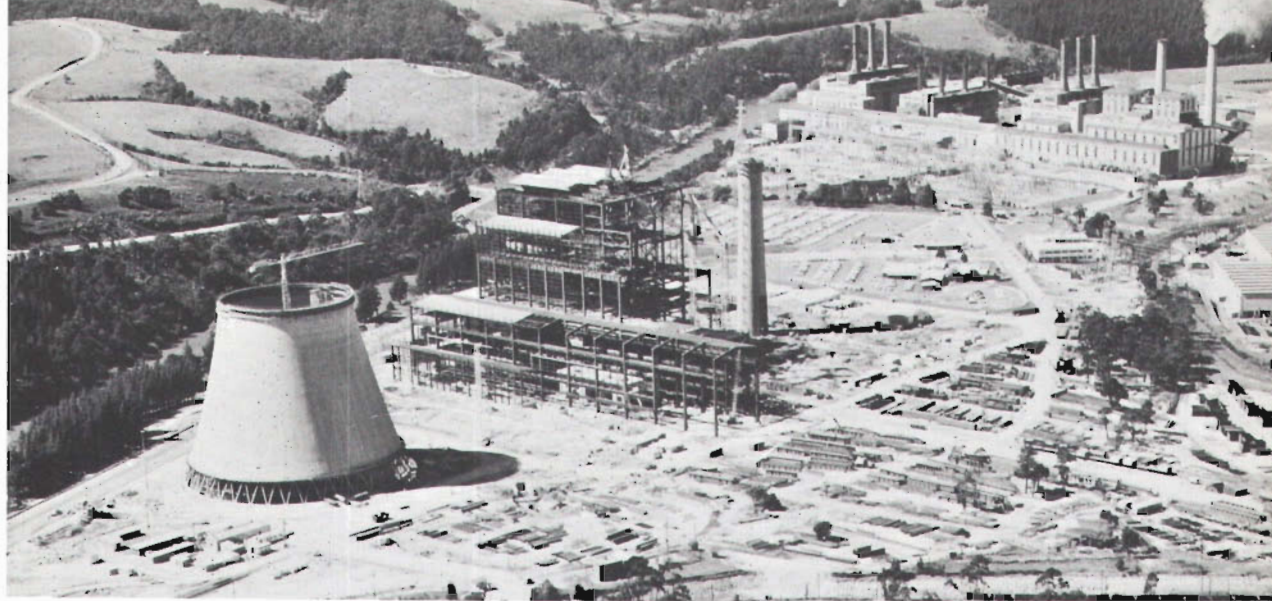
The tanker *Hemiglypta* being positioned into its berth at Long Island Point Liquids Pier, Western Port, in March 1970. This tanker carried the first consignment of Bass Strait oil to Australian refineries.

*Val Foreman*

The nearly completed earthworks for Lysaght's \$92m cold reduction plant at its steelworks project just north of Hastings, Western Port, in October 1970. Part of the Esso-B.H.P. tank farm is shown in the foreground.

*John Lysaght (Aust.) Ltd*



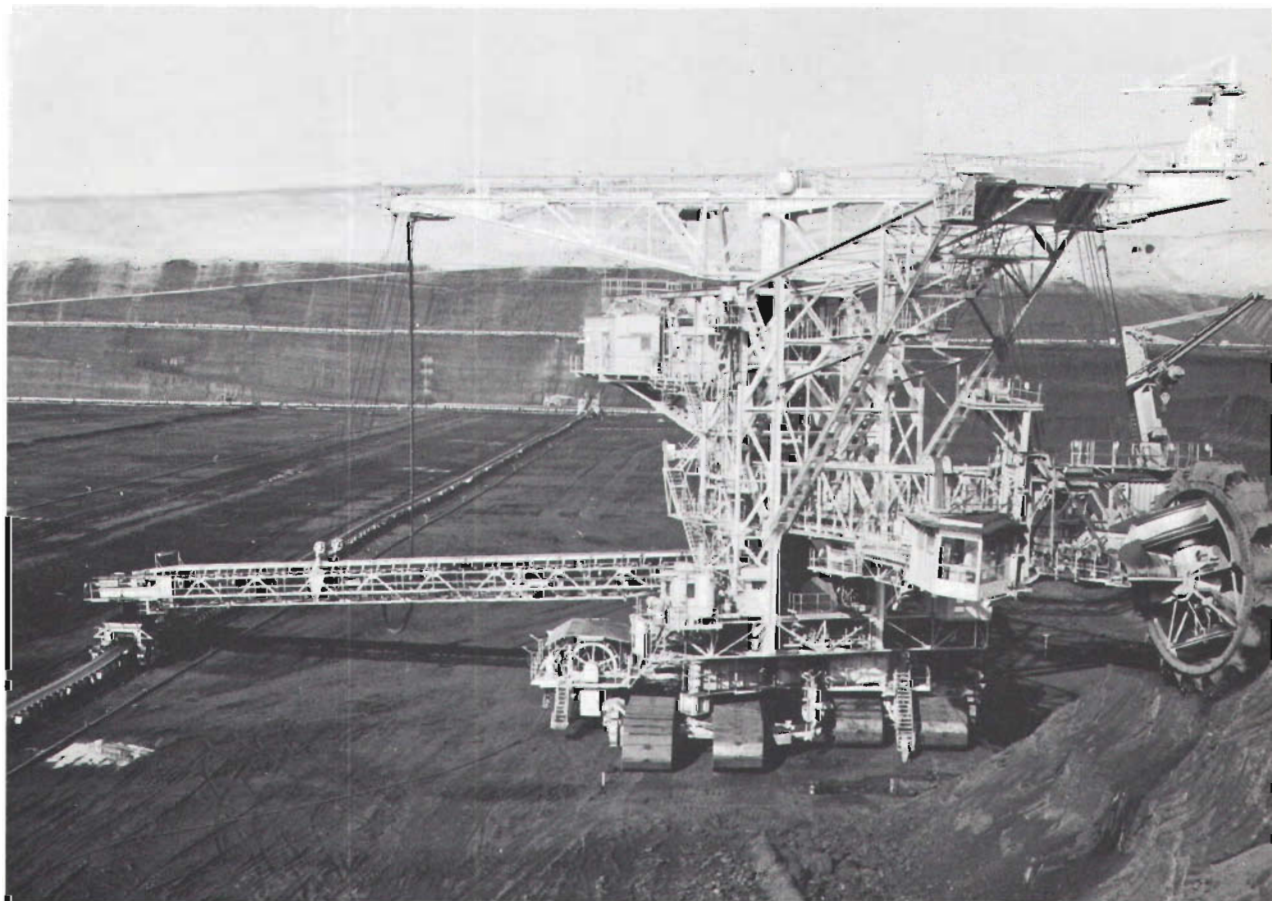


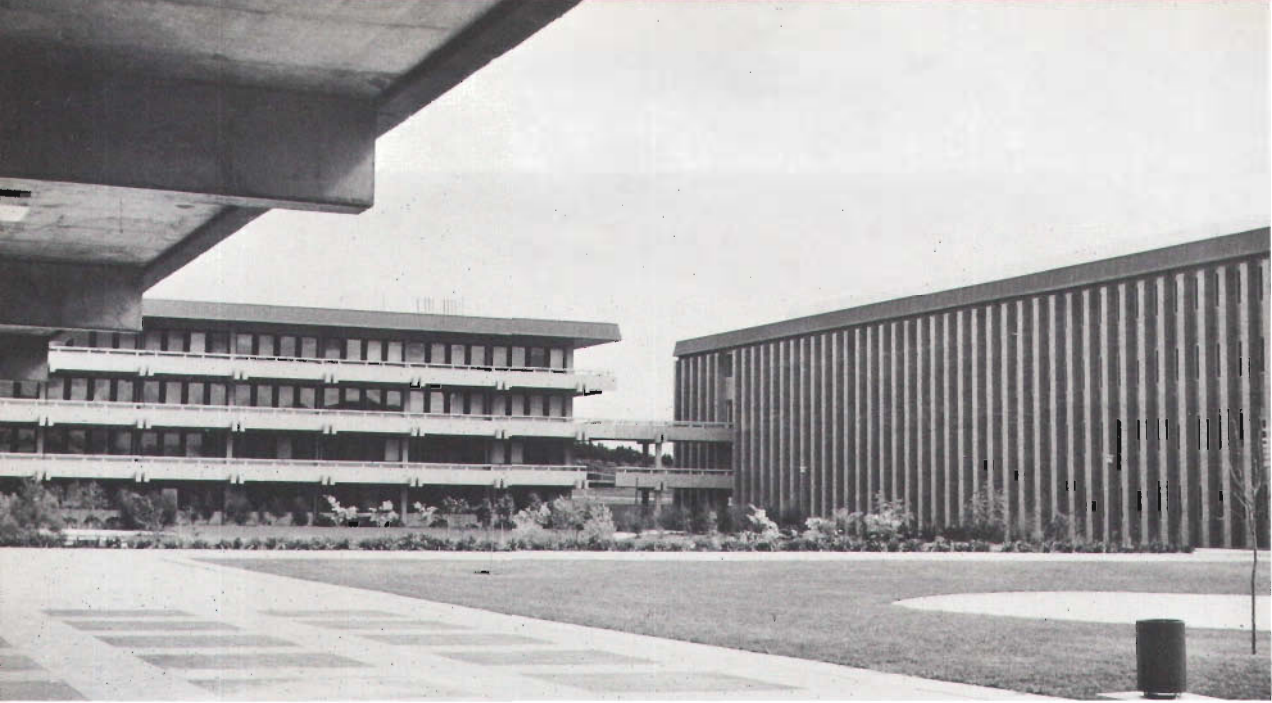
The Yallourn "W" power station under construction, showing in the foreground the base of the first of two 375 foot high natural draft cooling towers.

*State Electricity Commission*

The buckets on the revolving wheel of this brown coal excavator cut into the coal face and load coal directly onto belt conveyors to the Hazelwood and Morwell power stations, and the Morwell briquette works.

*State Electricity Commission*



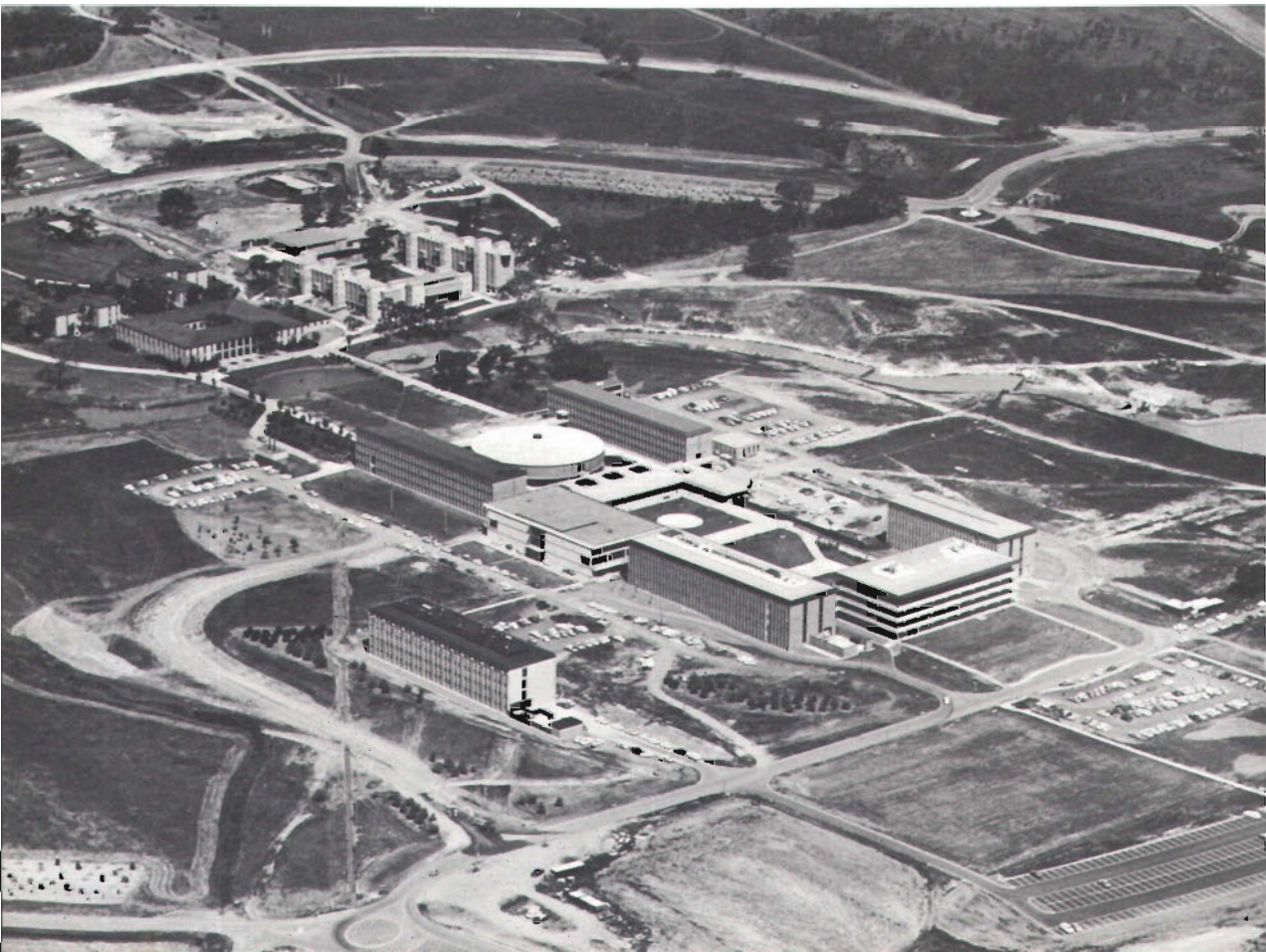


The Thomas Cherry building (left) and the chemistry building (right) at La Trobe University.

*La Trobe University*

An aerial view of the campus in November 1969.

*La Trobe University*





The applied mechanics laboratory in the McPherson School of Engineering at the Swinburne College of Technology.

*Victoria Institute of Colleges*

Children learning to make close observations in kindergarten.

*Mark Strizic*



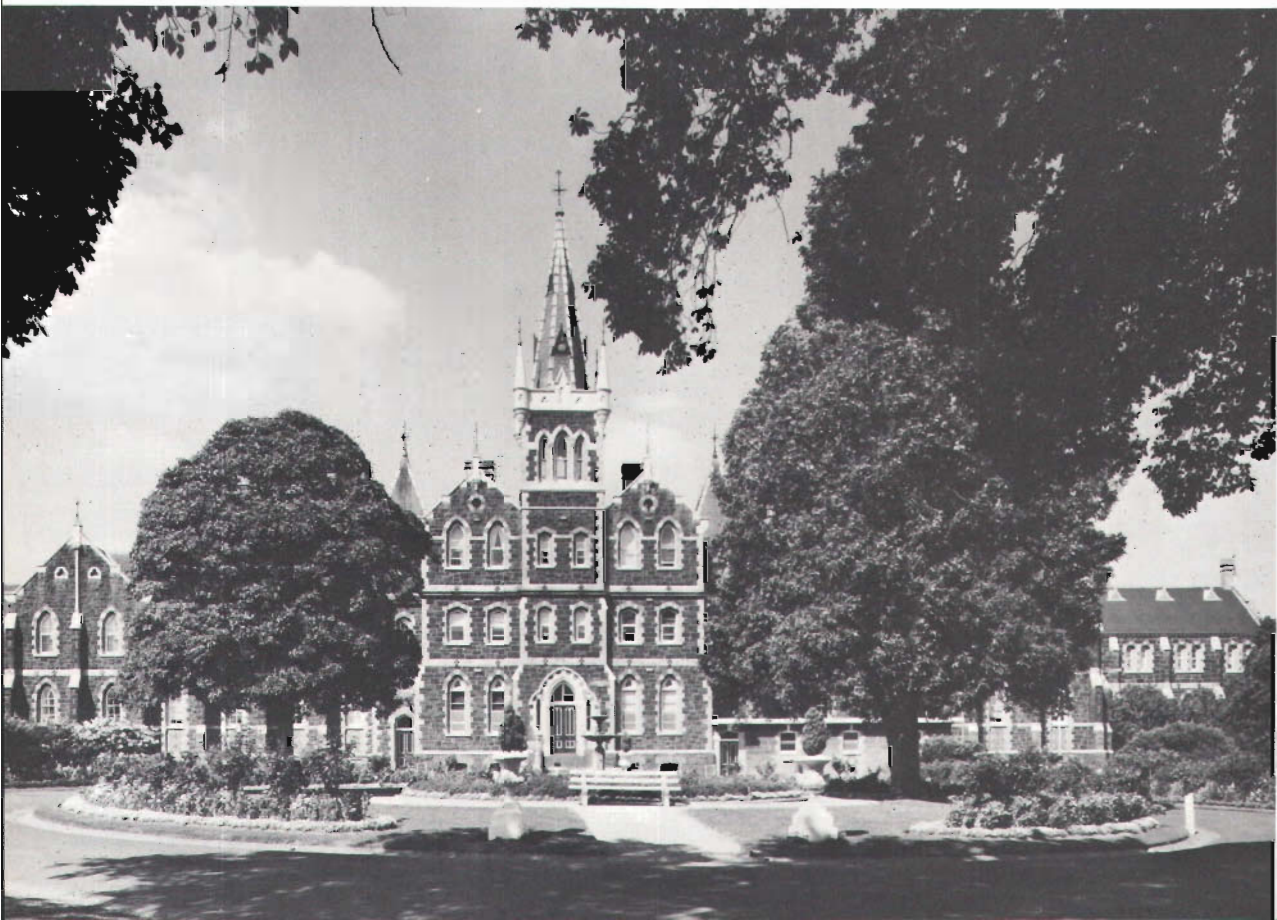


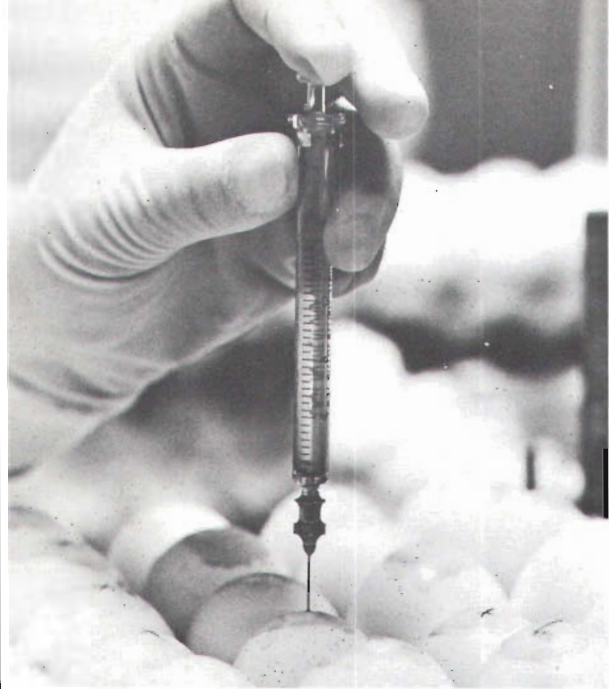
Teaching the sound "F" in the auditory training room at the Victorian School for Deaf Children.

*Victorian School for Deaf Children*

The School's bluestone building in St Kilda Road, Melbourne.

*Victorian School for Deaf Children*





Live influenza virus, injected into embryonated hen eggs, is the first stage in the production of influenza vaccine.

*Commonwealth Serum Laboratories*

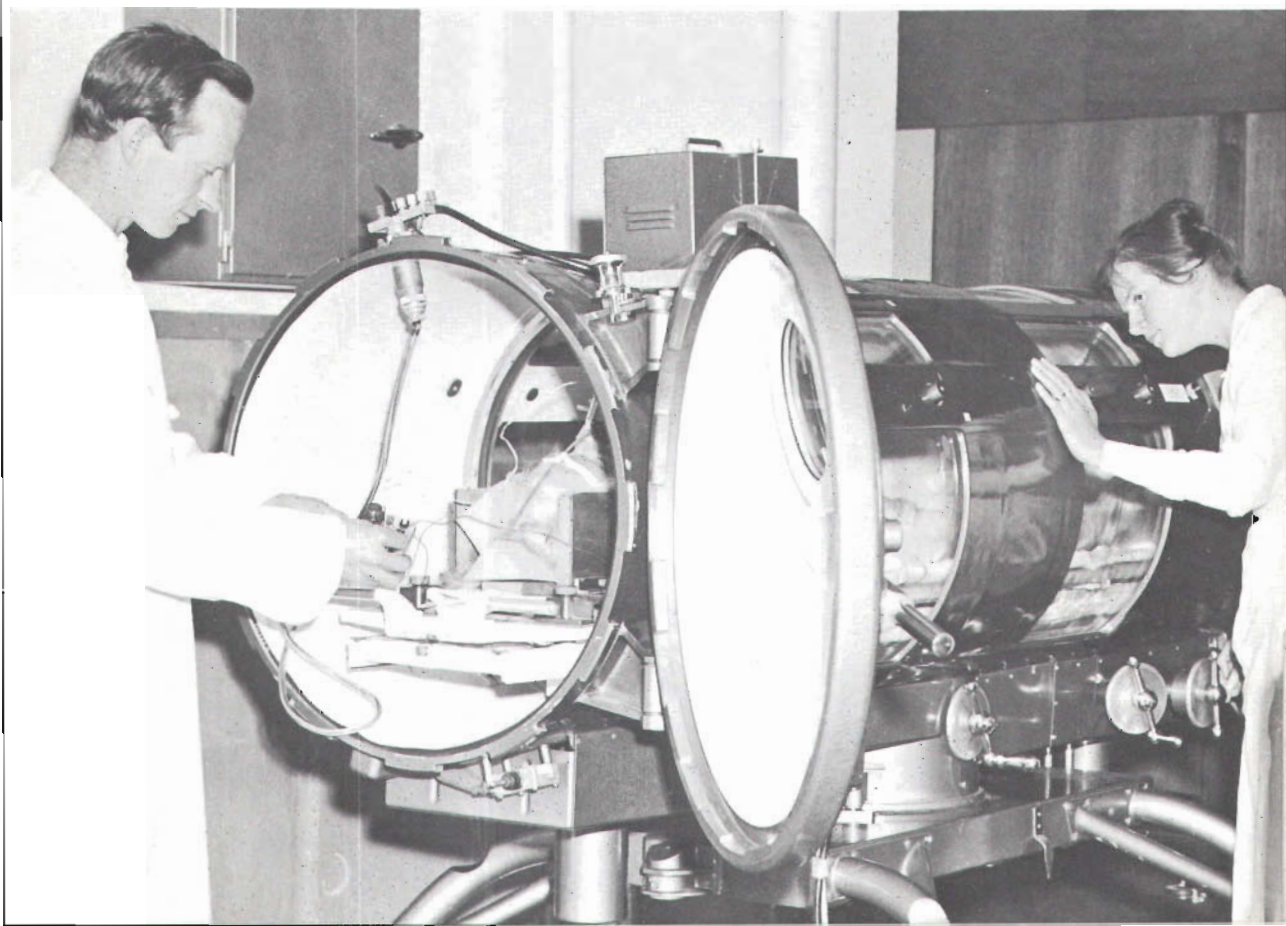


A tiger snake being "milked" to provide venom for antivenene production.

*Commonwealth Serum Laboratories*

This oxygen tank at the Cancer Institute helps in efficient treatment for patients.

*Hospitals and Charities Commission*







Como, in South Yarra, a gracious Victorian dwelling set in spacious grounds, has been maintained by the National Trust in period style.

*National Trust of Australia (Victoria)*

The market at Castlemaine, currently being restored by the National Trust.

*National Trust of Australia (Victoria)*





La Trobe's Cottage, the prefabricated timber residence of Victoria's first Lieutenant-Governor, has been re-erected on the Domain, Melbourne, and contains most of its original furnishings.

*National Trust of Australia (Victoria)*

Beechworth Powder Magazine, a relic of Victoria's gold mining era, has been restored by the National Trust with the assistance of the local community.

*National Trust of Australia (Victoria)*





This modern manually operated trunk exchange at Wangaratta serves telephone subscribers over an extensive area of north-eastern Victoria.

*Postmaster-General's Department*

The first train tops the 25 foot high crest of the single track hump section—the focal point of the Melbourne Yard Rearrangement Scheme.

*Victorian Railways*



consultation with the enterprises concerned. But otherwise actual book values are asked for, with the basis to be indicated (factory cost, cost plus a margin, wholesale selling value, etc.) If no commercial transfer values can be estimated, either by the enterprise or the Bureau, from market information, these book values are adjusted within the Bureau by a conventional method which gives all the establishments concerned a share of any surplus earned by the enterprise, and which provides values consistent for transfers out and the corresponding transfers in.

Some factories keep no book value for transfers (for example, a factory distributing its products through sales branches but keeping only one set of sales and stocks accounts, or a clothing factory supplying cut-out materials to be made up by outlying branch factories). In these cases no transfer value is estimated; the work done by the receiving establishment (whether sales branch or factory) is treated as done on commission for the supplying establishment, and a commission is imputed to it, while the sales and the stocks remain on the supplying establishment's return, which is charged with the amount of imputed commission.

Transfers are restricted to physical transfers of goods, and do not include transfers existing in books of account only. This is consistent with the distinction made between manufacturers' sales branches handling stocks, which are treated as wholesale establishments, and manufacturers' sales branches not handling stocks (such as order-taking offices, or sales representatives' offices), which are treated as ancillary units. Sales between enterprises of an enterprise group are not treated as transfers, even though they may not be at commercial value.

#### *Employment, salaries, and wages*

The main changes made in the employment and wages and salaries part of the factory form for 1968-69 were in the direction of simplification. With the new concept of the establishment, for example, it is not necessary for manufacturers to deduct any "non-manufacturing" employees (such as sales and delivery employees) or their earnings. All employees are to be included, and this includes employment at any ancillary units or administrative offices serving the establishment only—employees likely to be included in the payroll of the establishment in any case. As mentioned earlier, separate geographical details will be published for units of this type, including those reported on enterprise returns.

#### *Rent and leasing expenses*

Annual rent paid has been included in the censuses of manufacturing and mining in the past, but the figures were used to estimate the capital value of rented assets, for inclusion in the statistics of the value of fixed assets, and were not published themselves.

In the 1968-69 censuses rent and leasing expenses have been included in the establishment forms for all censuses, and in the enterprise form. It is intended to publish the results, which will be of particular interest in retail and wholesale trade and in some manufacturing industries. The extension to include leasing expenses reflects interest in the growth of leasing activity.

*Fixed capital expenditure*

Fixed capital expenditure has not appeared on retail trade census forms in the past, and in manufacturing and mining censuses has appeared in the form of "additions and replacements", an item used in the year to year reconciliation of the value of fixed assets. In the design of the integrated census forms the opportunity was taken to ask for fixed capital expenditure in the detail needed for national expenditure estimates and survey benchmarks, and most likely to be of general use as well. It has been impossible in the past, in estimating fixed capital expenditure for national accounts, to reconcile manufacturing censuses with business surveys, or with the statistics obtained from tax sources. Differences in scope, definitions, etc., meant that the estimates could be fitted into the national accounts framework only with a great deal of uncertainty. The integration of the censuses and the surveys should do much to improve the quality of the estimates in future.

The integration of establishment and enterprise returns will make it possible to combine the industry and geographical detail yielded by establishment returns with the desired conceptual basis of "ownership of assets" which only enterprise returns permit. In other words, the forms have been designed to provide statistics of fixed capital expenditure by enterprises on assets owned by them and located at their establishments.

The general basis of the fixed capital expenditure figures is: purchases of new and secondhand assets *less* sales of secondhand assets. (For establishments of multi-establishment enterprises, purchases include acquisitions by transfer from other establishments of the enterprise and sales include disposal by transfer to such establishments.) On this basis the capital expenditure of an industry will include net acquisition of secondhand assets acquired from other industries. However, it is possible to get a total for fixed capital expenditure on new assets for each industry, as the type-of-transaction breakdown provides for this.

The traditional type-of-asset breakdown was extended to show motor vehicles as a separate class as well as land and buildings, and plant and machinery. In addition, "land" was included with secondhand assets in the type-of-transaction breakdown, to make sure that it was not included by some in new assets.

An additional dissection of fixed capital expenditure is possible: by type of unit, that is, distinguishing between establishments, on the one hand, and administrative offices and ancillary units on the other.

*Value of fixed assets*

The manufacturing and mining censuses previously included a section on the book value of land and buildings, plant and machinery. This was dropped from the census forms for establishments in 1968-69, but included in the returns for enterprises, including those in retail and wholesale trade, as well as manufacturing and mining (and electricity and gas).

*Gross margin in retail and wholesale trade*

Besides publishing value added in retail and wholesale trade, it is proposed to publish derived statistics of *gross margin* for these censuses, both as an absolute figure and as a percentage of sales. These would make use of specific items of sales and purchases relating to trading transactions,

as distinct from manufacturing and other activities secondary to these industries.

Gross margin in retail and wholesale trade would be derived as follows : sales, transfers out\* and withdrawals from stock for own use (*less* any sales or transfers out\* of goods manufactured by the establishment) † *plus* increase in stocks *less* purchases of goods for resale and transfers in *equal* gross margin.

There is some approximation in the resulting figure, as the value of stocks in retail and wholesale trade censuses includes stocks held for any manufacturing or other non-trading activity carried on, as well as those held for retail or wholesale trading. Purchases of goods for resale, also, may include some materials purchased for use in repair work. However, this is considered unlikely to distort the figures significantly in the industry classes for which they are published, and certainly will not prevent them from being put to good use by those interested in analysing distribution statistics. It should be noted that gross margins relate only to transactions in "owned goods", not in goods sold on commission. (As already pointed out, the commodity detail in wholesale trade returns also relates only to owned goods.) To supplement the tables showing gross margins, there will be tables showing average rates of commission earned by establishments in various wholesale trade industries and types of operation.

#### Standardisation of data concepts : enterprise statistics

The statistics derived for enterprises from the integrated censuses are standardised because a common enterprise form is used for multi-establishment enterprises, whatever the industry in which their establishments operate, and for single-establishment enterprises the special "enterprise" items were common to all forms.

#### *Gross product statistics*

Earlier it was said that the new integrated censuses will provide valuable data directly applicable to national accounts estimates. One of the most important items of data of this kind is gross product (measured at market prices), and gross product at factor cost.

These concepts are related very closely to value added :

Gross product at factor cost *equals* value added *plus* rent and leasing revenue *minus* rent and leasing charges *minus* all other expenses *minus* land tax, rates, and pay-roll tax. (This concept differs from that at present employed in the Bureau's national accounts publications, in that it includes net rent and leasing revenue. It accords with the new SNA‡ concept, and will in due course be adopted in the Australian national accounts.)

Thus, to derive gross product at factor cost the enterprise income item rent and leasing revenue is needed. Rent and leasing expenses are in establishment forms as well as enterprise forms ; the reason why they appear there, but not rent and leasing revenue, is that the expenses are directly associated with the establishment itself, while the revenue is frequently a

\* Transfers out in wholesale census only.

† Owned goods only.

‡ *A System of National Accounts*, United Nations Statistical Office, *ibid.*

form of investment or property income associated with the whole enterprise rather than any particular establishment. This is not true of revenue derived from the hiring-out of consumer goods by establishments, and the forms provide for this to be reported in "other income" in the retail establishment returns. Some special action will also be taken about some types of wholesale establishment whose main source of income is leasing revenue.

The additional enterprise *expense* items needed are "other expenses", and land tax, rates, and pay-roll tax. These appear on the enterprise forms used in the integrated censuses.

The item "other expenses" will probably be of some value to users of the enterprise statistics, quite apart from its purpose in the derivation of gross product. It represents an aggregate of overhead "non-operating" expenses, all payable outside the enterprise, and each enterprise in a particular industry could usefully compare its own figure for this with the total for the industry.

Gross product at market prices can be derived from gross product at factor cost, but not without some estimation of components not directly provided by the integrated economic censuses :

Gross product at market price *equals* gross product at factor cost *plus* land tax, rates, and pay-roll tax, *plus* sales tax and estimates for other indirect taxes not included in the census forms, *less* subsidies (from establishment returns).

The indirect taxes not included in the census forms are taxes such as stamp duties and motor registration fees.

#### *Gross product estimates for establishments*

For national accounting purposes it is desirable to have statistics of gross product at factor cost with establishments as the unit of tabulation, as well as the series based on enterprises. This is because the industrial and geographical detail required go beyond what is likely to be possible at the enterprise level. (Gross product by States, for example, is not available without splitting enterprises into smaller units.) To derive statistics of gross product for establishment units it is necessary to adopt conventional rules for spreading the overhead expenses of enterprises not collected on establishment returns.

#### *Other enterprise statistics*

Statistics which it is expected could be published for enterprises, in suitable tabulations by industry, will include :

- Number of enterprises
- Number of establishments (operated by enterprises in the industry)
- Turnover
- Stocks, opening and closing
- Purchases and selected expenses
- Value added
- All other expenses
- Land tax, rates, and pay-roll tax
- Gross product at factor cost
- Rent and leasing expenses paid
- Rent and leasing revenue

Wages and salaries  
Employer contributions to superannuation schemes  
Gross operating surplus  
Interest paid  
Royalties paid  
Interest received  
Royalties received  
Depreciation  
Fixed capital expenditure  
Value of fixed tangible assets  
Employment

#### *Statistics for enterprise groups*

The choice of statistics to be published for enterprise groups is being examined. By the nature of the censuses, it will not be possible to derive consolidated statistics of such items as turnover, interest, or rent. However, it should be possible to publish a useful body of statistics for enterprise groups, in suitable broad industry groupings, by aggregation of statistics of the enterprises within the scope of the censuses.

## MANUFACTURING ACTIVITY

### Introduction

Information on the subjects dealt with in this section of the *Year Book* is contained in the annual printed bulletins *Manufacturing Industry* and *Manufacturing Commodities* issued by the Central Office of the Bureau. Information is also published, principally at the Australian (as distinct from State) level of aggregation, as soon as the data can be prepared, in a series of thirty-five annual mimeographed bulletins, *Manufacturing Industries*, each relating to a particular industry or group of industries. Advance annual information at the Australian level of aggregation is published in mimeographed form in *A Summary of Principal Statistics of Factories* and in *Principal Factory Products*, and for Victoria in the mimeographed bulletin *Factory Statistics: Preliminary*. Current information on factory products is available in the *Victorian Monthly Statistical Review* and the monthly Victorian bulletin *Production Statistics*.

In addition to the above-mentioned publications there is also a series of fifty-two *Monthly Production Summaries*, each relating to the production of a particular commodity or group of commodities at the Australian level of aggregation.

In respect of the year 1968-69 the Commonwealth Bureau of Census and Statistics has conducted the annual census of manufacturing industry as part of a programme of fully integrated economic censuses covering manufacturing and mining industries, and retail and wholesale trade. For a detailed description of the purposes served by this project, and of the new concepts and methods adopted, the reader is referred to the special article on these censuses on pages 368 to 389. A more detailed version of this article appears as Chapter 31 of the *Commonwealth Year Book* 1970.



The integrated economic censuses have been a major undertaking involving the development of new concepts, definitions, and procedures. Inevitably there has been a considerable delay in finalising the results of the censuses and, for this chapter on manufacturing industry, it has not been possible to provide more up-to-date statistics than those for 1967-68 which were included in the previous issue. In view of this, the detailed tables showing statistics for individual industries, included in the *Victorian Year Book* 1970 on pages 421-454, have not been repeated. Results of the 1968-69 censuses will be available in a set of special bulletins, extracts from which will be published in future issues of the *Victorian Year Book*.

### Industrial development during 1969

An important step in the development of Victoria's natural gas and oil industry was taken during October 1969, when crude oil flowed by pipeline from the Barracouta oil rig in Bass Strait to the shore based processing plant. The \$36m plant at Longford will process the crude oil. "Wet gas" is already being processed in one section of the Longford plant and fed into the Victorian Pipelines Commission system. It is transferred by pipeline to the Melbourne metropolitan area, where the process of conversion from town gas to natural gas was completed in December 1970.

The light ends of the Bass Strait crudes were piped to the \$24m Long Island Point fractionation plant in March 1970. This plant, completed during 1969, will undertake further processing to produce liquefied petroleum gas (L.P.G.). Heavier crudes will go to the Altona petrochemical complex for further processing. Refinery additions costing some \$26m have been completed giving the refinery the capacity to handle up to 40,000 barrels of Bass Strait crude daily. Processing began in March 1970.

Significant developments in the textile and apparel industries were concentrated mainly in outer metropolitan and country areas. A \$6m plant to produce mattress ticking was nearing completion at Lyndhurst. The plant was being constructed on a 40 acre site and \$2.5m was spent on automatic and semi-automatic machinery. At Breakwater, Geelong, a 5 acre site has been purchased by a men's and boys' apparel manufacturer. Initial plant installations will cost \$200,000 and it is anticipated that factory employment will eventually reach 750 persons. A further development in the textiles industries has been the modernisation of a Bendigo spinning mill and extensions to a tyre cord plant totalling \$1.25m. A shoe manufacturer has expanded its North Melbourne factory capacity involving an expenditure of \$550,000 and has erected a \$200,000 factory at Norlane, Geelong.

Steady expansion in the automotive industry has continued, with manufacturers and assemblers of motor vehicles increasing their capacity to meet the demands of a rising and highly competitive market. A new plant to manufacture V8 automotive engine units opened during the year at Fishermens Bend. The plant was established at a cost of \$23m. Another major project has been the installation of manufacturing facilities for automatic transmissions involving expenditure in excess of \$16m.

Land has been purchased at Mount Waverley as the first step in a project to manufacture micro-wave and telecommunications equipment. Production commenced late in 1970. A manufacturer of fasteners and fastening tools erected a new factory building at North Croydon planned to consolidate all the firm's activities. The factory, which was built on a 17 acre site, became operational in January 1971 and involves an investment on buildings and plant of at least \$1m. Further developments involved the completion of a 140,000 sq ft factory in November 1969 at Richmond to produce oil heaters and the completion of a \$2.5m communications equipment factory at Burwood in August 1969.

A project costing about \$4m in the field of fibreglass manufacture at Dandenong was completed during the year. The three-stage project included extensions to existing facilities, the construction of a factory to manufacture resins, sizes, and plastisols, and most importantly, the installation of a plant to produce fibreglass textile yarns using local raw materials.

Dairy products processing featured prominently among the food industries undertaking expansion programmes. A \$1m processed cheddar plant was completed at South Melbourne during the year. The entire processing area of the plant can be held at controlled temperature and humidity levels. Another manufacturer of dairy products is completing construction of a new processing, warehousing, and administration complex on a 20 acre site at Dandenong. A \$40,000 development laboratory has been included, and the project to date has involved an investment in excess of \$500,000.

A manufacturer and exporter of canned fruits carried out a \$3m rebuilding programme during 1969. The project, at Shepparton in the Goulburn Valley, included controlled atmosphere cool stores, new warehouse areas, and a new fruit intake inspection area.

Another food industry development during 1969 was the completion of new tea and coffee processing, warehouse, and administration premises at Notting Hill at a cost of approximately \$3m.

Expansion of the capacity of the aluminium plant at Point Henry to 90,000 tons per annum was completed during the year.

### **Government activities**

#### *Industrial legislation*

The *Labour and Industry Act* 1958 represents the development and consolidation of industrial legislation which had its beginnings in 1873. Among other matters, the Act deals with the registration and inspection of factories, guarding of machinery, and conditions of employment. It also provides for the appointment of Wages Boards and of the Industrial Appeals Court. Further information on these matters may be found on pages 166 to 197.

#### *Decentralisation of manufacturing industries :*

##### *Division of State Development*

Since the early stages of the Second World War successive State Governments have encouraged the development of existing manufacturing facilities and the establishment of new industries in country areas.

Concentration of Victoria's population in the metropolitan area of Melbourne is of increasing concern to both the people and Government

alike. The inroads of mechanisation into primary industry and the subsequent lessening of employment opportunities have emphasised the need to develop other avenues for the employment of labour in the non-metropolitan parts of the State. In order to encourage establishment or expansion of secondary industry in country areas the Government offers a variety of incentives.

Crown land may be provided to industry with or without consideration. This facilitates the acquisition of a site adequate to meet all likely needs of future expansion and at the same time provide for a range of staff amenities.

Crown land, where available, may also be provided for housing purposes. Priority for houses built by the State Housing Commission may be given for "imported" key personnel. Funds can also be made available to co-operative building societies for the express use of personnel nominated by a sponsored industry. As a further inducement to set up or expand manufacturing industry in non-metropolitan areas, loans at a moderate rate of interest are available through the Rural Finance and Settlement Commission.

To offset any locational disadvantages as compared with Melbourne, rail freight rates on raw materials and finished products are reduced to a nominal figure (as low as 10 per cent); charges for power, gas, and water can be subsidised, if necessary, to bring them in line with Melbourne rates; and, in respect of an approved decentralised industry, restriction on the use of road transport by company vehicles is eliminated.

There are also several other concessions which in themselves are minor, but which when applied in conjunction with the above, make country operations more attractive to many industries. The main drawback to decentralised industry is the shortage of skilled labour and small markets in these areas.

In an effort to promote the development of several important provincial centres, the Victorian Government recently agreed in principle with certain recommendations made by a Decentralisation Advisory Committee which was headed by the Minister of State Development. It suggested that five particular areas in Victoria (Ballarat, Bendigo, the Latrobe Valley, Portland, and Wodonga) appeared to be the most suitable for extra promotion and development. Such development could help to check the imbalance of population in the State.

Development committees have been set up in each of these centres, membership of which includes representatives of local government and leaders of commerce and industry.

These committees work towards the general development of their areas with emphasis on the development and diversification of secondary industry, and the promotion of commercial services and other opportunities. In addition to these centres, the Government has pledged its interest and support for all other areas wishing to pursue a policy of industrial development.

**Further reference, 1968**

*Commonwealth Department of Trade and Industry*

The functions of this Department relate chiefly to the policy aspects of Australian overseas trade, both imports and exports, and the encourage-

ment and development of Australian manufacturing industry.

It deals, among other things, with the development and diversification of Australian exports (including exports of manufactures) and, through the Office of Secondary Industry, with questions of protection to local industry against import competition, the special problems of small industries, the location of industry (decentralisation, etc.), and the efficiency of industry. It maintains liaison with such bodies as the Manufacturing Industries Advisory Council, the Export Development Council, and the Export Payments Insurance Corporation, and controls the Australian Trade Commissioner Service.

#### *Protection of industry*

The established policy of the Australian Government is to accord adequate and reasonable protection against import competition to economic and efficient industry. The Government seeks the advice of the Tariff Board on questions of protection for individual industries. The Board holds public inquiries into and reports on questions referred to it by the Minister. In cases of urgency, temporary protection may be accorded on the recommendation of a special advisory authority pending review by the Tariff Board.

The Customs Tariff is the accepted and normal instrument of protection to Australian industry. However, for some industries in special circumstances, assistance is accorded by means of bounties on local production. As a last resort, when other methods are inadequate, quantitative restrictions on imports are applied.

The Department of Customs and Excise administers the Customs Tariff and also operates the By-law system, under which plant and materials normally subject to protective duty may be admitted at concessional rates if no suitably equivalent products are reasonably available from local sources.

#### **Scientific research and standardisation**

##### *Commonwealth Scientific and Industrial Research Organization*

The functions of the Organization, as described in the Science and Industry Research Act, are to initiate and conduct research in connection with industries in Australia, to train research workers, to establish industrial research studentships and fellowships, to make grants in aid of pure scientific research, to establish industrial research associations in various industries, to provide for testing and standardisation of scientific equipment, to conduct an information service relating to scientific and industrial matters, and to act for Australia in liaison with other countries in matters of scientific research.

##### *Standards Association of Australia*

This Association is the national standardising organisation of Australia and issues standard specifications for materials and codes of practice. Specifications and codes are prepared and revised periodically in accordance with the needs of industry and standards are evolved and accepted by general consent. It is the Australian member body of the International Organisation of Standardisation and of the International Electrotechnical Commission.

*National Association of Testing Authorities*

This is the Australian organisation for approval of testing laboratories. The Association registers laboratories of governmental and industrial testing authorities, thereby organising a national testing service. Registration of laboratories is voluntary. Owners of registered laboratories are members of the Association. They have the right to endorse their test documents in the name of the Association, to indicate their technical and managerial competence.

**Definitions in factory statistics**

Factory statistics compiled for 1967-68 were the last of the old series. The first bulletin of statistics from the 1968-69 Economic Censuses (see pages 368 to 389 for details), *Manufacturing Establishments and Electricity and Gas Establishments: Preliminary Statement*, was issued in January 1971 and contained information in respect of ten industry subdivisions which permitted comparisons to be made between States, but did not permit comparisons to be made between 1968-69 and previous years because of the changes in the definition of the establishment, bases of classification, and forms. Accordingly, information in respect of factories for 1967-68 and previous years has been repeated in this *Year Book* to record the nature and location of secondary industry in Victoria, which changes little from year to year.

The statistics relating to factories have been compiled from returns supplied annually by manufacturers under the authority of the Commonwealth Census and Statistics Act. A return must be supplied for every factory, which is defined for this purpose as an establishment where four or more persons are employed or where power (other than manual) is used in any manufacturing process.

If a manufacturing business is conducted in conjunction with any other activity, particulars relating to the manufacturing section only are included in the statistics. Where two or more industries are conducted in the same establishment, a separate return is obtained for each industry, if practicable.

Manufacturers are requested to state in their returns particulars about the number, age, wages, etc., of their employees, the value of premises and equipment and of factory stocks, the horsepower of machinery, the value, and, in many cases, the quantities of raw materials and fuel used, and quantities and values of principal articles produced. These returns are not intended to show a complete record of the income and expenditure of factories, nor to show the profits or losses of factories collectively or individually.

The *average number of persons employed* is quoted on two different bases: the average during the period of operation and the average over the whole year. Of these, the former is simply the aggregate of the average number of persons employed in each factory during its period of operation (whether the whole or only part of the year). This average is used only for details dealing with the classification according to the number of persons employed. The latter, which is used in all other instances, is calculated by reducing the average number working in the factories (irrespective of period of operation) to the equivalent number working for a full year.

*Working proprietors* are included in all employment figures other than

those dealing with monthly employment and age dissections, but salaries and wages paid in all cases exclude drawings by working proprietors.

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.

The *value of production* is the value added to raw materials by the process of manufacture. It is calculated by deducting from the value of factory output the value (at the factory) of those items of cost specified on the factory statistical collection form, namely, materials used, containers and packing, power, fuel and light used, tools replaced, and materials used in repairs to plant (but not depreciation charges); the remainder constitutes the value added to raw materials in the process of manufacture, and represents the fund available for the payment of wages, taxation, rent, interest, insurance, etc., and profit.

It is considered that, because of the duplication of materials used (which means that the finished product of one process of manufacture often forms the raw material for another), an inaccurate impression would be obtained by using the total value of output of manufacturing industries in year to year comparisons. Woollen manufactures might be cited as an example. Greasy wool forms the raw material for the woolscouring industry, the product of which is scoured wool. This is afterwards combed into wool tops which are used in the spinning mills for the manufacture of yarn. In due course the yarn is woven into cloth, the raw material for the clothing industry. If these processes are carried out separately in different factories, it is evident that the value of the wool would be counted five times by using value of output as the basis for the annual comparisons of manufacturing production.

The concept of value added prevents this double counting and gives a truer picture of the relative economic importance of industries.

### **Classification of factories**

In the compilation of statistical data dealing with factories in Australia, a standard classification of manufacturing industries, formulated at a conference of Australian statisticians in 1902 and revised from time to time, was used until 1929–30. A new classification based on that used in Great Britain for census purposes was introduced in 1930–31, and this, revised and extended to a minor degree in regard to sub-classes of industry in accordance with decisions of the Statisticians' Conference, 1945, was used until 1967–68. The construction of a new Australian Standard Industrial Classification, compatible with the United Nations International Standard Industrial Classification, has been undertaken and is being introduced for the 1968–69 census of manufacturing establishments (see pages 378 to 379).

It should be noted that a factory engaged in activities that would entitle it to classification in more than one type of industry is classified to its predominant activity.

The classes and sub-classes in the classification of factories used in the 1967-68 factory census were as follows:

#### CLASSIFICATION OF FACTORIES

##### CLASS 1. TREATMENT OF NON-METALLIFEROUS MINE AND QUARRY PRODUCTS.

1. Coke works
2. Briquetting and pulverised coal
3. Carbide
4. Lime, plaster of paris, and asphalt
5. Fibrous plaster and products
6. Marble, slate, etc.
7. Cement, Portland
8. Asbestos cement sheets and mouldings
9. Other cement goods
10. Other

##### CLASS 2. BRICKS, POTTERY, GLASS, ETC.

1. Bricks and tiles
2. Earthenware, china, porcelain, and terracotta
3. Glass (other than bottles)
4. Glass bottles
5. Other

##### CLASS 3. CHEMICALS, DYES, EXPLOSIVES, PAINTS, OILS, GREASE

1. Industrial and heavy chemicals and acids
2. Pharmaceutical and toilet preparations
3. Explosives (including fireworks)
4. White lead, paints, and varnish
5. Oils, vegetable
6. Oils, mineral
7. Oils, animal
8. Boiling-down, tallow-refining
9. Soap and candles
10. Chemical fertilisers
11. Inks, polishes, etc.
12. Matches
13. Other

##### CLASS 4. INDUSTRIAL METALS, MACHINES, CONVEYANCES

1. Smelting, converting, refining, rolling of iron and steel
2. Foundries (ferrous)
3. Plant, equipment, and machinery, etc.
4. Other engineering
5. Extracting and refining of other metals; alloys
6. Electrical machinery, cables, and apparatus
- 7-16. Construction and repair of vehicles (10 groups)
- 17-18. Ship and boat building and repairing, marine engineering (Government and other)
19. Cutlery and small hand tools
20. Agricultural machines and implements
21. Non-ferrous rolling and extrusion.
22. Non-ferrous founding, casting, etc.

##### CLASS 4. INDUSTRIAL METALS, MACHINES, CONVEYANCES—*continued*

24. Sheet metal working, pressing and stamping
25. Pipes, tubes, and fittings—ferrous
26. Wire and wire netting (including nails)
27. Stoves, ovens, and ranges
28. Gas fittings and meters
29. Lead mills
30. Sewing machines
31. Arms and ammunition (excluding explosives)
32. Wireless and amplifying apparatus
33. Other metal works

##### CLASS 5. PRECIOUS METALS, JEWELLERY, PLATE

1. Jewellery
2. Watches and clocks (including repairs)
3. Electroplating (gold, silver, chromium, etc.)

##### CLASS 6. TEXTILES AND TEXTILE GOODS (NOT DRESS)

1. Cotton ginning
2. Cotton spinning and weaving
3. Wool—carding, spinning, weaving
4. Hosiery and other knitted goods
5. Silk, natural
6. Rayon, nylon, and other synthetic fibres
7. Flax mills
8. Rope and cordage
9. Canvas goods, tents, tarpaulins, etc.
10. Bags and sacks
11. Textile dyeing, printing and finishing
12. Other

##### CLASS 7. SKINS AND LEATHER (NOT CLOTHING OR FOOTWEAR)

1. Furriers and fur-dressing
2. Woolscouring and fellmongery
3. Tanning, currying, and leather-dressing
4. Saddlery, harness, and whips
5. Machine belting (leather or other)
6. Bags, trunks, etc.

##### CLASS 8. CLOTHING (EXCEPT KNITTED)

1. Tailoring and ready-made clothing
2. Waterproof and oilskin clothing
3. Dressmaking, hemstitching
4. Millinery
5. Shirts, collars, and underclothing
6. Foundation garments
7. Handkerchiefs, ties, and scarves
8. Hats and caps
9. Gloves
10. Boots and shoes (not rubber)
11. Boot and shoe repairing
12. Boot and shoe accessories
13. Umbrellas and walking sticks
14. Dyeworks and cleaning, etc.
15. Other

## CLASS 9. FOOD, DRINK, AND TOBACCO

1. Flour milling
2. Cereal foods and starch
3. Animal and bird foods
4. Chaffcutting and corncrushing
5. Bakeries (including cakes and pastry)
6. Biscuits
7. Sugar mills
8. Sugar refining
9. Confectionery (including chocolate and icing sugar)
10. Jam, fruit, and vegetable canning
11. Pickles, sauces, and vinegar
12. Bacon curing
13. Butter factories
14. Cheese factories
15. Condensed and dried milk factories
16. Margarine
17. Meat and fish preserving
18. Condiments, coffee, and spices
19. Ice and refrigerating
20. Salt
21. Aerated waters, cordials, etc.
22. Breweries
23. Distilleries
24. Wine making
25. Cider and perry
26. Malting
27. Bottling
28. Tobacco, cigars, cigarettes, and snuff
29. Dehydrated fruit and vegetables
30. Ice cream
31. Sausage casings
32. Arrowroot
33. Other

## CLASS 10. SAWMILLS, JOINERY, BOXES, ETC., WOOD TURNING AND CARVING

1. Sawmills
2. Plywood mills (including veneers)
3. Bark mills
4. Joinery
5. Cooperage
6. Boxes and cases
7. Woodturning, woodcarving, etc.
8. Basketware and wickerware (including sea-grass and bamboo furniture)
9. Perambulators (including pushers and strollers)
10. Wall or ceiling board (not plaster or cement)
11. Other

## CLASS 11. FURNITURE OF WOOD, BEDDING, ETC.

1. Cabinet and furniture making (including billiard tables and upholstery)
2. Bedding and mattresses (not wire)
3. Furnishing drapery
4. Picture frames
5. Blinds

## CLASS 12. PAPER, STATIONERY, PRINTING, BOOKBINDING, ETC.

1. Newspapers and periodicals
- 2-3. Printing (Government and other)
4. Manufactured stationery
5. Stereotyping, electrotyping
6. Process and photo engraving
7. Cardboard boxes, cartons, and containers
8. Paper bags
9. Paper making
10. Pencils, penholders, chalks, and crayons
11. Other

## CLASS 13. RUBBER

1. Rubber goods (including tyres made)
2. Tyre retreading and repairing

## CLASS 14. MUSICAL INSTRUMENTS

1. Gramophones and gramophone records
2. Pianos, piano-players, and organs
3. Other

## CLASS 15. MISCELLANEOUS PRODUCTS

1. Linoleum, leather-cloth, oil-cloth, etc.
2. Bone, horn, ivory, and shell
3. Plastic moulding and products
4. Brooms and brushes
5. Optical instruments and appliances
6. Surgical and other scientific instruments and appliances
7. Photographic material (including developing and printing)
8. Toys, games, and sports requisites
9. Artificial flowers
10. Other

## CLASS 16. HEAT, LIGHT, AND POWER

- 1-3. Electric light and power
- 4-6. Gas works

*Summary of factories*

The following table shows, at intervals between 1901 and 1967-68, the development of manufacturing industry in Victoria :



## VICTORIA—SUMMARY OF FACTORY DEVELOPMENT

Year	Factories	Employment (a)	Salaries and wages paid (b)	Value of—			
				Materials and fuel used	Production (c)	Output	Land, buildings, plant and machinery
	number	number	\$'000	\$'000	\$'000	\$'000	\$'000
1901	3,249	66,529	(d)	(d)	(d)	(d)	24,596
1911	5,126	111,948	17,822	51,334	32,162	83,496	27,516
1920-21	6,532	140,743	42,754	135,171	76,846	212,017	70,985
1932-33	8,612	144,428	42,437	122,070	81,900	203,970	135,655
1940-41	9,121	237,636	104,590	240,696	178,002	418,698	184,100
1946-47	10,949	265,757	155,988	367,883	262,992	630,875	243,755
1953-54	15,533	331,277	472,073	1,154,381	816,629	1,971,010	678,535
1960-61	17,173	388,050	775,998	1,913,978	1,417,546	3,331,524	1,641,886
1963-64	17,597	413,120	912,424	2,305,046	1,749,776	4,054,822	2,061,518
1964-65	17,925	432,389	1,028,492	2,551,121	1,949,665	4,500,786	2,233,660
1965-66	17,980	439,149	1,077,234	2,597,230	2,027,685	4,624,915	2,385,957
1966-67	18,054	445,557	1,167,872	2,814,145	2,236,370	5,050,515	2,616,977
1967-68	18,030	449,945	1,244,216	2,956,509	2,394,801	5,351,311	2,685,255

NOTE. See also definitions on pages 394-5.

(a) Average employment over whole year, including working proprietors.

(b) Excludes drawings of working proprietors.

(c) Value of output less value of materials, etc.

(d) Not available.

A graph showing the distribution of the components of value of output of the years 1958-59 to 1967-68 is shown on page 403.

A comparison of Victorian factory activity with that in other States is shown in the following table :

## AUSTRALIA—FACTORIES, 1967-68

State	Factories	Employment (a)	Salaries and wages paid (b)	Value of—			
				Materials and fuel used	Production (c)	Output	Land, buildings, plant and machinery
	number	number	\$m	\$m	\$m	\$m	\$m
New South Wales	24,884	531,185	1,498.1	3,965.5	3,131.0	7,096.5	3,828.2
Victoria	18,030	449,945	1,244.2	2,956.5	2,394.8	5,351.3	2,685.3
Queensland	6,154	120,852	306.0	1,124.4	657.9	1,782.3	946.7
South Australia	6,255	121,417	330.1	844.2	631.9	1,476.1	813.6
Western Australia	5,404	67,335	175.1	499.2	388.3	887.4	495.3
Tasmania	1,797	35,178	96.2	247.1	198.0	445.1	448.1
Northern Territory	188	1,519	5.0	9.2	9.7	18.8	14.9
Australian Capital Territory	241	3,710	11.3	16.9	19.3	36.2	33.4
Total	62,953	1,331,141	3,665.9	9,662.9	7,430.7	17,093.7	9,265.3

See footnotes to table above.

Industrial metals, machines, and conveyances with 192,073 persons or 42.7 per cent of the total employment in factories during 1967-68, employed considerably more persons than any other class of industry. Next in order of employment was Clothing with 49,027 or 10.9 per cent, followed by Food, drink, and tobacco, and Textiles and textile goods with 44,143 and 43,077, respectively, or 9.8 per cent and 9.6 per cent of the total.

The total value of production (added value) in 1967-68 was \$2,394,801,000. Of this amount the Metals group contributed \$921,834,000 which represented 38.5 per cent of the total. The Food group followed with \$293,980,000 or 12.3 per cent, and the next in order were Chemicals, dyes,

etc., \$208,658,000, 8·7 per cent, Paper with \$186,698,000, 7·8 per cent, Textiles \$180,486,000, 7·5 per cent, and Clothing \$157,932,000, 6·6 per cent.

*Factories classified according to class of industry*

The following table contains a summary of factories by class of industry in Victoria during the year 1967-68 :

VICTORIA—FACTORIES BY CLASSES, 1967-68

Class of industry	Fac-tories	Employ-ment (a)	Salaries and wages paid (b)	Value of—			
				Materials and fuel used	Pro-duction (c)	Output	Land, buildings, plant and machinery
	number	number	\$'000	\$'000	\$'000	\$'000	\$'000
1. Treatment of non-metalliferous mine and quarry products	478	7,560	23,989	70,331	53,794	124,125	83,622
2. Bricks, pottery, glass, etc.	172	7,692	23,275	31,760	46,678	78,438	57,054
3. Chemicals, dyes, explosives, paints, oils, grease	404	17,892	59,759	342,020	208,658	550,678	270,673
4. Industrial metals, machines, conveyances	7,683	192,073	570,717	981,344	921,834	1,903,178	906,140
5. Precious metals, jewellery, plate	255	2,218	5,493	6,282	10,080	16,362	6,686
6. Textiles and textile goods (not dress)	742	43,077	99,945	246,150	180,486	426,636	162,665
7. Skins and leather (not clothing or footwear)	213	3,715	9,070	20,112	15,655	35,767	13,979
8. Clothing (except knitted)	2,331	49,027	96,531	142,504	157,932	300,436	100,337
9. Food, drink, and tobacco	1,834	44,143	118,363	613,419	293,980	907,400	354,650
10. Sawmills, joinery, boxes, etc., wood turning and carving	1,371	15,724	40,307	82,363	67,173	149,536	56,187
11. Furniture of wood, bedding, etc.	641	7,167	16,809	35,037	30,251	65,287	24,849
12. Paper, stationery, printing, book-binding, etc.	1,120	30,991	92,314	194,988	186,698	381,686	202,064
13. Rubber	166	8,503	26,085	57,506	50,626	108,131	55,431
14. Musical instruments	16	216	581	721	841	1,562	822
15. Miscellaneous products	559	15,060	43,390	91,431	80,234	171,665	81,936
Total, Classes 1 to 15	17,985	445,058	1,226,628	2,915,969	2,304,919	5,220,888	2,377,093
16. Heat, light, and power	45	4,887	17,588	40,540	89,882	130,422	308,161
GRAND TOTAL	18,030	449,945	1,244,216	2,956,509	2,394,801	5,351,311	2,685,255

For footnotes see page 398.

The next table shows the number of factories in Victoria during the years 1963-64 to 1967-68 classified according to industry :

VICTORIA—NUMBER OF FACTORIES IN INDUSTRIAL CLASSES

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	480	484	488	485	478
2. Bricks, pottery, glass, etc.	189	182	176	178	172
3. Chemicals, dyes, explosives, paints, oils, grease	395	393	391	402	404
4. Industrial metals, machines, conveyances	7,041	7,332	7,470	7,582	7,683
5. Precious metals, jewellery, plate	251	263	252	253	255
6. Textiles and textile goods (not dress)	773	793	775	742	742
7. Skins and leather (not clothing or footwear)	246	235	224	222	213
8. Clothing (except knitted)	2,506	2,471	2,439	2,384	2,331
9. Food, drink, and tobacco	1,957	1,944	1,918	1,864	1,834
10. Sawmills, joinery, boxes, etc., wood turning and carving	1,323	1,341	1,361	1,394	1,371
11. Furniture of wood, bedding, etc.	644	636	621	641	641
12. Paper, stationery, printing, bookbinding, etc.	1,038	1,069	1,071	1,106	1,120
13. Rubber	183	187	188	176	166
14. Musical instruments	21	17	16	16	16
15. Miscellaneous products	494	519	538	562	559
Total, Classes 1 to 15	17,541	17,866	17,928	18,007	17,985
16. Heat, light, and power	56	59	52	47	45
GRAND TOTAL	17,597	17,925	17,980	18,054	18,030

The size classification of factories is based on the average number of persons employed during the period of operation (including working

proprietors). The following tables show the number of factories classified on this basis for each of the years 1963-64 to 1967-68 :

VICTORIA—FACTORIES CLASSIFIED ACCORDING TO  
NUMBER OF PERSONS EMPLOYED DURING PERIOD OF OPERATION

Year	Number of factories employing, on the average, persons numbering—							Total
	Under 4	4	5 to 10	11 to 20	21 to 50	51 to 100	Over 100	
1963-64	6,256	1,361	4,154	2,437	1,919	735	735	17,597
1964-65	6,251	1,418	4,244	2,499	1,970	758	785	17,925
1965-66	5,935	1,497	4,393	2,553	2,006	807	789	17,980
1966-67	5,920	1,523	4,371	2,604	2,011	808	817	18,054
1967-68	5,896	1,535	4,384	2,564	1,994	825	832	18,030

VICTORIA—AVERAGE NUMBER OF PERSONS EMPLOYED  
DURING PERIOD OF OPERATION

Year	Average number employed, (including working proprietors) in factories employing, on the average, persons numbering—							Total
	Under 4	4	5 to 10	11 to 20	21 to 50	51 to 100	Over 100	
1963-64	12,217	5,444	29,181	35,854	61,022	51,945	219,246	414,909
1964-65	12,108	5,672	29,769	36,796	62,028	53,156	234,897	434,426
1965-66	11,591	5,988	30,627	37,581	63,066	57,050	236,430	442,333
1966-67	11,705	6,092	30,431	38,076	63,176	56,970	241,755	448,205
1967-68	11,624	6,140	30,744	37,579	62,871	57,913	245,990	452,861

NOTE. Average employment during the period of operations includes working proprietors. The use of averages during period of operation has the arithmetic effect of increasing the average number of persons working in factories over the 1967-68 year—449,945 in total by 2,916 persons to total of 452,861 persons.

The relative importance of large and small factories is illustrated in the above tables. In 1967-68, 5,896 factories employing less than four employees had a total employment of 11,624 persons. Expressed in terms of percentages, 32.7 per cent of factories—those employing less than four persons—employed 2.6 per cent of the persons engaged in factories. The most numerous of the factories with less than four persons were Motor repair workshops, Bakeries, General engineering workshops, and Boot and shoe repairing.

The relative and absolute increases in the number of small factories using power other than manual, i.e., those employing less than four persons, is shown in the table which follows. In 1902 factories employing less than four persons numbered 525 and constituted 13.1 per cent of the total. By 1967-68 this figure had increased to 5,896, i.e., 32.7 per cent of the total. This increase is believed to be due not so much to an increase in the number of small factories, but to a greater use over the years of fractional horsepower electric motors in small factories, with the result that such establishments came within the statistical definition of a factory. The table also shows that in 1967-68 factories employing less than four persons accounted for only 1.8 per cent of the total value of production, and the value of production per person employed is lowest in the smallest factories and, in general, rises as size increases.

A graph showing number of factories and value of production by size groups in 1967-68 is shown on page 403.

VICTORIA—NUMBER OF FACTORIES: PERSONS EMPLOYED AND VALUE OF PRODUCTION ACCORDING TO NUMBER OF PERSONS EMPLOYED DURING PERIOD OF OPERATION, 1902 AND 1967-68

Average number of persons employed during period of operation	1902				1967-68							
	Factories		Persons employed (a)		Factories		Persons employed (a)		Value of production (b)			
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	\$'000	Per cent	Per person employed (\$)	
Under 4	525	13.1	1,636	2.2	5,896	32.70	11,624	2.57	42,718	1.78	3,742	
4	398	9.9	1,603	2.2	1,535	8.51	6,140	1.35	23,701	0.99	3,991	
5-10	1,629	40.7	11,303	15.5	4,384	24.32	30,744	6.79	132,833	5.55	4,406	
11-20	726	18.1	10,562	14.5	2,564	14.22	37,579	8.30	169,122	7.06	4,568	
21-50	467	11.7	14,361	19.6	1,994	11.06	62,871	13.88	303,540	12.67	4,878	
51-100	148	3.7	10,238	14.0	825	4.58	57,913	12.79	295,452	12.34	5,137	
101-200	} 110	2.8	23,360	32.0	462	2.56	65,227	14.40	377,316	15.76	5,794	
201-500					273	1.51	83,307	18.40	465,484	19.44	5,601	
Over 500					97	0.54	97,456	21.52	584,635	24.41	5,999	
Total	4,003	100.0	73,063	100.0	18,030	100.00	452,861	100.00	2,394,801	100.00	5,322	

For footnotes see page 398.

A general indication of the geographical distribution of factories in the State is shown in the next table where secondary industry in Victoria for 1967-68 is classified according to Statistical Divisions :

VICTORIA—FACTORIES IN STATISTICAL DIVISIONS, 1967-68

Statistical Division	Factories	Employment (a)	Salaries and wages paid (b)	Value of—			
				Materials and fuel used	Production (c)	Output	Land, buildings, plant and machinery
	number	number	\$'000	\$'000	\$'000	\$'000	\$'000
Melbourne	13,108	370,728	1,035,768	2,327,610	1,934,482	4,262,092	1,946,491
West Central	651	20,075	58,271	191,016	124,002	315,018	192,878
North Central	376	4,774	10,989	18,794	20,907	39,701	19,113
Western	1,028	15,809	37,792	100,325	65,487	165,813	68,844
Wimmera	384	2,426	4,835	11,826	9,421	21,247	7,587
Mallee	315	2,584	5,222	9,963	9,316	19,279	11,412
Northern	854	12,229	31,241	126,963	64,950	191,913	80,207
North Eastern	453	5,457	13,668	36,120	29,399	65,519	78,800
Gippsland	655	13,630	41,292	116,481	127,913	244,395	269,988
East Central	206	2,233	5,139	17,410	8,924	26,334	9,935
Total	18,030	449,945	1,244,216	2,956,509	2,394,801	5,351,311	2,685,255

For footnotes see page 398.

Factories in the Melbourne Statistical Division constituted 72.7 per cent of the total number in Victoria in 1967-68, 83.0 per cent of the persons employed, and 80.9 per cent of the value of production.

For information regarding the actual location of the Statistical Divisions named in the table, reference should be made to the maps folded inside the back cover of this book.

The number of factories and persons employed therein in each Statistical Division is shown in the following table :

VICTORIA—NUMBER OF FACTORIES AND PERSONS EMPLOYED (a)  
IN EACH STATISTICAL DIVISION: CLASSIFIED ACCORDING TO  
SIZE OF FACTORY, 1967-68

Size of factory (persons)	Statistical Division										Total
	Mel- bourne	West Central	North Central	West- ern	Wim- mera	Mallee	North- ern	North East- ern	Gipps- land	East Central	
NUMBER OF FACTORIES											
Under 5	4,786	319	221	536	248	180	484	256	293	108	7,431
5-10	3,165	163	91	284	95	84	192	92	163	55	4,384
11-20	2,031	70	31	93	22	25	92	67	106	27	2,564
21-50	1,717	53	13	64	14	15	37	24	52	5	1,994
51-100	693	18	13	23	3	10	32	7	19	7	825
101-500	641	21	5	25	2	1	14	6	16	4	735
Over 500	75	7	2	3	..	..	3	1	6	..	97
Total	13,108	651	376	1,028	384	315	854	453	655	206	18,030
AVERAGE NUMBER OF PERSONS EMPLOYED DURING PERIOD OF OPERATION											
Under 5	11,518	(b)	(b)	1,305	538	495	1,124	(b)	684	254	17,764
5-10	22,443	1,084	623	1,949	628	655	1,303	630	1,061	368	30,744
11-20	29,870	1,049	432	1,307	335	478	1,337	956	1,448	367	37,579
21-50	54,347	1,652	393	1,984	385	634	1,129	715	1,468	164	62,871
51-100	48,653	1,287	854	1,782	(b)	(b)	2,216	460	1,238	(b)	57,913
101-500	127,446	5,798	1,002	5,614	(b)	(b)	(b)	1,284	(b)	(b)	148,534
Over 500	78,682	(b)	(b)	2,002	..	..	(b)	(b)	(b)	..	97,456
Total	372,959	20,200	4,800	15,943	2,479	3,090	12,327	5,546	13,259	2,258	452,861

(a) See footnote, page 398.

(b) Not available for publication.

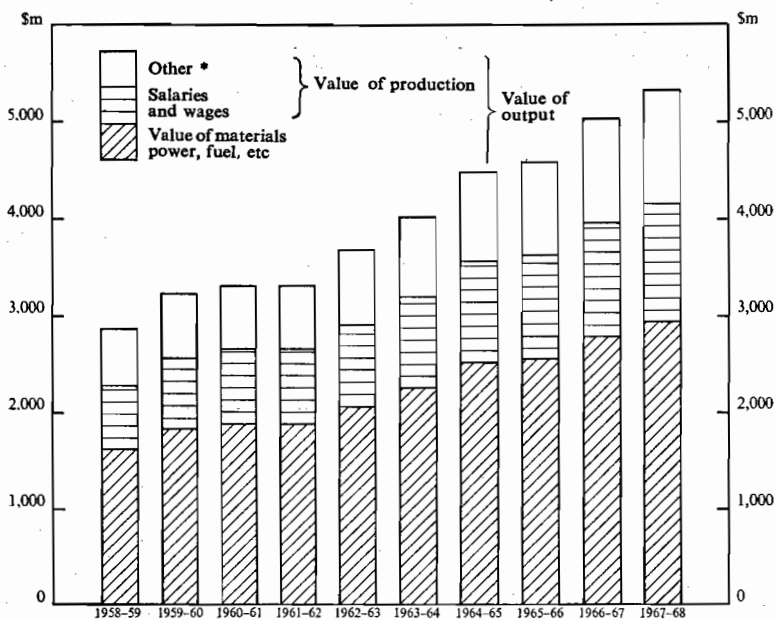
The above table shows that in 1967-68 there were 832 factories each employing more than 100 persons with a total employment of 245,990 persons in Victoria. Of the 18,030 factories (452,861 persons) in Victoria, 13,108 (372,959 persons) were located in the Melbourne Statistical Division and 651 (20,200 persons) in the West Central Statistical Division which includes Geelong. The balance, 4,271 factories (59,702 persons) were distributed over the remainder of the State principally in the Western (1,028 factories), Northern (854 factories), and Gippsland (655 factories) Statistical Divisions.

It should be noted that Geelong is located in the West Central Statistical Division, Castlemaine and Maryborough in the North Central Statistical Division; Ballarat and Warrnambool in the Western Statistical Division; Bendigo and Shepparton in the Northern Statistical Division; Wangaratta in the North Eastern Statistical Division; and Morwell and Yallourn in the Gippsland Statistical Division.

#### Employment in factories

All persons employed in the manufacturing activities of a factory, including proprietors working in their own businesses and persons working regularly at home are included as persons employed in factories while those engaged in selling and distributing, such as salesmen, travellers, and carters employed on outward delivery of manufactured goods, are excluded. The grouping of occupations comprises (i) working proprietors; (ii) managerial and clerical staff including salaried managers and working directors; (iii) chemists, draftsmen, and other laboratory and research staff; (iv) workers in factories (skilled and unskilled); foremen and

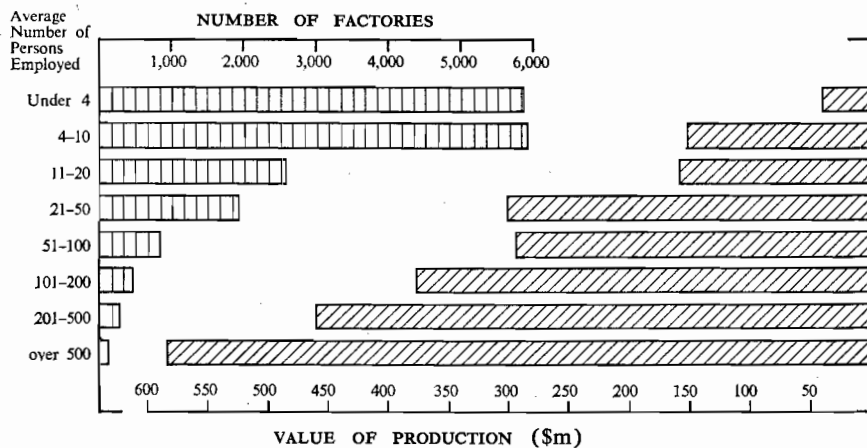
VICTORIA—FACTORIES : VALUES OF OUTPUT, 1958-59 TO 1967-68



\* The fund available for the payment of taxation, rent, interest, insurance, etc., depreciation, drawings of working proprietors, and profits.

FIGURE 9

VICTORIA—NUMBER OF FACTORIES AND VALUE OF PRODUCTION CLASSIFIED ACCORDING TO NUMBER OF PERSONS EMPLOYED, 1967-68



(The left hand bars show the number of factories in each employment size group. The right hand bars show the value of production in each of these size groups.)

FIGURE 10

overseers; carters (excluding delivery only), messengers, and persons working regularly at home as outworkers.

The figures showing average employment in factories represent the equivalent average number of persons employed, including working proprietors, over a full year of twelve months. This method is used for all purposes except in the tables shown on pages 400 to 402, where the average number of persons employed is the average during period of operation.

The following table shows the average number of persons employed in factories in each industrial class in Victoria for the years 1963-64 to 1967-68 :

VICTORIA—PERSONS EMPLOYED IN FACTORIES (a)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68		
					Males	Females	Persons
1. Treatment of non-metalliferous mine and quarry products	7,496	7,610	7,689	7,641	7,101	4,59	7,560
2. Bricks, pottery, glass, etc.	7,299	7,509	7,710	7,773	6,537	1,155	7,692
3. Chemicals, dyes, explosives, paints, oils, grease	16,396	17,329	17,648	18,154	13,762	4,130	17,892
4. Industrial metals, machines, conveyances	171,748	183,696	186,000	189,176	162,487	29,586	192,073
5. Precious metals, jewellery, plate	2,113	2,270	2,180	2,180	1,745	473	2,218
6. Textiles and textile goods (not dress)	42,674	43,798	43,343	43,316	17,696	25,381	43,077
7. Skins and leather (not clothing or footwear)	3,969	3,832	3,830	3,740	2,431	1,284	3,715
8. Clothing (except knitted)	47,168	47,622	48,432	48,636	12,731	36,296	49,027
9. Food, drink, and tobacco	40,832	42,049	43,583	44,130	28,826	15,317	44,143
10. Sawmills, joinery, boxes, etc., wood turning and carving	14,521	14,896	15,219	15,430	14,405	1,319	15,724
11. Furniture of wood, bedding, etc.	6,605	6,706	6,724	7,094	5,107	2,060	7,167
12. Paper, stationery, printing, bookbinding, etc.	27,075	28,294	29,634	30,354	22,408	8,583	30,991
13. Rubber	8,506	8,591	8,230	8,092	6,572	1,931	8,503
14. Musical instruments	192	194	199	211	172	44	216
15. Miscellaneous products	11,791	12,972	13,516	14,353	9,292	5,768	15,060
Total, Classes 1 to 15	408,385	427,368	433,937	440,280	311,272	133,786	445,058
16. Heat, light, and power	4,735	5,021	5,212	5,277	4,836	51	4,887
GRAND TOTAL	413,120	432,389	439,149	445,557	316,108	133,837	449,945

(a) For footnote see page 398.

The dominance of four classes, namely, Class 4. Industrial metals, machines, and conveyances; Class 6. Textiles and textile goods (not dress); Class 8. Clothing (except knitted); and Class 9. Food, drink, and tobacco with a total of 72.9 per cent of factory employment should be noted.

Female factory workers in 1967-68 were 29.8 per cent of the total. Females exceeded males in two classes: in Class 6. Textiles and textile goods (not dress) they accounted for 58.9 per cent and in Class 8. Clothing (except knitted) for 74.0 per cent of the Class total.

Of the total females employed 27.1 per cent were in Class 8; 22.1 per cent in Class 4; 19.0 per cent in Class 6; and 11.4 per cent in Class 9.

In the following table, the average number of persons employed in factories in Victoria is classified according to the nature of their employment for the years 1963-64 to 1967-68 :

## VICTORIA—NATURE OF EMPLOYMENT IN FACTORIES

Year	Working proprietors	Managerial and clerical staff	Chemists, draftsmen, etc.	Workers in factories (skilled and unskilled), foremen and overseers, carters (excluding delivery only), and messengers, etc.	Total
1963-64	12,641	53,637	8,291	338,551	413,120
1964-65	12,655	57,067	8,755	353,912	432,389
1965-66	12,586	60,273	9,515	356,775	439,149
1966-67	12,210	61,866	9,957	361,524	445,557
1967-68	12,025	63,164	10,189	364,567	449,945

The following table shows the nature of employment in factories in 1967-68 according to the class of industry :

## VICTORIA—NATURE OF EMPLOYMENT IN FACTORIES BY CLASSES OF INDUSTRY, 1967-68

Class of industry	Working proprietors	Managerial and clerical staff	Chemists, draftsmen, etc.	All other workers	Total
1. Treatment of non-metalliferous mine and quarry products	220	1,070	194	6,076	7,560
2. Bricks, pottery, glass, etc.	67	979	91	6,555	7,692
3. Chemicals, dyes, explosives, paints, oils, grease	103	3,351	1,471	12,967	17,892
4. Industrial metals, machines, conveyances	5,071	30,611	5,840	150,551	192,073
5. Precious metals, jewellery, plate	217	291	6	1,704	2,218
6. Textiles and textile goods (not dress)	368	4,248	407	38,054	43,077
7. Skins and leather (not clothing or footwear)	182	348	28	3,157	3,715
8. Clothing (except knitted)	1,998	3,675	81	43,273	49,027
9. Food, drink, and tobacco	1,543	6,077	842	35,681	44,143
10. Sawmills, joinery, boxes, etc., wood turning and carving	852	2,128	46	12,698	15,724
11. Furniture of wood, bedding, etc.	506	989	11	5,661	7,167
12. Paper, stationery, printing, bookbinding, etc.	613	5,077	254	25,047	30,991
13. Rubber	31	1,350	255	6,867	8,503
14. Musical instruments	7	29	..	180	216
15. Miscellaneous products	247	2,599	536	11,678	15,060
Total, Classes 1 to 15	12,025	62,822	10,062	360,149	445,058
16. Heat, light, and power	..	342	127	4,418	4,887
GRAND TOTAL	12,025	63,164	10,189	364,567	449,945

Although "all other workers" constitute 81.0 per cent of the total numbers employed in factories, the percentage varies from 72.5 per cent in Class 3 to 88.3 per cent in Class 6. Class 3 also has the highest percentage of managerial, clerical, and professional staff, 26.9 per cent, compared with the Victorian average of 16.3 per cent.

Where small factories predominate, there is usually a higher proportion of working proprietors than on the average and a smaller than average managerial and clerical staff. This is particularly evident in Class 5. Precious metals and jewellery, where working proprietors comprise 9.8 per cent of the total number employed; Class 11. Furniture of wood, bedding, etc., 7.1 per cent; and Class 10. Sawmills, joinery, etc., 5.4 per cent. The average for Victoria is 2.7 per cent.

The following table shows the age distribution of male and female factory employees on the last pay day in June of each of the years 1964 to 1968 :



VICTORIA—DISTRIBUTION OF EMPLOYEES ACCORDING TO AGE  
(Excluding working proprietors)

Last pay day in June—	Males				Females			
	Under 16 years	16 and under 21 years	21 years and over	Total	Under 16 years	16 and under 21 years	21 years and over	Total
1964	2,072	27,740	260,246	290,058	2,207	17,931	96,898	117,036
1965	1,690	28,609	268,840	299,139	1,614	18,458	104,012	124,084
1966	1,525	28,886	268,965	299,376	1,488	18,122	105,882	125,492
1967	1,333	29,308	274,563	305,204	1,392	17,698	110,378	129,468
1968	1,150	28,658	275,921	305,729	1,097	16,627	113,224	130,948

The numbers of females employed in each industrial class and in certain significant sub-classes, and the percentage that such female employment bears to total class or sub-class employment, are shown in the following table :

VICTORIA—FEMALE EMPLOYMENT IN FACTORIES

Class of industry	Females employed					
	Number			Percentage of total employment in each class of industry		
	1965-66	1966-67	1967-68	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	447	448	459	5.8	5.9	6.1
2. Bricks, pottery, glass, etc.	1,037	1,109	1,155	13.5	14.3	15.0
3. Chemicals, dyes, explosives, paints, oils, grease	3,972	4,101	4,130	22.5	22.6	23.1
4. Industrial metals, machines, conveyances—	27,317	28,452	29,586	14.7	15.0	15.4
Plant, equipment and machinery	4,247	4,199	4,473	12.0	11.8	12.4
Electrical machinery, cables, and apparatus	6,050	6,575	6,899	30.5	31.6	32.0
Sheet metal working	2,472	2,469	2,472	20.6	20.3	20.4
Wireless and amplifying apparatus	1,350	1,401	1,505	37.7	36.7	38.6
5. Precious metals, jewellery, plate	434	435	473	19.9	20.0	21.3
6. Textiles and textile goods (not dress)—	25,800	25,845	25,381	59.5	59.7	58.9
Cotton spinning and weaving	2,159	2,062	1,932	53.7	53.5	51.0
Wool-carding, spinning, weaving	4,945	4,697	4,571	53.6	53.3	52.9
Hosiery and other knitted goods	14,496	14,580	14,247	75.9	76.3	75.5
7. Skins and leather (not clothing or footwear)	1,267	1,297	1,284	33.1	34.7	34.6
8. Clothing (except knitted)—	35,320	35,655	36,296	72.9	73.3	74.0
Tailoring and ready-made clothing	8,319	6,733	6,540	75.4	73.5	73.2
Dressmaking and hemstitching	8,610	10,548	11,147	87.3	87.1	87.4
Boots and shoes (not rubber)	7,016	7,045	7,059	59.5	60.2	61.4
Dyeworks and cleaning, etc.	1,469	1,430	1,407	51.3	50.7	51.3
9. Food, drink, and tobacco—	15,032	15,135	15,317	34.5	34.3	34.7
Bakeries (including cakes and pastry)	1,956	1,955	1,926	29.8	30.0	29.9
Confectionery (including chocolate and icing sugar)	2,051	2,046	1,994	57.3	57.1	57.0
Jam, fruit, and vegetable canning	2,500	2,416	2,315	43.0	41.2	40.1
Tobacco, cigars, cigarettes	1,234	1,303	1,342	54.0	54.1	54.2
10. Sawmills, joinery, boxes, etc., wood turning and carving	1,116	1,183	1,319	7.3	7.7	8.4
11. Furniture of wood, bedding, etc.	1,716	1,992	2,060	25.5	28.1	28.7
12. Paper, stationery, printing, bookbinding, etc.	8,260	8,421	8,583	27.9	27.7	27.7
13. Rubber	1,833	1,821	1,931	22.3	22.5	22.7
14. Musical instruments	33	39	44	16.6	18.5	20.4
15. Miscellaneous products	5,212	5,479	5,768	38.6	38.2	38.3
16. Heat, light, and power	50	75	51	1.0	1.4	1.0
Total Classes only	128,846	131,487	133,837	29.3	29.5	29.7

In Class 16. Heat, light, and power, the percentage of females to total persons employed is at its lowest, 1.0 per cent. In Class 8. Clothing (except knitted), females predominate and comprise 74.0 per cent of the total number of persons employed. Within Class 8, in the Dressmaking sub-class, 87.4 per cent of the total employed are females. In Class 4.

Industrial metals, machines, and conveyances, females constitute 15·4 per cent of the persons employed. In 1938–39 only 6 per cent of the persons employed in Class 4 were females.

The numbers of males and females employed in factories, and the proportions of the average male and female population working in factories in 1967–68 and earlier years are shown in the following table :

VICTORIA—EMPLOYMENT OF MALES AND FEMALES IN FACTORIES

Year	Males		Females		Total	
	Number	Average per 10,000 of male population	Number	Average per 10,000 of female population	Number	Average per 10,000 of total population
1901	47,059	778	19,470	325	66,529	553
1911	73,573	1,118	38,375	579	111,948	848
1920–21	96,379	1,283	44,364	574	140,743	923
1932–33	91,899	1,020	52,529	575	144,428	796
1940–41	161,880	1,708	75,756	782	237,636	1,240
1946–47	188,758	1,876	76,999	745	265,757	1,303
1953–54	240,698	1,979	90,579	751	331,277	1,367
1960–61	280,207	1,903	107,843	742	388,050	1,326
1963–64	295,440	1,896	117,680	761	413,120	1,330
1964–65	306,983	1,933	125,406	795	432,389	1,366
1965–66	310,303	1,921	128,846	802	439,149	1,363
1966–67	314,070	1,912	131,487	805	445,557	1,360
1967–68	316,108	1,894	133,837	807	449,945	1,352

#### *Child labour in factories*

The Labour and Industry Act of Victoria debars employment in factories of children under the age of fifteen years, and the Victorian Education Act makes daily attendance at school compulsory between the ages of six and fifteen years.

Some children under fifteen may work in a shop or office if they are exempted under the Education Act, but the general effect of the two statutes contributes to the very low incidence of child labour in this State.

#### **Salaries, wages, and other costs**

##### *Salaries and wages*

The next table gives details of wages paid in the various classes of industry in Victoria in 1967–68. Amounts paid to managers, clerical staff, chemists, and draftsmen, etc., are shown separately from those paid to foremen, overseers, workers in the factory, etc. There is also a dissection within these categories of the amounts paid to male and female employees.

It should be noted that in all tables of salaries and wages paid the amounts drawn by working proprietors are excluded.

Of the total amount of salaries and wages paid in Victoria in 1967–68—\$1,244,216,000—the Industrial metals, etc., group was responsible for \$570,717,000 or 45·9 per cent, Food, drink, etc., \$118,363,000 or 9·5 per cent, Textiles, etc., \$99,945,000 or 8·0 per cent, and Clothing, etc., \$96,531,000 or 7·7 per cent.

The total amount of salaries and wages paid in industry in Victoria in each of the years of 1963–64 to 1967–68 and the average per employee are also shown.

VICTORIA—SALARIES AND WAGES PAID IN FACTORIES, 1967-68  
(Excludes drawings of working proprietors)  
(\$'000)

Class of industry	Managers, clerical staff, chemists, draftsmen, etc.		All other employees		Total		
	Males	Females	Males	Females	Males	Females	Persons
1. Treatment of non-metalliferous mine and quarry products	4,095	626	19,080	188	23,175	814	23,989
2. Bricks, pottery, glass, etc.	3,183	634	18,171	1,287	21,354	1,921	23,275
3. Chemicals, dyes, explosives, paints, oils, grease	16,089	3,164	36,436	4,070	52,524	7,234	59,759
4. Industrial metals, machines, conveyances	114,666	20,383	403,626	32,043	518,291	52,426	570,717
5. Precious metals, jewellery, plate	763	230	4,017	483	4,780	713	5,493
6. Textiles and textile goods (not dress)	11,380	4,193	44,538	39,834	55,918	44,027	99,945
7. Skins and leather (not clothing or footwear)	1,124	281	5,796	1,869	6,920	2,150	9,070
8. Clothing (except knitted)	8,576	4,034	25,742	58,179	34,318	62,213	96,531
9. Food, drink, and tobacco	18,092	5,854	73,123	21,294	91,215	27,148	118,363
10. Sawmills, joinery, boxes, etc., wood turning and carving	6,076	1,254	32,239	738	38,315	1,992	40,307
11. Furniture of wood, bedding, etc.	2,353	866	11,166	2,425	13,518	3,290	16,809
12. Paper, stationery, printing, bookbinding, etc.	14,831	4,309	62,975	10,200	77,805	14,509	92,314
13. Rubber	4,651	1,067	17,838	2,528	22,490	3,595	26,085
14. Musical instruments	68	22	421	70	489	92	581
15. Miscellaneous products	9,090	2,627	23,564	8,109	32,654	10,736	43,390
Total, Classes 1 to 15	215,035	49,545	778,732	183,316	993,767	232,861	1,226,628
16. Heat, light, and power	2,221	71	15,272	24	17,493	95	17,588
GRAND TOTAL	217,257	49,616	794,004	183,340	1,011,261	232,956	1,244,216

VICTORIA—SALARIES AND WAGES PAID IN FACTORIES  
(Excludes drawings of working proprietors)

Year	Salaries and wages paid to—				Total salaries and wages paid to—		
	Managers, clerical staff, chemists, draftsmen, etc.		All other employees				
	Males	Females	Males	Females	Males	Females	Persons
TOTAL AMOUNT PAID (\$'000)							
1963-64	148,006	33,514	599,172	131,732	747,178	165,246	912,424
1964-65	165,551	37,227	675,153	150,561	840,704	187,788	1,028,492
1965-66	183,714	41,200	693,542	158,778	877,256	199,977	1,077,234
1966-67	201,731	45,681	748,173	172,288	949,903	217,969	1,167,872
1967-68	217,257	49,616	794,004	183,340	1,011,261	232,956	1,244,216
AVERAGE PER EMPLOYEE (\$)							
1963-64	3,622	1,591	2,454	1,396	2,621	1,432	2,209
1964-65	3,804	1,669	2,667	1,495	2,834	1,526	2,450
1965-66	3,977	1,746	2,729	1,547	2,921	1,584	2,525
1966-67	4,255	1,871	2,911	1,649	3,120	1,691	2,695
1967-68	4,499	1,979	3,074	1,725	3,299	1,773	2,841

*Power, fuel, and light used*

The following table shows the cost of power, fuel, light, water, and lubricating oil used during the five years 1963-64 to 1967-68 :

VICTORIA—COST OF POWER, FUEL, LIGHT, ETC., USED IN FACTORIES  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	6,100	6,762	6,662	6,802	6,628
2. Bricks, pottery, glass, etc.	5,902	6,101	6,079	6,220	6,622
3. Chemicals, dyes, explosives, paints, oils, grease	15,170	16,782	16,919	18,419	21,313
4. Industrial metals, machines, conveyances	25,828	30,218	30,644	32,787	34,950
5. Precious metals, jewellery, plate	348	397	387	430	467
6. Textiles and textile goods (not dress)	5,934	6,310	6,502	6,895	7,268
7. Skins and leather (not clothing or footwear)	878	894	892	909	942
8. Clothing (except knitted)	2,094	2,265	2,373	2,480	2,578
9. Food, drink, and tobacco	13,640	14,619	15,384	15,907	16,624
10. Sawmills, joinery, boxes, etc., wood turning and carving	1,872	2,024	2,095	2,172	2,280
11. Furniture of wood, bedding, etc.	302	341	357	391	421
12. Paper, stationery, printing, bookbinding, etc.	5,406	5,943	6,431	7,063	8,174
13. Rubber	2,984	2,999	2,932	3,163	3,370
14. Musical instruments	20	21	21	28	27
15. Miscellaneous products	2,464	2,860	3,092	3,433	4,142
Total, Classes 1 to 15	88,942	98,536	100,770	107,099	115,808
16. Heat, light, and power	25,706	26,623	27,087	27,319	27,278
GRAND TOTAL	114,648	125,159	127,857	134,418	143,086

VICTORIA—COST OF ITEMS OF POWER, FUEL, LIGHT, ETC.,  
USED IN FACTORIES

Commodity	1963-64	1964-65	1965-66	1966-67	1967-68	
					Cost	Percentage of total
	\$'000	\$'000	\$'000	\$'000	\$'000	
Coal—						
Black	3,338	3,623	3,066	2,724	2,444	1.8
Brown	14,736	15,497	17,073	18,215	19,760	14.9
Brown coal briquettes	12,542	12,612	11,891	11,340	9,937	7.5
Coke	1,500	1,384	1,163	1,124	1,106	0.8
Wood	820	741	725	675	542	0.4
Fuel oil (a)	22,662	23,784	22,903	23,709	27,480	20.7
Tar fuel	196	187	161	156	163	0.1
Electricity	45,454	52,447	55,136	59,400	63,558	47.9
Gas	4,058	4,763	3,912	4,398	4,710	3.5
Other (charcoal, etc.)	1,506	1,379	2,694	2,732	3,122	2.4
Total power and fuel	106,812	116,417	118,724	124,473	132,823	100.0
Water	5,426	6,034	6,528	7,198	7,249	..
Lubricating oil	2,410	2,709	2,606	2,747	3,014	..
GRAND TOTAL	114,648	125,159	127,857	134,418	143,086	..

(a) Includes fuel oil equivalent of petroleum fractions used as fuel in petroleum refineries.

Combustible products consumed as raw materials, e.g., brown coal used in the manufacture of briquettes, have been excluded from the above table.

VICTORIA—QUANTITIES OF FUELS USED IN FACTORIES

Commodity	Unit of quantity	1963-64	1964-65	1965-66	1966-67	1967-68
Coal—						
Black	'000 tons	316	329	277	256	241
Brown	'000 tons	13,461	14,243	16,277	17,403	18,190
Brown coal briquettes	'000 tons	1,095	1,062	1,027	978	855
Coke	'000 tons	60	58	49	47	45
Wood	'000 tons	232	192	189	169	133
Fuel oil (a)	mill. gals	292	320	313	341	376
Tar fuel	'000 tons	9	9	8	8	8

(a) Includes fuel oil equivalent of petroleum fractions used as fuel in petroleum refineries.

*Cost of materials used*

The cost of materials used in factories is shown by classes for each of the last five years in the next table. "Materials used" includes the value of containers, etc., the cost of tools replaced, and repairs to plant.

VICTORIA—COST OF MATERIALS USED IN FACTORIES  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	50,008	56,696	59,165	62,465	63,703
2. Bricks, pottery, glass, etc.	17,244	21,399	21,911	23,735	25,138
3. Chemicals, dyes, explosives, paints, oils, grease	254,174	272,007	272,855	310,835	320,707
4. Industrial metals, machines, conveyances	694,788	806,468	814,925	891,831	946,395
5. Precious metals, jewellery, plate	4,692	5,437	5,178	5,535	5,815
6. Textiles and textile goods (not dress)	211,476	224,520	221,628	238,690	238,882
7. Skins and leather (not clothing or footwear)	22,018	20,351	21,434	22,280	19,170
8. Clothing (except knitted)	120,078	126,842	126,171	134,435	139,926
9. Food, drink, and tobacco	473,308	513,541	537,976	569,962	596,795
10. Sawmills, joinery, boxes, etc., wood turning and carving	65,474	71,628	72,681	76,968	80,082
11. Furniture of wood, bedding, etc.	26,988	29,579	30,012	31,582	34,615
12. Paper, stationery, printing, bookbinding, etc.	139,992	153,673	160,910	173,517	186,814
13. Rubber	46,544	51,117	48,086	49,003	54,136
14. Musical instruments	436	486	505	579	694
15. Miscellaneous products	52,666	61,679	63,221	74,674	87,290
Total, Classes 1 to 15	2,179,886	2,415,423	2,456,658	2,666,091	2,800,162
16. Heat, light, and power	10,512	10,538	12,714	13,637	13,262
GRAND TOTAL	2,190,398	2,425,961	2,469,372	2,679,727	2,813,424

*Value of output and production*

Value of factory output by classes of industry in each of the years 1963-64 to 1967-68 is shown in the following table :

VICTORIA—VALUE OF FACTORY OUTPUT  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	100,244	112,597	114,331	121,060	124,125
2. Bricks, pottery, glass, etc.	56,654	65,706	69,038	73,898	78,438
3. Chemicals, dyes, explosives, paints, oils, grease	421,160	453,964	460,136	522,377	550,678
4. Industrial metals, machines, conveyances	1,375,608	1,583,854	1,620,395	1,783,781	1,903,178
5. Precious metals, jewellery, plate	12,614	14,775	14,326	15,547	16,362
6. Textiles and textile goods (not dress)	362,874	388,457	386,925	417,558	426,636
7. Skins and leather (not clothing or footwear)	35,770	35,142	36,866	38,285	35,767
8. Clothing (except knitted)	249,190	263,965	268,577	286,311	300,436
9. Food, drink, and tobacco	703,268	767,695	811,891	870,056	907,400
10. Sawmills, joinery, boxes, etc., wood turning and carving	121,306	132,632	134,771	144,392	149,536
11. Furniture of wood, bedding, etc.	49,826	54,508	56,210	60,289	65,287
12. Paper, stationery, printing, bookbinding, etc.	276,944	305,280	323,571	351,382	381,686
13. Rubber	87,646	91,944	87,545	91,955	108,131
14. Musical instruments	1,062	1,373	1,294	1,389	1,562
15. Miscellaneous products	105,126	120,501	123,031	149,826	171,665
Total, Classes 1 to 15	3,959,292	4,392,393	4,508,907	4,928,106	5,220,888
16. Heat, light, and power	95,530	108,393	116,009	122,408	130,422
GRAND TOTAL	4,054,822	4,500,786	4,624,915	5,050,515	5,351,311

Value of production—the value added to raw materials by the process of manufacture—and not the value of output, is used in measuring the relative importance of various industries or the value of the manufacturing industries as a whole. A definition of "value of production" will be found on page 395.

In the next table the value of production in Victoria is given according to the various classes of industry for each of the years 1963-64 to 1967-68 :

**VICTORIA—VALUE OF PRODUCTION OF FACTORIES**  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	44,138	49,139	48,503	51,792	53,794
2. Bricks, pottery, glass, etc.	33,508	38,206	41,049	43,943	46,678
3. Chemicals, dyes, explosives, paints, oils, grease	151,814	165,175	170,362	193,123	208,658
4. Industrial metals, machines, conveyances	654,992	747,168	774,826	859,163	921,834
5. Precious metals, jewellery, plate	7,574	8,941	8,761	9,582	10,080
6. Textiles and textile goods (not dress)	144,574	157,627	158,795	171,973	180,486
7. Skins and leather (not clothing or footwear)	13,764	13,897	14,540	15,096	15,655
8. Clothing (except knitted)	127,018	134,857	140,033	149,396	157,932
9. Food, drink, and tobacco	216,320	239,535	258,530	284,187	293,980
10. Sawmills, joinery, boxes, etc., wood turning and carving	53,960	58,980	59,995	65,252	67,173
11. Furniture of wood, bedding, etc.	22,536	24,588	25,841	28,317	30,251
12. Paper, stationery, printing, bookbinding, etc.	131,546	145,665	156,230	170,802	186,698
13. Rubber	38,118	37,828	36,526	39,789	50,626
14. Musical instruments	606	866	768	782	841
15. Miscellaneous products	49,996	55,962	56,718	71,719	80,234
<b>Total, Classes 1 to 15</b>	<b>1,690,464</b>	<b>1,878,434</b>	<b>1,951,477</b>	<b>2,154,916</b>	<b>2,304,919</b>
16. Heat, light, and power	59,312	71,232	76,208	81,452	89,882
<b>GRAND TOTAL</b>	<b>1,749,776</b>	<b>1,949,665</b>	<b>2,027,685</b>	<b>2,236,370</b>	<b>2,394,801</b>

**Relation of costs to output and production**

Certain costs of production, the value of output, and the balance available for profit, interest, rent, taxation, and depreciation, etc., in each class of manufacturing industry during the year 1967-68 are given in the following tables :

**VICTORIA—FACTORY COSTS AND OUTPUT, 1967-68**  
(\$'000)

Class of industry	Costs of—			Balance between value of output and specified costs (c)	Value of output
	Materials used (a)	Fuel, light, and power used (b)	Salaries output and wages paid		
1. Treatment of non-metalliferous mine and quarry products	63,703	6,628	23,989	29,805	124,125
2. Bricks, pottery, glass, etc.	25,138	6,622	23,275	23,403	78,438
3. Chemicals, dyes, explosives, paints, oils, grease	320,707	21,313	59,759	148,899	550,678
4. Industrial metals, machines, conveyances	946,395	34,950	570,717	351,116	1,903,178
5. Precious metals, jewellery, plate	5,815	467	5,493	4,587	16,362
6. Textiles and textile goods (not dress)	238,882	7,268	99,945	80,541	426,636
7. Skins and leather (not clothing or footwear)	19,170	942	9,070	6,585	35,767
8. Clothing (except knitted)	139,926	2,578	96,531	61,401	300,436
9. Food, drink, and tobacco	596,795	16,624	118,363	175,618	907,400
10. Sawmills, joinery, boxes, etc., wood turning and carving	80,082	2,280	40,307	26,867	149,536
11. Furniture of wood, bedding, etc.	34,615	421	16,809	13,442	65,287
12. Paper, stationery, printing, bookbinding, etc.	186,814	8,174	92,314	94,384	381,686
13. Rubber	54,136	3,370	26,085	24,540	108,131
14. Musical instruments	694	27	581	260	1,562
15. Miscellaneous products	87,290	4,142	43,390	36,844	171,665
<b>Total, Classes 1 to 15</b>	<b>2,800,162</b>	<b>115,808</b>	<b>1,226,628</b>	<b>1,078,291</b>	<b>5,220,888</b>
16. Heat, light, and power	13,262	27,278	17,588	72,294	130,422
<b>GRAND TOTAL</b>	<b>2,813,424</b>	<b>143,086</b>	<b>1,244,216</b>	<b>1,150,585</b>	<b>5,351,311</b>

(a) Includes containers, tools replaced, and repairs to plant.

(b) Includes cost of lubricants and water.

(c) Balance available to provide for all other costs and overhead expenses such as rent, interest, insurance, pay-roll tax, income tax, depreciation, etc., as well as drawings by working proprietors and profit.

VICTORIA—PERCENTAGE OF SPECIFIED COSTS OF PRODUCTION,  
ETC., TO VALUE OF OUTPUT OF FACTORIES, 1967-68  
(Per cent)

Class of industry	Specified costs of production			Balance between value of output and specified costs (c)
	Materials used (a)	Fuel, light, and power used (b)	Salaries and wages paid	
1. Treatment of non-metalliferous mine and quarry products	51·3	5·4	19·3	24·0
2. Bricks, pottery, glass, etc.	32·1	8·4	29·7	29·8
3. Chemicals, dyes, explosives, paints, oils, grease	58·2	3·9	10·9	27·0
4. Industrial metals, machines, conveyances	49·7	1·8	30·0	18·5
5. Precious metals, jewellery, plate	35·5	2·9	33·6	28·0
6. Textiles and textile goods (not dress)	56·0	1·7	23·4	18·9
7. Skins and leather (not clothing or footwear)	53·6	2·6	25·4	18·4
8. Clothing (except knitted)	46·6	0·9	32·1	20·4
9. Food, drink, and tobacco	65·8	1·8	13·0	19·4
10. Sawmills, joinery, boxes, etc., wood turning and carving	53·6	1·5	26·9	18·0
11. Furniture of wood, bedding, etc.	53·0	0·7	25·7	20·6
12. Paper, stationery, printing, bookbinding, etc.	49·0	2·1	24·2	24·7
13. Rubber	50·1	3·1	24·1	22·7
14. Musical instruments	44·5	1·7	37·2	16·6
15. Miscellaneous products	50·8	2·4	25·3	21·5
Total, Classes 1 to 15	53·6	2·2	23·5	20·7
16. Heat, light, and power	10·2	20·9	13·5	55·4
GRAND TOTAL	52·6	2·7	23·2	21·5

For footnotes see page 411.

There are considerable variations in the proportions which the cost of materials and the expenditure on wages bear to the value of the output in the different classes of industries. These are, of course, due to the difference in the treatment required to convert the materials to their final form. Thus, in Class 2, the sum paid in wages represents 29·7 per cent and the cost of raw materials 32·1 per cent of the values of the finished articles, while, in Class 9, the expenditure on wages amounts to 13·0 per cent and that on raw materials to 65·8 per cent of the value of the output.

In the next table, specified costs of production, the value of the output of factories, and the balance available for profit and miscellaneous expenses are compared for each of the years 1963-64 to 1967-68:

VICTORIA—SPECIFIED COSTS OF PRODUCTION, ETC., AND  
VALUE OF OUTPUT OF FACTORIES  
(\$'000)

Year	Specified costs of production			Balance between value of output and specified costs (c)	Total value of output
	Materials used (a)	Fuel, light, and power used (b)	Salaries and wages		
1963-64	2,190,398	114,648	912,424	837,352	4,054,822
1964-65	2,425,961	125,161	1,028,492	921,172	4,500,786
1965-66	2,469,372	127,858	1,077,234	950,451	4,624,915
1966-67	2,679,726	134,418	1,167,872	1,068,499	5,050,515
1967-68	2,813,424	143,085	1,244,216	1,150,585	5,351,311

For footnotes see page 411.

In the following table these figures are converted to their respective percentages of the value of output :

VICTORIA—PERCENTAGE OF SPECIFIED COSTS OF PRODUCTION,  
ETC., TO VALUE OF OUTPUT OF FACTORIES  
(Per cent)

Year	Specified costs of production			Balance between value of output and specified costs (c)	Total
	Materials used (a)	Fuel, light, and power used (b)	Salaries and wages		
1963-64	54.0	2.8	22.5	20.7	100.0
1964-65	53.9	2.8	22.8	20.5	100.0
1965-66	53.4	2.8	23.3	20.5	100.0
1966-67	53.1	2.7	23.1	21.1	100.0
1967-68	52.6	2.7	23.2	21.5	100.0

For footnotes see page 411.

**Land, buildings, plant, and machinery**

The following statement shows the value of land and buildings used in the various classes of manufacturing industries for the years 1963-64 to 1967-68 :

VICTORIA—FACTORIES : VALUE OF LAND AND BUILDINGS  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	28,122	28,176	29,968	29,804	29,637
2. Bricks, pottery, glass, etc.	21,952	22,310	23,192	24,490	26,472
3. Chemicals, dyes, explosives, paints, oils, grease	75,812	78,235	81,160	87,612	84,898
4. Industrial metals, machines, conveyances	393,476	442,743	470,730	495,854	528,358
5. Precious metals, jewellery, plate	4,350	5,067	4,810	4,877	5,168
6. Textiles and textile goods (not dress)	77,674	78,596	80,751	87,303	90,487
7. Skins and leather (not clothing or footwear)	9,382	9,310	9,780	9,642	10,163
8. Clothing (except knitted)	58,300	62,152	66,737	69,599	72,832
9. Food, drink, and tobacco	138,268	149,037	159,823	173,363	187,945
10. Sawmills, joinery, boxes, etc., wood turning and carving	29,102	32,047	34,467	36,541	37,893
11. Furniture of wood, bedding, etc.	14,104	16,154	17,375	19,582	21,084
12. Paper, stationery, printing, bookbinding, etc.	64,062	70,608	82,825	89,569	101,056
13. Rubber	20,150	20,475	22,443	27,173	26,880
14. Musical instruments	332	433	452	513	573
15. Miscellaneous products	32,078	32,869	36,184	41,297	43,190
Total, Classes 1 to 15	967,164	1,048,212	1,120,697	1,197,219	1,266,636
16. Heat, light, and power	53,630	57,500	56,244	57,536	51,368
GRAND TOTAL	1,020,794	1,105,712	1,176,941	1,254,755	1,318,004

The values recorded in the above table and in the table which follows are, generally, the values shown in the books of the individual firms after allowance has been made for depreciation, but they include estimates of the capital value of premises and plant rented. Consequently, the totals shown in the tables do not represent the actual amount of capital invested in industry.

Where land and buildings, etc., and plant and machinery, etc., are rented by the occupiers of factories, the capital value of these items has been computed by capitalising the rent paid at fifteen years' and ten years' purchase, respectively.



In the following table the depreciated book values of machinery and plant used in the various classes of manufacturing industries are shown for each of the years 1963-64 to 1967-68 :

VICTORIA—FACTORIES : VALUE OF PLANT AND MACHINERY  
(\$'000)

Class of industry	1963-64	1964-65	1965-66	1966-67	1967-68
1. Treatment of non-metalliferous mine and quarry products	50,682	54,293	57,540	58,136	53,985
2. Bricks, pottery, glass, etc.	23,766	22,450	23,173	27,111	30,582
3. Chemicals, dyes, explosives, paints, oils, grease	146,856	143,637	149,872	192,686	185,775
4. Industrial metals, machines, conveyances	282,304	322,331	344,775	363,346	377,782
5. Precious metals, jewellery, plate	1,350	1,551	1,448	1,491	1,517
6. Textiles and textile goods (not dress)	59,224	61,847	65,544	70,456	72,178
7. Skins and leather (not clothing or footwear)	3,172	3,346	3,584	3,495	3,816
8. Clothing (except knitted)	20,134	22,197	23,186	25,298	27,504
9. Food, drink, and tobacco	123,086	126,623	135,500	152,184	166,705
10. Sawmills, joinery, boxes, etc., wood turning and carving	17,064	17,826	19,230	19,219	18,294
11. Furniture of wood, bedding, etc.	3,096	3,186	3,335	3,531	3,765
12. Paper, stationery, printing, bookbinding, etc.	62,370	69,009	74,818	86,258	101,008
13. Rubber	15,850	16,196	18,498	26,759	28,551
14. Musical instruments	118	124	144	183	249
15. Miscellaneous products	25,032	30,011	32,566	34,664	38,746
Total, Classes 1 to 15	834,104	894,627	953,213	1,064,817	1,110,457
16. Heat, light, and power	206,620	233,321	255,800	297,404	256,793
GRAND TOTAL	1,040,724	1,127,948	1,209,013	1,362,221	1,367,250

Motive power classified in the tables which follow relates to the rated horsepower of engines used. Engines in reserve or idle are the subject of a separate table, but obsolete engines are completely excluded from any information shown.

VICTORIA—TOTAL RATED HORSEPOWER OF ENGINES AND  
ELECTRIC MOTORS ORDINARILY IN USE IN FACTORIES (a), 1967-68

Class of industry	Steam		Internal combustion	Water	Motors driven by electricity		Total without duplication
	Reciprocating	Turbine			Purchased	Own generation	
1. Treatment of non-metalliferous mine and quarry products	1,221	16,750	1,280	..	95,808	6,820	115,059
2. Bricks, pottery, glass, etc.	125	..	3,887	..	56,031	12	60,043
3. Chemicals, dyes, explosives, paints, oils, grease	2,229	69,029	5,425	..	188,750	40,453	265,433
4. Industrial metals, machines, conveyances	1,351	..	10,754	..	745,548	2,543	757,653
5. Precious metals, jewellery, plate	150	..	75	..	3,879	25	4,104
6. Textiles and textile goods (not dress)	205	..	1,095	..	124,808	280	126,108
7. Skins and leather (not clothing or footwear)	690	..	173	..	18,954	460	19,817
8. Clothing (except knitted)	575	..	151	..	34,241	..	34,967
9. Food, drink, and tobacco	1,624	2,636	3,447	830	267,348	2,029	275,885
10. Sawmills, joinery, boxes, etc., wood turning and carving	3,920	200	23,235	..	112,664	6,809	140,019
11. Furniture of wood, bedding, etc.	..	..	..	..	17,072	..	17,072
12. Paper, stationery, printing, bookbinding, etc.	250	23,850	657	..	123,464	51,534	148,221
13. Rubber	..	..	144	..	99,886	..	100,030
14. Musical instruments	..	..	..	..	297	..	297
15. Miscellaneous products	..	2,000	127	..	56,197	120	58,324
Total, Classes 1 to 15	12,340	114,465	50,450	830	1,944,947	111,085	2,123,032
16. Gas works	2,711	1,213	3,594	..	20,213	..	27,731
GRAND TOTAL	15,051	115,678	54,044	830	1,965,160	111,085	2,150,763

(a) Includes gas works, but excludes central electric stations.

The total rated horsepower in reserve or idle during 1967-68 and not included above was 251,367.

Motors driven by purchased electricity comprised approximately 91.4 per cent of the total horsepower used in factories other than central electric stations in 1967-68, while steam turbines were next in demand with 5.4 per cent.

A comparison over the five year period 1963-64 to 1967-68 of the total rated horsepower used to drive engines and electric motors ordinarily in use in factories is given in the table which follows :

VICTORIA—TOTAL RATED HORSEPOWER OF ENGINES AND ELECTRIC MOTORS ORDINARILY IN USE IN FACTORIES (a)

Year	Steam		Internal combustion	Water	Motors driven by electricity		Total without duplication
	Reciprocating	Turbine			Purchased	Own generation	
1963-64	17,081	98,724	53,296	890	1,616,591	60,992	1,786,582
1964-65	16,149	89,148	54,815	890	1,727,537	60,978	1,888,539
1965-66	16,294	95,919	55,283	890	1,824,907	68,823	1,993,293
1966-67	15,712	106,715	55,853	880	1,907,935	88,502	2,087,095
1967-68	15,051	115,678	54,044	830	1,965,160	111,085	2,150,763

(a) Includes gas works, but excludes central electric stations.

The following table shows the total rated horsepower for each year from 1963-64 to 1967-68 for engines and electric motors in reserve or idle. It includes engines which are only used occasionally, or, for example, during periods of breakdown to power supply.

VICTORIA—TOTAL RATED HORSEPOWER OF ENGINES AND ELECTRIC MOTORS IN RESERVE OR IDLE IN FACTORIES (a)

Year	Rated horsepower of engines, etc., in reserve or idle		
	Purchased electricity	All other types	Total
1963-64	161,471	60,501	221,972
1964-65	173,182	55,420	228,602
1965-66	181,057	54,520	235,577
1966-67	188,763	57,280	246,043
1967-68	191,527	59,840	251,367

(a) Without duplication; includes gas works, but excludes central electric stations.

Particulars of the type and capacity of engines and generators installed in central electric stations in Victoria during 1967-68 are shown in the following table :

VICTORIA—POWER EQUIPMENT INSTALLED IN CENTRAL ELECTRIC STATIONS, 1967-68

Particulars		Capacity of engines and generators			
		Steam turbine	Internal combustion	Water	Total
Engines installed	rated hp	3,070,300	27,279	445,574	3,543,153
Generators installed—					
Kilowatt capacity—					
Total installed	kW	2,291,500	19,545	332,515	2,643,560
Effective capacity	kW	2,282,500	17,545	331,500	2,631,545
Horsepower—					
Total installed	hp	3,070,610	26,190	445,570	3,542,370
Effective capacity	hp	3,058,550	23,510	444,210	3,526,270

Similar information to that shown in the preceding table, but giving a comparison over the years 1963-64 to 1967-68 is shown below :

VICTORIA—POWER EQUIPMENT INSTALLED IN CENTRAL ELECTRIC STATIONS

Particulars		1963-64	1964-65	1965-66	1966-67	1967-68
		Central electric stations Engines installed	number rated hp	29	29	22
Generators installed— Kilowatt capacity— Total installed	kW	2,213,474	2,520,744	2,903,307	3,354,145	3,543,153
Effective capacity	kW	1,660,828	1,885,831	2,081,834	2,453,782	2,643,560
Horsepower equivalent— Total installed	hp	1,640,697	1,831,925	1,973,961	2,337,369	2,631,545
Effective capacity	hp	2,226,311	2,527,924	2,789,658	3,288,068	3,542,370
		2,199,326	2,455,664	2,645,108	3,132,074	3,526,270

Principal factory products

Annual quantity and value

The next table shows the quantities and values of the principal articles manufactured in Victoria, and corresponding figures for Australia during 1967-68. Owing to the limited number of producers, it is not permissible under statute to publish particulars regarding some articles of manufacture which would otherwise appear in the following table :

VICTORIA AND AUSTRALIA—PRINCIPAL ARTICLES MANUFACTURED, 1967-68

Commodity Code No.	Article	Unit of quantity	Victoria		Australia	
			Quantity	Value	Quantity	Value
				\$'000		\$'000
023. 10, 14, 17	Bacon and ham (c)	mill lb	20.6	13,430	67.6	49,887
027. 02-29	Meat—canned	mill lb	24.5	6,200	42.7	12,933
051. 21-27	Milk—condensed	mill lb	97.5	13,494	135.3	15,658
051. 31	Butter	mill lb	231.9	79,491	420.9	143,067
051. 35	Cheese	mill lb	73.6	17,686	155.4	36,657
051. 61	Ice cream	mill gals	11.2	10,746	37.4	36,543
051. 72-73	Milk—powdered : full cream	mill lb	21.8	6,134	47.3	13,197
062. 01	Flour, plain—wheaten (including sharps)	'000 short ton	403	30,775	1,351.5	110,346
063. 11	Malt—barley	mill bush	9.2	19,911	13.5	29,383
064. 03-13	Bread—2 lb loaves equivalent	mill	211.8	34,536	806	146,945
064. 21	Biscuits	mill lb	82.0	18,521	233.4	63,560
064. 43-45	Cakes, pastry, pies, etc. (including canned puddings)	..	(b)	28,879	(b)	96,717
	Fruit : preserved—					
076. 15	Peaches	mill lb	149.4	17,223	253.6	30,149
076. 22	Pears	mill lb	139.9	18,146	152.8	19,802
076. 60	Jams, fruit spreads, fruit butters, etc.	mill lb	37.4	6,661	83.9	14,937
094. 02-49	Vegetables canned or bottled (including pickled)	mill lb	46.5	8,008	182.0	28,560
	Confectionery—					
104. 06-18	Chocolate base	mill lb	42.8	21,402	98.9	48,757
104. 21-29	Other without chocolate	mill lb	45.5	15,138	112.8	38,111
122. 02	Soup—tomato	mill imp pint	17.6	2,719	23.4	3,568
123. 18	Sauce—tomato	mill imp pint	21.3	5,013	32.2	7,723
139. 14	Sausage casings—sheep and lamb	'000 bundles	2,949	5,410	4,646	8,290
152. 06	Pollard	'000 short ton	84.3	3,342	305.5	12,305
171. 03-05	Aerated and carbonated waters	mill imp gals	34.9	23,930	126.9	88,201
183. 02, 11, 21-28	Tobacco, cigars, and cigarettes (d)	mill lb	34.6	94,205	59.0	158,674
242. 07-11	Wool—scoured or carbonised	mill lb	56.6	4,459	157.8	17,966
242. 32	Wool tops	mill lb	15.4	15,206	42.4	35,582
261. 41	Briquettes—brown coal	'000 ton	1,745	12,276	1,745	12,276
281. 04	Ice	'000 ton	48.2	784	187.3	2,612
	Leather (dressed)—					
301. 31-37	Vegetable tanned : sole	'000 lb	3,969	1,600	10,399	4,540
301. 43-65	Chrome tanned	mill sq ft	22.4	8,201	72.2	28,025
331. 01-19	Timber produced from logs—Australian	mill sup ft	317.5	(a)	1,447	(a)
369. 11	Ropes and cables (excluding wire)	'000 cwt	63.3	2,360	117.7	4,374

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VICTORIA AND AUSTRALIA—PRINCIPAL ARTICLES MANUFACTURED,  
1967-68—continued

Commodity Code No.	Article	Unit of quantity	Victoria		Australia	
			Quantity	Value	Quantity	Value
				\$'000		\$'000
372.02-20	Cloth piece goods woven—					
372.22-36,48,50	Worsted or predominantly worsted	'000 sq yd	3,557	9,340	9,530	21,006
372.52-62; 374.51-55	Woollen or predominantly woollen	'000 sq yd	7,107	9,204	14,852	18,563
401.57	Blankets, bed (e)	'000 pair	771	5,006	1,594	10,994
403.02, 18,20, 52-92, 96; 404.02-98	Acid—sulphuric	'000 ton	468	1,814	1,892	14,647
412.02, 04, 08, 10	Plastics and synthetic resins	'000 cwt	1,525	31,196	3,349	72,327
412.42-46	Paints (not water) and enamels ready mixed (excluding bituminous and marine)	'000 imp gals	4,773	18,113	15,624	62,416
434.09	Paints, water (excluding powder form)	'000 imp gals	1,299	4,827	4,358	17,313
447.81	Gas, town	mill therms	119	(a)	312	(a)
461.20	Pipe fittings, ferrous	..	(b)	3,090	(b)	13,320
461.30	Steel, constructional—fabricated	'000 ton	132.0	33,334	584.8	165,538
465.04	Window frames—metal	..	(b)	15,022	(b)	50,077
472.01, 03	Bolts and nuts—for sale as such	..	(b)	14,823	(b)	25,594
472.12	Bricks—clay	mill	412	19,652	1,440	68,173
475.30	Tiles, roofing—	mill	13.9	1,704	47.5	5,236
475.46	Terracotta	mill	33.5	2,582	96.8	10,024
479.32, 33	Concrete	'000 long ton	232.1	6,954	701.6	21,418
499.42	Pipes—concrete (excluding agricultural)	mill sq yd	12.8	8,744	32.8	20,701
503.21-32	Plaster sheets	'000 mill kWh	11.0	(a)	43.4	(a)
507.51	Electricity generated	'000	659	(a)	2,911	(a)
511.01	Electric motors	..	(b)	20,080	(b)	36,746
512.01, 11; 589.31	Machinery: industrial—	..	(b)	12,090	(b)	23,972
521.01	Pumping (including pumps)	..	(b)	12,100	(b)	26,346
523.01, 02, 05	Conveyors (and appliances)	..	(b)	9,892	(b)	21,327
528.17	Hoists, cranes, lifting	..	(b)	10,174	(b)	25,343
581.02-08	Mining and drilling	..	(b)	8,772	(b)	9,813
581.10-16; 582.04-28	Metal working	..	(b)	10,174	(b)	25,343
584.11-49	Food processing and canning	..	(b)	8,772	(b)	9,813
626.01	Finished motor vehicles (f)—	number	117,990	199,670	270,963	447,654
643.01-37	Cars	number	40,811	73,838	106,485	185,907
649.51, 55; 683.03-61	Other	number	4,177	6,905	20,710	16,817
651.11-17	Trailers and semi-trailers	'000	1,153.2	(a)	4,012.4	(a)
661.21-23	Tyres retreaded and recapped	'000	158.3	4,631	522.4	22,146
671.14	Radios and radiograms (domestic)	'000	2,826	(a)	9,848	(a)
672.01	Transformers, chokes, etc.	'000	595.5	4,652	624.0	5,240
693.02, 06, 12	Radiators and electric fires (domestic)	'000	199.0	1,132	331.7	2,243
741.01	Toasters (domestic)	'000	83.2	1,750	212.8	4,214
744.01	Sinks—stainless steel	..	(b)	22,821	(b)	48,378
773.01-31	Steam, gas and water fittings, valves, etc. (non-ferrous)	'000	22.5	4,240	191.5	27,668
774.01-18	Clothes washing machines (domestic)	..	(b)	34,843	(b)	126,916
774.41-47, 60-67	Furniture and office equipment—	..	(b)	19,558	(b)	58,314
775.01-19	Wooden	'000 doz	1,024	19,522	2,226	37,595
775.51-776.22	Metal	'000 doz	1,033	7,436	2,373	16,514
791.01, 03, 09, 15, 17, 20, 25, 27	Shirts (men's and boys')	'000 doz pair	4,451	20,486	3,952	33,684
791.31, 33, 39, 45, 47, 50, 55, 57	Underwear—	'000 doz pair	2,618	14,577	2,824	15,708
791.61, 62, 66, 70, 71, 72, 76, 79, 81, 82, 87, 88, 92, 93, 97, 99	Men's and boys'	'000 pair	4,488	21,702	9,619	46,677
791.05, 07, 10, 23, 35, 37, 40, 53, 63, 64, 69, 75, 83, 85, 86, 91, 95	Women's and girls'	'000 pair	10,074	40,466	16,079	63,719
	Stockings—women's (g)	'000 pair	2,840	4,909	5,541	11,191
	Socks and stockings—men's and children's	'000 pair	9,477	10,726	11,039	13,877
	Footwear—					
	Boots, shoes, and sandals (h)—					
	Men's and youths'					
	Women's and maids'					
	Children's (including infants')					
	Slippers					

VICTORIA AND AUSTRALIA—PRINCIPAL ARTICLES MANUFACTURED,  
1967-68—continued

Commodity Code No.	Article	Unit of quantity	Victoria		Australia	
			Quantity	Value \$'000	Quantity	Value \$'000
805.01-13 ; 806.02-06	Soaps and detergents— Personal toilet use	'000 cwt	133	3,197	553	22,668
	Other purposes	'000 cwt	597	8,497	3,349	61,032
805.22-60 ; 806.10-44	Mattresses—all types	'000	459	7,013	1,704	23,260
844.01-61	Pharmaceutical products for human use	..	(b)	30,379	(b)	112,675
871.01	Cans, canisters, containers—metal	..	(b)	46,747	(b)	106,538
941.11	Containers—paperboard (f)	..	(b)	56,374	(b)	149,616
943.02-08	Boxes and cases—wooden	..	(b)	4,849	(b)	23,483
944.11,21,31, 41	Cans, canisters, containers—plastic	..	(b)	8,340	(b)	18,965
945.21						

(a) Quantity only available.

(b) Value only available.

(c) Cured bone-in weight of smoked, cooked, and canned bacon and ham.

(d) Source : Department of Customs and Excise.

(e) Double, three quarter, single ; wool, wool mixture, and other fibre.

(f) Excludes vehicles finished by specialist body building works outside the motor vehicle manufacturers' organisation.

(g) Includes panty hose.

(h) Excluding wholly of rubber.

(i) Includes composite wood and paperboard butter boxes.

### Monthly production statistics

The Bureau collects monthly production returns and makes available printed tables of Australian production statistics within a few weeks of the

### AUSTRALIA—PRODUCTION SUMMARIES

Ref. No.	Subject	Ref. No.	Subject
1	Automotive Spark Plugs and Shock Absorbers	29	Biscuits, Ice Cream, Cocoa, Confectionery
2	Chemicals, etc.	30	Storage Batteries—Wet Cell
3	Plastics and Synthetic Resins and Plasticisers	32	Perambulators, Pushers and Strollers
4	Paints and Other Surface Coatings	33	Motor Vehicles
5	Electricity and Gas	34	Television, Radios, Other Sound Equipment, Transistors
6	Soaps, Detergents, Glycerine and Fatty Acids	35	Bed Bases and Mattresses
7	Internal Combustion Engines	36	Processed Milk Products
8	Lawn Mowers	38	Fish Preserving
9	Electrical Appliances	39	Jams and Preserved Fruit and Vegetables
10	Motor Bodies, Trailed Vehicles, Lift-on Freight Containers, etc.	40	Cereal Products
11	Pedal Cycles	41	Vegetable Oils: Margarine and other Edible Processed Fats
12	Meters	42	Malt and Beer
13	Building Fittings	43	Stock and Poultry Foods including Bran and Pollard
14	Cotton Goods	45	Phonograph Records
15	Woolscouring, Carbonising, and Fellingmongering	47	Aerated and Carbonated Waters, Cordials and Syrups
16	Wool Top Making and Yarn Produced	48	Sports Goods
17	Wool Woven Fabric, etc.	49	Building Materials
18	Hosiery	50	Electrodes for Manual Welding
19	Women's, Maids' and Girls' Clothing	51	Hides and Skins Used for Tanning
20	Cellulosic and Synthetic Fibre Tops, Yarns and Woven Fabrics	52	Electric Power Frequencies, Transformers, Chokes and Ballasts
21	Paper, Wood Pulp and Adhesive Tapes	53	Plastics Film, Sheeting and Coated Materials
22	Floor Coverings and Felts	55	Butter and Cheese
23	Electric Motors	56	Canned Meat
24	Men's, Youths' and Boys' Clothing	58	Steel Wire and Wire Products
25	Foundation Garments	59	Non-ferrous Rolled, Extruded and Drawn Products
27	Gloves and Slide Fasteners		
28	Footwear		

month to which they relate. A list of the subjects included in these Production Summaries is given above.

In addition, Statistical Bulletins for the Meat, Gold Mining, and Dairying Industries, and Minerals and Mineral Products are issued each month. Australian totals for a greater range of commodities are published in these Bulletins and Production Summaries than are published in the *Monthly Bulletin of Production Statistics*. Victorian figures are published in the Victorian monthly bulletin *Production Statistics*.

### INDIVIDUAL INDUSTRIES

Details of most individual industries published in previous *Victorian Year Books* have been deleted in this edition. However, publication will be resumed when the results of the integrated censuses are known.

**History of Manufacturing, 1961; Motor Vehicle Industry, 1962; Chemical Industry, 1963; Petrochemical Industry, 1964; Glass Industry, 1965; Agricultural Machinery Industry, 1966; Aluminium Industry, 1967; Textile Industry, 1968; Canning of Foodstuffs, 1969; Butter, Cheese, and Processed Milk Products, 1970**

### Heavy engineering

#### *Introduction*

Victoria is relatively poor in iron ore and the coking coals necessary for the production of pig iron, the basic constituent in the making of steel in large quantities. However, the availability of rolled steel products and pig iron produced mainly in New South Wales and South Australia has enabled Victoria to develop a significant heavy engineering industry.

The heavy engineer's function is to produce machinery and massive structures in metal. Foundries and rolling mills produce basic shapes which are then forged, machined, fabricated, and assembled. Heavy engineering products are such items as locomotives, railway and tramway rolling stock, and agricultural, industrial, and mining machinery, bridges, cranes, boilers, pumps, steam engines, condensing and feed heating plant, and other similar items.

#### *Early history*

Equipment and machinery manufactured in the early days of the State was, of course, less massive and more limited in application than the machines of today. In some instances activities classified as heavy engineering in the past have changed to an extent that they would not now be so classified. An example of such an industry is the manufacture of motor vehicles.

The heavy engineering industry in Victoria had its beginning in the early 1850s when a number of companies began to manufacture equipment for alluvial mining. A typical example of such an establishment was Thompsons (Castlemaine) Ltd. In 1852 the brothers David and James Thompson migrated from Ireland and engaged in the erection of quartz crushing batteries, engines, and pumps and winding equipment, mostly in the Castlemaine district. One of the earliest contracts obtained was for the supply of points and crossings for the Victorian Railways. These are still being supplied. In 1864 the company erected a flour mill in Castlemaine on the site of the present offices.

The growth of the industry was rather slow. However, for an industry that was in its infancy in a new country, the projects that were then completed were regarded as great achievements in the light of existing knowledge and industrial capacity.

*Development after 1900*

Towards the end of the nineteenth and during the early years of the twentieth century, industrial activity in Victoria became more diversified and the demand for heavy engineering products increased to such an extent that a number of companies entered the field. For example, by 1911 the demand for iron and steel castings resulted in the formation of Charles Ruwolt Pty Ltd (later Vickers Ruwolt Pty Ltd) which built an iron foundry, and the expansion of the steel casting plant of The Steel Company of Australia Pty Ltd.

At the beginning of the century significant advancement took place in alluvial mining when hydraulic sluicing was introduced. At this time dredges incorporating gravel pumps, nozzle pumps, sluice boxes and efficient boilers were also becoming popular, while air compressors and steam and electric winders were being used in all principal mining fields in Australia.

In 1908 the manufacture of water tube boilers and high speed forced lubrication engines was introduced to Australia and, coupled with centrifugal pumps, were supplied for irrigation purposes along the Murray River.

By 1919 complete dredges—large, complex, and cumbersome pieces of equipment—weighing up to 1,500 tons were being produced. They represented the most advanced application of mechanisation to hydraulic mining operations.

About this time, demand for such items as hydraulic lifts and hydraulic appliances increased and was stimulated by the provision of a general supply of hydraulic power in Melbourne, which prompted many new developments. Johns and Waygood Ltd derive their origin from this type of operation. At about the same time some new town gas plants were being built and this again opened up wider fields for the heavy engineer.

During the First World War engineering methods advanced rapidly partly as a result of demand for D class locomotives and marine engines. Ship building and maintenance activities increased during this period and had to rely on the abilities of local heavy engineers. Many overseas supplies were cut and the engineering industry initiated many processes and made many new types of equipment. As an example, railway and tramway tyres which until the war were imported were now made in Victoria. During this period Thompsons (Castlemaine) Ltd installed a plant which included a 500 ton forging press for the making of solid rolled tyres.

After the First World War the increasing demand for electric power generating plants resulted in further calls being made on the heavy engineering industry. Steam turbines, condensing and feed heating plants were manufactured and installed in power stations throughout Australia. At this time manufacture of lifts was also carried out on a much larger scale in Victoria.

As demand for dredges for gold mining came to an end—the last dredge being manufactured in 1927—companies in this field looked to new markets and products. Some manufactured rock crushing, mining and cement making equipment. As an indication of advances made in design and manufacture, the first rock crushers weighed a mere four tons compared with some crushers made today that weigh up to 400 tons.

Progress through the 1930s was not as rapid as in the preceding ten years; however, some companies operating in this period commenced to use research techniques and testing of products. Examples include Vickers Ruwolt Pty Ltd, Thompsons (Castlemaine) Ltd, and The Steel Company of Australia Pty Ltd, all of which developed laboratory methods of testing their products before use.

In the early 1940s Australia was again at war and production turned to defence, including the manufacture of artillery, such as 25 pounder guns and 6 pounder tank-attack guns. In addition tanks and mobile units were made. The Government ordnance factories, aircraft and shipbuilding industries expanded rapidly.

The demand on the heavy engineer through this period was so great that many existing plants had to be enlarged. Following the war years, production methods slowly changed with the advent of more sophisticated machinery; machines became larger and tended more towards automatic and semi-automatic operations. This was particularly noticeable in the automotive industry, where by the late 1940s the introduction of automatic machinery was gathering momentum. New machines also included X-ray machines for checking the depth of penetration of welds.

#### *Present position*

In some areas the Victorian heavy engineering industry is among the leaders of development. Examples are metallurgical research and development and the setting up by The Steel Company of Australia Pty Ltd, of one of five plants in the world using the vacuum refining and degassing process in steelmaking.

A typical example of how the industry has grown over the years is the plant of Thompson's (Castlemaine) Ltd. Its principal products are centrifugal pumps of all types, vacuum pumps and air compressors, welded pressure vessels, condensing, feed heating, evaporating and de-aerating plant, points and crossings, railway and tramway tyres, and heavy forgings. The company has facilities for testing of materials in accordance with British, Australian, and American standards. The company can roll mild steel plate up to 3 inches (cold) and 5 inches (hot), it can pour bronze castings up to 5 tons and iron castings up to 30 tons, and handle ingots up to 20 tons on the forge. The maximum flow that can be measured in the hydraulic test laboratory is 150,000 gals per minute. The laboratory is suitable for electric motor drives up to 2,000 hp on voltages of 2,200, 3,300, and 6,600. The maximum power on 415 volts is 1,000 hp. This particular company is only one of many in the field of heavy engineering. Others include the following:

Products	Company
Road rollers and machinery	A. H. McDonald and Co. Pty Ltd Moore Road Machinery (Vic.) Pty Ltd
Hydraulic lifts	Johns and Waygood Ltd Otis Elevator Co. Pty Ltd
Earthmoving equipment	International Harvester Co. of Aust. Pty Ltd William Adams Tractors Pty Ltd
Quarrying and mining machinery	Vickers Ruwolt Pty Ltd John Thompson (Aust.) Pty Ltd
Locomotives and railway rolling stock	Thompson's (Castlemaine) Ltd Victorian Railways



Products	Company
Structural engineers	Johns and Waygood Ltd Australian Iron and Steel Pty Ltd
Cranes	Harnishchfaeger of Aust. Pty Ltd Cranes and Shovels Pty Ltd
Boilers	Babcock and Wilcox Aust. Ltd Vickers Ruwolt Pty Ltd
Agricultural machinery	International Harvester Co. of Aust. Pty Ltd William Adams Tractors Pty Ltd
Shipbuilders and repairers	Fleet Forge Pty Ltd Hobson's Bay Dock and Engineering Co. Pty Ltd
Aircraft	Commonwealth Aircraft Corp. Pty Ltd Government Aircraft Factory
Engines and turbines	Hawker Siddeley Brush Pty Ltd Amalgamated Power Engineering (Aust.) Ltd
Motor vehicles	General Motors-Holden's Pty Ltd Ford Motor Co. of Aust. Ltd
Trams	Melbourne and Metropolitan Tramways Board Victorian Railways

### Conclusion

Heavy engineering is in many ways the heart of industry ; most industries rely on the heavy engineer in some way or another. The industry is virtually self-sufficient through the availability of local materials. Knowledge and techniques, frequently adapted to local conditions from overseas research and industrial experience, are readily available in Victoria.

### Ministry of Fuel and Power

Following the discovery of natural gas off the East Gippsland coast early in 1965, and anticipating the discovery of oil, the Government passed the *Fuel and Power Act 1965*, establishing the Ministry of Fuel and Power, to determine the means by which the present and future supplies could be developed and utilised. Private oil and gas companies may refer legislative and other problems concerned with the production and marketing of energy to the Ministry, which has authority to examine proposals and give decisions.

The Ministry co-ordinates the activities of the State Electricity Commission of Victoria, the Gas and Fuel Corporation of Victoria, and the Victorian Pipelines Commission, as well as any future bodies which may be established to utilise sources of primary and secondary energy.

**Further reference, 1969**

### State Electricity Commission of Victoria

The State Electricity Commission, which was constituted by the *Electricity Commissioners Act 1918*, is a semi-governmental authority administered since 1921 by a full-time chairman and three part-time commissioners. The principal duty of the Commission is to co-ordinate and extend on an economic basis the supply of electricity throughout Victoria.

For this purpose, it is vested with power to erect, own, and operate power stations and other electrical plant and installations, supply electricity retail to individual consumers or in bulk to any corporation or public institution, acquire and operate electricity undertakings, develop, own, and operate brown coal open cuts and briquetting works, develop the State's hydro-electric resources, and form or acquire interests in any company for the purpose of selling char, coal, and briquettes.

From its own revenues, which it controls, the Commission must meet all expenditure in the operation of its power, fuel, and subsidiary undertakings, and all interest and other charges incurred in the service of its loans and other capital commitments.

The Commission is the controlling authority for all electrical undertakings in Victoria. It is responsible for the registration of electrical contractors, the licensing of electrical mechanics, the control of installation methods and material, and the testing and approval of electrical equipment and appliances.

#### *Electricity generation*

Since it began operating in 1919, the State Electricity Commission has expanded and co-ordinated the production and supply of electricity on a State-wide basis to the point where its system now generates almost all the electricity produced in Victoria and serves virtually all of the population.

Development of Victoria's electricity system is based on the utilisation for both power and fuel of Victoria's extensive brown coal resources in the Latrobe Valley in eastern Gippsland, with supplementary development of the hydro-electric potential of north-eastern Victoria. Victoria is entitled to one third of the electricity from the Snowy Mountains Hydro-electric Scheme, after the Commonwealth has taken the power it needs. Victoria also shares with New South Wales in the electricity generated at Hume Hydro Station on the River Murray.

By far the greater part of the State's electricity is generated from brown coal, either used in its raw state or manufactured into higher quality fuel in the form of brown coal briquettes. All the brown coal and briquette fuel is supplied by undertakings which the Commission itself owns and operates. Output of brown coal in 1969-70 from the three open cuts at Yallourn, Yallourn North, and Morwell totalled 22,788,946 tons, of which 18,210,187 tons were used in the Commission's own power stations, and 4,181,941 tons were manufactured into 1,540,717 tons of brown coal briquettes, 16 per cent of the briquette output then being used for electricity production in metropolitan and other steam power stations. The two functions, generation of electricity and production of fuel, are closely integrated. Apart from the large proportion of brown coal and briquette fuel consumed in the power stations, the process of briquette manufacture results also in the generation of electricity, since the steam needed for processing the raw coal for briquetting is first used to operate turbo-generators.

#### *Electricity supply*

At 30 June 1970, the number of ultimate consumers in Victoria was 1,250,540. Of these, 1,250,359 were served by the State system and 181 by local country undertakings. The State system supplies all the Melbourne metropolitan area and 2,362 other centres of population.

By 30 June 1970, almost all of the dwellings in the State, and 73,401 of Victoria's 75,600 farms were supplied with electricity.

Electricity supply has been extended almost throughout the State and there are now only a few remote areas not served by the State distribution system.

The Commission sells electricity retail in all areas except part of the metropolitan area, where it sells in bulk to eleven municipal undertakings which operate as local retail supply authorities under franchises granted before the Commission was established. Bulk supply is also being provided at present to several New South Wales municipalities and irrigation settlements bordering the River Murray. The number of consumers served by the State system outside the Melbourne metropolitan area is 602,861. Of the new consumers connected to supply by the Commission each year, almost two thirds are outside the metropolitan area.

The Commission's retail consumers numbered 1,014,572 at 30 June 1970. Retail supply is administered through the Metropolitan Branch and ten extra-metropolitan branches (Barwon, Eastern Metropolitan, Gippsland, Mallee, Midland, Mid-Western, North-Eastern, Northern, South-Western, and Wimmera). A 30 June 1970 there were branch and district supply offices in Melbourne and 95 other cities and towns in Victoria.

#### *Electricity production, transmission, and distribution*

Electricity generated in the State system or purchased by it totalled 13,454 mill. kWh in 1969-70, or more than 99 per cent of all Victoria's electricity for public supply. The system comprises a series of thermal and hydro-electric power stations. Inclusive of generator capacity both within the State and available to the Victorian system from outside the State, the total installed generator capacity at 30 June 1970, was 3,546,000 kW. Power stations are interconnected and feed electricity into a common pool for general supply.

The major power station in this interconnected system is the brown coal burning power station at Hazelwood, which alone generates 55 per cent of Victoria's electricity. It became fully operational with eight 200MW generating sets in service in 1970. Other power stations in the interconnected system comprise two further base-load power stations—Yallourn (which contributes 23 per cent) and Morwell; steam stations in Melbourne (Newport, Richmond, and Spencer Street), Geelong, and Ballarat, and also at Red Cliffs, which has, in addition, some internal combustion plant; and hydro-electric stations at Kiewa, at Eildon, on the Rubicon and Royston Rivers near Eildon, and at Cairn Curran, on Eppalock Reservoir on the Campaspe River near Bendigo. All major power stations within Victoria are Commission owned, except Spencer Street Power Station, which remains the property of the Melbourne City Council, although operated as a unit in the interconnected system.

A 330 kV transmission line links the Victorian system with the Snowy Mountains undertaking, and also provides facilities for interconnection between the Victorian and New South Wales State generating systems. Also linked with the Victorian interconnected system is the hydro station at Hume Reservoir on the River Murray. This power station is operated by the Electricity Commission of New South Wales. Output and operating costs are shared by Victoria and New South Wales.

In meeting the total demand on the system, which fluctuates throughout the day and from month to month, each group of stations in the interconnected system is assigned a pre-determined function dependent upon



the availability of power from each group and the economics of generation. The various stations are utilised in the combination that will meet the system load most economically at a given time.

The electrical transmission and distribution system in the State supply network at 30 June 1970, comprised 61,306 miles of power lines, four auto-transformation stations, 25 terminal receiving stations, 158 zone substations, and over 62,000 distribution substations. Main transmission is by 500 kV, 330 kV, 220 kV, and 66 kV power lines which supply the principal distribution centres and also provide interconnection between the power stations. The 500 kV, 330 kV and 220 kV systems total 1,943 route miles.

The transmission of energy from Hazelwood at 500 kV is at the highest voltage for electricity transmission in the southern hemisphere. A second 500 kV transmission line from the Latrobe Valley is expected to be in service in 1971.

The following table shows the predominant part taken by the State Electricity Commission in the generation of public supply electric power in Victoria, the amount of power generated by water power and other sources, and the relative importance of the main power stations :

VICTORIA—PUBLIC SUPPLY ELECTRICITY GENERATED, POWER STATIONS, AND SOURCES OF POWER, 1968-69

Station or origin of power	Source T = Thermal (a) H = Hydro.	Quantity	Percentage of production
		mill. kWh	
State Electricity Commission—			
Own generation—			
Hazelwood Power Station	T	5,838·1	47·8
Yallourn Power Station and Briquette Factory	T	3,896·0	31·9
Morwell Power Station	T	1,175·0	9·6
Newport Power Station	T	324·8	2·7
Spencer Street Power Station (b)	T	55·6	0·4
Richmond Power Station	T	17·7	0·1
Provincial thermal power stations	T	12·5	0·1
Total S.E.C. thermal generation	T	11,319·7	92·6
Eildon	H	226·0	1·9
Kiewa	H	396·7	3·2
Total S.E.C. hydro generation	H	622·7	5·1
Other public supply generation	T	13·9	0·1
Total generation by public supply undertakings	T and H	11,956·3	97·8
Net interstate purchases	T and H	265·4	2·2
Total	T and H	12,221·7	100·0

(a) Includes internal combustion.

(b) Melbourne, City Council.

#### *Future development*

Hazelwood Power Station, the largest project undertaken by the State Electricity Commission, provides 1,600 MW of base-load capacity. The

station operates on raw brown coal supplied by belt conveyors from the Morwell open cut.

A new power station, Yallourn 'W', being built half a mile west of Yallourn Power Station, will meet base load growth after the completion of Hazelwood. Yallourn 'W' will have two 350 MW turbo-generators operating on brown coal supplied by conveyors from the Yallourn open cut. The station's first unit is expected in service in 1972 and the second in 1973.

#### *Local country electricity undertakings*

The operation of independent undertakings is governed by the *Electric Light and Power Act 1958*, which is administered by the State Electricity Commission. Under the Commission's rural electrification programme, the Mallacoota undertaking, the only remaining independent electricity undertaking in Victoria, is shortly to be acquired and absorbed into the State system.

The only other Victorian public supply not provided by the Commission is in the Bendoc area, which is served by the Monaro County Council in New South Wales. The number of consumers in the Mallacoota and Bendoc areas was 181 at 30 June 1970.

#### **Gas industry**

The gas industry in Victoria provides a reticulated gas supply to the Melbourne metropolitan area and to twenty-six country centres throughout the State. The Melbourne metropolitan area accounts for approximately 89 per cent of all gas sales. Gas is supplied by the Gas and Fuel Corporation of Victoria, a public authority of the State, and two privately-owned public companies, The Colonial Gas Association Ltd and The Geelong Gas Company. A fourth company, The Gas Supply Company Ltd, sold its assets in Victoria to the Gas and Fuel Corporation late in 1970. Consumer and sales statistics for the individual undertakings for the year ended 30 June 1970 are set out in the following table :

VICTORIA—CONSUMER AND GAS SALES

Undertaking	Consumers at 30 June 1970	Sales 1969-70 million therms
Gas and Fuel Corporation of Victoria	447,652	130.0
The Colonial Gas Association Ltd	87,456	23.1
The Geelong Gas Company	24,000	5.0
The Gas Supply Company Ltd	15,200	6.9
Total	574,308	165.0

#### *Gas and Fuel Corporation of Victoria*

The Gas and Fuel Corporation of Victoria came into being by Act of Parliament in 1950. It was formed by the merger of the Metropolitan and Brighton Gas Companies which supplied gas to adjoining areas. The privately held shares in the two companies were exchanged for fully paid up preference shares in the Gas and Fuel Corporation and the State Government of Victoria invested \$8m which was held as ordinary shares in the Corpora-

tion. Three directors are appointed by the preference shareholders and the chairman and three other directors are appointed by the Government. The Corporation's operations are governed by the *Gas and Fuel Corporation Act 1958*.

The Corporation was originally formed to utilise the large resources of brown coal in the Latrobe Valley for town gas production. Its responsibilities include, among other things, encouraging and promoting the use of gas and advising the Government how to secure a safe, economical, and effective supply of gas in Victoria.

The Lurgi high pressure gasification plant was erected at Morwell between 1951 and 1956 and came into operation in 1956. This plant, which produced town gas from brown coal briquettes, continued to make a significant contribution to the Corporation's total gas issues until 26 November 1969, when it was shut down as part of the programme of progressive phasing out of manufacturing plant following the introduction of natural gas.

Changes in raw material availability and parallel development of new gas making processes have led to considerable diversification in the methods of gas production over the years. The Corporation has progressively introduced new gasification processes making use of new feedstocks to achieve minimum production costs. This diversification is illustrated in the following table :

VICTORIA—GAS AND FUEL CORPORATION OF VICTORIA :  
GAS MADE AND PURCHASED

Type of gas	1959-60		1968-69		1969-70	
	Million therms	Per cent of total	Million therms	Per cent of total	Million therms	Per cent of total
Brown coal gas (Lurgi)	20.4	27.5	36.7	31.3	14.1	10.0
Black coal gas	24.8	33.5	6.6	5.6	3.2	2.3
Water gas	8.0	10.8	2.4	2.1	0.5	0.3
Oil gas	..	..	20.8	17.8	21.2	14.9
Refinery gases	20.9	28.2	45.4	38.7	32.5	23.0
Natural gas	..	..	5.2	4.5	69.9	49.5
Total gas issued	74.1	100.0	117.1	100.0	141.4	100.0

The Corporation's metropolitan distribution system, which includes supply to the Mornington Peninsula, now covers an area of approximately 262 sq miles. Gas is also supplied to the country centres of Bendigo, Castlemaine, Kyneton, Maffra, Morwell, Sale, Trafalgar, Traralgon, and Warragul. The Sale undertaking was purchased from the Gas Supply Company Ltd in May 1969. At 30 June 1970 the Corporation was supplying gas to 441,879 consumers through systems involving approximately 4,919 miles of main.

#### *Natural gas*

Victoria's natural gas supplies are coming from the Esso and B.H.P. Barracouta and Marlin gas fields off-shore in east Gippsland. Transmission of natural gas from the outlet of the Esso/B.H.P. treatment plant at

Longford to the Corporation's city gate at Dandenong is undertaken by the Victorian Pipelines Commission. The Corporation was appointed consultant to the Commission for the design and construction of the Longford-Dandenong natural gas transmission pipeline, and associated ancillary facilities.

Construction of the 108 miles long, 30 inch diameter, 1,000 psig transmission pipeline commenced in February 1968 and was completed in January 1969. Natural gas was turned into the Corporation's metropolitan distribution system on 31 March 1969 and the task of converting gas appliances owned by the Corporation's customers began on 14 April 1969.

The Corporation transports gas from the city gate at Dandenong through its high pressure trunk distribution system, a major feature of which is a ring main operating at pressures up to 400 psig. This ring main consists of a 51 mile long, 18 inch diameter northern loop running between Dandenong, Doncaster, Keilor, North Melbourne, and West Melbourne, where it joins the 22.5 miles long, 30 inch diameter loop between Dandenong and West Melbourne. The northern loop was constructed and commissioned in sections, laying commenced in October 1966 and was completed in October 1969. Construction of the 30 inch diameter section began in December 1968 and was completed in May 1970. The Corporation's conversion operation took place in two stages. The first or pre-work stage, commenced on 8 April 1968 and continued ahead of the second or final conversion stage. The final conversion operation commenced on 14 April 1969, and was completed on 22 December 1970.

International Gas and Power Engineers Pty Ltd were responsible for the conversion operation on behalf of the Corporation and worked closely with the Corporation's conversion division which undertook the task of planning and administering the conversion of consumers' appliances to natural gas.

Before natural gas was introduced the Corporation's entire metropolitan distribution system was divided into sections, each containing approximately 3,000 consumers. Valves were inserted in the existing mains to allow each section to be isolated from its neighbours and fed with natural gas at the time of conversion. Over the conversion period the contractor converted approximately one million domestic, industrial, and commercial appliances on the premises of the Corporation's consumers. Two sections of approximately 3,000 consumers were converted each week and the operation was designed to minimise consumer inconvenience. At 7 October 1970, 895,124 appliances owned by 363,672 of the Corporation's customers had been converted to burn natural gas.

The introduction of natural gas is expected to result in significant growth in domestic and commercial gas usage. However, forward estimates indicate that the greater part of the potential market for this fuel lies in the industrial sphere.

#### *The Colonial Gas Association Ltd*

The Colonial Gas Association Ltd was incorporated in 1888. It supplies gas in the Footscray and Box Hill areas of Melbourne and in the country centres of Benalla, Horsham, Seymour, Shepparton, and Wangaratta. Until



1959 the Association's gas works operated using conventional carbonisation methods to produce gas from black coal imported from New South Wales. Between 1959 and 1963 its country undertakings were modified to operate on tempered liquefied petroleum gas and, at the same time, liquefied petroleum gas became a significant feedstock in its metropolitan gas undertakings. At 30 June 1970 the Association was supplying gas to 87,456 consumers in Victoria, of which about 79,000 are located in Melbourne's eastern and western suburbs, through approximately 1,400 miles of main.

The Association purchased its first supplies of natural gas on 5 May 1969 and immediately commenced the conversion of consumers' appliances in its area of supply in the eastern suburbs of Melbourne. Carried out by the conversion contractor, Stone and Webster Service Pty Ltd, the entire operation in both the eastern and western supply areas was completed early in March 1970.

#### *The Geelong Gas Company*

The Geelong Gas Company was incorporated by Act of the Victorian Parliament in 1858; it has an exclusive franchise for the supply of reticulated gas throughout the Geelong area and the Bellarine Peninsula. On 1 July 1969 it purchased the Queenscliffe Gas and Coke Company Ltd from the Gas Supply Company Ltd. At 30 June 1970 gas was supplied to 24,000 customers through about 370 miles of mains.

During the year the Company initiated a programme of installing propane gas satellite plants to supply localised communities some distance from the reticulated supply and is planning to expand this type of operation.

The Victorian Pipelines Commission commenced, in September 1970, the construction of a 32 miles long, 14 inch diameter transmission pipeline to convey natural gas to the Geelong area in March 1971. The Geelong Gas Company has several miles of new high pressure pipelines to distribute the gas and has commenced preparatory work on the conversion of appliances.

#### *The Gas Supply Company Ltd*

The Gas Supply Company Ltd was incorporated in Victoria in 1926 and operates gas undertakings in Victoria, New South Wales, and Queensland. At the present time the company provides a reticulated gas service in the Victorian towns of Ararat, Bacchus Marsh, Ballarat, Colac, Hamilton, Portland, Stawell, Warrnambool, and Wodonga. Originally, all the gas supplied in these areas was manufactured from coal. In 1962, however, the Company constructed the first tempered liquefied petroleum gas satellite plant in Australia to supply industry with gas produced in local refineries, and has now completely rebuilt all plants to supply either reformed or tempered liquefied petroleum gas.

Some 51 per cent of the Company's customers are supplied by its Ballarat undertaking which in 1969-70 accounted for over 76 per cent of the Company's total gas sales in Victoria.

The Company's assets in Victoria were sold to the Gas and Fuel Corporation for \$3.3m late in 1970.

## Victorian Pipelines Commission

### *Formation*

The Victorian Pipelines Commission, consisting of a full-time Chairman and four part-time Commissioners, came into existence on 1 March 1967 under the provisions of the *Victorian Pipelines Commission Act 1966*. The Commission is responsible for the construction, operation, and maintenance of natural gas transmission pipelines in Victoria. It acts as a common carrier of natural gas, and may also buy and sell natural gas, although it may not retail gas in any area served by the Gas and Fuel Corporation of Victoria, or any other gas utility, without the prior consent of the relevant utility.

### *Operations*

The Commission's initial activity was the construction of the pipeline from the gas producers' treatment plant at Longford to Dandenong where it connects with the metropolitan gas distribution network. This pipeline is 108 miles long, 30 inches in diameter and is designed for an operating pressure of 1,000 lb per square inch. It was laid underground with a minimum cover of 4 ft. Laying commenced in February 1968 and the line began operating on 16 March 1970. The metering and testing station has been constructed at Longford, and constant checks of the specific gravity, calorific value, moisture content, and other properties of the gas are made before it enters the transmission pipeline. Metering and regulating stations have been constructed at Dandenong, Ringwood, and Footscray where the gas passes through filtering equipment, meters, and pressure regulators before it is delivered to the metropolitan systems of the Gas and Fuel Corporation and The Colonial Gas Association Ltd. A branch of the Longford-Dandenong pipeline supplies the provincial centres of Sale and Maffra.

The Commission's first major extension of the transmission pipeline will be the 14 inch diameter pipeline from Melbourne to Geelong. To be laid by Australian Pipelines Construction, the line will be 32 miles long with a maximum operating pressure of 1,000 psig. To be completed in 1971, it is estimated to cost \$2.5m.

At 30 June 1969 the loan liability of the Commission was \$17,750,000.