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Australia is a federation of six states and two territories with a population of 11.5 million. It depends heavily on agricultural export and a growing manufacturing industry. Responsibility for education lies with the state governments which are administered centrally because of sparse population. School attendance is required to age 15 with exemptions for those in remote locations for whom correspondence and radio courses are usually available. About one-fourth of the students attend non-government schools. Technical education is a state responsibility with little organizational uniformity between states. Technical institutions conduct a variety of courses grouped into courses for training for technologists (degree and diploma courses), technicians (certificate), and craftsmen (trade), courses in general education, and courses for recreational purposes. In 1963 enrollments were 27,500 in universities, 34,000 in technical training institutions, and 275,300 in trade courses. Work experience is considered a fundamental training procedure. Technical education by correspondence is available. Technical teachers are recruited from industry or commerce and given inservice teacher education courses. Apprenticeship is the most common means of entry into trades, and 95,000 were being trained in 1965. Industry provides programs for executive, supervisor, technologist, technician, apprentice, and semiskilled worker training. (JM)

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Outline of Vocational Training in AUSTRALIA

PREPARED BY THE DEPARTMENT OF LABOUR AND NATIONAL SERVICE
OF THE COMMONWEALTH OF AUSTRALIA FOR THE
PAN INDIAN OCEAN CONFERENCE ON TECHNICAL EDUCATION AND TRAINING
PERTH, 1966

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1. Introduction

Area, Population

Australia is a federation of six States and two territories, having a total area of almost three million square miles. Most of the population of 11.5 million is concentrated in the well-watered eastern, southern and south-western areas. Slightly more than half of the population live in the capital cities of the six States.

Primary Industry

As a result of generally good seasons, favourable market opportunities, and improving technical efficiency, there has been an increase of nearly 50 per cent in the volume of rural output over the past decade.

Wool has retained first position in both production and exports, but the Australian continent contains areas of widely differing climatic and soil conditions, and many other rural industries have been successfully developed. The production of mutton and lamb has increased over 50 per cent in the past 10 years. Production of beef, which is the most important rural industry in the northern regions of Australia, has also increased markedly.

About one-quarter of the total production of meat in Australia is exported. While the dairying industry produces mainly for the home market, in a normal year, the greater part of the wheat crop is exported.

In the three years to June, 1965, pastoral and agricultural products, mainly wheat and wool, and processed farm products such as flour, butter, canned meats, fruits and wool tops, represented 77 per cent of total exports.

Although less than two per cent of the work force are engaged in mining and quarrying, these industries earn nearly 10 per cent. of Australia's export income. Between 1954 and 1964, mineral output at constant prices increased by about 50 per cent. In terms of output, the main minerals are coal, silver-lead-zinc, gold and copper.

In the early 1960's there was a quick succession of rich new mineral discoveries—iron ore deposits in Western Australia, oil in southern Queensland and vast bauxite deposits in Queensland and Western Australia. More recently, commercial quantities of oil and natural gas have been located in Western Australia and Victoria respectively.

Secondary Industry

Manufacturing industries contribute almost 30 per cent of gross national product and account for 13 per cent of Australia's total exports.

The past 20 years has seen a marked expansion of productive capacity, especially in the construction materials, chemical, and engineering industries, and the establishment of a whole range of new industries.

Between 1955 and 1965, production of steel increased from 2.2 to 5.1 million tons, cement from 1.9 million tons to 3.7 million tons, and sulphuric acid from 835,000 tons to 1,613,000 tons. Large-scale manufacture of motor vehicles commenced, and many other items were produced for the first time—among them tinplate, aluminium, man-made fibres, penicillin, diesel locomotives and heavy earth-moving equipment.

A large-scale expansion of oil refining capacity since 1954 has lifted annual crude oil distillation capacity from less than one million tons to 22 million tons, and further installations are in the course of construction. Associated with the development of oil refining capacity, has been the establishment of a large petro-chemical industry.

General Economic Development

Few of the development phases in Australia's history have been so prolonged, and none has been so widely spread throughout the economy as that since 1945.

Between 1947 and 1961, the size of the total work force increased by 28 per cent. While there has been a fall in the work force engaged in primary industries, there were large increases in the numbers engaged in manufacturing, commerce and other industries.

Over the past five years, it is estimated that the gross national product, measured at constant prices, has grown at an average rate approaching four per cent a year.

Despite the steady diversification which has come with increasing industrialization, a continuing high level of imports is essential in order to provide raw materials not available locally and the specialized machinery necessary to maintain the country's industrial expansion.

Australia's economic fortunes have always been closely united to her export industries. These are still predominantly the pastoral and agricultural sectors, although the contribution of the manufactured products has increased significantly.

Britain is still Australia's major export market, but the dependence on this market is being reduced considerably. Before the war, approximately half of Australia's exports went to Britain, but the proportion in recent years has declined to about one-fifth. On the other hand, the increase in the proportion of exports going to Asian countries has almost trebled since 1939.

2. General Education*

Under the Australian Constitution, the responsibility for education lies with the State Governments.† These Governments have developed systems which, while not identical, have many similar features. For example, in each case, the responsibility for framing and implementing education policy rests with a Minister for Education, who is a member of the State Cabinet. Again, the administrative authority in each State is an Education Department, headed by a Director-General or Director of Education. In New South Wales there is a separate Department of Technical Education; otherwise, separate divisions of the Education Department in each State administer primary, secondary, and technical education. These administrations are largely centralised, mainly because of the smallness of the population in relation to the large area for which educational services must be provided.

School attendance is compulsory throughout Australia, between the ages of six and 15, except in Tasmania, where the minimum leaving age is 16.

Children may be exempted from the requirement of compulsory attendance if they live too far from a school or suffer physical disability. These children usually receive correspondence tuition, which is often supplemented by "School of the Air" or school radio broadcasts.

The general structure of education is shown in simplified form in Figure 1, p. 10.

Tuition in Government schools is free. Although there is variation between State practices in making text-books available, it is usual for children to be asked to supply their own writing materials.

In Australia, in 1965, there were approximately 7,800 Government schools (primary and secondary), with an enrolment of 1,857,000 pupils. The teaching force numbered 75,000 of whom about half were women.

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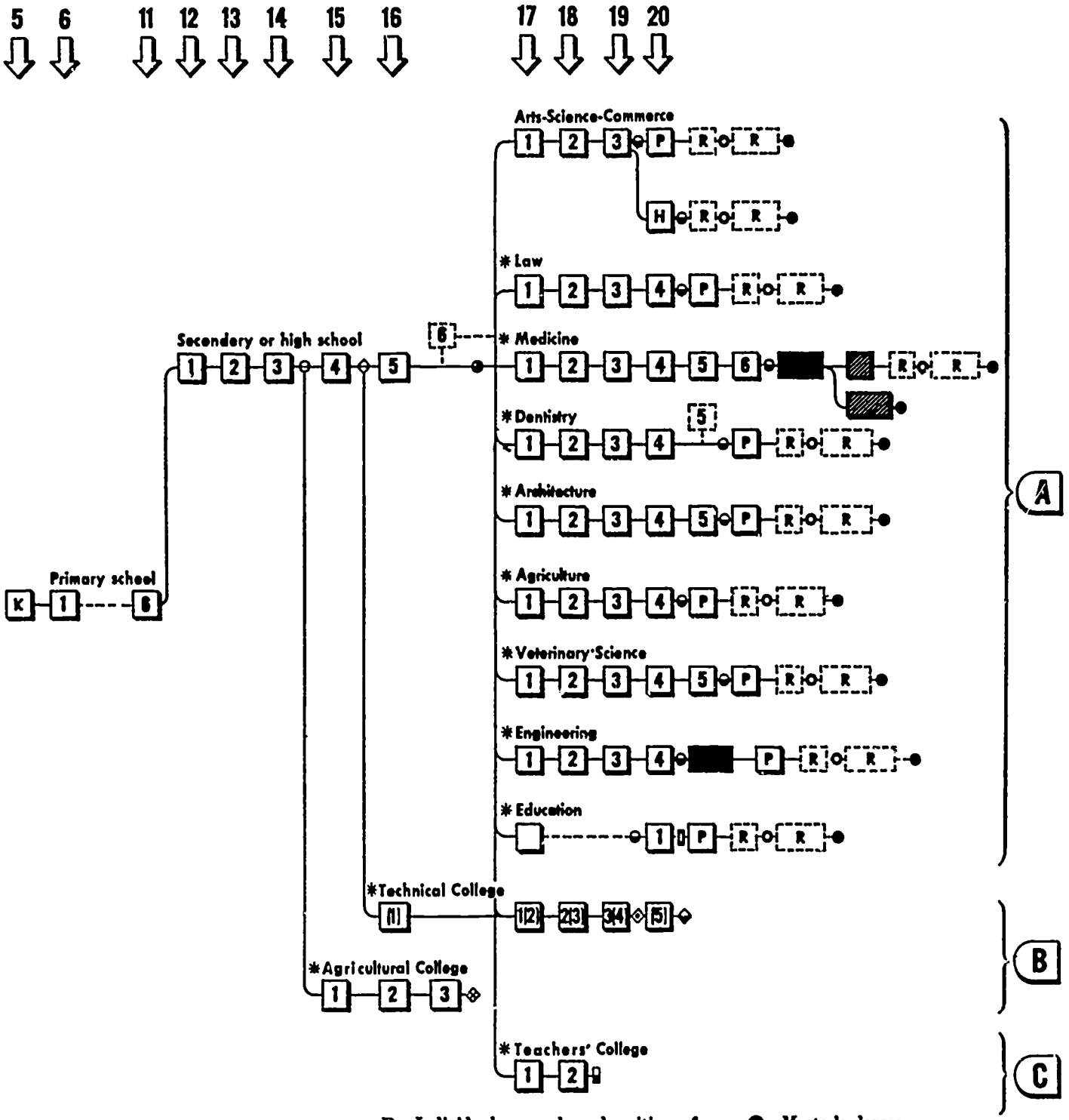
* The information in this section is based on material provided by the Commonwealth Office of Education.
† Excluding education in the Commonwealth Territories for which the Federal Government is responsible.

AUSTRALIA

STRUCTURE OF EDUCATION



KEY TO SYMBOLS

- A Universities. (The cimplified diagram indicates the principal faculties to be found in Australian universities. Other faculties to be found in one or more of the individual universities include music, education, technology and applied science.)
- B Technical and agricultural colleges
- C Teachers' colleges
- H Honours year
- K Kindergarten
- P Preliminary study and examination prior to commenting research
- R Individual research and writing of thesis
- Practical training in hospitals and examination
- Period of professional employment
- ✳ Varying periods of practical experience during vacations or term, outside the institution, in hospitals, industry, schools, on farms, etc., are required
- ⊖ Intermediate certificate
- ⊕ School leaving certificate
- ◒ Bachelor's degree
- ◎ Master's degree
- ⊗ Postgraduate diploma
- ● Doctorate
- ▮ Teacher's certificate
- ▯ Diploma of education
- ⟐ Intermediate technical certificate (Victoria)
- ⟐ Diploma—Agricultural college
- ◈ Diploma or associateship—Technical college
- ◆ Fellowship—Technical college

* World Survey of Education : UNESCO 1966

In addition to the schools which form part of the State education systems there are many non-Government schools, the majority being conducted by various religious denominations. One child in every four in the Australian States attends a non-Government school. These schools are mainly dependent on their own resources; in most cases, fees for tuition and other expenses must be paid. Many of these schools provide both primary and secondary tuition, and the larger make provision for boarders.

Only a small proportion of young Australian children attend pre-school centres or kindergartens. The distance of centres from homes is the main reason for non-attendance and explains the popularity of radio and television programmes which bring pre-school activities into the children's own homes.

Although school attendance is not compulsory until the age of six years, most Australian children begin school at five, attending infants' schools or classes attached to the primary school. In some States, the first year of the infants' department is also known as kindergarten. The emphasis in these infant classes, which occupy two to three years, is on general development, play activities and the informal aspects of education in the second and third years.

Primary schools are most commonly organized into mixed classes of boys and girls and cater for children up to the age of twelve or thirteen. Children attend primary schools in their own districts, usually within walking distance of their homes, on five days each week. During the 4½ to 5 hours of daily instruction, individual lessons last from 20 to 30 minutes, and special periods are set aside for physical education and sport. One teacher generally has charge of a class and teaches all of the subjects set out in the curriculum for the particular "grade".

Syllabuses of instruction, with emphasis on "tool" subjects, social studies, and the English language, are prescribed by the Education Departments, although the teacher is to a certain extent free to identify courses to suit local circumstances. Progression from primary to secondary school is automatic after the six or seven years (depending on the State concerned), of primary schooling has been successfully completed.

In secondary schools, children are grouped in classes according to the subjects which they intend to pursue. The subjects include some already followed in primary school, e.g., English, physical education and music, and ones new to them such as foreign languages, technical and commercial subjects, and more specialized studies in science, history and mathematics. A school day is divided into "periods" and the children are taught by a number of teachers, each specialising in a particular group of subjects. Secondary school courses are of five to six years' duration.

No tuition fees are charged at the Government secondary schools, and text-book allowances are available in some States, but parents are expected to bear the cost of uniforms and charges made for the use of sports materials and equipment for special subjects. Scholarships from Government and private sources are offered to encourage able students to remain at school longer.

In the past, metropolitan high schools have provided courses on traditionally academic lines with the aim of preparing pupils for public examinations, qualifying them to enter universities, teachers' colleges or other tertiary institutions, the Public Service and commercial occupations. Curricula, therefore, have varied to meet the requirements of the public examinations in each State, but have usually included English language and literature, one or two foreign languages, mathematics, chemistry, physics and other natural and social sciences.

Such purely academic-type courses continue to be available for those pupils desiring them and capable of undertaking them; but it is becoming increasingly common for high schools to be of the comprehensive type, catering for the needs of the greater number and diversity of children seeking secondary education and staying on at school beyond the school leaving age. Most high schools now have modern facilities for the teaching of domestic science, commercial subjects, woodwork and other practical subjects.

In country areas, high schools have always tended to provide facilities for technical, commercial, home science or agricultural courses in addition to academic courses. Where the population is insufficient to warrant the erection and maintenance of separate schools, secondary classes are sometimes attached to a primary school, but the tendency more and more is to bring children in by bus from outlying areas to the high school in the nearest town.

During the course of secondary education, there are two main examinations. The earlier examination is held at the end of the third or fourth year (i.e., equivalent to the ninth or tenth year of full-time schooling) of the secondary course and qualifies pupils for entry to trade courses at technical colleges and some agricultural colleges, to commercial occupations such as junior positions in insurance and banking, to nursing and secretarial courses, to certain grades of the public services, and to various positions in industry. Many pupils leave school at this stage. The examination at the end of the secondary school course qualifies students for entry to universities, teachers' colleges, the public services and numerous commercial occupations.

The special problems of bringing education to the relatively sparse population outside the towns and cities of Australia have been met in a variety of ways.

In areas where there are sufficient children of school age, a school may be formed with all primary grades in the one classroom, under the control of the one teacher. More than one-third of all Government schools throughout Australia are one-teacher schools.

In some States, in districts where a number of small centres are scattered around a larger centre or country town, the policy has been to close the one-teacher schools and transport pupils each day by buses to a consolidated school in the larger centre. Consolidated schools provide primary instruction and from two to four years of post-primary instruction.

All States have systems of subsidies whereby transport is made available free or at a concession rate for children who have to travel daily to school.

For children whose homes are too far from a secondary school to allow daily travel, some States run hostels or give financial assistance to privately owned hostels.

Correspondence schools have been established in each capital city to meet the needs of children whose daily attendance at school is prevented by distance between home and school, by illness or by physical disability. Lessons are completed with the help of a supervisor, usually a member of the child's family, and posted back to the correspondence school, where they are marked and commented on by the teachers.

Schools of the Air are an attempt to give the outback child of school age, some of the benefits of school life, and, at the same time, to supplement correspondence education. Using the two-way wireless equipment, developed first by the Royal Flying Doctor Service, children hundreds of miles apart can take part in the same lesson, and teacher and pupils can talk directly with each other.

3. Technical Education

ORGANIZATION AND ADMINISTRATION

In Australia technical education, like primary and secondary education, is a responsibility of the State Governments.‡ There is, however, little uniformity in the State systems, considerable differences being apparent in administrative arrangements, organizational structure, and educational philosophy.

In New South Wales, technical education is controlled by a Department of Technical Education which is administratively separate from the department which controls primary and secondary education (Figure 2, p. 19).

In other States, it is administered by a branch of the Department of Education. The arrangements in Western Australia, which are broadly typical, are shown in Figure 3, p. 20. Tasmania has recently modified this pattern, to the extent that it has established a Board of Technical Education, representative of the island's major industries. However, its functions are largely advisory, and the Administrator of Technical Education who is the Board's chief executive officer, is also responsible to the Director of Education. (See Figure 4, p. 21.)

The New South Wales organization is therefore unique in Australia. The reasons for its development have been summarized by Hugh King.§

> "One of the main reasons for wishing to separate technical education from primary and secondary education was the importance, for economic and industrial development, of having a vigorous and flexible technical education system, sensitive to the needs of industry and commerce. Separation was seen as desirable because a small administration can generally be made more flexible than a large one. Separation was also thought

‡ Excluding the Federal Territories.
§ "Technical Education for Development", p. 80.

> desirable because frequent consultation with representatives of industry and regular study of industrial and economic developments are necessary. In turn, leaders in industry generally wish to discuss proposals with a man genuinely in charge of technical education who, knowing their problems and the limits of his own resources, can make his own decisions and policies promptly without first seeking approval elsewhere".

According to King, the creation of a Technical Education Board in Tasmania in 1963, was also "designed to make technical education more sensitive and responsive to the training needs of industry".[9] At the same time, it could be seen as "a move towards the partial separation of technical from secondary education".

By contrast, the relationship between technical and secondary education is probably strongest in Victoria, where it was early found expedient to establish a system of junior technical schools to act as "feeders" (i.e., suppliers of good quality students) for the technical colleges. Nor can there be any doubt that the arrangement is successful in encouraging a larger number of students to undertake higher level technical courses. Although these schools are tending to broaden their courses and assume more of the character of normal secondary schools, the continued interest of the authorities in the technical content of their courses (especially in relation to the needs of apprentices), reflects a philosophy of technical education that places a deal of emphasis on the value of pre-vocational training. New South Wales, on the other hand, takes the view that technical studies in the curricula of academic secondary schools, should be for the purposes of general development rather than pre-vocational preparation.

In the sense that no State has established a regional administration, the various technical education systems are all centralised. Nevertheless, there are unusual features about the arrangements in South Australia and Victoria. In the former, virtually all technical education above the trade level has been the responsibility not of the Education Department, but of

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[9] Ibid., p. 86.

an independent South Australian Institute of Technology. In Victoria, there is no division of responsibility on the basis of the level of the training undertaken, but a number of the major technical institutions (e.g., Ballarat School of Mines, Bendigo Technical College, Royal Melbourne Institute of Technology, and the Gordon Institute of Technology at Geelong), are controlled by councils with varying degrees of autonomy.

The reasons for the existence of autonomous or semi-autonomous council-controlled schools are largely historical. Technical education in Australia traces its origins to the "mechanics institutes" (and later the "schools of arts"), set up in the 1830's, by direction of the British Government. While such institutions may have served a useful function in England, they bore little relation to the industrial needs of the Australian colonies, which, at the time, were much more those of rural than of manufacturing industry. On the other hand, the Schools of Mines which emerged in Victoria in the early 1870's, were established as a direct response to the needs of the gold-mining and ancillary industries which played so important a part in that State's early economic development. They provided courses with a strong practical bias, and were not greatly influenced by the Government Technological Commission that was set up about the same time to construct and administer a system of technical education, but concerned itself largely with culturally-oriented schools of art. Much of the autonomy of the early technical institutions has since been maintained, although some have been drawn into the ambit of the Education Department. The steeply-rising cost of technical training has made them increasingly dependent on Government grants approved by the State technical education authority.

An interesting development in Victoria, arising from a recommendation in the Martin Report,** was the establishment in 1965, of an autonomous Victoria Institute of Colleges. Eight institutions responsible for conducting professional (diploma) courses for technologists have so far been admitted

** Report of a Commonwealth Committee on the Future of Tertiary Education in Australia under the Chairmanship of Professor L. Martin, 1964.

to membership. The Institute's broad function is to promote growth in the breadth and stature of technical colleges. In particular, its activities will include planning for the expansion of technical and other non-university tertiary institutions; making submissions to the Governments on financial requirements; developing diversity in curricula; improving the quality of teaching and exercising general supervision over the standards and conduct of examinations; co-ordinating the work of the colleges and the types of instruction given; and making provision for the transfer of students from one college to another.

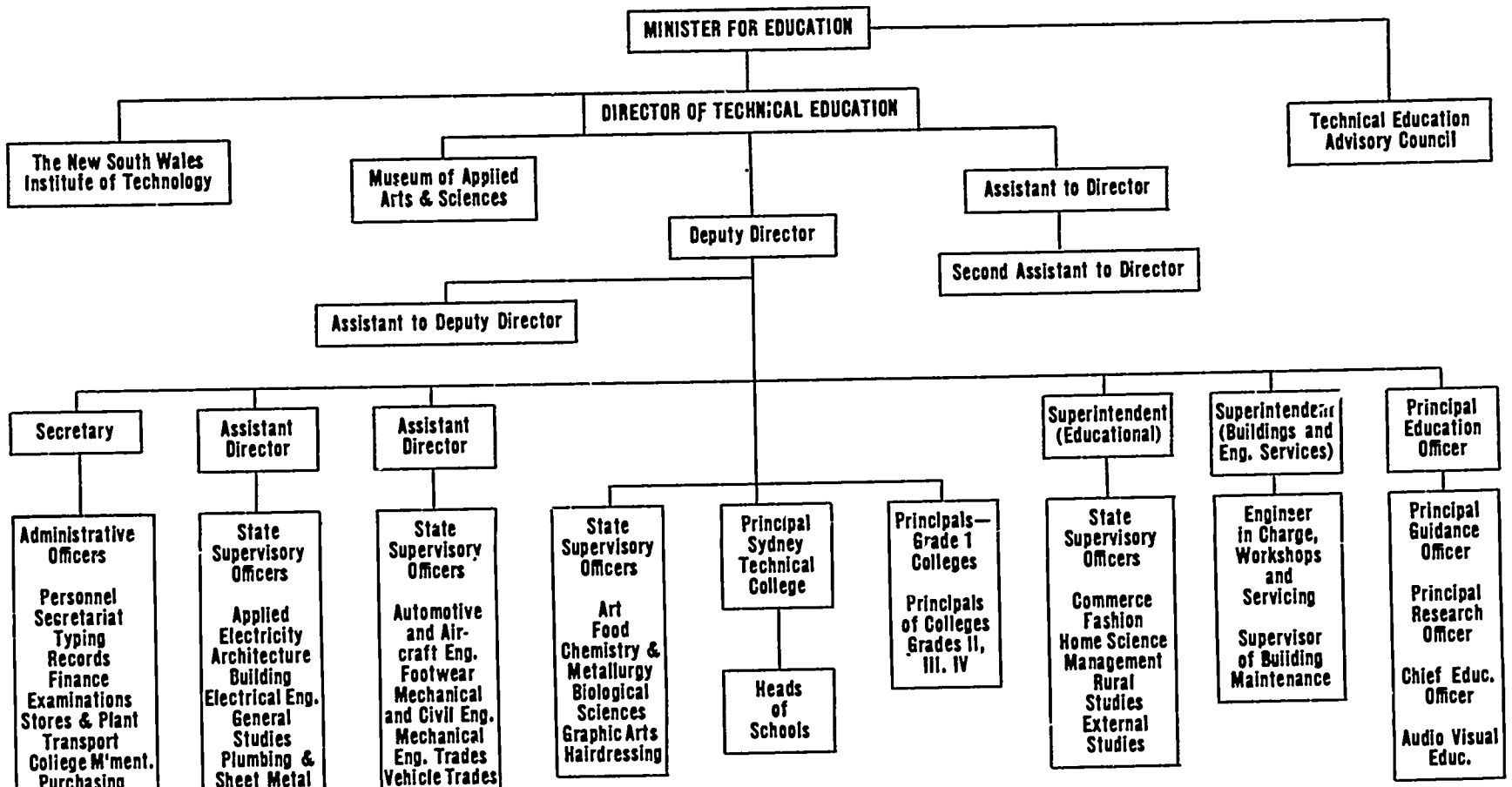
The Martin Report recommended the establishment of a similar institute of colleges in each State.

In all States, machinery for liaison with industry has been established with the broad objectives of gaining industry's support and of keeping ahead of its changing needs for trained manpower. For example, at the State level, bodies such as the New South Wales and Queensland Technical Education Advisory Councils have been set up to advise on training needs and the conduct of technical education to meet them. Most States also have a widely established system of regional committees, responsible for advising on technical education matters generally, within their area. In addition to these arrangements, it is common to find advisory committees established for particular trades or occupational groups.

In New South Wales, the work of these bodies is supplemented by means of systematic surveys which provide an assessment of training needs and of future trends. The surveys have been conducted at the professional, sub-professional and trade training levels.

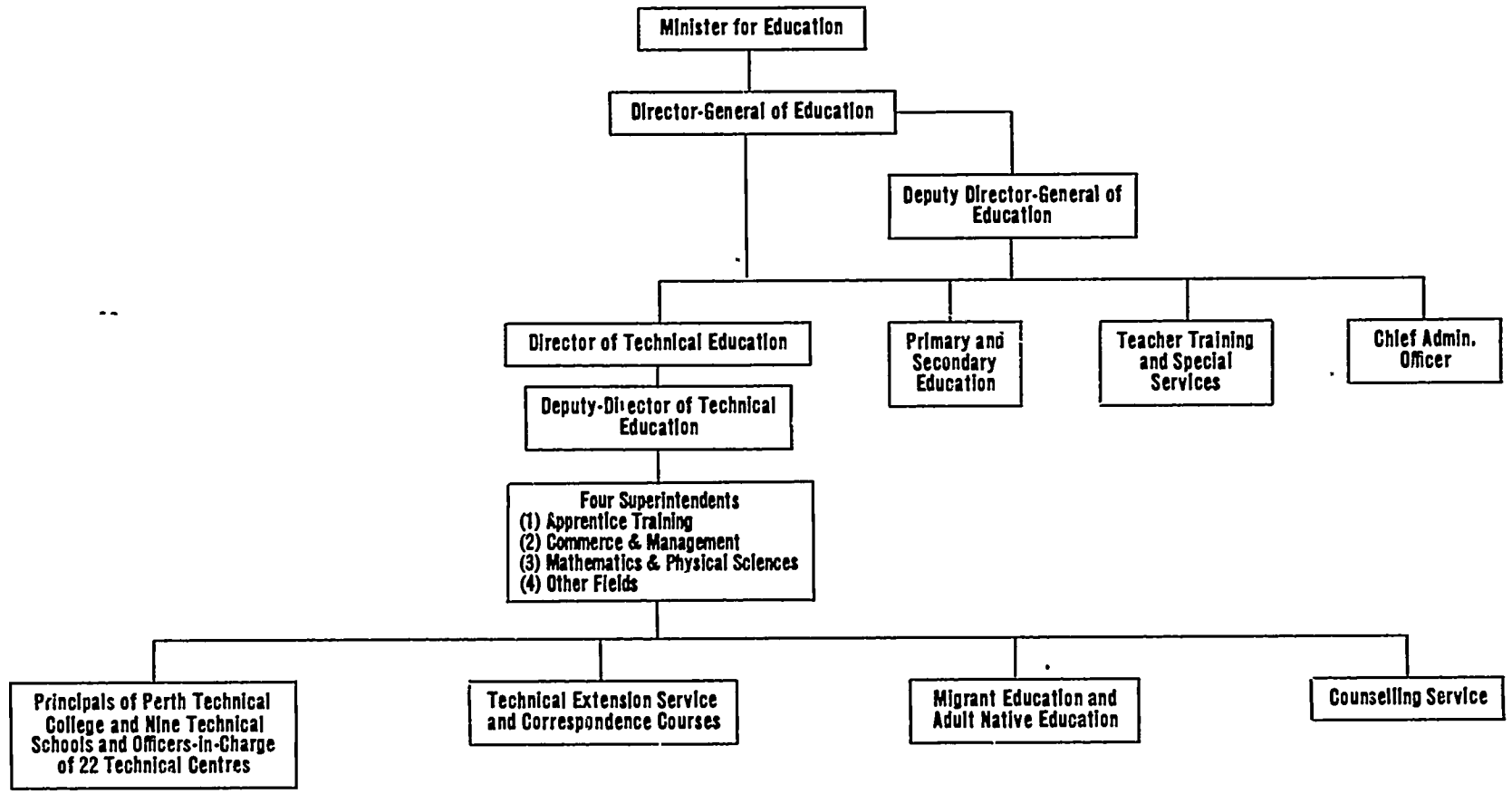
As to finance, recurrent expenditure on technical education is largely met from the consolidated revenue of each State. Buildings and major equipment are financed from Commonwealth Loan Funds allocated to the States. In recent years, however, the Commonwealth Government has provided direct financial assistance to help the States extend and improve their facilities for training technically-skilled manpower. Arising from recommendations in the Martin Report, finance was made available for

Fig. 2 : ORGANISATION OF DEPARTMENT OF TECHNICAL EDUCATION, NEW SOUTH WALES *



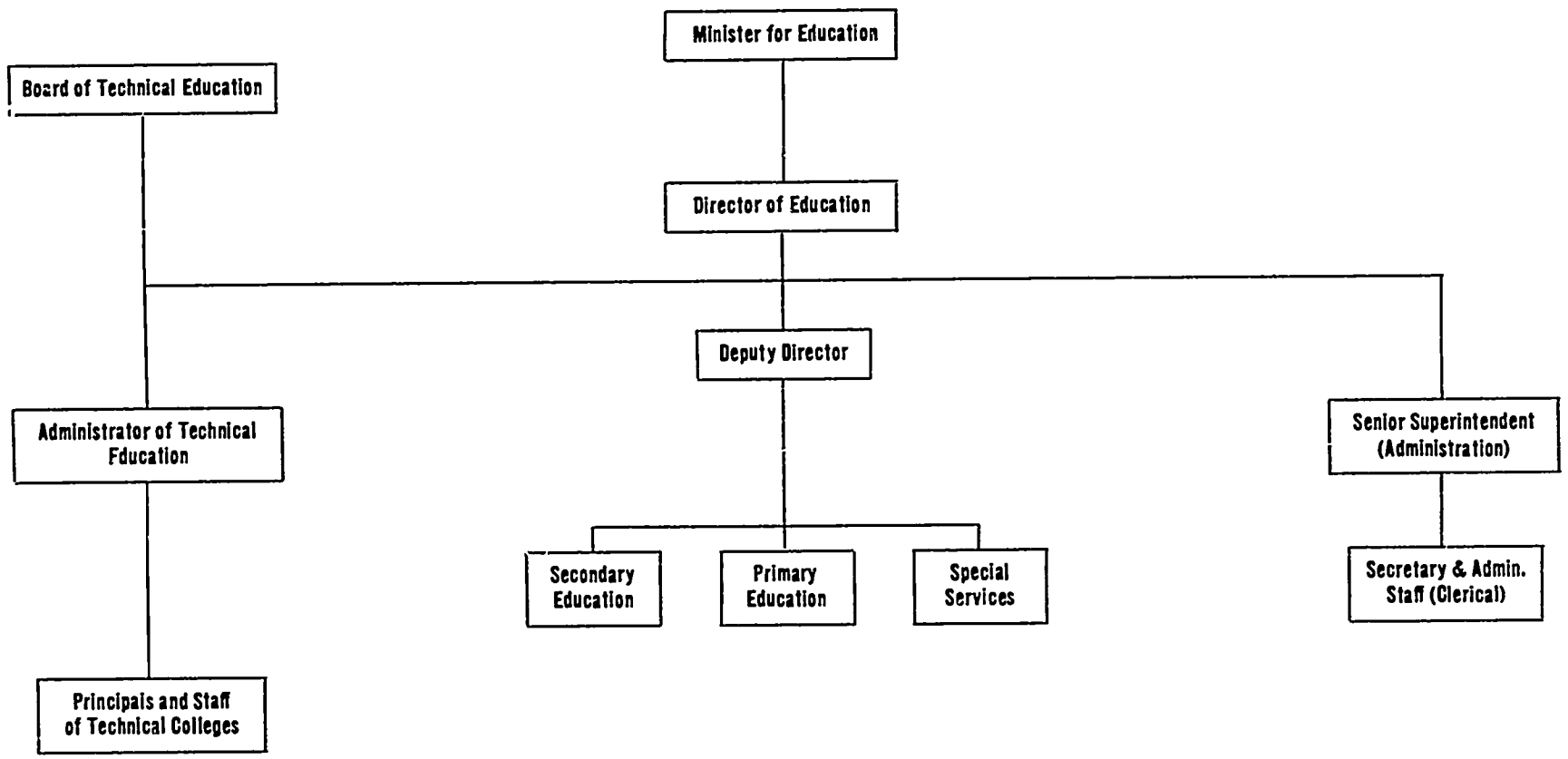
* Ibid., p. 82

Fig. 3: ORGANISATION OF TECHNICAL EDUCATION IN WESTERN AUSTRALIA*



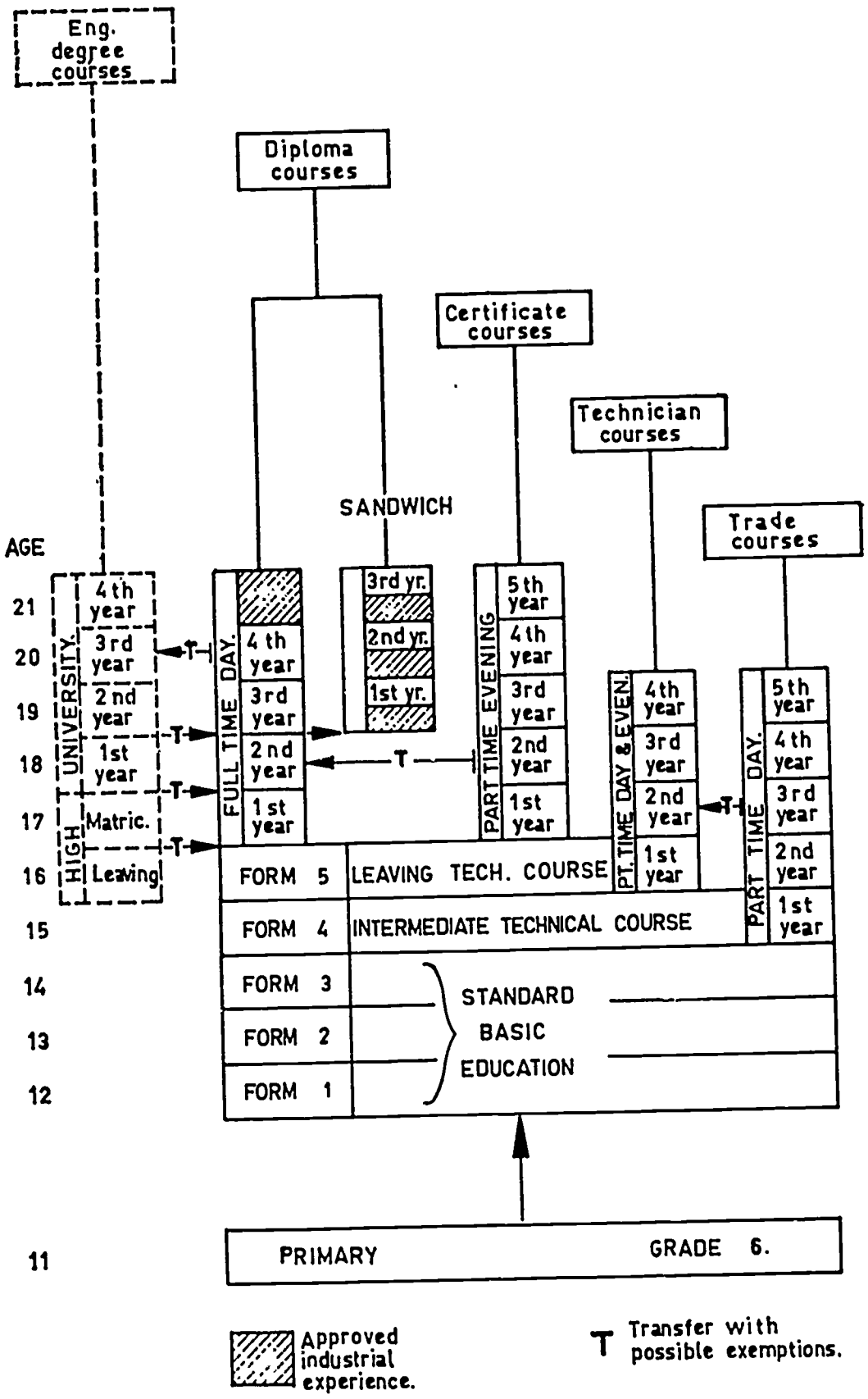
* Ibid., p. 87

Fig. 4 : ORGANISATION OF TECHNICAL EDUCATION IN TASMANIA *



* Ibid., p. 89

Fig. 5 : ENGINEERING COURSES IN VICTORIAN TECHNICAL SCHOOLS 1965.



* SOURCE: Victoria, Education Department.

tertiary education as follows: $2.4 million for capital works in 1965-1966, to be matched dollar for dollar by the States; a maximum of $24 million for capital works in the triennium 1967-1969, to be dollar for dollar; and a maximum of $24 million for recurrent expenditure in the triennium above the level of expenditure 1964-1965, to be matched $1.85 State to one dollar Commonwealth.

In June of 1964, legislation was enacted whereby the States will share a triennial grant for the provision of buildings and equipment for use in technical training. (An initial amount of A$10 million was granted for 1964-1965. This was subsequently extended for a further triennium 1965-1966, 1966-1967, 1967-1968).

In 1965, a Commonwealth Technical Scholarship Scheme was introduced that initially provided 2,500 scholarships tenable at technical and agricultural colleges throughout Australia.

TYPES OF INSTITUTIONS

Apart from the technological training available in the universities, professional education in certain fields, for students who have completed at least the compulsory years of secondary education, is provided in institutions variously known as Institutes of Technology, Technical Colleges and Technical Schools or by others more specific to particular fields.

In this paper separate consideration is given to arrangements for training technical teachers, because of the great variations from State to State, and to correspondence training which, of course, has its own special features.

Technical institutions conduct a wide variety of courses which may be conveniently grouped into the following five categories: courses for training technologists (diploma and, in some cases, degree courses); courses for training technicians (certificate and other courses); courses for training craftsmen (trade courses); courses in general education; and courses for recreational purposes.

It should be noted, however, that the above terminology is by no means uniform from State to State. What is a diploma course in one State may be a certificate course in another; in others, a certificate courses may be the equivalent of a post-trade course elsewhere.

In 1963, some 27,500 students were enrolled in full-time courses at universities, while a little more than half this number attended on a part-time basis. On the other hand, over 34,000 students were undertaking courses with some tertiary content at other technical training institutions, while 275,300 were enrolled in trade courses. The great majority of these students were undertaking part-time courses in which their theoretical training proceeded hand-in-hand with practical experience on the job. For example, 95 per cent of enrolments in New South Wales were part-time; even in Victoria, which has been highly successful in establishing full-time diploma courses, 90 per cent of enrolments were part-time. This pattern is, of course, a reflection of the British learn-as-you-work approach to technical education. As the Australian Council of Educational Research has pointed out—††

> "The actual work experience on-the-job in any particular occupation has been regarded as being a fundamental training procedure which is complemented by part-time after work courses in training institutions provided for the purpose".

However, the trend over the past few years, which have seen a gradual rising of the school leaving age, is for a steadily increasing number of students to embark on full-time studies. There is also a growing tendency for industry to support day-release and block or sandwich attendance. This is, of course, a result of industry's continuing need for high-grade skilled manpower.

A general picture of the relationship between engineering courses in Victoria will be gained from Figure 5, p. 22. The Victorian arrangements, however, are not typical of other States.

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†† "Current Trends in Vocational and Technical Training", ACER. 1964.

Technological Institutes and Technical Colleges

Australia has six institutes of technology—The Royal Melbourne, Queensland, South Australian, Western Australian, New South Wales and Gordon (at Geelong in Victoria) Institutes of Technology. As from the start of 1967, Queensland will have additional Institutes in Rockhampton and Toowoomba.

All of them provide courses at the diploma and certificate level. The South Australian institute, in association with the University of Adelaide, also offers a three-year course leading to the degree of Bachelor of Technology (which has a content of roughly 75 per cent of that for a normal Bachelor of Engineering Degree), and a four-year degree of Bachelor of Applied Science.

The technical colleges show considerable variation in range and level of courses. In Victoria, for example, there are regional technical colleges (metropolitan and country), which offer diploma and certificate courses and to which students are sent (in the metropolitan area at least), for the final years of their trade training. Indeed, it would be true to say that throughout Australia, there is a trend to concentrate the higher courses at the major technical colleges.

There are varying degrees of specialization in technical schools ranging from the mono-technical schools (e.g., the Melbourne School of Printing and Graphic Arts), or something closely approaching them, to much more generalised institutions. The schools with specialised functions are either in major city areas where there are large concentrations of population, or in regional centres where there is an emphasis on a particular aspect of primary industry (e.g., textiles at Geelong in Victoria).

TYPES OF COURSES

In this section consideration is given to the training of technologists, technicians and tradesmen, and to training for commerce and management, and for purposes of general education and recreation.

Courses for Training Technologists

Diploma courses are designed to develop highly trained technologists with the qualifications and experience required for professional status in fields such as architecture, art, building, commerce, management, public administration, manual arts, the various branches of engineering and metallurgy, and pure and applied science. They consist of complete progressive units of study in which the lecture room, laboratory and workshop are closely associated. Their length varies from three to five years' full-time, or up to seven years' part-time study. At least one full year's employment in an appropriate occupation is usually required for an associateship diploma. In Victoria (Figure 5, p. 22), an alternative arrangement, available in some courses, is for students who have completed their second year, to undertake a further three years' study on a sandwich basis.

Entrance qualification for diploma courses vary from the eleventh to the twelfth year of schooling.

In some States it is possible to transfer from technical college diploma courses to degree courses at universities. For example, students in Victoria who have completed a four-year diploma course with credits in certain academic subjects and are recommended by their college principal, may obtain a block exemption which admits them to the third year of an engineering course at Melbourne or Monash University.

In addition to the associateship diplomas, a small number of colleges award fellowship diplomas in certain courses. These require a further year of study beyond the period of the associateship diploma course.

Post-diploma courses are gaining support as a means of keeping up with the growing specialization of industry.

Courses for Training Technicians

Courses for training technicians are conducted at two broad levels that may be conveniently described as sub-professional and super-trade or industrial. However, there is considerable variation between States, in their names, aims and organizations.

In general, sub-professional technician courses lead to a certificate, and are known as certificate courses. They are mostly of three to five years' duration and are conducted on a part-time basis to cater for persons already in employment. Admission is normally at the conclusion of the tenth year of schooling. The courses cover a wide range of occupations such as accountancy, agriculture, applied science, art, planning, engineering, fashion, food, horticulture, interior decoration, design, management, photography, sheep and wool.

In general, certificate courses are regarded as being terminal in nature, students who are capable of pursuing higher studies being encouraged to do so from the outset. Hence such courses have a distinctive character, and are designed to meet specific occupational needs. In some States, however, the courses are designed to facilitate transfer to diploma studies, and therefore include subjects taken for diploma courses.

In most States there is a great deal of variety in courses at the lower end of the technician range; many are post-apprenticeship, e.g., bricklaying, advanced carpentry, supervisory plumbing, automobile transmission. Others, as in Victorian (industrial "Technician" courses, are open to lads with no particular trade qualification provided they have completed fourth year of secondary school. A technician course in Victoria is of four years' duration and can be undertaken concurrently with the apprenticeship course. The student who successfully completes a technician course, becomes not only a skilled tradesman, but also a qualified technician with greatly increased opportunities for employment and advancement. Since, however, the technician course is of a higher standard than the apprenticeship course, further study is required.

Courses for Training Tradesmen

Australian technical education institutions offering training for apprentices have been guided in the past by the principle that practical experience on-the-job is essential, and that their function is to supplement this with theoretical and basic trade training on a part-time basis, (usually from four to eight hours instruction per week).

Subjects in most trade courses can be grouped under the headings of trade theory, trade practice, drawing, mathematics, and science. Examinations held by the technical education authorities do not in general determine the apprentice's success or failure in his total trade training; they can, however, have relevance in respect of licensing of tradesmen (e.g., in plumbing and electrical trades). The major industries for which trade courses are provided include the metal, electrical, textile, food, printing, building, furniture, and vehicle industries.

In general, entrance to trade courses takes place at the conclusion of the ninth or tenth year of schooling. While the period of apprenticeship is normally five years, special provision exists in the metal, electrical and vehicle building trades for lads with specified academic qualifications (mainly in mathematics and science) to gain remissions which reduce the normal period of apprenticeship from four to as little as three years. In some instances, an initial continuous period of six months training in basic skills is required. Special classes in technical schools have been set up for this purpose in several States.

Courses in Commerce and Management

Accountancy courses in the advanced technological institutions, play a special role in business education in Australia, in that they provide an opportunity for advanced business studies outside the universities. They lead to diplomas or certificates in accounting, or to certificates in functional fields such as cost accounting.

Management and public administration courses, whilst varying in content, are predominantly concerned with the formal theory of management and its functional divisions, but also include some work in the humanities. They are normally restricted to students of mature age with some experience in management, who attend on a part-time basis over a minimum period of five or six years.

Certificate courses in management are available to non-matriculated students and cover the same ground as the diploma courses at a rather lower level, but with more emphasis on administrative skills.

A wide range of courses at certificate level is also available in supervision, and in specialised aspects of management such as personnel management and work-study. Courses are also available for people wishing to be trained in special activities such as purchasing, automatic data processing, safety and retailing.

Courses in General Education

These are at various levels. Some are designed as a preparation for matriculation, and therefore provide a valuable opportunity for students who left secondary school before reaching this standard, but find they need to do so before they can undertake study for a degree or (in some States), a diploma.

Other courses are designed to broaden the educational background of students studying for a diploma or who are simply interested in cultural development.

Courses for Recreation

These are for evening students who wish to obtain some instruction in an art or craft, e.g., woodwork, pottery, sheet metal work, automobile maintenance and repair, photography, dressmaking, cookery.

ARRANGEMENTS FOR CORRESPONDENCE TRAINING

Each State has a well developed system of technical education by correspondence to extend training facilities to students who are beyond easy reach of a technical college. Other types of technical correspondence students include young people who may have failed a secondary school course, those who are physically disabled, members of the Armed Services stationed overseas, and adults who wish to improve their occupational status, or their general knowledge. Entrance qualifications are identical with those for regular classes.

The provision of practical training is one of the major problems in teaching certain technical subjects by correspondence. It is partly overcome by holding practical sessions at appropriate training centres or technical

colleges once a year, or at a mobile workshop stationed for the time at a focal point within the district. For example, in New South Wales, a number of railway carriages have been fitted up as engineering workshops. Among trade courses offered by correspondence in South Australia, are trade drawing, fitting and machining, welding, diesel engine operation, automotive engineering and workshop practice, and farm mechanics.

Victorian correspondence schools also operate their own radio stations on short wave. Students attach special converters to their sets to receive broadcasts. The broadcasts are principally made for apprentices attending country schools for supervised study.

ARRANGEMENTS FOR TECHNICAL TEACHER TRAINING

The majority of technical teachers and instructors are recruited from technically-qualified people in industry or commerce, and are subsequently trained as teachers. The nature and extent of their training, however, varies greatly from State to State.

Victoria has established a Technical Teachers' College which provides training for students with appropriate diploma or trade qualifications and industrial experience amounting to two years in the case of diplomates, and five years for tradesmen. The length of the course is one year for technical teachers, and two years for trade instructors.

In New South Wales, a Teacher Training Annexe at the Sydney Technical College, provides a one-year course of teacher training for newly appointed technical college lecturers and trade instructors.

During their first year of service, new teachers are required to attend courses for two days (12 hours) per week and to spend the remaining three days per week at technical colleges. They must also undertake one month (30 hours per week) of full-time training. This training consists of one week of pre-service attendance and three weeks' at the end of third term.

Other States operate schemes, some of a broadly similar kind. South Australia provides a course for trade teachers through one of its teachers' colleges. Tasmania conducts a full-time technical teacher diploma course for people who will be teaching manual subjects in secondary schools.

Most courses cover subjects such as English, general methods of teaching, special methods of teaching technical subjects, allied trade subjects, education, educational psychology and teaching practice.

4. Apprenticeship

Apprenticeship is the normal, though not the sole method, of entry into the more important skilled trades occupations in Australia. Entry is usually restricted, either by law or practice, to those leaving school or within the first year or so of their employment.

Apprenticeship in Australia is patterned on the British system but is more formalised. The administration and oversight of apprenticeship is primarily in the hands of separate statutory authorities for each regional area (State or Commonwealth territory). Employers' and workers' representatives and the technical education authorities are integral parts of the machinery.

Wages and general conditions of employment of apprentices (including the proportion of apprentices to tradesmen), are most commonly determined by the normal industrial tribunals, though some apprenticeship authorities may determine wages etc. of those within their exclusive control.

The customary term of apprenticeship has been five years. A growing questioning of this (and of other aspects of apprenticeship), has led to four years being the maximum limit in Queensland, and even shorter terms (down to three years), becoming operative in most States, in some trades.

Formal technical training complementing the training on the job is compulsory for most apprentices. Employers are required to release apprentices for technical training during normal working hours without loss of pay. The period varies from region to region, and by trades; but the trend is towards formal technical training being undertaken exclusively during working hours on a basis equivalent to one full day a week. Facilities for study by correspondence are available to apprentices who are not within convenient reach of a technical college. Where technical training for apprentices is not free, the employer is required to pay the technical training fees, though the amounts are relatively small.

The content of the formal technical training is determined by the technical education authorities, usually in collaboration with the apprenticeship authorities, assisted in most instances by advisory committees, comprising representatives of employers and unions drawn from the industry or trades concerned. In the past, technical education has been spread over four years, but the tendency is towards concentrating technical training into a shorter total period with block release training increasing in popularity.

As at 30th June, 1965, apprentices numbered approximately 95,000, some two-thirds in the metal, electrical and building trades.

5. In-industry Training

Since 1945, both Australia's population and its industry have been growing rapidly. This expansion has been accompanied by a demand by industry and commerce for increasing numbers of skilled workers at all levels—managers, supervisors, technologists, technicians, tradesmen, and others.

Particularly over the past decade, industry and commerce have played an increasing part in meeting these needs. The early post-war emphasis was on supervisor and management training, but later the training needs of technicians, apprentices and operatives began to receive more attention.

A recent survey,‡‡ as yet unpublished, of 500 manufacturing firms employing more than 50 persons, showed the extent to which they conducted some form of organized training. In Table 1, below, the results are tabulated by size of firm and (major) area of training.

TABLE 1

Survey of 500 Manufacturing Firms

Proportion with Organized Training Programmes

Area of Training	Percentage of Firms Conducting Organized In-plant Training		
	Over 1,000 Employees	101-1,000 Employees	51-100 Employees
Management	48%	6%	3%
Supervisor	58%	14%	4%
Technician	25%	8%	1%
Apprentice	64%	21%	12%
Operative	55%	21%	12%

‡‡ Conducted by the Department of Labour and National Service.

Training in the Larger Undertakings

As in most industrialised countries, training in the larger firms (i.e., those with over 1,000 employees) is relatively well organized. Of those covered by the survey just referred to, 39 per cent employed specialist training officers.

Executive development programmes are commonplace. Besides job rotation, they usually involve regular seminars on company policies and organization and other specialist aspects of management, e.g., communication, work study, cost control, marketing. In some cases the training is quite extensive, e.g., the Australian Bankers' College (sponsored by the Australian Banking Association), conducts an annual eight-week residential course at Healesville, Victoria, for bank executives; and on a somewhat less ambitious scale, the Broken Hill Proprietary Co. Ltd. conducts one-week management training seminars in Melbourne and Newcastle.

Industry is also making increasing use of the direct and indirect training facilities offered by university summer schools of business administration, the Australian Administrative Staff College, the Australian Institute of Management and other organizations.

Typical courses for the training of *supervisors* seek to develop a concept of supervision within the framework of company policies and practices, and to develop skill in practical techniques relating to the technical, administrative and human relations aspects of the job. For example, one company has reported inclusion of the following topics in its course: industrial economics, fundamentals of organization, work simplification, communication, report writing, quality control, product engineering, materials handling, industrial awards, and factory accounting. While line managers and technical experts participate directly in the training by giving some of the sessions, much of it is directly conducted by training officers. The general practice is for the training to be arranged on a small group basis, and for extensive use to be made of discussion and case methods.

Large companies frequently sponsor cadetship schemes for training *technologists.* These schemes are most commonly on a day-release basis, though some companies also sponsor full-time, sandwich (alternate six months school, six months work) and graduate cadets' courses. During his cadetship the trainee is given practical experience in the departments related to his chosen career and some firms provide lectures by specialists on a planned basis.

Recent studies conducted by the Department of Labour and National Service into the employment of *technicians* in the Australian chemical and allied industries, and the electrical engineering, electronics and telecommunications industries, indicate that considerably more than 60 per cent of the technicians employed received their training wholly on the job. Those receiving institutional training, normally attend technical college courses on a part-time basis. In many cases, they are allowed to attend classes up to one day a week in the employer's time. On completion of their courses, they may be given further on-the-job training to strengthen their technical knowledge. As with technologists, they may also attend additional lectures given by specialists from within the undertaking.

As to *apprentices,* a recent survey*† of just over 100 manufacturing firms employing ten or more metal and electrical trades apprentices, revealed that a third of them had established some form of special centre or annexe in which apprentices received their early training. In general, these were the larger undertakings. The facilities provided, ranged from small spaces set aside within the production area, through large specialised sections of the workshop, to training schools complete with classrooms or training workshops, or both. About 40 of the firms, mainly those with special training centres, had an in-plant apprentice training programme for each apprenticeship year. Other firms rotated apprentices through various sections of the works.

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*† D. Hardie: "In-plant Training Arrangements for Apprentices in the Metal and Electrical Trades". *Personnel Practice Bulletin,* Vol. XXII, No. 2, June, 1966.

The training of *semi-skilled workers* in many of the larger companies is also well organized. A number have carried out detailed programmes of job analysis that have served as the basis for the development of comprehensive operating manuals and systematic training programmes. In general, the instruction is given on the job and proceeds along T.W.I. Job Instruction lines, specially selected workers often being designated as instructors. In some instances, particularly in the textile industry, use is being made of analytical methods for training operatives.

The significance of this general development in the larger undertakings, lies in the fact that although less than four per cent of Australian manufacturing concerns employ more than 100 workers, they employ about half the total labour force engaged in manufacturing. Hence in-plant training facilities are being made available to a significant and growing number of people in the industry.

Training in Medium and Smaller Undertakings

As might be expected, training in the medium-sized firms is, in general, somewhat less well organized than in the larger. The emphasis again appears to be on operative and apprentice training, with supervisor training receiving some attention. Management training is obtained, on the whole, through external organizations.

The survey of apprentice training arrangements already referred to, indicated that, although few of the sixty or so medium-sized firms which were included, had special apprentice training facilities. more than half of them moved their apprentices, on a planned basis, through the various sections of the works or from one machine to another.

As to supervisor training, extensive use is made of standard basic training programmes which, in many cases, have been derived from T.W.I. Most of these programmes teach the J.I. method of instruction, or a variation of it, thereby promoting the systematic training of process and other semi-skilled workers.

Opportunities for the smaller firms to establish systematic internal training arrangements are, of course, restricted. At the apprenticeship level, some progress has been made in arranging group training schemes.

An important contribution towards meeting the supervisor and management training needs of the medium and smaller undertakings, particularly, is made by industry-sponsored organizations such as the Australian Institute of Management and some employers' organizations. Extensive management and supervisory training programmes are available through lectures, conferences and seminars, some on a residential basis. Typical of the many subjects covered are: management fundamentals, supervision problems, production planning and control, preventive maintenance, supply management, industrial relations, marketing, conference leadership, and public speaking.

A number of professional organizations, such as the Institute of Personnel Management (Australia) and the Institute of Sales Management also play an important role in training their members in their own particular fields.

A further development which should be of particular help to medium and smaller undertakings, is a current move by the technical education authorities in a number of States towards the establishment of trainer-training facilities. Following traditional lines, the initial step contemplated is the provision of training for T.W.I. trainers.

Up to the present, industry's needs for T.W.I. trainers have been met mainly through the admission of nominees from private industry to T.W.I. institutes conducted by the Department of Labour and National Service for personnel from Commonwealth and State Departments. To date, these courses have catered for 630, 327, 286 and 370 trainers in respectively Job Instruction, Job Relations, Job Methods and Job Safety. It should be said, however, that the training that is given, and the approach, differ in four important respects from the traditional pattern of T.W.I. First, three of

the programmes have been extensively recast. Second, trainers are encouraged to adopt a flexible approach and to adapt the material to their own undertaking's specific requirements. Third, extensive use is made of audio-visual aids. Fourth, trainers are encouraged to undertake parallel courses, e.g., conference leading, that will develop their industrial teaching abilities.

Arrangements for Training Training Specialists

Some limited assistance in the training of industrial trade instructors, apprentice masters and training officers has been available to industry through the admission of trainees from private undertakings to short courses conducted by the Department of Labour and National Service for trade and technical instructors employed in the industrial elements of the Commonwealth Public Service. These courses are held from time to time at a residential centre some 40 miles from Melbourne. Accelerated teacher training methods are used, and the content is heavily biassed towards practical work, using mock lessons in the Norwegian style. The aim is to develop a practical "technician" type teaching ability in the presentation of two types of lessons—the information or theory lesson, and the practical or manual skill lesson. To date nearly 400 instructors have been through the course and the demand is steadily increasing.

In 1957, the Melbourne Division of the Australian Institute of Management, established a course for training industrial education and training officers.*‡ The subject matter of the course fell into five main areas: practical problems of staff efficiency, assessment of training needs, development of training programmes, teaching methods and assessment of results. The course was conducted on a sandwich basis, and consisted of eight one-week, and one two-week self-contained units covering the basic concepts of in-industry training; teaching methods, including discussion leading; and techniques of operator, supervisor and management training.

*‡ J. B. O'Hara: "The Training of Industrial Education and Training Officers in Australia", *Business Review*, May, 1964.

The course catered for training officers from all States. However, the trend to decentralise facilities that has emerged in the case of T.W.I. trainer training has also become evident in the provision of facilities for training training officers. The Melbourne Division of the A.I.M. is in the process of developing, in place of the earlier course, a non-sandwich continuous course for Melbourne training officers, and the Sydney Division is similarly experimenting with new training arrangements.

In recent years, several associations of industrial education and training officers have come into being. The largest one, comprising the Training Management Section of the Melbourne Division of the Australian Institute of Management, has over 100 members. A similar organization exists in New South Wales, while Western Australia has established a Training Association of Western Australia.