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CHAPTER XXVIII.
MISCELLANEOUS.

§ 1. Patents, Trade Marks and Designs.

1. **Patents.**—(i) *General.* The granting of patents is regulated by the Commonwealth Patents Act 1903–1935, which, in regard to principle and practice, has the same general foundation as the Imperial Statutes, modified to suit Australian conditions. The Act is administered by a Commissioner of Patents. Fees totalling £10 are sufficient to obtain letters patent for the Commonwealth of Australia and the Territories of Papua, New Guinea and Norfolk Island. A renewal fee of £5 is payable before the expiration of the seventh year of the patent on all patents granted on applications lodged prior to 2nd February, 1931. On patents granted on applications made on or after the 2nd February, 1931, renewal fees are payable as follows:—£1 before the expiration of the fifth year and an amount progressively increasing by ten shillings before the expiration of each subsequent year up to the fifteenth, when the fee becomes £6. If a renewal fee is not paid when it becomes due, an extension of time up to twelve months may be granted on grounds specified in the Act, and subject to the payment of prescribed fees.

(ii) *Summary.* The number of separate inventions in respect of which applications were filed during the years 1931 to 1935 is given in the following table, which also shows the number of letters patent sealed in each year:—

PATENTS, AUSTRALIA.—SUMMARY.

Particulars.	1931.	1932.	1933.	1934.	1935.
No. of applications	5,576	5,148	5,040	4,984	5,110
No. of applications accompanied by provisional specifications	3,798	3,783	3,511	3,286	3,238
Letters patent sealed during each year	3,041	2,344	1,701	2,063	2,129

(iii) *Revenue.* The revenue of the Commonwealth Patent Office during the years 1931 to 1935 is shown hereunder:—

PATENTS, AUSTRALIA.—REVENUE.

Particulars.	1931.	1932.	1933.	1934.	1935.
	£	£	£	£	£
Fees collected under Patents Act	37,136	32,015	30,121	33,488	35,980
Receipts from publications	1,593	1,381	1,311	1,359	1,532
Total	38,729	33,396	31,432	34,847	37,512

2. **Trade Marks and Designs.**—(i) *Trade Marks.* Under the Trade Marks Act 1905 the Commissioner of Patents is also Registrar of Trade Marks. This Act has been amended from time to time, the last amendment having been made in 1934. Special

provisions for the registration of a "Commonwealth Trade Mark" are contained in the Act of 1905, and are applicable to all goods included in or specified by a resolution passed by both Houses of Parliament that the conditions as to remuneration of labour in connexion with the manufacture of such goods are fair and reasonable.

(ii) *Designs.* The Designs Act 1906, as amended by the Patents, Designs and Trade Marks Act 1910 and the Designs Acts 1912, 1932, 1933 and 1934, is now cited as the Designs Act 1906-1934. Under this Act a Commonwealth Designs Office has been established, and the Commissioner of Patents appointed "Registrar of Designs."

(iii) *Summary.* The following table shows the applications for trade marks and designs received and registered during the years 1931 to 1935:—

TRADE MARKS AND DESIGNS, AUSTRALIA.—SUMMARY.

Applications.	1931.	1932.	1933.	1934.	1935.
RECEIVED.					
Trade Marks	1,876	1,976	1,905	2,087	2,071
Designs	661	409	646	1,670	2,319
REGISTERED.					
Trade Marks	1,546	1,273	1,316	1,268	1,349
Designs	538	470	497	1,465	2,085

(iv) *Revenue.* The revenue of the Trade Marks and Designs Office during the years 1931 to 1935 is given hereunder:—

TRADE MARKS AND DESIGNS, AUSTRALIA.—REVENUE.

Particulars.	1931.			1932.			1933.			1934.			1935.		
	Trade Marks.	Designs.	Publications.	Trade Marks.	Designs.	Publications.	Trade Marks.	Designs.	Publications.	Trade Marks.	Designs.	Publications.	Trade Marks.	Designs.	Publications.
Fees collected under Commonwealth Acts ..	£ 12,241	£ 789	£ 120	£ 11,596	£ 750	£ 21	£ 12,720	£ 814	£ 13	£ 20,469	£ 1,052	£ 17	£ 15,580	£ 1,053	£ 13

No fees in respect of Trade Marks have been collected under State Acts since the year 1922.

§ 2. Copyright.

1. *Legislation.*—Copyright is regulated by the Commonwealth Copyright Act 1912-1935 wherein, subject to modifications relating to procedure and remedies, the British Copyright Act of 1911 has been adopted and scheduled to the Australian law.

Reciprocal protection of unpublished works was extended in 1918 to citizens of Australia and of the United States of America under which copyright may be secured in the latter country by registration at the Library of Congress, Washington. The

Commonwealth Government promulgated a further Order in Council which came into operation on the 1st February, 1923, and extended the provisions of the Copyright Act to the foreign countries of the Copyright Union, subject to the observance of the conditions contained therein.

2. Applications and Registrations.—The following table shows under the various headings the number of applications for copyright received and registered, and the total revenue obtained for the years 1930 to 1935:—

COPYRIGHT, AUSTRALIA.—SUMMARY.

Particulars.		1931.	1932.	1933.	1934.	1935.
Applications received—						
Literary	No.	1,258	1,469	1,463	1,611	1,408
Artistic	"	143	91	90	108	78
International ..	"	..	1	2	3	2
Applications registered—						
Literary	"	1,213	1,381	1,350	1,514	1,346
Artistic	"	122	74	72	91	69
International ..	"	..	..	..	..	..
Revenue	£	398	405	382	433	378

§ 3. Local Option and Reduction of Licences.

Local option concerning the sale of fermented and spirituous liquors is in force in all the States (excepting New South Wales, where the taking of polls has been suspended, and Victoria, where "State Option" is in operation), the States being divided into areas generally coterminous with electoral districts, and a poll of the electors is taken from time to time in each district regarding the continuance of the existing number of licensed premises, the reduction in number, or the closing of all such premises. Provision is made for giving effect to the results of the poll in each district in which the vote is in favour of a change.

In earlier issues of the Year Book (*see* No. 22, pp. 1005–1008), details, by States, were published of polls taken and of the operations of the Licences Reduction Boards.

§ 4. Lord Howe Island.

1. Area, Location, etc.—Lord Howe Island is situated between Norfolk Island and the Australian coast in latitude 31° 30' south, longitude 159° 5' east. It was discovered in 1788. The total area is 3,220 acres, the island being 7 miles in length and from $\frac{1}{2}$ to $1\frac{1}{2}$ miles in width. It is distant 436 miles from Sydney, and in communication therewith by monthly steam service. The flora is varied and the vegetation luxuriant, the forest growth consisting principally of palms and banyans. The highest point is Mount Gower, 2,840 feet. The climate is mild and the rainfall abundant, but on account of the rocky formation only about a tenth of the surface is suitable for cultivation.

2. Settlement.—The first settlement was by a small Maori party in 1853; afterwards a colony was settled from Sydney. Constitutionally, the island is a dependency of New South Wales, and is included in King, one of the electorates of Sydney. A Board of Control at Sydney manages the affairs of the island and supervises the palm seed industry referred to hereafter.

3. Population.—The population at the Census of 30th June, 1933, was 88 males, 73 females—total 161.

4. **Production, Trade, etc.**—The principal product is the seed of the native or *Kentia* palm. The lands belong to the Crown. The occupants pay no rent, and are tenants on sufferance.

§ 5. Commonwealth Council for Scientific and Industrial Research.

1. **General.**—By the Science and Industry Research Act 1926, the previously existing Commonwealth Institute of Science and Industry was reorganized under the title of the Council for Scientific and Industrial Research. An account of the organization and work of the former Institute was given in earlier issues of the Official Year Book. (See No. 18, p. 1062.)

2. **Science and Industry Research Act 1926.**—This Act provides for a Council, consisting of—

- (a) Three members nominated by the Commonwealth Government.
- (b) The Chairman of each State Committee constituted under the Act.
- (c) Such other members as the Council, with the consent of the Minister, co-opt by reason of their scientific knowledge.

The three Commonwealth nominees form an Executive Committee which may exercise, between meetings of the Council, all the powers and functions of the Council, of which the principal are as follows:—(a) To initiate and carry out scientific researches in connexion with primary or secondary industries in the Commonwealth; (b) to train research workers and to establish industrial research studentships and fellowships; (c) to make grants in aid of pure scientific research; (d) to establish industrial research associations in any industries; (e) to test and standardize scientific apparatus and instruments; (f) to establish a Bureau of information; and (g) to act as a means of liaison between the Commonwealth and other countries in matters of scientific research.

State Committees, whose main function is to advise the Council as to matters that may affect their respective States, have been constituted in accordance with prescribed regulations.

3. **Science and Industry Endowment Act 1926.**—Under this Act, the Government has established a fund of £100,000, the income from which is to be used to provide assistance (a) to persons engaged in scientific research, and (b) in the training of students in scientific research. Provision is made for gifts or bequests to be made to the fund, which is controlled by a trust consisting of the three Commonwealth nominees on the Council. In accordance with the Act, arrangements have been made to send a number of qualified graduates abroad for training in special fields of work.

4. **Work of the Council.**—The full Council held its first meeting in June, 1926, since which time it has held meetings at about half-yearly intervals. It has adopted a policy of placing each of its major fields of related researches under the direction of an officer having a standing at least as high as, if not higher than, that of a University Professor.

The main branches of work of the Council are (i) plant problems, (ii) soil problems, (iii) entomological problems, (iv) animal nutrition, (v) animal diseases, (vi) forest products, (vii) food preservation and transport, (viii) radio research, (ix) ore-dressing (gold) and mineragraphic investigations, and (x) fisheries investigations. Successful results have been obtained in a number of directions, particularly in regard to bitter pit in apples, spotted wilt in tomatoes, water blister of pineapples, blue mould of tobacco, the cultivation and drying of vine fruits, the cultivation of citrus fruits, contagious pleuro-pneumonia of cattle, the feeding of sheep for increased wool production, black disease, infectious entero-toxæmia, pulpy kidney and caseous lymphadenitis of sheep, internal parasites, coast disease of sheep, soil surveys, paper making from Australian timbers, timber seasoning and preservation, and the preservation and transport of bananas, oranges, chilled beef and other food-stuffs. More detailed information concerning the work of the Council may be found in Year Book No. 22, pp. 1009 and 1010.

§ 6. Australian Institute of Anatomy.

1. **Foundation of Institute.**—The Australian Institute of Anatomy, situated in Canberra, occupies a monumental building erected by the Federal Government under the Zoological Museum Agreement Act of 1924. Prior to the passing of this Act, the Federal Government had expressed regret that the Australian Nation possessed neither a collection of specimens of the unique and fast disappearing fauna of Australia, nor a Museum in which such specimens could be preserved for future generations. Comparative anatomy is the basis of medical science, and while the importance of a study of Australian animals in the solution of various medical problems had for years been recognized by other countries and steps taken by them to procure specimens for their museums, national effort in this direction was neglected in Australia. Sir Colin MacKenzie, the present Director of the Institute of Anatomy, however, very kindly presented to the Federal Government his entire private collection, and this magnificent gift was acquired and provision was made for its proper housing under special legislation by the Federal Government.

2. **Additions to Original Collection.**—In addition to the original collection, which has been greatly augmented, the following free gifts have been made to the Australian Nation, and are on view in the Institute :—

- (1) *Horne-Bowie Collection.*—Dealing with the life of Central Australian aborigines, and throwing valuable light on the psychology of this Stone Age people.
- (2) *Burrell Collection.*—This deals with the life history of the platypus, and is unique in the world. The platypus is the most primitive mammal known to science, and is the link between the bird, the reptile and the mammal.
- (3) *Milne Collection.*—This is an anthropological and ethnological collection dealing with the aborigines of New South Wales, and contains many valuable and now unobtainable native weapons and implements.
- (4) *Murray Black Collection* of anatomical material representative of the aborigines of Southern Victoria and the River Murray.
- (5) *Nankivell Collection*, illustrating the anatomy of the aborigines of the Murray Valley.
- (6) *Harvard University Collection.*—This includes a collection of specimens from the Harvard University, U.S.A., representing a carefully worked out epitome of archaeology of the United States, and, together with two rare skeletons of primitive North American Indians, was a goodwill gift from the University to the Institute of Anatomy.
- (7) *The Sir Hubert Murray Collection.*—The ethnological and osteological collection of Sir Hubert Murray, Lieutenant-Governor of Papua. This deals especially with the anthropology of Papua.
- (8) *The Rabaul Ethnological Collection.*—This concerns chiefly the Ethnology of the Mandated Territory of New Guinea.
- (9) *The Basedow Collection.*—This collection has been recently purchased by the Commonwealth Government. It deals especially with the anthropology of Central and Northern Australia and was assembled, after many years of research, by the late Dr. Herbert Basedow of Adelaide who was formerly Protector of Aborigines.
- (10) Many hundreds of specimens and books received from numerous interested scientists, the most outstanding being those from Mr. E. Hill, of Nagambie, Victoria; Mrs. Harry Burrell, New South Wales; and medical books for the Library from the estates of the late Drs. Molloy, David Grant and Robert Stirling.

3. **Endowments for Orations and Lectures.**—In addition to the aforementioned donations of material, there have been several endowments for Orations and Lectures as follows :—

- (1) *The Halford Oration.*—Endowed with a gift of £1,000 by the family of the late Professor G. B. Halford, founder of the first medical school in the Southern Hemisphere. The interest on this amount is given to a prominent scientist to deliver an oration on a subject suggested by the life and work of the late G. B. Halford.
- (2) *The Anne MacKenzie Oration.*—Founded with a gift of £1,000 by Sir Colin MacKenzie, in memory of his mother. The orator receives the annual interest for delivering an oration on any phase of " Preventive Medicine ".
- (3) *The Dr. G. E. Morrison Memorial Lecture on Ethnology.*—Founded by Chinese residents in Australia, in memory of a great Australian who rendered important services to China.
- (4) *The Kendall Lecture in Veterinary Science.*—Endowed by the sons of the late Dr. W. T. Kendall, who was the founder of the first Veterinary School in the Southern Hemisphere.
- (5) *The Charles Mackay Lecture on Medical History.*—Endowed by Miss C. MacKenzie with a gift of £607 as a memorial to her grandfather, an educationalist, who arrived in Melbourne in 1852 and died at Kilmore, Victoria.
- (6) *The Cilento Medal.*—This bronze medal has been endowed in perpetuity by Sir Raphael Cilento, Director-General of Health for Queensland, to be awarded annually to the scientist deemed to have accomplished the best practical work for the furtherance of Tropical Hygiene and Native Welfare in Australia.

4. **Ultimate Scope of the Institute.**—The Institute of Anatomy may be regarded as the first unit of a National University of Australia, and has already become the most important centre in the Southern Hemisphere for the study of comparative anatomy and of its application to human health and disease. Research work in many branches of this subject is being carried out, and an extensive collection of material for the use of future generations is being catalogued. The microscopic specimens of Australian fauna number many thousands, and are unique in the world. They represent normal mammalian tissues unaffected by disease or domestication, and with these, human tissues such as those affected with cancer can be compared. The building is used to a large extent for educational purposes. From 1931 to 1935 all the University College lectures were given there, and all public lectures of an educational nature are delivered in the lecture theatre attached to the Institute. The general public is admitted to the two great Museums of Osteology and Applied Anatomy, and large numbers take advantage of this concession.

§ 7. The Commonwealth Solar Observatory.

1. **Reasons for Foundation.**—The Commonwealth Solar Observatory was established for the study of solar phenomena, for allied stellar and spectroscopic research, and for the investigation of associated terrestrial phenomena. It is so situated to complete the chain of existing astrophysical observatories round the globe separated by 90 degrees of longitude. In addition to advancing the knowledge of the universe and the mode of its development, it is hoped that the eventual discovery of the true relation between solar and terrestrial phenomena may lead to results which will prove of direct value to the country.

2. **History of Inauguration.**—A short account of the steps leading up to the establishment of the Observatory will be found in Official Year Book No. 19, p. 979.

3. *Site of the Observatory.*—The site selected for the Observatory is on Mount Stromlo, a ridge of hills about 7 miles west of Canberra. The highest point is 2,560 feet above sea level, or about 700 feet above the general level of the Federal Capital City.

4. *Equipment.*—The bulk of the telescopic equipment is due to the generosity of supporters of the movement in England and Australia. The gifts include a 6-in. Grubb refracting telescope presented by the late W. E. Wilson, F.R.S., and Sir Howard Grubb, F.R.S., trustees of the late Lord Farnham; a 9-in. Grubb refractor with a 6-in. Dallmeyer lens presented by the late Mr. James Oddie, of Ballarat; while Mr. J. H. Reynolds of Birmingham presented a large reflecting telescope with a mirror 30 inches in diameter. A sun telescope including an 18-in. cœlostast has been installed, and further additions include a spectroheliograph, cosmic ray apparatus, radio research equipment and spectroscopes for the examination of spectra in the infra-red, violet and ultra-violet regions. Donations amounting to over £2,500 have been received, and form the nucleus of a Foundation and Endowment Fund.

5. *Observational Work.*—The observational work embraces the following:—(a) solar research; (b) stellar research; (c) spectroscopic researches; (d) atmospheric electricity; (e) cosmic radiation; (f) radio research; (g) ozone content of the atmosphere; (h) luminosity of the night sky; and (i) meteorological observations. A more detailed account of the observational work cannot, owing to limits of space, be published in this issue, but may be found in earlier issues (*see* No. 22, p. 1011).

§ 8. Standards Association of Australia.

This Association was established under the aegis of the Commonwealth and State Governments for the promotion of standardization and simplified practice.

In addition to the Council and Standing and Organization Committees, the following Sectional Committees have been appointed to formulate Australian standard specifications and codes:—A.—*Safety Codes Group*—(1) Boiler Regulations (including Gas Cylinders); (2) Concrete and Reinforced Concrete Structures; (3) Cranes and Hoists; (4) Electrical Wiring Rules; (5) Lift Installations; (6) Pump Tests; (7) Refrigeration; (8) Steel Frame Structures; (9) Welding; (10) Fireproof Construction; (11) Building By-laws; (12) Electrical Service Rules; (13) Handling and Use of Explosives; (14) Air-lock Operation; (15) Street Lighting. B.—*General Technical Standard Group*—(1) Bore Casing; (2) Building Materials; (3) Calcium Carbide; (4) Cement; (5) Coal—Sampling and Analysis; (6) Colliery Equipment; (7) Containers for Inflammable Liquids; (8) Electrical; (9) Firebricks; (10) Locomotives; (11) Lubricants; (12) Machine Belting; (13) Machine Parts; (14) Non-ferrous Metals; (15) Paint and Varnish; (16) Pipes and Plumbing; (17) Railway Permanent Way Materials; (18) Roadmaking Materials; (19) Structural Steel; (20) Testing, Weighing and Gauging; (21) Timber; (22) Tramway Rails; (23) Typography; (24) Galvanizing and Galvanized Products; (25) Roadmaking Machinery; (26) Sugar Mill Machinery; (27) Creosote; (28) Safety Glass for Automobiles. C.—*Co-ordinating Committees*—(1) Concrete Products; (2) Ferrous Metals; (3) Non-ferrous Metals; (4) Methods of Physical Testing, Sampling and Chemical Analysis—Co-ordination of. D.—*Commercial Standards Division Committees*—(1) Building Materials Classification; (2) Three-ply Wood Panels for Use in Stock Door Manufacture; (3) Institutional Supplies and Co-ordinated Purchasing (Hospitals, Asylums and other Public Institutions); (4) General Conditions of Contract; (5) Purified Feathers; (6) Commercial Paper Sizes; (7) Road Gully Gratings; (8) Street Name Plates, Building Number Plates and Road Signs; (9) Sheet Metal Guttering, Ridging and Downpiping; (10) Laminated Steel Springs for Motor Cars; (11) Shellgrit for Poultry.

A Power Survey Committee to deal with the collection of data and the framing of recommendations for assistance in the development and co-ordination of power schemes has also been appointed.

The objects of the Association include the following:—To prepare and promote the general adoption of standards in connexion with structures, materials, etc.; to co-ordinate the efforts of producers and users for the improvement of materials, processes and methods; and to procure the recognition of the Association in any foreign country.

The sole executive authority of the Association is vested in the Council, which undertakes the whole of the organization of the movement, the raising of the necessary funds, the controlling of the expenditure, the arranging of the subjects to be dealt with by the various sectional and sub-committees, and the authority for the issue of all the reports and specifications.

The Association was established in July, 1929, by amalgamation of the Australian Commonwealth Engineering Standards Association and the Australian Commonwealth Association of Simplified Practice.

§ 9. Valuation of Australian Production.

1. *Value of Production.*—(i) *Net Values.* The annual value of production was defined by the Conference of Statisticians in 1924 as the sum available each year for distribution among those concerned in industry, i.e., workers, proprietors (including landlords) and providers of capital. In the past the want of complete uniformity in the methods of compilation and presentation of statistics of recorded production rendered it very difficult to make a satisfactory valuation of the various elements of production in accordance with the above definition. At the conference of 1924 and those subsequently held a uniform method of determining the gross value, marketing costs and production costs was laid down. This arrangement enabled the State Statisticians to compile the various elements of costs on a uniform basis which permitted the aggregation of the figures for each State to obtain a total for Australia.

The figures shown in the following table have been compiled by the Statisticians of the several States and, to a large extent, are based upon actual records. Where this has not been possible careful estimates have been made from the best available data. Absolute uniformity has not been attained in every detail but the few remaining differences of procedure are of little importance. This matter is referred to in the note at the head of the table.

Attention is directed to the fact that the value shown in the table refers only to recorded production and excludes the building and construction industry, those industrial establishments not classified as factories, and agricultural and farmyard produce grown on areas of less than one acre.

The following is a brief explanation of the terms used in the table:—

- (a) *Gross value* is the value placed on gross production at the wholesale price realized in the principal markets. (In cases where primary products are consumed at the place of production or where they become raw material for a secondary industry, these points of consumption are presumed to be the principal markets.)
- (b) *Local value* is the gross production valued at the place of production and is ascertained by deducting marketing costs from the gross value. (Marketing costs include freight, cost of containers, commission and other charges incidental thereto.)
- (c) *Net value* represents the net return to the producer after deducting from the gross value costs of marketing and of materials used in the process of production. Materials used in the process of production include seed, fodder consumed by farm stock, manures, dips, sprays and other costs. No account has been taken of depreciation and maintenance costs. This matter is more fully dealt with in the Production Bulletin, No. 29, issued by this Bureau.

Attention is directed to the following points in the table hereunder:—Depreciation and maintenance costs have not been deducted and therefore the net value as stated in the table is greater than it should be. The value of materials used in the process of primary production for New South Wales does not include the cost of power. The costs for the pastoral industry in Queensland are not as exact as might be desired but these defects will be eliminated in due course. In Tasmania the value shown for Mines and

Quarries is understated owing to the omission of Quarries. As explained in the Note (a) production costs are not available for all States in respect of Fisheries, Mines and Quarries and Local Values have been used for these industries with consequent overstatement.

GROSS, LOCAL AND NET VALUE OF RECORDED PRODUCTION—AUSTRALIA, 1934-35.

Industry.	Gross Production valued at Principal Markets.	Local Value—Gross Production valued at place of Production.	Net Value of Production (without deduction of depreciation or maintenance.)
	£	£	£
Agriculture	68,439,685	56,597,274	43,136,198
Pastoral	64,647,128	57,660,435	55,758,499
Dairying	31,373,771	29,158,329	24,360,240
Poultry and Bees	9,190,842	8,302,231	5,465,166
Total Rural (c)	173,651,426	151,718,269	128,720,103
Trapping	2,185,627	1,827,348	1,827,348
Forestry	7,331,603	6,464,139	6,437,348
Fisheries	1,595,127	1,343,016	(a) 1,343,016
Mines and Quarries	20,033,019	19,899,211	(a) 19,899,211
Total Non-rural	31,145,376	29,533,714	29,506,923
Total All Primary	204,796,802	181,251,983	158,227,026
Factories	(b) 143,527,129	(b) 143,527,129	143,527,129
Total All Industries	348,323,931	324,779,112	301,754,155

(a) Local value. Production costs not available for all States. (b) Net value. (c) The term "Rural" is used to cover those industries ordinarily considered to be farm industries.

The net value of production in each State is shown hereunder:—

NET (a) VALUE OF RECORDED PRODUCTION IN STATES, 1934-35.

Industry.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
	£	£	£	£	£	£	£
Agriculture	12,787,000	8,735,776	9,018,187	6,375,538	4,268,547	1,951,150	43,136,198
Pastoral	23,311,000	13,305,109	11,004,135	3,181,285	3,916,280	1,040,690	55,758,499
Dairying	8,844,000	7,531,415	5,798,796	1,121,089	619,810	445,130	24,360,240
Poultry and Bees	1,944,000	2,224,587	259,137	382,387	336,515	318,540	5,465,166
Total Rural (net)	46,886,000	31,796,887	26,080,255	11,060,299	9,141,152	3,755,510	128,720,103
Trapping	979,000	480,823	60,325	54,143	55,817	197,240	1,827,348
Forestry	1,922,000	604,800	1,988,751	523,786	1,012,261	325,750	6,437,348
Fisheries (local)	536,000	140,549	261,411	151,843	181,913	71,300	1,343,016
Mines and Quarries (local)	7,239,000	1,459,595	2,631,798	1,862,123	5,956,725	749,970	19,899,211
Total Non-rural (local and net)	10,676,000	2,745,767	4,942,285	2,591,895	7,206,716	1,344,260	29,506,923
Total All Primary	57,562,000	34,542,654	31,022,540	13,652,194	16,347,868	5,099,770	158,227,026
Factories	61,430,000	48,473,628	14,623,319	9,557,113	6,284,923	3,158,146	143,527,129
Total All Industries	118,992,000	83,016,282	45,645,859	23,209,307	22,632,791	8,257,916	301,754,155

(a) See letterpress at head of previous Table.

NET (a) VALUE OF RECORDED PRODUCTION PER HEAD OF MEAN POPULATION.

Industry.	New South Wales.	Victoria.	Q'land.	South Australia.	Western Australia.	Tasmania.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Agriculture	4 17 1	4 15 2	9 7 9	10 18 3	9 12 8	8 10 4	6 9 0
Pastoral	8 17 0	7 4 11	11 9 0	5 8 11	8 16 9	4 10 10	8 6 9
Dairying	3 7 2	4 2 0	6 0 8	1 18 5	1 8 0	1 18 10	3 12 10
Poultry and Bees	0 14 9	1 4 3	0 5 5	0 13 1	0 15 2	1 7 10	0 16 4
Total Rural (net)	17 16 0	17 6 4	27 2 10	18 18 8	20 12 7	16 7 10	19 4 11
Trapping	0 7 5	0 5 3	0 1 3	0 1 10	0 2 6	0 17 3	0 5 6
Forestry	0 14 7	0 7 3	2 1 5	0 17 11	2 5 8	1 8 5	0 19 3
Fisheries (local)	0 4 1	0 1 6	0 5 5	0 5 3	0 8 3	0 6 3	0 4 0
Mining (local)	2 14 11	0 15 11	2 14 9	3 3 9	13 8 10	3 5 5	2 19 6
Total Non-rural (local and net)	4 1 0	1 9 11	5 2 10	4 8 9	16 5 3	5 17 4	4 8 3
Total All Primary (local and net)	21 17 0	18 16 3	32 5 8	23 7 5	36 17 10	22 5 2	23 13 2
Factories	23 6 4	26 7 11	15 4 5	16 7 2	14 3 8	13 15 8	21 9 2
Total All Industries	45 3 4	45 4 2	47 10 1	39 14 7	51 1 6	36 0 10	45 2 4

(a) See letterpress at head of previous Table.

(ii) *Gross Values.* The estimated gross value of production shown in the following table is a continuation of the method previously used by this Bureau. It cannot be compared with the gross values shown in the table above on account of the difference in the methods used and the change in the computing authority. It is proposed to discontinue the publication of this table once the net values have been satisfactorily established.

ESTIMATED GROSS VALUE OF PRODUCTION.—AUSTRALIA.

Year.	Agriculture.	Pastoral.	Dairy, Poultry, and Bee-farming.	Forestry.	Fisheries.	Mining.	Manufacturing.(a)	Total.
	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.
1924-25	107,163	127,301	45,190	10,577	1,780	24,592	137,077	454,580
1925-26	89,267	113,556	48,278	10,964	1,820	24,529	143,256	431,670
1926-27	98,295	111,716	46,980	11,046	1,744	23,939	153,634	447,354
1927-28	84,328	124,554	50,261	10,339	1,842	23,015	158,562	452,901
1928-29	89,440	116,733	50,717	9,449	2,168	19,539	159,759	447,805
1929-30	77,109	84,563	49,393	9,103	2,268	17,912	149,184	389,537
1930-31	70,500	69,499	43,067	6,488	1,825	15,361	112,066	319,706
1931-32	74,489	61,540	41,478	6,033	1,670	13,352	106,456	305,018
1932-33	75,562	64,851	39,622	6,791	1,679	15,583	114,136	318,224
1933-34	70,721	95,613	40,306	7,985	1,620	17,608	123,355	357,218
1934-35	68,587	74,556	44,763	9,221	1,635	19,949	137,349	356,060

(a) Net Values. These amounts differ from those given in the two previous tables and in Chapter XXIV, Manufacturing Industry, which include certain products included under Dairy Farming and Forestry in this table.

2. **Productive Activity.**—In previous issues an attempt was made to measure the quantity of material production by means of production price index-numbers. It was found, however, that these were not satisfactory in their application to factory production.

In the absence of a satisfactory measure of the "quantity" of production, the retail price index-numbers ("A" Series) have been applied to the value of production in the same manner as applied to nominal wages to measure their relative purchasing power. The results may be taken to indicate the purchasing power, in retail prices, of the things produced. For convenience these results will hereafter be called "real" production. Two tables are given. The first shows "real" production per head of population. This table must be used with caution, as the production considered is material production only and takes no account of services. As civilization advances, material production becomes less important relatively to services, and a smaller proportion of the population is engaged in material production. For example, the present use of the motor car, the cinema and wireless is comparatively recent, and these employ a much larger number of people in services than in material production. Hence material production per head of population will not measure accurately the progress of productive efficiency, but will tend to give too low a value. Unemployment, of course, will also depress it.

A better measure is afforded by "real" production per person engaged in material production. The second table attempts to give this. The result affords a better measure of individual productive efficiency, but does not take into account the effect of unemployment, though the index may be somewhat depressed by short time and rationing.

The two tables tell different stories. Before unemployment became severe in 1930 "real" production per head, as shown in the last column of the first table, had remained substantially steady, with minor fluctuations ever since 1906. Whatever gain had been made in individual productive efficiency had been off-set by the gradual transfer of labour from production of goods to production of services. Coincident with the heavy increase in unemployment between the years 1930 and 1933, the maximum being reached in 1932, the index fell sharply from its normal figure of about 100 to 76 in 1930-31. This would imply a fall in average "real" income of about 24 per cent. from the normal level, taking unemployment into account. In the next three years the index rose steadily to 96, equivalent to an increase in "real" production of 26 per cent. In 1934-35 the index fell to 92, owing to a rise in the retail price index-number, the value of production showing little change.

The index of "real" production per person engaged, as given in the last column of the second table, shows, on the other hand, an appreciable upward tendency. It rose steeply during the war, as might have been expected, fell somewhat after the war, and recovered again. For 1929-30 it fell to 105, owing to the lag in the fall of retail prices, but increased during the next four years to 125 only to fall again in 1934-35 to 115 with the fall in wool prices during that year. This high figure for "real" production per person engaged implies a high "real" wage for those in employment and is consistent with available information concerning rates of effective or "real" wages which more than maintained in recent years the high level reached in the years 1927 to 1929.

The data for the second table are not complete. The numbers engaged in timber-getting are not accurately known, so that the value of production on this account and the corresponding persons engaged are both left out of account. Further, the information concerning women engaged in primary production is unsatisfactory, and only males are counted in primary industries. In manufacturing, the numbers are converted into equivalent male workers on the basis of relation of wages for male and female workers. The column headed "numbers engaged" is, therefore, rather an index than the absolute number of individuals occupied in material production, but, as an index, it should be accurate enough to give a satisfactory measure of production per person engaged.

PRODUCTION PER HEAD OF POPULATION.—AUSTRALIA.

Year.	Gross Value of Material Production.			Retail Prices Index Number. (a) 1911 = 1,000.	"Real" produc- tion per head of population (measured in retail purchas- ing power). 1911 = 100.
	Total.	Per head of population.			
		£1,000.	£	Index Number, 1911 = 100.	
1901	114,585	30.0	73	880	83
1906	147,043	35.9	87	902	97
1907	166,948	40.1	97	897	109
1908	162,861	38.5	93	951	98
1909	174,273	40.3	98	948	103
1910	185,399	41.9	102	970	105
1911	188,359	41.2	100	1,000	100
1912	209,236	44.1	107	1,101	97
1913	220,884	45.1	110	1,104	99
1914	213,552	43.0	104	1,140	92
1915	255,571	51.4	125	1,278	98
1916	261,996	53.3	129	1,324	98
1917	279,418	56.1	136	1,318	103
1918	291,875	57.5	140	1,362	102
1919-20 ..	343,697	64.9	158	1,624	97
1920-21 ..	390,644	72.2	175	1,821	96
1921-22 ..	344,426	62.5	152	1,600	95
1922-23 ..	379,445	67.4	163	1,642	100
1923-24 ..	400,276	69.6	169	1,714	99
1924-25 ..	454,580	77.3	188	1,690	111
1925-26 ..	431,670	72.0	175	1,766	99
1926-27 ..	447,354	73.1	178	1,763	101
1927-28 ..	452,901	72.5	176	1,776	99
1928-29 ..	447,805	70.5	171	1,785	96
1929-30 ..	389,537	60.6	147	1,783	83
1930-31 ..	319,706	49.2	120	1,574	76
1931-32 ..	305,018	46.5	113	1,432	79
1932-33 ..	318,224	48.2	117	1,358	86
1933-34 ..	357,218	53.7	130	1,365	96
1934-35 ..	356,060	53.1	129	1,399	92

(a) Retail prices of Food, Groceries and Housing (all Houses) for six capital cities.

PRODUCTION PER PERSON ENGAGED.—AUSTRALIA.

Year.	Number engaged in Material Production.(a)	Value of Material Production per person engaged in production.(a)		"Real" production per person engaged (measured in retail purchasing power). 1911 = 100.
		Actual.	Index Number. 1911 = 100.	
	(1,000)	£		
1906	659	223	87	96
1907	678	244	95	106
1908	677	239	93	98
1909	684	252	98	104
1910	704	262	102	105
1911	728	257	100	100
1912	744	279	109	99
1913	756	290	113	102
1914	733	289	113	99
1915	704	361	141	110
1916	685	381	148	112
1917	683	408	159	120
1918	685	424	165	121
1919-20 ..	743	460	179	110
1920-21 ..	760	510	199	109
1921-22 ..	775	441	172	107
1922-23 ..	793	475	185	113
1923-24 ..	810	491	191	111
1924-25 ..	826	547	213	126
1925-26 ..	831	515	201	114
1926-27 ..	841	527	205	116
1927-28 ..	838	536	209	118
1928-29 ..	830	536	209	117
1929-30 ..	803	482	187	105
1930-31 ..	728	431	168	107
1931-32 ..	741	411	160	112
1932-33 ..	81	407	158	117
1933-34 ..	815	437	170	125
1934-35 ..	862	412	160	115

(a) See explanatory remarks above tables.

§ 10. Film Censorship.

1. Legislation.—The censorship of imported films derives its authority from section 52 (g) of the Customs Act, which gives power to prohibit the importation of goods. Under this section regulations have been issued prohibiting the importation of films and relative advertising matter except under certain conditions and with the consent of the Minister. The regulations provide, *inter alia*, that no film shall be registered which in the opinion of the censor is (a) blasphemous, indecent or obscene; (b) likely to be injurious to morality, or to encourage or incite to crime; (c) likely to be offensive to the people of any friendly nation; (d) likely to be offensive to the people of the British Empire; or (e) depicts any matter the exhibition of which is undesirable in the public interest.

The regulations governing the exportation of Australian-made films are similar, with the addition that no film may be exported which in the opinion of the Censorship is likely to prove detrimental or prejudicial to the Commonwealth of Australia.

The Censorship consists of a Censorship Board of three persons and an Appeal Censor, the headquarters being in Sydney. Importers also have the right of appeal to the Minister.

In addition to the censorship of moving pictures, the Censorship may refuse to admit into Australia any advertising matter proposed to be used in connexion with the exhibition of any film. Such control does not, however, extend to locally-produced publicity.

2. **Imports of Films.**—Imported films dealt with by the Censorship for the year 1935 were as follows:—1,380 films of 3,336,514 feet passed without eliminations, 161 films of 871,981 feet passed after eliminations, and 35 films of 213,401 feet rejected in first instance, making a total of 1,576 films of 4,421,896 feet (one copy). The countries of origin were as follows:—United States of America, 1,034 films of 3,185,915 feet; United Kingdom, 443 films of 1,116,391 feet; and 99 films of 119,590 feet from other countries.

The above figures relate to standard size films (35 millimeters). There were also imported during 1935, 633 miniature films (16 millimeters and 9.5 millimeters) of 248,704 feet.

3. **Exports of Films.**—The number of films exported for the year 1935 was 1,153 of 1,239,891 feet (one copy), of which 922 films of 1,079,720 feet were sent to places in the British Empire including Mandated Territories.

§ 11. Marketing of Australian Commodities.

Particulars in respect of various Commonwealth Acts and Regulations, together with the operations of the Boards or Councils appointed to assist or control the marketing of Australian commodities, were published in earlier issues of the *Year Book* (See No. 28, p. 893). It should be remembered, however, that the joint Commonwealth and State schemes for the orderly marketing of primary products have been rendered unconstitutional by the recent decision of the Privy Council in the *James (Dried Fruits) Case*.

§ 12. The National Safety Council of Australia.

The National Safety Council of Australia was founded in Melbourne in 1927 for the purpose of developing mainly by means of education safety on the road, at work and in the home, and its activities have developed in other directions wherever the need for reducing the toll of accidents has been shown. In the States of New South Wales, Victoria, Queensland, South Australia and Tasmania, it issues by courtesy of the Traffic Authorities a thirty-two page booklet with every motor driver's licence, and conducts continuous propaganda through the press and other sources. It also forms Junior Safety Councils in the schools for developing a safety conscience among children. The children themselves are officers of these Councils and patrol the roads in the neighbourhood of the schools and conduct the scholars across in safety. Posters are available to schools at cost in connexion with Health and Safety lessons in the schools. Small films specially taken are available for children's and home safety instruction.

A "Freedom from Accidents" competition is also conducted among employee drivers, those completing a year free from any accident for which they are responsible being given a certificate to that effect. A Factories Service of four posters per month, together with slips for pay envelopes, constitutes a regular service for the dissemination of safety advice, and was supplied to over 40,000 workers in factories last year. Committees deal with specific problems regarding traffic, films, safety in industry, air safety and home dangers. The Air Safety Committee has issued a thirty-two page booklet "Air Sense" for distribution with "A" pilots' licences through the Civil Aviation Branch of the Defence Department.

The Council is supported by public subscription and sales of service, and is a non-profit organization. Numerous lectures are given throughout the year on the work of the Council, and on various aspects of safety, and lecturers are always available for any organization which makes application to the Secretary.

§ 13. League of Nations.

Australia was one of the original signatories of the Treaty of Versailles of 28th June, 1919, under which the League of Nations was established, and thus became a Member of the League and its kindred organizations—the International Labour Organization and later the Permanent Court of International Justice. On 2nd October, 1933, Australia was elected a non-permanent member of the Council of the League of Nations for a period of three years. There are now four permanent members of the Council (Great Britain, France, Italy and the Union of Soviet Socialist Republics) and ten non-permanent members, viz., Bolivia, Chile, Ecuador, New Zealand, Poland, Portugal, Roumania, Spain, Sweden and Turkey. The term of the non-permanent members is three years.

Australia has been represented at each Assembly of the League from its inauguration in 1920, and at nearly all of the conferences of the International Labour Organization. The contribution of Australia towards defraying the expenditure of the League of Nations and its kindred organizations is on the basis of 27 of 931 units, and for the year 1936 amounts to 820,147 gold francs, or, in Australian currency at the present rate of exchange, approximately £64,500, out of a total budget of 28,279,901 gold francs. Australia holds a mandate, issued through the League of Nations, for the former German Territory of New Guinea, and, by agreement with Great Britain and New Zealand, administers the Mandated Territory of Nauru, for which a mandate was issued to the British Empire.

§ 14. War Service Homes.

The operations of the War Service Homes Commission at 28th February, 1936, may be briefly set out as follows:—Total applications approved, 42,328; expenditure on provision of homes, purchase of land for future use, etc., £29,068,736; 21,240 houses had been completed; and 34 homes had been enlarged.

In addition, the Commission had purchased on behalf of eligible applicants, 12,936 already existing properties, and had taken over mortgages existing on 2,681 dwelling houses. Dual assistance had been approved in respect of 54 applications, making the total number of homes provided under the War Service Homes Act, 36,945. Homes are insured under a comprehensive policy, the total insurances in force including cover notes amounting to £21,275,684. The total receipts of the Commission to 29th February, 1936, were £22,137,828, of which £7,949,454 was paid to the National Debt Sinking Fund. The percentage of arrears of instalments due was 5.03, while the total instalments due amounted to £19,086,674, and arrears to £960,404.

Pursuant to legislation passed by the Commonwealth Government and the State Parliament of South Australia, the control of homes under the State Bank of South Australia was transferred to the Commission as at 1st January, 1935, and the figures quoted cover the activities in respect of homes so transferred.

Australian Population Mortality Census of 1933.*

1. *Introductory.*—Among the subjects which are dealt with in the periodical publications of the Commonwealth Bureau of Census and Statistics there are certain aspects of the vital statistics of the country which are reserved for consideration at decennial intervals, owing to the fact that they involve material derivable only from the decennial census enumerations. Of these subjects the most important, in all likelihood, is the construction of National Life Tables. The compilation of such Tables in Australia is, of course, not a new thing, even for the Commonwealth Government. In 1911 the Supervisor of Census (Mr. Wickens) advised that, as data in respect of population and deaths for the three decennia 1881–90: 1891–1900: and 1901–10 were available, complete life tables for each sex and for each decennium should be constructed for Australia as a whole, and this recommendation was duly carried into effect.

* By F. W. Barford, M.A., A.I.A.

After the census of 1921 Mr. Wickens, who had now become Commonwealth Statistician, carried on his investigations still further. On this occasion an important departure was made. The Life Table based upon the census of 1921 was founded upon the age distribution of that census only, and the deaths for the calendar years, 1920-22. This, however, was a matter of detail merely, and does not affect the general principle, which was that it was virtually decided on that occasion that the work done in 1911 should be perpetuated, and that, in order to maintain continuity, the construction of a National Life Table should form in future an integral part of the work carried out in connexion with the decennial census.

For financial reasons the census of 1931 was postponed for two years and carried out on 30th June, 1933. In accordance with the above idea, it was determined at an early date that a new Australian Life Table should form part of the investigation. Two other important points of principle were determined afterwards. Firstly it was resolved that the new Table should relate to Australia as a whole, and that, for many reasons, sectional Tables relating to the individual States should not be undertaken. The time thus saved would—it was considered—be more profitably spent in constructing a more complete series of financial Tables, including Joint Life Tables, which were not included in the investigation of 1921, and for which there has been a demand. In the second place it was resolved to base the investigation upon the census of 1933, and the deaths in the calendar years 1932-34. This, of course, involves to a certain extent a break of continuity in the Australian series, for the tables prior to 1921 were based upon two censuses and the deaths of the intervening ten years. But tables based upon the latter foundation suffer from the defect, which is ineradicable, that at the time of publication the mortality experience may be as much as ten years out of date. A break with the past seems clearly indicated, such as occurred in England between Life Tables 7 and 8. In Australia the corresponding break occurred between the A^M Table and the A^{M21} , and the present tables, which will be designated A^{M33} and A^{F33} , have followed the precedent of 1921. It is not suggested, of course, that the methods of 1933, even when endorsed by those of 1921, will, of necessity, govern the procedure in the future. But the method of 1911 is so obviously defective when applied to a country where the vitality is steadily and continuously increasing, that I cannot help entertaining the feeling that population mortality tables based upon the results of two censuses and the intervening deaths are virtually things of the past.

2. *Data.*—As has already been stated, the data for the compilation of the Tables were taken to be the census results of 1933 combined with the related deaths for the years 1932-34. Since the data derivable from census returns are always to a certain extent suspect so far as age is concerned, they were carefully watched for irregularities. The case as regards these irregularities was thus stated by Sir Alfred Watson in the report upon English Life Table No. 9. "The mis-statements referred to (i.e., in regard to enumerated populations and deaths) are of two types: (1) local errors such as the preference for digits ending in 0, which for the most part consist of comparatively small inaccuracies, and (2) deliberate or biased errors So far as the registered deaths are concerned, it would seem probable that errors of the first type are, relatively to the census, more numerous than those of the second. However this may be, the fact that local errors exist in the death registrations as well as in the enumerated population, and at the same points, goes some way towards the diminution of distributing effects upon the computed rate of mortality at particular ages, while the application of any good method of graduation must reduce the residual effects to insignificance. In the case of the larger errors unfortunately it is otherwise I am not however disposed to attribute to these errors any profound influence upon the rates of mortality brought out by comparing the deaths at the ages affected with the corresponding enumerated populations, nor do I think that such effect as they produce in this direction is other than a decreasing one—regard being had to the growth of education and to the development of other conditions"

It is gratifying to note that Sir Alfred Watson is confident as to a considerable increase in the reliability of census and population statistics, for it will be remembered that Mr. George King found room for improvement. But since the period when Mr. George King was at work upon English Life Table No. 8, a considerable time has elapsed.

There has been a great advance in education, and in all likelihood a correspondingly increased feeling of responsibility in filling in forms. Moreover, the bulk of the population at the present time has been born in the registration period, and all this tends to increased accuracy. It is not surprising, therefore, that the officials responsible for the census of 1933 feel hopeful that in the population return of that census, and the related death returns of 1932-34, a relatively high degree of reliability has now been reached.

One feature however was well defined and calls for attention. In the population returns there was, between the 3rd and 7th decades, a strongly marked maximum at ages ending in 0, and another, not so strong, at ages ending in 2, while there was a most pronounced minimum at ages ending in 1. The same feature was noticeable in the deaths except that it appeared one decade later, and the maximum at ages ending in 2 was more prominent. It can hardly be suggested that this represents the actual facts of the case, and it seems to point to a psychological peculiarity which makes some people reluctant to admit that they have passed a decade until the fact can no longer be concealed.

The fact that this peculiarity appears in both numerator and denominator of the fraction from which q_x is obtained assists in reducing the disturbing effect, and it is still further diminished by the grouping, to which reference will be made in the next section.

3. Graduation.—As the recorded numbers which form the basis of a population investigation are not free from error, it is customary to subject the derived rates to a process of graduation. On this occasion it was decided after careful consideration to adopt the method which is associated with the name of Mr. George King. This method was elaborated by Mr. King for the purposes of Life Table No. 8, and justified itself so abundantly that it was employed by Sir Alfred Watson for the purpose of graduating Life Table No. 9. Since then, it has been used in graduating the English and Scottish Tables founded on the census of 1931, and Irish Free State Tables founded on the census of 1926. It was also employed in New Zealand in connexion with the census of 1921, and a very exhaustive paper on this subject was submitted by Mr. Polden to the Actuarial Society in 1926. This method of graduation has therefore been well tested in practice, and may be considered to be established in popular favour.

It may be frankly admitted that this process of graduation owes its present vogue to its own undoubted merits. Mr. King laid down as a criterion that the process employed must be "simple in theory, easy in application . . . and would produce curves of smooth graduation which would adhere closely to the original data." These conditions are satisfied, especially the last which is so important. Sir Alfred Watson also brought forward another consideration, which was that for some years to come the effects of the Great War would be to cause such a disturbance in the sequence of numbers of males at the higher ages, that any attempt at mathematical curve fitting would be inadmissible. For these reasons it was decided to depart from the processes which had been employed in the previous Australian Life Tables and to adopt the method of graduation by osculatory interpolation.

The method has been so exhaustively discussed by Mr. King, and further by Sir Alfred Watson in his report upon English Life Table No. 9, that no further description need be attempted here. The following were the principal stages in the work:—

- (1) Grouping. After considerable experimental work, it was finally decided to divide population and deaths into the quinquennial groups 0-4 : 5-9 : 10-14 As the census was at 30th June, 1933 (i.e., at the mid point of the triennium 1932-34), no adjustment on this account was required.
- (2) Pivotal values for the central age of each group were then calculated by means of the formula $U_7 = \cdot 2W_6 - \cdot 008 \Delta^2 W_0$.
- (3) From these values pivotal rates of mortality were calculated for the ages 12, 17, 22 92: and the tables from 17-87 completed by osculatory interpolation. The function used was $\log(q_x + \cdot 1)$.

(4) The section 0—5 was computed according to the formulae of Sir Alfred Watson (English Life Table No. 9). The figures for the births were taken in quarters. A typical formula may be taken as follows:—

$$q_2 = \left\{ \begin{array}{c} \text{Deaths at ages 2-3} \\ \text{in the years} \\ 1932, 1933 \text{ and } 1934 \end{array} \right\} \div \left\{ \begin{array}{l} \frac{1}{8} (B_1^{29} + 3B_2^{29} + 5B_3^{29} + 7B_4^{29}) \\ + \text{total births } 1930 \text{ and } 1931 \\ + \frac{1}{8} (7B_1^{32} + 5B_2^{32} + 3B_3^{32} + B_4^{32}) \\ - \text{deaths at age 0-1 in} \\ 1930, 1931 \text{ and } 1932 \\ - \text{deaths at age 1-2 in} \\ 1931, 1932 \text{ and } 1933 \end{array} \right\}$$

where, for example, B_1^{29} = births in first quarter of 1929, etc.

(5) The section 6—16 was graduated by a third difference interpolation using the four values $q_6, q_{12}, q_{17}, q_{18}$ already obtained. A slight amendment was made in the pivotal value q_{12} as it was considered that some distortion would have been caused to the birth rate about 1921 owing to the return of soldiers from the war. The amended value only differed slightly from the original value, and the complete graduation over this section gave much better results when tested by the correspondence of actual with expected deaths.

(6) The section 88—104 was graduated by a fourth difference formula using the values $q_{85}, q_{86}, q_{87}, q_{92}$ and $q_{104} = 1$. This differs from the method employed in completing English Life Table No. 9, where a Gompertz graduation was used.

In concluding this section, I may state that the interpolations rendered necessary in the sections 6—16 and 88—104 were carried out by the Newton—Sheppard system of adjusted differences. Attention was called to this by a note in the Journal of the Institute of Actuaries (J.I.A. Vol. LVIII. p. 31c) in which it was pointed out that similar work in connexion with English Life Table No. 9 could have been performed in a single continuous arithmetical operation, without the solution of simultaneous equations.

The values of q_x obtained in the manner thus outlined were then plotted out in three sections in combination with the corresponding values from A^M and A^F : A^{M21} and A^{F21} ; the male rates of mortality being in one series and the female rates in another. A small adjustment was made in consequence in the male rates between 22 and 27 to make the first differences continuously positive, but otherwise no change was made. Two features called for some attention. In the first case q_4 in the female curve is too high to be consistent with the steady downward sweep, and a distinct bend in the curve appears. As, however, this is a value obtained from the basic data, and an examination of that data showed no reason to suspect inaccuracy, it was allowed to stand. In the second case, the flattening of the curve which Mr. Wickens noticed in 1921 to occur about age 50, occurs in 1933 at a later date, and consequently there comes a period in later middle life at which the improvement in the rate of mortality appears to reach a distinct minimum. A minor point of interest is the very slight rise in the rate of male mortality between the pivotal values of 22 and 27. This is an unusual feature, but has its counterpart in the English and Scottish Tables based on the census of 1931.

The final step was to test the rates of mortality thus obtained by a comparison of the actual and expected deaths. The values of q were converted, for this purpose, into the corresponding values of m by means of the relation $m = \frac{2q}{2 - q}$.

The values of q up to, and including, the age of 5, were obtained from the records of births and deaths, so this section of the table was excluded from the comparison. In order to carry out the test under the most stringent conditions, it was applied not to the original quinquennial groups 5—9 : 10—14, etc., but to septennial groups 6—12 : 13—19 : . . . 83—89. It was not carried farther than age 89 since the formula m

$= \frac{2q}{2 - q}$ ceases to hold exactly at advanced ages, but there are, comparatively, so

few deaths at these advanced ages that no appreciable error is likely.

The results of these tests are given in the Appendix Tables III. and IV., and I think it will be admitted that they are very satisfactory. In both Male and Female Tables the deviations are small; they frequently change sign; and the total accumulated deviation is trifling in amount. In only one case in either table does the deviation exceed the square root of the actual number of deaths, a figure which is often taken as a "standard" error. This result appears to support entirely Mr. King's contention that the method of osculatory interpolation gives results which adhere closely to the original facts.

4. Conclusion.—Lastly, the table was completed by means of the following formulæ amongst others:—

$$e_x = p_x (1 + e_{x+1})$$

$$l_x \mu_x = \frac{1}{12} \{7(d_{x-1} + d_x) - (d_{x-2} + d_{x+1})\}$$

$$e_x = e_x + \frac{1}{2} - \frac{1}{12} \mu_x$$

The complete tables for Males and Females, including the functions, l_x , d_x , p_x , q_x , and e_x are given in the Appendix, Tables I. and II.

The characteristics of the Tables may be summed up as follows:—

- (1) Great lightness of mortality in the infantile group.
- (2) Light mortality in adolescence in contradistinction to English Life Table No. 9. (It is understood, however, that the halt in the improvement in England was due to temporary causes which are passing away.)
- (3) Only a comparatively small improvement shown in later middle age. (Owing probably to flattening already mentioned.)
- (4) But the general improvement is shown to persist to advanced ages. (This supports Sir Alfred Watson's comment in the report on Life Table No. 9 when he says "it is difficult to believe that persons of an advanced age have not participated to some extent with other classes in the general amelioration of the conditions of life, and that their longevity has not been extended".)

It is customary in comparing the results of continuous population investigations to make use of four criteria as follows:—

- (a) rates of mortality at selected ages. (q_x)
- (b) number of survivors at selected ages. (l_x)
- (c) complete expectation of life at selected ages. (e_x)
- (d) probability of surviving 10 years at selected ages. (${}_{10}p_x$)

The third of these criteria is not accorded much weight by actuaries, but is without doubt popular amongst the general public. It is quite possible that the most valuable criterion is the fourth, for which I must admit a personal preference.

The results of these comparisons are set out in Tables A, B, C and D below:—

AUSTRALIAN LIFE TABLES : A.
Comparative rates of mortality (1000 q_x).

Age.				1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
MALES.								
0	..	..	..	132.5	118.4	95.1	71.3	45.4
10	..	..	..	2.5	2.3	1.8	1.6	1.2
20	..	..	..	7.1	4.7	3.7	2.8	2.2
30	..	..	..	8.7	7.0	5.2	3.9	2.7
40	..	..	..	11.3	9.7	8.2	6.2	4.6
50	..	..	..	18.6	15.2	14.0	11.6	9.7
60	..	..	..	32.3	30.3	25.8	24.1	22.2
70	..	..	..	64.2	60.5	61.6	52.9	50.8
80	..	..	..	136.5	138.4	138.0	133.4	126.6
90	..	..	..	256.9	258.4	277.4	283.0	249.9
100	..	..	..	473.9	481.1	525.4	530.0	552.7

AUSTRALIAN LIFE TABLES : A—*continued.*

Comparative rates of mortality (1000 q_x)—*continued.*

Age.	1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
FEMALES.					
0	115.7	101.4	79.5	55.7	36.4
10	2.4	2.0	1.6	1.3	0.9
20	5.3	3.9	3.3	2.5	1.8
30	8.3	6.5	5.2	3.9	2.8
40	10.4	8.4	7.2	5.2	4.0
50	14.0	11.4	9.6	8.1	7.4
60	24.0	22.5	19.2	15.7	14.7
70	52.2	46.7	47.8	40.9	38.0
80	124.5	122.4	113.3	112.3	101.1
90	253.6	240.0	242.2	251.1	233.9
100	452.8	501.9	500.7	501.0	586.5

AUSTRALIAN LIFE TABLES : B.

Numbers surviving (l_x).

Age.	1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
MALES.					
0	100,000	100,000	100,000	100,000	100,000
10	79,700	82,781	86,622	89,389	93,193
20	76,630	80,349	84,493	87,697	91,797
30	70,531	75,706	80,844	84,743	89,566
40	64,106	69,788	75,887	80,813	86,539
50	55,606	62,014	68,221	74,330	81,061
60	43,483	50,205	56,782	63,386	69,950
70	27,291	32,134	38,275	44,332	50,086
80	10,438	12,568	14,330	18,614	22,223
90	1,328	1,501	1,652	2,141	2,935
100	22	25	15	17	44

FEMALES.

0	100,000	100,000	100,000	100,000	100,000
10	81,643	84,606	88,395	91,314	94,424
20	79,099	82,473	86,459	89,906	93,341
30	73,862	78,329	82,909	87,086	91,174
40	67,453	72,487	78,001	83,279	88,175
50	59,978	66,095	71,945	78,313	83,680
60	50,939	56,617	63,247	70,150	75,565
70	34,877	40,943	46,793	54,771	59,629
80	15,691	18,631	21,356	27,170	31,539
90	2,095	2,833	3,566	4,238	5,808
100	42	52	56	62	73

AUSTRALIAN LIFE TABLES : C.

Complete expectations of life (e_x^0).

Age.	1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
MALES.					
0	47.2	51.1	55.2	59.2	63.5
10	48.9	51.4	53.5	56.0	58.0
20	40.6	42.8	44.7	47.0	48.8
30	33.6	35.1	36.5	38.4	39.9
40	26.5	27.7	28.6	30.1	31.1
50	19.7	20.5	21.2	22.2	22.8
60	13.8	14.0	14.3	15.1	15.6
70	8.8	8.9	8.7	9.3	9.6
80	5.1	5.0	5.0	5.0	5.2
90	2.9	2.9	2.6	2.6	3.0
100	1.3	1.3	1.2	1.2	1.1

FEMALES.					
0	50.8	54.8	58.8	63.3	67.1
10	52.0	54.5	56.4	59.2	61.0
20	43.4	45.7	47.5	50.0	51.7
30	36.1	37.9	39.3	41.5	42.8
40	29.1	30.5	31.5	33.1	34.0
50	22.1	22.9	23.7	24.9	25.6
60	15.4	15.9	16.2	17.2	17.7
70	9.7	9.9	10.0	10.4	11.0
80	5.3	5.5	5.7	5.6	6.0
90	3.0	3.1	3.0	2.9	3.0
100	1.4	1.2	1.2	1.2	1.0

AUSTRALIAN LIFE TABLES : D.

Probability of surviving 10 years ($_{10}P_x$).

Age.	1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
MALES.					
0 .. .. .	.797	.828	.866	.894	.932
10 .. .. .	.961	.971	.975	.981	.985
20 .. .. .	.920	.942	.957	.966	.976
30 .. .. .	.909	.922	.939	.954	.966
40 .. .. .	.867	.889	.899	.920	.937
50 .. .. .	.782	.810	.832	.853	.863
60 .. .. .	.628	.640	.674	.699	.716
70 .. .. .	.382	.391	.374	.420	.444
80 .. .. .	.127	.119	.115	.115	.132
90 .. .. .	.017	.017	.009	.008	.015

AUSTRALIAN LIFE TABLES : D—continued.
 Probability of surviving 10 years ($_{10}P_x$)—continued.

Age.	1881-90.	1891-1900.	1901-10.	1920-22.	1932-34.
FEMALES.					
0 .. .. .	.816	.846	.884	.913	.944
10 .. .. .	.969	.975	.978	.985	.989
20 .. .. .	.934	.950	.959	.969	.977
30 .. .. .	.913	.925	.941	.956	.967
40 .. .. .	.889	.912	.922	.940	.949
50 .. .. .	.834	.857	.879	.896	.903
60 .. .. .	.697	.723	.740	.781	.789
70 .. .. .	.450	.455	.456	.496	.529
80 .. .. .	.134	.152	.167	.156	.184
90 .. .. .	.020	.018	.016	.015	.013

One more comparison is possible and reasonable, and that is a comparison between the rates of mortality deduced from population statistics and those deduced from Friendly Society Experience. The most useful Friendly Society Table for this purpose I considered to be Mr. Gawler's Table compiled from South Australian Experience 1920-29. A comparison of the rates over a selected period at quinquennial intervals is given as follows :—

TABLE E.
 q_x : MALES.

Age.	S.A.	A^{M33} .	A^{M21} .
20 .. .. .	.00218	.00219	.00284
25 .. .. .	.00242	.00249	.00355
30 .. .. .	.00280	.00271	.00390
35 .. .. .	.00341	.00346	.00475
40 .. .. .	.00441	.00460	.00617
45 .. .. .	.00603	.00659	.00844
50 .. .. .	.00865	.00966	.01158
55 .. .. .	.01289	.01493	.01552
60 .. .. .	.01970	.02216	.02407
65 .. .. .	.03067	.03311	.03552
70 .. .. .	.04818	.05082	.05290
75 .. .. .	.07591	.07808	.08340
80 .. .. .	.12550	.12659	.13340

In comparing Mr. Gawler's Table with A^{M33} , two things must be remembered. Firstly, that the Friendly Societies deal with the more provident members of the population, and secondly, that South Australia is a State of rather unusually light mortality. It would therefore be expected that Mr. Gawler's results would be somewhat more favourable than those of A^{M33} , even when allowance is made for the difference in time, and as a matter of fact they are. But when due allowance is made for these factors, I think it may be admitted that these two tables confirm each other to a remarkable degree, except for a short section in later middle age, and when compared with A^{M21} , give striking evidence as to the advancing vitality of the Australian population.

In conclusion, I think it is hardly necessary to lay stress upon the advantages of periodical investigations of this nature. Questions relating to schemes of Social Insurance and Superannuation are becoming every day more insistent in Australia, and direct evidence as to the national vitality more and more valuable. It is unusual for a portion of the census investigation to be published in advance of the main volume, but it is probable that there never was a time when up-to-date evidence as to the trend of population mortality was so important and so likely to be useful as it is to-day. If the results now submitted are held to be of interest, and even of value, I hope it will be considered that the experiment has not been altogether unsuccessful.

APPENDIX : AUSTRALIAN LIFE TABLES—1932-1934.

Age.	l_x	d_x	p_x	q_x	e_x
0	100,000	4,543	.95457	.04543	63.478
1	95,457	740	.99225	.00775	65.493
2	94,717	358	.99622	.00378	65.003
3	94,359	271	.99713	.00287	64.247
4	94,088	201	.99786	.00214	63.431
5	93,887	173	.99816	.00184	62.566
6	93,714	151	.99839	.00161	61.680
7	93,563	134	.99857	.00143	60.779
8	93,429	121	.99870	.00130	59.865
9	93,308	115	.99877	.00123	58.943
10	93,193	111	.99881	.00119	58.015
11	93,082	111	.99881	.00119	57.083
12	92,971	114	.99877	.00123	56.151
13	92,857	120	.99871	.00129	55.219
14	92,737	128	.99862	.00138	54.290
15	92,609	138	.99851	.00149	53.364
16	92,471	150	.99838	.00162	52.443
17	92,321	162	.99825	.00175	51.527
18	92,159	174	.99811	.00189	50.617
19	91,985	188	.99796	.00204	49.712
20	91,797	201	.99781	.00219	48.812
21	91,596	213	.99767	.00233	47.918
22	91,383	222	.99757	.00243	47.029
23	91,161	224	.99754	.00246	46.142
24	90,937	226	.99752	.00248	45.255
25	90,711	226	.99751	.00249	44.366
26	90,485	226	.99750	.00250	43.476
27	90,259	227	.99749	.00251	42.583
28	90,032	230	.99744	.00256	41.689
29	89,802	236	.99737	.00263	40.795
30	89,566	243	.99729	.00271	39.901
31	89,323	251	.99719	.00281	39.008
32	89,072	261	.99707	.00293	38.117
33	88,811	274	.99692	.00308	37.227
34	88,537	289	.99674	.00326	36.341
35	88,248	305	.99654	.00346	35.458
36	87,943	324	.99632	.00368	34.579
37	87,619	342	.99610	.00390	33.705
38	87,277	360	.99587	.00413	32.835
39	86,917	378	.99565	.00435	31.969
40	86,539	398	.99540	.00460	31.107
41	86,141	421	.99511	.00489	30.248
42	85,720	448	.99477	.00523	29.394
43	85,272	480	.99437	.00563	28.546
44	84,792	516	.99391	.00609	27.705

Table 1.—Males—Elementary Values. A^{M33} .

AUSTRALIAN LIFE TABLES—1932-1934—continued.

Age.	l_x	d_x	P_x	q_x	e_x
45	84,276	555	.99341	.00659	26.872
46	83,721	597	.99287	.00713	26.046
47	83,124	642	.99228	.00772	25.230
48	82,482	687	.99167	.00833	24.422
49	81,795	734	.99103	.00897	23.623
50	81,061	783	.99034	.00966	22.832
51	80,278	839	.98955	.01045	22.050
52	79,439	902	.98864	.01136	21.278
53	78,537	976	.98757	.01243	20.516
54	77,561	1,057	.98637	.01363	19.768
55	76,504	1,142	.98507	.01493	19.034
56	75,362	1,229	.98369	.01631	18.315
57	74,133	1,315	.98226	.01774	17.610
58	72,818	1,396	.98083	.01917	16.919
59	71,422	1,472	.97939	.02061	16.240
60	69,950	1,550	.97784	.02216	15.571
61	68,400	1,633	.97613	.02387	14.913
62	66,767	1,725	.97417	.02583	14.265
63	65,042	1,824	.97196	.02804	13.630
64	63,218	1,926	.96954	.03046	13.009
65	61,292	2,029	.96689	.03311	12.402
66	59,263	2,136	.96396	.03604	11.809
67	57,127	2,243	.96074	.03926	11.232
68	54,884	2,348	.95721	.04279	10.670
69	52,536	2,450	.95337	.04663	10.124
70	50,086	2,545	.94918	.05082	9.595
71	47,541	2,634	.94459	.05541	9.082
72	44,907	2,714	.93956	.06044	8.585
73	42,193	2,779	.93414	.06586	8.105
74	39,414	2,826	.92831	.07169	7.641
75	36,588	2,857	.92192	.07808	7.192
76	33,731	2,876	.91475	.08525	6.759
77	30,855	2,882	.90660	.09340	6.342
78	27,973	2,883	.89695	.10305	5.944
79	25,090	2,867	.88573	.11427	5.570
80	22,223	2,813	.87341	.12659	5.224
81	19,410	2,706	.86059	.13941	4.909
82	16,704	2,539	.84801	.15199	4.624
83	14,165	2,325	.83583	.16417	4.364
84	11,840	2,088	.82362	.17638	4.125
85	9,752	1,840	.81136	.18864	3.903
86	7,912	1,590	.79902	.20098	3.697
87	6,322	1,349	.78658	.21342	3.505
88	4,973	1,122	.77429	.22571	3.324
89	3,851	916	.76220	.23780	3.152

Table I.—Males—Elementary Values. A^{M33} —continued.

AUSTRALIAN LIFE TABLES—1932-1934—continued.

Age.	l_x	d_x	P_x	q_x	e_x
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Table I.—Males—Elementary Values. A^{1933} —continued.

90	2,935	733	.75014	.24986	2.985
91	..	..	..	2,202	577	.73774	.26226	2.819
92	..	..	..	1,625	448	.72441	.27559	2.651
93	..	..	..	1,177	342	.70941	.29059	2.477
94	..	..	..	835	257	.69171	.30829	2.296
95	..	..	..	578	191	.67012	.32988	2.108
96	..	..	..	387	138	.64323	.35677	1.912
97	..	..	..	249	97	.60943	.39057	1.711
98	..	..	..	152	66	.56690	.43310	1.506
99	..	..	..	86	42	.51360	.48640	1.302
100	..	..	..	44	24	.44730	.55270	1.100
101	..	..	..	20	13	.36555	.63445	.903
102	..	..	..	7	5	.26569	.73431	.705
103	..	..	..	2	2	.14486	.85514	.515
104	..	..	..	..	..	.00000	1.00000	.325

Table II.—Females—Elementary Values. A^{1933} .

0	..	..	..	100,000	3,642	.96358	.03642	67.144
1	..	..	..	96,358	622	.99355	.00645	68.674
2	..	..	..	95,736	315	.99671	.00329	68.118
3	..	..	..	95,421	230	.99759	.00241	67.342
4	..	..	..	95,191	198	.99792	.00208	66.503
5	..	..	..	94,993	150	.99842	.00158	65.641
6	..	..	..	94,843	127	.99866	.00134	64.744
7	..	..	..	94,716	109	.99885	.00115	63.830
8	..	..	..	94,607	96	.99899	.00101	62.903
9	..	..	..	94,511	87	.99908	.00092	61.966
10	..	..	..	94,424	82	.99913	.00087	61.023
11	..	..	..	94,342	81	.99914	.00086	60.075
12	..	..	..	94,261	84	.99911	.00089	59.127
13	..	..	..	94,177	89	.99905	.00095	58.179
14	..	..	..	94,088	97	.99897	.00103	57.234
15	..	..	..	93,991	106	.99887	.00113	56.292
16	..	..	..	93,885	117	.99875	.00125	55.355
17	..	..	..	93,768	129	.99862	.00138	54.424
18	..	..	..	93,639	142	.99848	.00152	53.498
19	..	..	..	93,497	156	.99833	.00167	52.579
20	..	..	..	93,341	171	.99817	.00183	51.666
21	..	..	..	93,170	184	.99802	.00198	50.760
22	..	..	..	92,986	197	.99788	.00212	49.860
23	..	..	..	92,789	208	.99776	.00224	48.965
24	..	..	..	92,581	217	.99766	.00234	48.073

AUSTRALIAN LIFE TABLES—1932-1934—continued.

Age.	l_x	d_x	P_x	q_x	e_x
25	92,364	224	.99757	.00243	47.185
26	92,140	232	.99748	.00252	46.299
27	91,908	239	.99740	.00260	45.414
28	91,669	245	.99733	.00267	44.531
29	91,424	250	.99727	.00273	43.649
30	91,174	254	.99721	.00279	42.767
31	90,920	260	.99714	.00286	41.886
32	90,660	267	.99705	.00295	41.004
33	90,393	278	.99692	.00308	40.124
34	90,115	292	.99676	.00324	39.247
35	89,823	306	.99659	.00341	38.372
36	89,517	320	.99642	.00358	37.502
37	89,197	333	.99627	.00373	36.635
38	88,864	341	.99616	.00384	35.770
39	88,523	348	.99607	.00393	34.906
40	88,175	354	.99598	.00402	34.042
41	87,821	364	.99585	.00415	33.177
42	87,457	379	.99567	.00433	32.314
43	87,078	399	.99542	.00458	31.452
44	86,679	423	.99512	.00488	30.594
45	86,256	451	.99477	.00523	29.742
46	85,805	481	.99439	.00561	28.895
47	85,324	513	.99399	.00601	28.056
48	84,811	547	.99355	.00645	27.222
49	84,264	584	.99307	.00693	26.396
50	83,680	623	.99256	.00744	25.576
51	83,057	662	.99203	.00797	24.764
52	82,395	703	.99147	.00853	23.959
53	81,692	742	.99092	.00908	23.161
54	80,950	778	.99039	.00961	22.369
55	80,172	817	.98981	.01019	21.581
56	79,355	862	.98914	.01086	20.798
57	78,493	915	.98834	.01166	20.020
58	77,578	975	.98743	.01257	19.251
59	76,603	1,038	.98645	.01355	18.489
60	75,565	1,108	.98534	.01466	17.736
61	74,457	1,188	.98404	.01596	16.993
62	73,269	1,282	.98250	.01750	16.260
63	71,987	1,390	.98069	.01931	15.541
64	70,597	1,508	.97864	.02136	14.837

Table II.—Females—Elementary Values. A^{F33} —continued.

AUSTRALIAN LIFE TABLES—1932-1934—continued.

Age.	l_x	d_x	p_x	q_x	\ddot{e}_x
65	69,089	1,634	.97635	.02365	14.150
66	67,455	1,764	.97385	.02615	13.480
67	65,691	1,895	.97115	.02885	12.828
68	63,796	2,022	.96830	.03170	12.194
69	61,774	2,145	.96528	.03472	11.577
70	59,629	2,267	.96198	.03802	10.975
71	57,362	2,394	.95827	.04173	10.389
72	54,968	2,526	.95404	.04596	9.820
73	52,442	2,665	.94919	.05081	9.268
74	49,777	2,800	.94374	.05626	8.738
75	46,977	2,926	.93771	.06229	8.228
76	44,051	3,033	.93114	.06886	7.742
77	41,018	3,115	.92406	.07594	7.277
78	37,903	3,169	.91639	.08361	6.834
79	34,734	3,195	.90802	.09198	6.411
80	31,539	3,187	.89894	.10106	6.010
81	28,352	3,143	.88916	.11084	5.630
82	25,209	3,058	.87868	.12132	5.269
83	22,151	2,939	.86731	.13269	4.928
84	19,212	2,787	.85492	.14508	4.606
85	16,425	2,601	.84163	.15837	4.304
86	13,824	2,383	.82760	.17240	4.021
87	11,441	2,139	.81302	.18698	3.756
88	9,302	1,879	.79797	.20203	3.508
89	7,423	1,615	.78240	.21760	3.272
90	5,808	1,359	.76609	.23391	3.047
91	4,449	1,118	.74870	.25130	2.829
92	3,331	900	.72971	.27029	2.616
93	2,431	709	.70850	.29150	2.407
94	1,722	544	.68428	.31572	2.200
95	1,178	405	.65612	.34388	1.996
96	773	291	.62294	.37706	1.793
97	482	201	.58352	.41648	1.594
98	281	130	.53650	.46350	1.398
99	151	78	.48037	.51963	1.208
100	73	43	.41347	.58653	1.023
101	30	20	.33400	.66600	.842
102	10	8	.24002	.75998	.666
103	2	2	.12943	.87057	.499
104	..	..	.00000	1.00000	.340

Table II.—Females—Elementary Values. A^{F33} —continued.

APPENDIX : TABLES III. and IV.

These show for septennial groups of ages the number of deaths expected in a year on the basis of the graduated rates of mortality, and three times the population as disclosed at the census of 1933. These are compared with the actual deaths in those groups recorded in the years 1932-34. Populations and deaths are adjusted figures, obtained after distribution of "not stated."

TABLE III.
COMPARISON OF ACTUAL WITH EXPECTED DEATHS.

Age Groups.	Expected.	Actual.	Deviation.		Total Accumulated Deviation.
			-	+	
MALES.					
6-12	1,779	1,790	11	..	-11
13-19	2,125	2,152	27	..	-38
20-26	2,972	3,005	33	..	-71
27-33	3,050	2,992	..	58	-13
34-40	3,813	3,811	..	2	-11
41-47	5,719	5,740	21	..	-32
48-54	8,030	8,029	..	1	-31
55-61	10,293	10,278	..	15	-16
62-68	14,633	14,610	..	23	+ 7
69-75	16,956	16,988	32	..	-25
76-82	12,303	12,277	..	26	+ 1
83-89	5,568	5,566	..	2	+ 3
—	87,241	87,238	124	127	+ 3

APPENDIX : TABLE IV.
COMPARISON OF ACTUAL WITH EXPECTED DEATHS.

Age Groups.	Expected.	Actual.	Deviation.		Total Accumulated Deviation.
			-	+	
FEMALES.					
6-12	1,322	1,338	16	..	-16
13-19	1,613	1,577	..	36	+20
20-26	2,597	2,597	..	..	+20
27-33	2,800	2,876	..	14	+34
34-40	3,688	3,685	..	3	+37
41-47	4,451	4,466	15	..	+22
48-54	5,690	5,718	28	..	- 6
55-61	6,679	6,672	..	7	+ 1
62-68	10,189	10,157	..	32	+33
69-75	12,588	12,643	55	..	-22
76-82	10,204	10,237	33	..	-55
83-89	6,000	5,952	..	48	- 7
—	67,911	67,918	147	140	- 7

APPENDIX : TABLE V. (ILLUSTRATION).
 INTERPOLATION FROM 6-16.—NEWTON-SHEPPARD SYSTEM OF ADJUSTED
 DIFFERENCES.
 Females.

$q_x \times 10^8$		1st Difference.		2nd Difference.		3rd Difference.	
18	152,000						
		(-1)	+14,000				
17	138,000			(-6/2)	+1,400		
		(-5)	+9,800			(-13/3)	-433
12	89,000			(-12/2)	+3,276		
		(-7)	-9,857			(-11/3)	-433
5	158,000			(-6/2)	+4,864		
		(1)	-24,449			(-5/3)	-433
6	133,551			(1)	+5,586		
		(1)	-18,863			(1)	-433
7	114,688			(1)	+5,153		
		(1)	-13,710			(1)	-433
8	100,978			(1)	+4,720		
		(1)	-8,990			(1)	-433
9	91,988			(1)	+4,287		
		(1)	-4,703			(1)	-433
10	87,285			(1)	+3,854		
		(1)	-849			(1)	-433
11	86,436			(1)	+3,421		
		(1)	+2,572			(1)	-433
12	89,008			(1)	+2,988		
		(1)	+5,560			(1)	-433
13	94,568			(1)	+2,555		
		(1)	+8,115			(1)	-433
14	102,683			(1)	+2,122		
		(1)	+10,237			(1)	-433
15	112,920			(1)	+1,689		
		(1)	+11,926			(1)	-433
16	124,846			(1)	+1,256		
		(1)	+13,182			(1)	-433
17	138,028			(1)	+823		
		(1)	+14,005			(1)	-433
18	152,033						

The final values of q_{12} q_{17} q_{18} fail to close exactly, since some of the adjusted differences have to be cut down to the nearest whole number.

The originating rates are $q_5 = .00158$
 $q_{12} = .00089$
 $q_{17} = .00138$
 $q_{18} = .00125$