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## SECTION XXXIV.

## MISCELLANEOUS.

## § 1. Immigration.

## (A) The Encouragement of Immigration into Australia.

1. **Introduction.**—Various measures have from time to time been adopted by the Commonwealth and State Governments, as well as by private societies and individuals, with a view to promoting the immigration of suitable classes of settlers into Australia. Since the outbreak of war, however, this work has remained in abeyance. The activities of the Commonwealth Government (which is vested with constitutional powers in regard to immigration under Sec. 51, xxvii., of the Constitution Act 1900) with respect to the encouragement of immigration, have hitherto practically been confined to advertising the resources and attractions of Australia in handbooks, newspapers, and periodicals.

2. **State Immigration.**—The advertising in the United Kingdom of the resources of the individual States has been carried out by their Agents-General in London. During 1910 and the three subsequent years, a great advance was made in Australian immigration generally, the State Governments having adopted more active and direct means than had hitherto existed for making the advantages and opportunities of their respective States better known to the people of the United Kingdom, Europe, and America. During the war, no State action was taken in the matter of immigration. In previous issues of the Year Book will be found in detail the various methods under which intending immigrants could obtain information and assistance (see Year Book No. 8, p. 1053).

Particulars of the net immigration to the Commonwealth are given on page 95, and of assisted immigration on page 115 hereinbefore.

3. **Commonwealth Scheme of Immigration.**—Prior to the war the Commonwealth Government supplemented the efforts of the States to promote immigration by a scheme of general advertising of the resources and attractions of the Commonwealth. An agreement, however, has now been reached between the Commonwealth and States under which the Commonwealth, in addition to carrying on propaganda work, will be responsible for, and have full control of, all organizations and transport arrangements for bringing immigrants to Australia. The sum of £100,000 has been provided on the Commonwealth Estimates for 1920–21 to meet the expenses of this scheme. The States will be responsible for the reception of the immigrants on arrival in Australia, and for their settlement on the land or employment on public works, etc.

4. **The High Commissioner for Australia and the Agents-General.**—Intending settlers or immigrants may, on application, obtain information from the High Commissioner for Australia—

THE RIGHT HON. A. FISHER, P.C.,  
AUSTRALIA HOUSE,  
STRAND,  
LONDON, W.C.

Information regarding individual States may be obtained from the officials specified below :—

## AUSTRALIAN AGENTS-GENERAL.

<i>New South Wales</i> ..	(Vacant)*	
<i>Victoria</i> ..	Sir PETER MCBRIDE, K.B.	Australia House, Strand, London
<i>Queensland</i> ..	The Hon. J. MCE. HUNTER ..	Marble Hall, 409–10, Strand, London
<i>South Australia</i> ..	Hon. EDWARD LUCAS ..	Strand, London, E.C.
<i>Western Australia</i> ..	Sir J. D. CONNOLLY, K.B.	Savoy House, Strand, London, W.C.
<i>Tasmania</i> ..	A. H. ASHBOLT ..	Strand, London, W.C.

\* Sir T. A. Coghlan (acting), Strand, London, W.C.

## (B) The Regulation of Immigration into Australia.

1. **Pre-Federal Restrictions.**—(i) *Alien Races.* The several States of Australia had regarded it as desirable, long prior to Federation, to impose certain restrictions upon the admission of persons wishing to become inhabitants of those States. The influx of Chinese for example, was limited by stringent statutes, and later, general Acts were passed in some of the States which had the effect of restricting the immigration of other—principally Asiatic—races.

(ii) *Undesirable Immigrants.* Further restrictions were placed upon the admission of persons who were undesirable as inhabitants, either for medical or moral reasons, or who were likely to be an economic burden upon the community.

2. **Powers and Legislation of the Commonwealth.**—(i) *Constitutional Powers.* By Chap. I, Pt. V., Sec. 51, xxvii. and xxviii. of the Commonwealth Constitution Act the Parliament of the Commonwealth is empowered to make laws with respect to immigration and emigration and the influx of criminals. (See page 22 herein.)

(ii) *Legislation.* The powers above specified have now been exercised by the Commonwealth Government, and the laws passed in pursuance thereof supersede the previously existing State laws. The present Commonwealth Acts dealing with Immigration are the Immigration Act 1901–1912 and the Contract Immigrants Act 1905. A summary of the provisions of these Acts, giving particulars regarding the admission of immigrants, prohibited immigrants, the liabilities of ship masters and others, and kindred matters will be found in preceding Year Books (see Year Book, No. 12, pp. 1166–1168).

3. **Agreements with other Countries.**—Arrangements may be made with the Government of any country regulating the admission into Australia of the subjects or citizens of such country, such subjects not being, during the subsistence of the arrangement, required to pass the dictation test.

Persons who have resided either continuously or from time to time in the Commonwealth for a period of five years in the whole, and who are about to depart from it, being persons who, if they return, would be prohibited immigrants, may obtain a certificate of exemption entitling them to return.

Certificates of exemption are granted by the Minister for Home and Territories, whose department administers the Act, and by the Collector of Customs in each State.

4. **Statistics.**—The following tables shew the number of persons who desired but were not permitted to land, those who were allowed to land, and the nationality of the persons admitted:—

### PERSONS ADMITTED OR REFUSED ADMISSION TO COMMONWEALTH UNDER PROVISIONS OF IMMIGRATION RESTRICTION ACT, 1911 TO 1919.

Year.	Persons Admitted who Passed Education Test.	Persons Admitted without Passing Education Test.	Persons Refused Admission.
1911 .. ..	Nil	139,020	83
1912 .. ..	Nil	163,990	187
1913 .. ..	Nil	140,251	109
1914 .. ..	Nil	110,701	54
1915 .. ..	Nil	70,436	56
1916 .. ..	Nil	59,140	233
1917 .. ..	Nil	53,036	13
1918 .. ..	Nil	77,169	16
1919 .. ..	Nil	223,736	27

NATIONALITIES OF PERSONS ADMITTED WITHOUT TEST, 1911 TO 1919.

Nationality.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
<b>EUROPEANS—</b>									
Austrians .. .. .	1,184	855	794	676	(d)27	(d)10	..	(d)3	(d)22
Belgians .. .. .	84	95	63	63	105	69	35	35	31
British .. .. .	124,061	146,602	122,443	93,136	60,505	50,489	45,988	e71,765	f217,037
Danes .. .. .	393	371	444	478	305	173	137	110	124
Dutch .. .. .	307	435	288	287	182	156	194	163	526
French .. .. .	1,166	1,238	1,491	1,187	595	516	676	571	815
Germans .. .. .	2,517	3,501	3,155	3,395	(d)890	(d)452	(d)58	(d)36	(d)54
Greeks .. .. .	583	736	480	772	361	160	265	288	93
Italians .. .. .	1,365	1,632	1,963	1,642	645	179	93	24	116
Maltese .. .. .	41	122	193	464	57	173	212	14	47
Poles .. .. .	34	17	7	12	2	..	1	3	2
Portuguese .. .. .	6	9	25	12	1	..	7	8	9
Rumanians .. .. .	13	24	9	34	6	8	13	9	6
Russians .. .. .	994	1,159	1,334	1,446	716	497	341	199	142
Scandinavians .. .. .	1,384	1,303	1,285	1,489	1,202	786	552	493	448
Spaniards .. .. .	128	118	116	169	206	51	37	23	37
Swiss .. .. .	130	209	202	220	64	40	21	39	30
Turks .. .. .	10	6	5	19	1	1	..	..	(d)1
Other Europeans .. .. .	27	(a)57	5	(b)165	13	7	1	..	106
<b>AMERICANS—</b>									
North Americans .. .. .	914	1,386	1,713	1,529	1,066	1,050	870	749	1,102
South Americans .. .. .	17	37	14	31	5	16	24	12	8
American Indians .. .. .	31	9	1	1	..	..	..	..	..
Negroes .. .. .	13	47	7	23	9	8	9	2	5
West Indians .. .. .	11	8	1	3	2	9	1	3	5
<b>ASIATICS—</b>									
Afghans .. .. .	14	17	7	2	3	..	..	..	..
Arabs .. .. .	1	18	14	19	2	6	..	..	..
Burmese .. .. .	..	..	1	1	1	..	..	..	..
Chinese .. .. .	2,009	2,250	2,286	1,975	2,287	2,289	2,016	1,723	1,495
Cingalese .. .. .	4	17	8	9	6	18	11	2	7
Eurasians .. .. .	7	13	2	..	..	..	..	..	..
Filipinos .. .. .	17	13	12	4	15	15	15	10	18
Hindoos .. .. .	188	157	187	305	144	133	111	102	203
Japanese .. .. .	459	698	822	387	423	1,089	888	431	521
Javanese .. .. .	12	6	3	20	3	4	20	21	27
Malays .. .. .	479	326	303	291	285	254	190	65	320
Syrians .. .. .	104	75	31	19	5	14	13	1	6
<b>OTHER RACES—</b>									
Maoris .. .. .	31	32	41	21	16	6	2	1	..
Mauritians .. .. .	9	2	7	10	..	..	..	..	..
Pacific Islanders .. .. .	69	92	105	101	37	59	40	43	24
Papuans .. .. .	139	196	171	189	185	178	132	133	135
St. Helena Blacks .. .. .	..	..	..	..	..	..	..	..	..
Unspecified .. .. .	(e)85	(c)102	(c)214	(e)104	(e)58	(e)225	63	(c)88	214
<b>Total .. .. .</b>	<b>139,020</b>	<b>163,990</b>	<b>140,251</b>	<b>110,701</b>	<b>70,436</b>	<b>59,140</b>	<b>53,036</b>	<b>77,169</b>	<b>223,736</b>

(a) Bulgarians. (b) Including 162 Bulgarians. (c) A large percentage of these immigrants was Timorese. (d) Principally prisoners of war and their families. (e) Including 44,151 returned troops and nurses. (f) Including 163,756 troops and nurses.

The following table shews to what extent immigration has taken place into the several States of the Commonwealth from 1911 to 1919:—

IMMIGRATION INTO THE SEVERAL STATES OF THE COMMONWEALTH, 1911 TO 1919.

Year.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	C'wealth.
1911 ..	69,640	21,488	17,778	7,039	18,386	4,563	126	139,020
1912 ..	86,239	34,568	11,820	10,035	16,624	4,480	224	163,990
1913 ..	73,946	29,121	10,496	8,220	15,985	2,350	133	140,251
1914 ..	67,221	20,720	8,594	4,820	6,954	2,249	143	110,701
1915 ..	44,899	13,028	3,963	1,847	4,358	1,925	416	70,436
1916 ..	36,782	12,970	2,426	924	4,054	1,735	249	59,140
1917 ..	32,825	10,701	1,814	1,540	4,761	1,133	262	53,036
1918 ..	37,375	31,114	1,474	1,958	5,043	..	205	77,169
1919 ..	96,331	84,751	6,007	16,897	18,507	1,163	80	223,736

## § 2. Patents, Trade Marks, and Designs.

1. **Devolution of Jurisdiction upon the Commonwealth.**—Prior to the establishment of Federation, and for a few years thereafter, each Australian State possessed independent jurisdiction in respect of patents, copyrights, trade marks, and designs, and had, with the exception of Tasmania in regard to copyrights, enacted its own laws. Any person, therefore, who desired to obtain the grant of a patent, or the registration of any copyright, trade mark, or design had necessarily, with the exception aforesaid, to incur the trouble and expense of making separate applications in each State. The Commonwealth Constitution Act conferred upon the Federal Parliament power to legislate respecting these matters. (See page 22 hereinbefore.) The Patents Act of 1909 applied the laws relating to patents for inventions to the Territory of Papua.

The State Acts, though in general based upon the Imperial Statutes dealing with these subjects, were not wholly governed by them. The Commonwealth Acts, both in regard to principle and practice, have the same general foundation as the Imperial Statutes, but in some respects have been modified and brought into line in accordance with Australian experience.

2. **Patents.**—(i) *General.* The first Commonwealth Patents Act was passed in 1903, and was amended in 1906, 1909, 1910, 1915 and 1916. (See page 41 *ante.*) Under these Acts, which are administered by a "Commissioner of Patents," the powers and functions exercised under the States Acts became vested in the Commonwealth. Comparatively small fees, totalling £8, are now sufficient to obtain for an inventor protection throughout the Commonwealth and the Territory of Papua, and the only renewal fee (£5) is payable before the expiration of the seventh year of the patent, or within such extended time, not exceeding one year, and upon payment of further fees as may be allowed. Particulars in regard to the terms under which patents are granted, publications, etc., of the Commonwealth Patents Office, have been given in full in preceding issues of the Official Year Book. (See Year Book 12, p. 1170 *et seq.*) Limits of space preclude their repetition in the present issue.

(ii) *Applications Filed, Provisional Specifications Accepted, and Letters Patent Sealed.* The numbers of individual inventions in respect of which applications were filed in the Commonwealth during each year from 1910 to 1919 inclusive are shewn in the following table. The number of applications accompanied by provisional specifications and the number of patents sealed in respect of applications made in each year are also shewn.

### PATENTS.—APPLICATIONS FILED AND LETTERS PATENT SEALED IN THE COMMONWEALTH, 1910 TO 1919.

Year	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
No. of applications .. .. .	3,605	3,497	4,071	4,163	3,486	3,117	2,906	3,244	3,543	4,166
No. of applications accompanied by provisional specifications	2,294	2,290	2,273	2,626	2,232	2,133	1,980	2,186	2,405	2,468
Letters patent sealed during each year .. .. .	1,552	2,027	1,502	1,495	2,098	1,279	1,162	1,218	1,130	1,452

(iii) *Revenue of Patent Office.* The revenue of the Commonwealth Patent Office or each year from 1910 to the end of the year 1919 is shewn in the subjoined table:—

### REVENUE OF COMMONWEALTH PATENT OFFICE, 1910 TO 1919.

Particulars.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
	£	£	£	£	£	£	£	£	£	£
Fees collected under—										
States Patents Acts ..	1,940	768	118	50	16	19	15	11	15	4
Patents Acts 1903-16	17,042	19,640	18,542	18,800	21,575	15,463	14,055	15,629	16,223	19,764
Receipts from publications	208	237	305	283	274	298	294	281	317	414
Petty receipts .. .. .	33	48	50	49	81	6	4	..	..	..
Total .. .. .	19,223	20,693	19,015	19,182	21,946	15,786	14,368	15,921	16,555	20,182

3. Trade Marks.—The remarks made concerning the unification of the patent system of the Commonwealth apply equally to trade marks. Under the Trade Marks Act 1905, which came into force on the 2nd July, 1906, the Commissioner of Patents is appointed to act also as “Registrar of Trade Marks.” The Trade Marks Act of 1905 was amended by the Patents, Trade Marks, and Designs Act 1910, assented to on the 14th November, 1910, by the Trade Marks Act 1912, and by the Trade Marks Act 1919, and is now cited as the Trade Marks Act 1905-1919. The principal objects of the amending Act were to enlarge the scope of marks capable of registration, and repeal the provisions of the Act of 1905 relating to the “Workers Trade Mark,” the provisions regarding which were held to be unconstitutional. 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 in their opinion the conditions as to remuneration of labour in connexion with their manufacture are fair and reasonable. (See also Official Year Book 12, p. 1173.)

4. Designs.—The Designs Act of 1906 came into operation on the 1st January, 1907, being subsequently amended by the Patents, Designs and Trade Marks Act 1910, and the Designs Act 1912, and is now cited as the Designs Act 1906-12. Under this Act a Commonwealth Designs Office has been established and the Commissioner of Patents appointed “Registrar of Designs.” (See also Official Year Book 12, p. 1174.)

5. Applications for Trade Marks and Designs.—The following table gives particulars of applications for trade marks and designs received and registered under the Commonwealth Acts from 1910 to 1919 inclusive :—

**APPLICATIONS FOR TRADE MARKS AND DESIGNS RECEIVED AND REGISTERED UNDER COMMONWEALTH ACTS, 1910 TO 1919.**

Applications.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
<b>RECEIVED.</b>										
Trade Marks ..	1,729	1,977	1,803	1,957	1,619	1,526	1,636	1,532	1,739	2,634
Designs ..	186	203	235	301	267	326	298	266	262	256
<b>REGISTERED.</b>										
Trade Marks ..	1,190	1,323	1,389	1,468	1,272	1,015	1,126	1,033	1,095	1,229
Designs ..	160	180	211	281	220	266	253	236	223	203

The following table shows the revenue of the Trade Marks and Designs Office during the years 1915 to 1919 :—

**REVENUE OF TRADE MARKS AND DESIGNS OFFICE, 1915 TO 1919.**

Particulars.	1915.			1916.			1917.			1918.			1919.		
	Trade Marks.	Designs.	Publ-ications.	Trade Marks.	Designs.	Publ-ications.	Trade Marks.	Designs.	Publ-ications.	Trade Marks.	Designs.	Publ-ications.	Trade Marks.	Designs.	Publ-ications.
Fees collected under State Acts	£ 32	£ ..	£ ..	£ 21	£ ..	£ ..	£ 28	£ ..	£ ..	£ 14	£ ..	£ ..	£ 192	£ ..	£ ..
Fees collected under Commonwealth Acts	4,024	329	95	4,280	354	89	3,978	312	94	4,330	318	114	5,314	346	101
Total ..	4,056	329	95	4,301	354	89	4,006	312	94	4,344	318	114	5,506	346	101

6. **Enemy Patents and Trade Marks.**—On the outbreak of the European war the Commonwealth Government deemed it advisable to extend the powers of the Governor-General of the Commonwealth during the continuance of hostilities with reference to patents, trade marks, and designs, the property of alien enemies.

Acts Nos. 15 and 16 of 1914 were accordingly passed by the Commonwealth Parliament in November, 1914, giving the Governor-General power to make regulations as follows:—

- (a) for avoiding or suspending in whole or in part any patent or license the person entitled to the benefit of which is the subject of any State at war with the King;
- (b) for avoiding or suspending the registration, and all or any rights conferred by the registration, of any trade mark or design the proprietor whereof is a subject as aforesaid;
- (c) for avoiding or suspending any application made by any such person under any of the Acts referred to in this section;
- (d) for enabling the Minister to grant, in favour of persons other than such persons as aforesaid, on such terms and conditions, and either for the whole term of the patent or registration or for such less period, as the Minister thinks fit, licenses to make, use, exercise or vend patented inventions and registered designs so liable to avoidance or suspension as aforesaid; and
- (e) for extending the time within which any act or thing may be or is required to be done under any of the Acts referred to in this section.

The regulations prescribed by the Governor-General for giving effect to the provisions of these Acts may be found in the official journals issued by the Commonwealth Commissioner of Patents (see *Australian Official Journal of Patents*, vol. 20, No. 47 *et seq.*).

To the end of December, 1918, 21 applications had been made under these Acts to avoid or suspend patents, of which 6 were granted and 3 refused, the others being withdrawn. Thirty-five applications were also made to avoid or suspend trade marks, of which 8 were granted and subsequently revoked, 22 refused, 3 withdrawn, and 2 were still pending. Five hundred and fifty-eight Commonwealth and 319 State registrations of trade marks, and all rights conferred by such registrations, also have been suspended in favour of the Minister of State for Trade and Customs. Two Commonwealth trade marks—"Lysol" and "Aspirin"—were avoided from the 23rd July, 1917, ten patents were suspended in favour of the Minister of State for the Navy, and in addition, four patents were suspended in favour of the Engineer-in-Chief for the Commonwealth Railways and such person or persons as may be licensed by the Minister.

### § 3. Copyright.

1. **Copyright Legislation.**—Prior to the 1st January, 1907, the date on which the Commonwealth Copyright Act of 1905 came into operation, the subject of copyright was regulated by the laws of the separate States. In general, the provisions of State laws were similar to those of the Imperial Copyright law, including the law of 1842 and the earlier unrepealed or subsequent Acts, the most important of which were the Colonial Copyright Act 1847 and the International Copyright Act of 1886. They were also generally included under the British international relations embracing the Berne-Paris provisions of the International Copyright Union and the reciprocal relations with the United States of America, with the exception that in the Austria-Hungary Treaty, New South Wales and Tasmania were not parties, because they did not exercise the right of ratification especially reserved to individual colonies.

Though the Commonwealth Copyright Act of 1905 took the place of the State Copyright Acts formerly in force, it left unaffected existing rights under the State laws, but transferred the administration thereof to the Commonwealth. Provision was also made

under the law of 1905 for the registration of International and State copyrights. The principal features of the Act of 1905 are given in previous issues of the Year Book (see No. 9, p. 1119). This Act was repealed by the Copyright Act of 1912, which was assented to and became operative on the 20th November, 1912. Subject to modifications relating to procedure and remedies, the Commonwealth law of 1912 adopted the British Copyright Act of 1911, and declared the latter law to be in force within the Commonwealth as from the 1st July, 1912. The British Act extends throughout the whole of His Majesty's dominions, but it is not to be in force in a self-governing dominion unless enacted by the legislature thereof either in full or with modifications relating exclusively to procedure and remedies necessary to adapt the Act to the circumstances of the dominion. (See also Official Year Book 12, p. 1176.)

By an Order-in-Council made by the Government of the Commonwealth of Australia, simultaneously with the issue of a Proclamation by the President of the United States of America on the 15th March, 1913, reciprocal protection was extended to citizens of the respective countries in regard to unpublished literary, dramatic, musical and artistic works in which copyright existed on the date mentioned, or may thereafter subsist under the laws of these countries. The enjoyment of the rights conferred by the Order-in-Council is subject to the accomplishment of the conditions and formalities prescribed by law of the United States of America, or, in other words, registration at the Library of Congress, Washington, D.C., U.S.A., is made a condition precedent to the protection of Australian copyright property in the United States of America.

Further details relative to the provisions of the Act of 1912 will be found in previous issues of the Year Book (see No. 8, p. 1066).

2. Applications for Copyright.—The following table gives particulars of copyright applications received and registered under the Commonwealth Acts from 1915 to 1919 inclusive :—

**APPLICATIONS FOR COPYRIGHT RECEIVED AND REGISTERED UNDER  
COMMONWEALTH ACTS, 1915 TO 1919.**

Year.	Copyrights.			
	Literary.	Artistic.	International and State.	Total.
<b>APPLICATIONS RECEIVED.</b>				
1915 .. .. .	740	237	4	981
1916 .. .. .	845	180	..	1,025
1917 .. .. .	835	141	..	976
1918 .. .. .	816	261	4	1,081
1919 .. .. .	923	216	1	1,140
<b>APPLICATIONS REGISTERED.</b>				
1915 .. .. .	742	222	3	967
1916 .. .. .	797	168	..	965
1917 .. .. .	793	140	..	933
1918 .. .. .	750	232	3	985
1919 .. .. .	850	197	..	1,047

The revenue from copyright for the years 1915, 1916, 1917, 1918, and 1919, was £252, £268, £256, £309, and £234 respectively.



### § 4. Old-age and Invalid Pensions.

1. **General.**—In previous issues an account has been given of the introduction of the old-age pension system into Australasia, together with a detailed description of the Commonwealth Invalid and Old-age Pensions Act of 1908, which became operative on 1st July, 1909. (See Year Books 3-8.)

Details regarding Old-age Pensions for the several States as at 30th June, 1919, are as follows :—

#### COMMONWEALTH OLD-AGE PENSIONS, YEAR ENDING 30th JUNE, 1919.

Particulars.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	C'wealth.
Claims examined during year ending 30th June 1919 .. ..	4,438	2,748	1,481	995	548	512	10,722
Claims rejected .. ..	806	116	321	110	67	52	1,472
Claims granted .. ..	3,632	2,632	1,160	885	481	460	9,250
Transfers from other States ..	351	308	123	145	76	57	1,060
Existing 30th June, 1918 .. ..	35,078	29,159	12,360	9,659	4,401	4,730	95,387
	39,061	32,099	13,643	10,689	4,958	5,247	105,697
To be deducted—							
Deaths .. ..	2,795	2,298	1,020	741	271	306	7,431
Cancellations and transfers to other States .. ..	744	622	306	338	169	118	2,297
	3,539	2,920	1,326	1,079	440	424	9,728
Old-age Pensions existing on 30th June, 1919 .. ..	35,522	29,179	12,317	9,610	4,518	4,823	95,969

2. **Sexes of Old-age Pensioners.**—Of the 95,969 persons in receipt of pensions at 30th June, 1919, 38,261 (or 40 per cent.) were males, and 57,708 (or 60 per cent.) were females. Details for the several States are as follows :—

#### SEXES OF OLD-AGE PENSIONERS, 30th JUNE, 1919.

State.	Males.	Females.	Total.	(a) Masculinity.
New South Wales .. ..	14,979	20,543	35,522	72.92
Victoria .. ..	10,989	18,190	29,179	60.41
Queensland .. ..	5,277	7,040	12,317	74.96
South Australia .. ..	3,477	6,133	9,610	56.69
Western Australia .. ..	1,885	2,633	4,518	71.59
Tasmania .. ..	1,654	3,169	4,823	52.19
Total .. ..	38,261	57,708	95,969	66.30

(a) Number of males to each 100 females.

3. Ages and Conjugal Condition of Old-age Pensioners Granted Pensions during 1918-19.—The recorded ages of the 9,250 persons to whom pensions were granted during the year 1918-19 varied considerably, ranging from 1,830 at age 60 to one at age 95. Particulars for quinquennial age-groups are as follows :—

AGES AND CONJUGAL CONDITION OF PERSONS GRANTED OLD-AGE PENSIONS DURING 1918-19.

Age Groups.	Males.				Females.				Grand Total.
	Single.	Married.	Widowed.	Total.	Single.	Married.	Widowed.	Total.	
60-64 ..	41	155	55	251	352	1,724	1,593	3,669	3,920
65-69 ..	610	1,440	496	2,546	81	432	386	899	3,445
70-74 ..	131	399	177	707	29	198	241	468	1,175
75-79 ..	44	152	81	277	8	64	115	187	464
80-84 ..	16	33	48	97	3	15	67	85	182
85-89 ..	4	11	11	26	2	5	17	24	50
90 and above ..	..	3	..	3	..	1	10	11	14
Total ..	846	2,193	868	3,907	475	2,439	2,429	5,343	9,250

4. Commonwealth Claims for Invalid Pensions.—Details as at 30th June, 1919, are given hereunder :—

COMMONWEALTH INVALID PENSIONS.—YEAR ENDING 30th JUNE, 1919.

Particulars.	N.S.W.	Vic.	Q'land.	S.A.	W.A.	Tas.	Total C'wealth.
Claims examined during year ending 30th June, 1919 ..	2,562	1,932	1,096	457	421	353	6,821
Claims rejected .. ..	765	340	298	106	107	106	1,722
Claims granted .. ..	1,797	1,592	798	351	314	247	5,099
Transfers from other States ..	109	74	45	46	10	16	300
Existing 30th June, 1918 ..	12,169	8,901	3,679	2,044	1,313	1,806	29,912
	14,075	10,567	4,522	2,441	1,637	2,069	35,311
Deduct—							
Deaths .. ..	698	931	295	169	84	113	2,290
Cancellations and Transfers to other States ..	279	299	176	121	53	94	1,022
	977	1,230	471	290	137	207	3,312
Invalid Pensions existing 30th June, 1919 .. ..	13,098	9,337	4,051	2,151	1,500	1,862	31,999

5. **Sexes of Invalid Pensioners.**—Of the 31,999 persons in receipt of an invalid pension on 30th June, 1919, 15,144, or 47 per cent., were males, and 16,855, or 53 per cent., were females. Details for the several States are as follows :—

**SEXES OF INVALID PENSIONERS, 30th JUNE, 1919.**

State.	Males.	Females.	Total.	(a) Masculinity.
New South Wales .. .. .	6,086	7,012	13,098	86.79
Victoria .. .. .	4,491	4,846	9,337	92.67
Queensland .. .. .	2,094	1,957	4,051	107.00
South Australia .. .. .	819	1,332	2,151	61.49
Western Australia .. .. .	812	688	1,500	118.02
Tasmania .. .. .	842	1,020	1,862	82.55
Commonwealth .. .. .	15,144	16,855	31,999	89.85

(a) Number of males per 100 females.

6. **Ages and Conjugal Condition of Persons Granted Invalid Pensions during 1918-19.**—The recorded ages of the 5,099 persons who received invalid pensions in the period under review varied from 16 to 85. The following table gives particulars for those up to age 20 and in decennial age-groups after age 20 :—

**AGES AND CONJUGAL CONDITION OF PERSONS GRANTED INVALID PENSIONS IN 1918-19.**

Age Groups.	Males.				Females.				Grand Total.
	Single.	Married.	Widowed.	Total.	Single.	Married.	Widowed.	Total.	
16-19 ..	161	..	2	161	196	..	..	196	357
20-29 ..	176	48	..	226	281	16	11	288	514
30-39 ..	127	168	8	303	166	33	49	253	556
40-49 ..	144	255	22	421	165	99	144	408	829
50-59 ..	268	560	89	917	212	347	445	1,004	1,921
60-69 ..	194	402	104	700	24	50	72	146	846
70-79 ..	6	15	14	35	2	11	21	34	69
80 and over ..	1	1	2	4	..	1	2	3	7
Total ..	1,077	1,449	241	2,767	1,026	562	744	2,332	5,099

7. **Cost of Administration.**—Under the State régime the cost of administration differed considerably in the several States, and for 1908-9 represented in New South Wales 4.17 per cent. of the amount actually paid in pensions. In Victoria for the same year the corresponding percentage was 0.70. During the year 1918-19 the total cost to the Commonwealth of administering the Old-age and Invalid Pensions Department was £63,280, or about 1.6 per cent. of the amount actually paid in pensions. Details concerning the cost of administration for 1918-19 are as follows :—

	£
Salaries .. .. .	17,028
Temporary assistance .. .. .	3,420
Services of magistrates, registrars, clerks of courts, and police ..	3,730
Commission to Postmaster-General's Department, at 12s. 6d. per £100 paid .. .. .	23,755
Postage and telegrams .. .. .	4,523
Other expenses .. .. .	10,824
Total .. .. .	£63,280

The actual sum disbursed in Old-age and Invalid Pensions in the financial year 1918-19, apart from the cost of administration, was £3,880,865.

8. **Liability Undertaken in Granting Old-age Pensions.**—As an indication of the extent of the responsibility which an old-age pension scheme involves, it may be mentioned that in connexion with the evidence tendered to the Commonwealth Commission on Old-age Pensions a computation was made of the total liability in respect of accrued pensions which the Commonwealth would have incurred if, at 31st March, 1901, the date of the Census, 39 per cent. of the persons aged sixty-five and upwards were entitled to pensions of ten shillings per week. The present value at that date of the liability so computed was £10,415,820. (See Minutes of Evidence of Royal Commission on Old-age Pensions, p. 80.)

The following table gives detailed statistical information concerning the working of the Act for the last six years :—

INVALID AND OLD-AGE PENSIONS, 1914 TO 1919.

Financial Year ended 30th June—	Number of Pensioners.			Amount Paid in Pensions.	Amount Paid to Asylums for Maintenance of Pensioners.	Total Payment to Pensioners and Asylums.	Cost of Administration.	Cost of Administration per £100 paid to Pensioners and Asylums.	Average Fort-nightly Pension on last day of Financial Year.
	Old-Age.	Invalid.	Total.						
				£	£	£	£	£ s. d.	s. d.
1914	87,780	16,865	104,645	2,577,965	14,236	2,592,201	47,015	1 16 3	19 5
1915	90,892	20,417	111,309	2,704,309	27,630	2,731,939	48,018	1 15 4	19 5
1916	91,783	23,439	115,222	2,859,766	31,831	2,891,597	44,401	1 10 9	19 4
1917	93,672	26,781	120,453	3,518,987	35,148	3,554,135	54,393	1 10 7	24 3
1918	95,387	29,912	125,299	3,753,977	39,060	3,793,037	54,355	1 8 8	24 3
1919	95,969	31,999	127,968	3,880,865	55,750	3,936,615	63,280	1 12 2	24 2

9. **Pensions Act, 1916.**—On 30th September, 1916, an Act was assented to, which amended the original Pensions Act in a very important particular. It had been felt for some time that, owing to the increased cost of living, the grant of ten shillings a week was insufficient. Accordingly amendments were made in the case of the two important sections, 24 and 26. Section 24 of the Invalid and Old-age Pensions Act 1908-1912 originally enacted that the pension "shall not exceed the rate of twenty-six pounds per annum in any event, nor shall it be at such a rate as will make the pensioner's income, together with pension, exceed fifty-two pounds per annum." It was amended (a) by omitting the words "twenty-six pounds," and inserting in their stead the words "thirty-two pounds ten shillings"; and (b) by omitting the words "fifty-two pounds" and inserting in their stead the words "fifty-eight pounds ten shillings." Section 26 originally enacted that if an applicant for pension was in receipt of board or lodging, the actual or estimated value or cost of this should be counted as income, to an extent not exceeding five shillings per week. This has now been amended by omitting the words "five shillings" and inserting in their stead the words "seven shillings and sixpence."

The effect of these amendments was to increase the liability under the heading of Invalid and Old-age Pensions by about 25 per cent. This is the cause of the great increase in the amount paid in pensions in the last three years.

### § 5. Maternity Allowance.

The Federal Parliament, during the session of 1912, passed an Act (assented to on 10th October, 1912) providing under certain circumstances for the payment of maternity allowances. The scope and main provisions of the Act will be gathered from the following sections and sub-sections, given in full :—

4. "Subject to this Act, there shall be payable out of the Consolidated Revenue Fund, which is hereby appropriated accordingly, a maternity allowance of Five pounds to every woman who, after the commencement of this Act, gives birth to a child, either in Australia or on board a ship proceeding from one port in the Commonwealth or a Territory of the Commonwealth to another port in the Commonwealth or a Territory of the Commonwealth."
5. (1) "A maternity allowance shall be payable in respect of each occasion on which a birth occurs, and the child is born alive, or is a viable child, but only one allowance shall be payable in cases where more than one child is born at one birth."
6. (1) "The maternity allowance shall be payable only to women who are inhabitants of the Commonwealth or who intend to settle therein."  
(2) "Women who are Asiatics or are aboriginal natives of Australia, Papua, or the islands of the Pacific, shall not be paid a maternity allowance."

The following table gives a statistical summary of the most important points in connexion with the working of the Maternity Allowance Act since 10th October, 1912, when the first payments were made :—

#### COMMONWEALTH MATERNITY ALLOWANCE.—SUMMARY, 1913 TO 1919.

Year ended 30th June—	Claims Paid.	Claims Rejected.	Amount Paid.	Cost of Administration.	Cost per £100 of allowance paid.
			£	£	£ s. d.
1913 (a) ..	82,475	619	412,375	6,547	1 11 9
1914 .. ..	134,998	709	674,990	10,281	1 10 6
1915 .. ..	138,855	640	694,275	12,900	1 17 2
1916 .. ..	131,943	504	659,715	12,165	1 16 11
1917 .. ..	132,407	459	662,035	13,735	2 1 6
1918 .. ..	126,885	404	634,425	12,250	1 18 7
1919 .. ..	124,016	510	620,080	11,369	1 16 8

(a) From 10th October, 1912.

### § 6. War Pensions.

1. General.—An Act for the provision of war pensions was passed in 1914 and amended in 1915 and 1916. Its scope can be determined by the following extract from Section 3. "Upon the death or incapacity of any member of the forces whose death or incapacity results, or has resulted, from his employment in connexion with warlike operations in which His Majesty is, or has since the commencement of the present state of war been engaged, the Commonwealth shall, subject to this Act, be liable to pay to the member or his dependents, or both, as the case may be, pensions in accordance with this Act." Full details as to rates of pension, etc., are given in the section on Defence, page 1015.

2. Number of Pensioners, 1919.—The following statistical tables show the position of affairs as at the 30th June, 1919 :—

PARTICULARS OF WAR PENSIONERS AT 30th JUNE, 1919.

Classification.	In respect of Deceased Members.	In respect of Incapacitated Members.	Total.
(i) Dependents of members of the Forces—			
(a) Wives or widows .. .. .	9,009	23,207	32,216
(b) Children under 16 years .. .. .	14,464	32,190	46,654
(c) Children over 16 years .. .. .	274	270	544
(d) Widowed mothers of unmarried members	6,839	1,201	8,040
(e) Other mothers of members .. .. .	14,685	2,086	16,771
(f) Fathers .. .. .	2,936	125	3,061
(g) Brothers and sisters .. .. .	1,618	173	1,791
(h) Others .. .. .	611	329	940
Total number of dependents of members of the Forces .. .. .	50,436	59,581	110,017
(ii) Incapacitated members of the Forces .. .. .	..	71,512	71,512
Total number of war pensioners at 30th June, 1919 .. .. .	50,436	131,093	181,529

NUMBER OF WAR PENSIONERS AT 30th JUNE, 1919.

Where Paid.	Incapacitated Members of the Forces.	Dependents of—		Total.
		Deceased Members.	Incapacitated Members.	
Canada .. .. .	2	3	4	9
South Africa .. .. .	17	34	32	83
New Zealand .. .. .	141	226	78	445
New South Wales .. .. .	23,218	13,165	17,453	53,836
Victoria .. .. .	22,836	17,309	19,341	59,486
Queensland .. .. .	8,899	4,325	6,065	19,289
South Australia .. .. .	5,561	4,087	5,311	14,959
Western Australia .. .. .	6,815	4,286	6,387	17,488
Tasmania .. .. .	3,057	2,105	2,621	7,783
London .. .. .	966	4,896	2,289	8,151
Total .. .. .	71,512	50,436	59,581	181,529

EXPENDITURE IN 1918-19.

	£		£
New South Wales .. .. .	1,586,981	Tasmania .. .. .	192,837
Victoria .. .. .	1,431,849	London and elsewhere .. .. .	239,138
Queensland .. .. .	505,223		
South Australia .. .. .	410,880	Total .. .. .	4,828,072
Western Australia .. .. .	461,164		

The cost of administration in 1918-19 was £97,738.

### § 7. Local Option.

1. **General.**—The principles of local option as to the sale of fermented and spirituous liquors have been applied in all the States of the Commonwealth. The last State to adopt these principles was Western Australia, where provision was made for a system of local option by the Licensing Act 1911. Since the outbreak of war in 1914, various enactments have been made in several of the States relative to the control of the liquor traffic. While not in any way pertaining to the scheme of local option, these measures are referred to in this section, as possibly, if not probably, affecting future public opinion in regard to this matter.

2. **New South Wales.**—(i) *Local Option.* The Act in force relating to local option in this State is the Liquor Act 1912, which consolidated the laws relating to publicans, brewers, and other persons engaged in the brewing, manufacture or sale of liquor. The local option vote is taken in every electorate on the day fixed for the poll therein at each general election, but special provision was made under the Liquor Amendment Act 1916 to suspend the taking of the local option vote at the general election in 1917. The option with regard to licenses extends to public-houses, wineshops, and clubs, and the persons entitled to vote are those entered on the Parliamentary electoral rolls. The first local option vote under the Liquor (Amendment) Act of 1905 was taken at the general election in 1907, and the second at the election in 1910, while the vote in 1913 was taken under the Liquor Act 1912. In 1907, when the first local option vote was taken, there were 3,023 hotels in existence; of this number 293 were ordered to be closed at varying dates. At the election of 1910 there were 2,869 hotels, and of these, 28 were ordered to be closed. At the 1913 election there were 2,719 hotels, of which 23 were closed before July, 1917. The number of wine licenses at the time of the vote of 1907 was 633, of which 46 were abolished. In 1910, 5 wine shops out of 565 were closed, and in 1913, 7 out of 514 were ordered to be closed. The resolutions to be submitted, and the effects of such resolutions, if carried, are given *in extenso* in previous issues of this book. The following statement shews the number of electorates in which each of the resolutions was carried :—

#### NEW SOUTH WALES.—EFFECTS OF LOCAL OPTION VOTES, 1907, 1910, and 1913.

Particulars.	General Election, 1907.		General Election, 1910.		General Election, 1913.	
	Electorates.	Votes.	Electorates.	Votes.	Electorates.	Votes.
<i>Results in favour of—</i>						
(a) Continuance ..	25	209,384	76	324,973	75	380,707
(b) Reduction ..	65	75,706	14	38,856	15	44,453
(c) No license ..	Nil	178,580	Nil	212,889	Nil	245,202

(ii) *Liquor Referendum Act 1916.* On 17th February, 1916, a proclamation was issued, in terms of the War Precautions Act, by the Minister for Defence, ordering that licensed premises be closed at 6 p.m. in the County of Cumberland, and within a radius of 5 miles from any military camp; a week later the closing hour was varied from 6 to 8 p.m. Subsequently the Liquor Referendum Act 1916 was passed in the State Parliament to decide by referendum the hour of closing for premises licensed under the Liquor Act 1912. At the referendum the electors were enabled to record votes in order of preference for each hour from 6 to 11 p.m. inclusively. The count of the first preference votes resulted in a large majority for 6 o'clock, and from 21st July, 1916, all licensed premises and registered clubs in New South Wales have been closed at that hour. This determination prevails during the currency of the war and for a period not exceeding six months thereafter.

(iii) *Liquor Amendment Act 1919*. This Act, which was assented to on the 23rd December, 1919, provides for the continuance of the six o'clock closing of hotels, and suspends Local Option pending a referendum on the question of prohibition, which must be taken within eighteen months after the passing of the Act. Other clauses provided for the establishment of Reduction Boards to regulate the number of licenses and the amount of compensation to be paid in cases where cancellations are recommended.

3. *Victoria*.—The Acts dealing with the subject of local option as to the sale of fermented and spirituous liquors, and with the compulsory closing of hotels in this State, are the Licensing Act 1915, No. 2683, and the Licensing Act 1916, No. 2855. Other Acts, now repealed, which dealt with the subject, were the Licensing Acts 1876, 1885, 1888, 1890, 1906, and 1907.

Part XIII. of the Act of 1915 relates to the subject of local option. Under this Part the local option provisions were to come into operation at the first general election subsequent to 1st January, 1917. The 1916 Act provides that the first local option polls are not to be held till the second general election following on the above date. In the meantime, the Licenses Reduction Board, which by the same Act has been constituted the Licensing Court for the whole State, is empowered to continue the work of closing hotels, which it has carried out since 1906.

The provision of a statutory number of hotels for each licensing district disappeared with the old conditions relating to closing, and the Court is now authorised to close hotels in any licensing district, as if resolution B (Reduction), under the local option provisions, had been carried in each district. This allows of a reduction proportionate to the existing number, the maximum closing not to exceed one-fourth. Power has also been given to accept the surrender of any victualler's license irrespective of the number otherwise closed. A greater number must not be closed than can be compensated, and the old limitation, that hotels licensed after 1886 were not entitled to compensation, has been removed.

(i) *The Licenses Reduction Board*. This Board was established by the 1906 Act, with power to reduce the number of licensed victuallers' premises, up to December, 1916, in districts where there were more than the statutory number of licenses. It had also the duty of fixing and awarding compensation to the owners and licensees of the closed hotels. The compensation was provided by an annual percentage fee of 3 per cent. on all liquor purchased by licensed victuallers. The compensation fund obtained in this manner has risen from £48,233 in 1907, to £63,623 in 1915, which was the highest figure reached. In 1916, with the restricted hours of trading, the amount received was £60,396. The licensing fund which was distinct from the compensation fund, was protected by a provision that the remaining hotels, by a *pro rata* assessment, had to make up annually the amount of the license fees lost by the closing of hotels; the license fees for hotels were of varying amounts, based on the annual municipal value of the premises, ranging from £5 to £50, in four classes, viz., £5, £15, £25, £50. By the 1916 Act, this system of fixed fees was abolished, as was also the *pro rata* assessment of lost fees and the 3 per cent. compensation fees. The two funds referred to above were merged into one, and a system of percentage fees was applied to all licenses for the sale of liquor in the State, whether wholesale or retail, and the amount received is paid into one fund.

Under this system, all vendors of liquor pay in proportion to the benefit they derive from the license. The amount charged the wholesale trade is 4 per cent. on the cost of all liquors sold to non-licensed persons, no charge being made on sales to other licensed vendors. The retail trade is charged 6 per cent. on liquor purchases, except the holders of Australian wine licenses, who are charged 4 per cent.

During 1916, prior to the passing of the above Act, a number of owners and licensees, fearing that no provision would exist for the acceptance of surrenders when Part XIII. came into operation, took advantage of the existing provisions. Consequently, the number closed, 143, was in excess of the average, and the 1917 compensation funds had to be drawn upon to the extent of £18,087. The closings of 1917 had to be somewhat curtailed for this reason. The maximum compensation payable is still governed by the trading results and the rents of the years 1903-6, though a concession was made in the Amending Act by which licensees are entitled to be compensated on a three years' tenure, if they are in possession of a lease of that extent when deprived of



their license. Under the 1916 Act 232 hotels have been closed and £139,105 awarded as compensation to 231 hotels. The total number of hotels closed up to the 31st December, 1919, was 1,286, and the compensation paid, £679,956, or an average of £529 per hotel. The following table shews particulars of the operations of the Board and Court up to the 31st December, 1919 :—

**VICTORIA.—OPERATIONS OF LICENSES REDUCTION BOARD, 31st DECEMBER, 1919.**

Particulars.	Licenses in December, 1906.			Hotels Deprived of Licenses.	Compensation Awarded.		Hotels Surrendered.	Compensation Awarded.	
	Number in Existence.	Statutory Number.	(a) Number in Excess.		Owner.	Licensee.		Owner.	Licensee.
Metropolitan and Suburban ..	1,020	877	401	330	£ 247,042	£ 48,968	15	£ 7,398	£ 1,584
Country ..	2,428	1,622	967	621	241,483	38,447	(b) 320	85,513	9,521
Total ..	3,448	2,499	1,368	951	488,525	87,415	335	92,911	11,105

(a) In some districts the number of hotels was below the statutory number; in these districts the total number of hotels less than the statutory number was 418. (b) Including 4 Roadside licenses.

(ii) *Early Closing of Hotels.* Consequent on the war, an Act (No. 2584) was passed, and came into operation on 6th July, 1915, restricting the hours for the sale of intoxicating liquors, the restriction being limited to the duration of the war. Sale was permitted only between the hours of 9 a.m. and 9.30 p.m. By a subsequent Act (No. 2776), tenants of licensed premises were given the right to apply to the Licenses Reduction Board to adjust the rents of their premises. Four hundred licensees took advantage of this provision. The hours of trading in the evening were further restricted as from 25th October, 1916—six o'clock being fixed as the time of closing.

The provisions of the Rent Adjustment Act were extended so as to enable the Board to deal with applications for reductions of rent arising from fresh restrictions. Between 300 and 400 additional applications were received, the amounts involved being substantial.

Special provision was made in the 1916 Act for the granting of victuallers' licenses in the Mallee. Power was given to proclaim areas containing 500 resident electors, when petitions signed by a majority of the residents were lodged, and where the Licensing Court, after enquiry, recommended this course.

On the proclamation of an area, a poll of the electors is to be taken at which, if the poll is to be recognised, one-third of those enrolled must vote. A majority of those voting decides whether a license is to issue or not. Hotels must be at least twelve miles apart, except at Mildura, where special provision is made for the issue of three licenses. Under these provisions six areas have been proclaimed, in five of which polls were taken and resulted in favour of license. Licenses have now been granted at Mildura, Murrayville, Ouyen, Manangatang, and Ultima.

4. **Queensland.**—The local option clauses of the Liquor Acts of 1912–1914 provide for the following :—

- (i) The conditions under which new licenses may be granted until the completion of the business of the Licensing Court in April, 1916.
- (ii) The continuance of the local option clauses of the Licensing Act of 1885 until the 31st December, 1916.
- (iii) The institution of a new scheme, under which electors from and after the year 1917 will have the opportunity of voting every three years on the question of reduction or increase of licenses.

(i) *New Licenses.* With regard to the granting of "new licenses" from the 1st April, 1913, and until the completion of the business of the Licensing Court in April, 1916, it is provided that no new licensed victualler's or wine seller's or provisional licenses

shall be granted, unless at a local option vote of the electors of the local option area in which the premises or proposed premises are situated a resolution "that new licenses shall be granted in this local option area" has been carried.

If the resolution is carried, the Court may, but need not, grant applications; but if the resolution is not carried, the Court shall not grant any application during the said years in the said local option areas.

The Acts of 1912 and 1914 provided that a local option vote following on an application for a license might be taken in any of the years 1913, 1914, 1915, and 1916 in a local option area, but having been taken once should not be taken again during those years in the same local option area. During 1913 a vote was taken in ten districts on the resolution "that new licenses be granted." In five of these the resolution was carried, the other five districts declaring against any increase in the number of licenses. In 1914, sixteen districts voted on the same resolution, in eleven of which it was carried, while in 1915, sixteen districts also voted, the resolution being carried in ten cases.

(ii) *Continuance of Present System until 1917.* With the exception of the third resolution, viz., "that no new licenses be granted," the local option provisions of the Licensing Act of 1885 remained in full force and effect until the 31st December, 1916, with certain modifications and additions. These will be found fully described in previous issues of the Year Book (see No. 6, p. 1177).

(iii) *General Local Option.* The first vote may be taken in the year 1917, either on the same day as the election of senators takes place, or if no Senate election is held in 1917 before the 30th September, then on a day to be appointed by the Governor-in-Council, and the vote will be by ballot.

The vote will be taken on the request of one-tenth of the number of electors in an area, which is defined in the request, and such area may be:—(a) an electoral district, (b) an electoral division of an electoral district, or (c) a group of two or more divisions of an electoral district, provided that the whole of such local option area is wholly comprised within one and the same electoral district.

There must be a separate request for each resolution on which a vote is required to be taken.

The resolutions on which a vote may be taken are:—(a) reduction by one-fourth of the existing number, (b) further reduction by one-fourth of the existing number, (c) further reduction by one-fourth of the existing number, (d) prohibition, and (e) new licenses.

On the 5th May, 1917, 57 polls were taken, 55 being on the question of reduction (resolution a) and two being on the question of increase (resolution e). Reduction was carried in only four local option areas—Biggenden, Ipswich, Maryborough and Toowong. The number of licenses which cease to exist as from 1st January, 1920, in these districts are two licensed victuallers' in Biggenden; three licensed victuallers' and one wineseller's in Ipswich; seven licensed victuallers', two wholesale spirit merchants' and one wineseller's in Maryborough; and one licensed victualler's in Toowong. Increase was carried in Atherton and Cloncurry.

In previous issues of the Year Book (see No. 6, p. 1178) will be found fuller reference to the effect of the carrying of any of the resolutions.

On the 13th December, 1919, twelve polls were taken, eleven being on the question of increase or new licenses (resolution e) and one on the question of reduction of licenses (resolution a). Increase was carried in five local option areas—Ayr, Eungella, Clermont, Quilpie, and Windorah—but in Eungella and Windorah a sufficient number of electors did not vote, 35 per cent. being required under Section 175 of the Liquor Acts. The poll at Cleveland resulted in a majority against reduction.

The Liquor Act Amendment Act of 1920 provides that every local option vote must be taken in the month of May in every third year, on a day to be fixed by the Governor in Council, but no vote may be taken on the same day as the State General Election or a Commonwealth General or Senate Election.

(iv) *State Option, Prohibition, and Continuance of Present System.* The Liquor Act Amendment Act of 1920 provides for triennial polls throughout the State on the following resolutions :—

- (a) State management of manufacture, importation, and sale of fermented and spirituous liquors.
- (b) Prohibition of manufacture, importation, and retail of fermented and spirituous liquors to take effect from 1st July, 1925, in case of the poll in 1920 or 1923, and for subsequent polls from 1st July in the third year after the carriage of resolution (b).
- (c) Continuance of the present (or if (a) or (b) has been carried—return to the earlier) system of manufacture, importation and retail of fermented and spirituous liquors.

The first poll under this provision will be held on 30th October, 1920, that date having been fixed by the Governor in Council. Voting is compulsory under a compulsory preferential system.

5. *South Australia.*—In this State the subject of local option is now regulated by Part VIII. of the Licensing Act 1917.

Under this Act, each electoral district for the House of Assembly is constituted a local option district, and each electoral district may be divided into local option districts by proclamation of the Governor. A quorum consisting of 500 electors, or one-tenth of the total number of electors, whichever be the smaller number, in any district may petition to the Governor for a local option poll. The persons entitled to vote at the poll are those whose names appear on the electoral roll and who reside in the local option district.

The resolutions to be submitted, together with the effects such resolutions would have, are set out in detail in previous issues of the Year Book (see No. 6, p. 1179).

(i) *Local Option Poll.* On the 2nd April, 1910, local option polls were taken under the Act of 1908 in twenty-four districts; the electors in the remaining nine local option districts did not petition for polls. A resolution that the number of licenses be reduced was carried in only one district, Wallaroo; in the remaining twenty-three districts a resolution that the number of licenses be not increased or reduced was carried. At the general election of the House of Assembly, held on the 10th February, 1912, no local option polls were held in any local option district. On the 27th March, 1915 (the same day as the Parliamentary elections), a local option poll was taken in the Flinders Southern (Port Lincoln) local option district, when the resolution "that the number of licenses be not increased or reduced" was carried. There have been no further polls in any of the districts up to the end of 1917.

(ii) *Early Closing of Hotels.* On the 27th March, 1915, a referendum was held as to the hour for the closing of bar-rooms in licensed premises. Out of a total of 178,362 votes cast, 100,418 were cast in favour of closing bar-rooms at 6 p.m., those in favour of closing at 11 p.m. being 61,362. Electors had the choice of voting for hours other than the two mentioned, but the votes so cast were comparatively few. No polls have since been taken.

(iii) *Re-proclamation of Districts.* Local option districts were re-proclaimed on the 29th November, 1917, the districts, which number thirty-five, being given in the *Government Gazette* of the same date.

6. *Western Australia.*—The law relating to local option in Western Australia is contained in Part V. (sections 75 to 86) of the Licensing Act 1911, which was assented to on 16th February, 1911, and came into force on the 7th April following. Prior to the passing of this Act there was no provision for any system of local option in Western Australia.

The resolutions to be submitted under the above-mentioned Act and the effect such resolutions would have, are given in detail in previous issues of the Year Book (see No. 6, p. 1180).

The first vote under the Act of 1911 was taken on 26th April, 1911, the main question being confined (as prescribed by the Act when the vote is taken prior to 1920) to a resolution "that the number of licenses be increased," the only other questions submitted being those of State control of new publicans' general licenses and State management throughout all licensing districts.

The following table shews the result of this local option poll :—

**WESTERN AUSTRALIA.—RETURN SHEWING THE RESULT OF LOCAL OPTION POLL OF 26th APRIL, 1911.**

Result of Local Option Poll.		Do you vote that all new Publicans' General Licenses be held by the State ?		Are you in favour of State Management throughout all Licensing Districts ?	
Votes given in favour of the number of Licenses in the various districts being increased.	Votes given in favour of the number of Licenses in the various districts not being increased.	Yes.	No.	Yes.	No.
4,554	17,623	27,007	14,387	26,631	14,944

Under the 1911 Act a second poll was due on 26th April, 1914, but an amending Act was passed in December, 1913, continuing the present conditions until April, 1915. Subsequently, by an amending Act of 1915, the present conditions were further continued until 1918, and by an Act assented on the 7th August, 1917, the poll was postponed until 30th September, 1918, with a proviso that on a resolution passed by both Houses of Parliament the present conditions shall continue for a further period as may be expressed in such resolution. In 1918, the poll was further postponed till 1921.

(i) *Regulation of Liquor Traffic during the War.* In 1914, upon the outbreak of war, a special Act was passed in Western Australia which empowered the Government by proclamation to restrict or prohibit the sale or supply of liquor within any licensing district, or any portion of a licensing district, and rendered it an offence for any person, licensed or unlicensed, to offer for sale or supply liquor contrary to such proclamation, with a penalty of £200, or imprisonment for twelve months.

Provision was also made to limit and fix the hours during which licensed premises in any district, or portion thereof, might be open for the sale of liquor. The Act also contained the necessary powers to enforce the provisions thereof, including power to search without warrant and seize any liquor where there was reason to believe that such liquor existed in a prohibited area.

The Act was passed solely as an emergency measure, and so far there has been no necessity to issue any proclamation thereunder. The Act has been extended up to December, 1920.

In 1915, a further Act was passed *regulating the sale of liquors.* That Act divided the State into four districts—Metropolitan, Goldfields, Agricultural, and North-West, the last-named being exempt from the provisions of the Act.

The main feature, as regards the Metropolitan and Agricultural districts, was to reduce the period during which licensed premises could be open for the sale of liquor to the hours between 9 a.m. and 9 p.m., the previous period being between the hours of 6 a.m. and 11 p.m.

As regards the Goldfields district, the Act provided that upon receipt of a requisition signed by not less than 2,000 electors in the district, a referendum should be held.

In submitting the referendum, each elector had one vote, and the voting paper set out the hours of 6 o'clock, 7 o'clock, 8 o'clock, 9 o'clock, 10 o'clock, and 11 o'clock p.m. as alternative hours of closing. Each elector was to indicate his vote by marking an "X" opposite the hour which he desired to have fixed as the hour of closing. If the majority of votes were cast in favour of any particular hour, that hour was to be certified as being the result of the vote and proclaimed as the hour of closing. If there was no majority, then the votes cast for the earliest hour were to be transferred to the next later hour, and so on until a majority was thus obtained, when such majority would have the same effect as if the votes were originally given in favour of the hour to which they had been transferred, and such hour would be proclaimed the hour of closing.

A petition signed by the necessary number of electors was duly received, and a referendum was taken on the 24th May, 1916, the result of the poll being that the majority of all votes cast was in favour of the hour of 11 o'clock p.m. being fixed as the hour of closing.

The result of the referendum left the hour of closing in the Goldfields district 11 p.m. as previously.

The Act has been extended up to December, 1920.

7. *Tasmania*.—In this State the subject of local option is dealt with in Part VI. (sections 72 to 84) of the Licensing Act 1902, as subsequently amended by section 8 of the Licensing Act 1908, which later Act, however, did not come into full operation until the first of January, 1917. Other Acts which formerly dealt with the subject, but are now repealed, are the Licensing Acts 1889–1890, the Innkeepers Relief Act 1894, and the Licensing Act Amendment Act 1898. Under the Act of 1902, opposition to the grant of a license may be made (i) by any resident ratepayer, (ii) by petition of ratepayers resident in the neighbourhood, or (iii) by local option poll.

The conditions under which applications may be made to the Licensing Bench, opposing the granting of licenses, are set out in detail in previous issues of the Year Book. (See No. 6, p. 1181.)

(i) *Local Option Poll*. Any number of ratepayers not less than seven, resident in the neighbourhood of the house in respect of which a certificate for a hotel license has been applied for, may require, by petition lodged with the Clerk of Petty Sessions, that a poll of the ratepayers resident in the neighbourhood be taken upon the question whether such certificate be granted or not. If a majority of the votes taken be against the granting of the certificate the Licensing Bench must refuse to grant it.

An application refused is not to be renewed within three years.

(ii) *Early Closing of Licensed Premises*. A referendum on the question of the closing time for the sale and supply of liquor on licensed premises (6 Geo. V., No. 63) was taken on the 25th March, 1916, when 42,713 votes were cast in favour of closing at six o'clock p.m., against 26,153 votes in favour of ten o'clock, and 3,951 votes for other hours. The majority in favour of closing at six o'clock over all other hours was 12,609, and the Licensing Act (No. 2) of 1916 gives effect to the wishes of the electors.

## § 8. Preferential Voting.

In previous issues of the Year Book, a description in detail has been given of the systems of preferential voting now in force in the States of Victoria, Queensland, Western Australia, and Tasmania. It is not intended to repeat the description in the present issue. It is interesting to note that the system of preferential voting was introduced into elections for the Federal House of Representatives by Act No. 27 of 1918, which amended the previous electoral law. Section 124, sub-section (a) reads as follows :—

“ Where his (the voter's) ballot-paper is a ballot-paper in accordance with Form F in the Schedule—he shall place the number 1 in the square opposite the name of the candidate for whom he votes as his first preference, and shall give contingent votes for all the remaining candidates by placing the numbers 2, 3, 4 (and so on, as the case requires) in the squares opposite their names so as to indicate the order of his preference for them.”

This regulation will rectify one of the serious anomalies of the old system of voting, though it does not constitute true proportional representation.

### § 9. Valuation of Commonwealth Production.

1. Value of Production.—The want of uniformity in methods of compilation and presentation of Australian statistics renders it an extremely difficult task to make anything like a satisfactory valuation of the various elements of production. At present there is so little accurate statistical knowledge regarding such industries as forestry, fisheries, poultry, and bee-farming, that any valuation of the production therefrom can only be regarded as the roughest approximation. As a matter of fact, complete information as to value of production in all States is available in regard to the mining industry alone, and even in this case adjustments have to be made before the returns are strictly comparable. Careful estimates have been made in connexion with the value of production from the agricultural and pastoral industries, which, it is believed, in the main give fairly accurate results. In the case of manufactories, prior to 1909, five of the States collected statistics of the value of production, while for the sixth State, Tasmania, an estimate has been prepared which it is believed gives a fair approximation. The returns given in the following table are fuller and more approximate than those which have been given previously, and the figures furnished for 1909 and subsequent years may be taken as substantially correct. The table hereunder shews the approximate value of the production from all industries during the years 1909 to 1918 :—

#### ESTIMATED VALUE OF PRODUCTION FROM INDUSTRIES, 1909 TO 1918.

Year.	Agriculture.	Pastoral.	Dairy, Poultry, and Bee-farming.	Forestry and Fisheries.	Mining.	Manufacturing. (a)	Total.
1909	£1,056	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.	£1,000.
1910	41,056	50,864	15,064	4,462	23,036	39,713	174,195
1911	39,752	56,993	17,387	4,789	23,222	45,598	187,741
1912	38,774	50,725	19,107	5,728	23,494	50,767	188,595
1913	45,754	51,615	20,280	6,432	25,645	57,022	206,748
1914	46,162	57,866	20,341	6,338	25,810	61,586	218,103
1915	36,052	60,265	21,562	6,419	22,275	62,922	209,495
1916	73,769	65,607	21,156	5,777	22,428	62,883	251,620
1917	60,207	89,939	26,949	5,505	23,606	64,205	270,411
1918	57,967	93,435	31,326	5,523	25,581	69,797	283,629
1918	58,080	98,297	33,738	7,137	26,156	75,261	298,660

(a) These amounts differ from those given in Section XIII., Manufacturing Industries, owing to certain products which are there included having been included in Dairy Farming and Forestry in this table.

2. Relative Productive Activity.—The relative output or production per head of population measured quantitatively cannot be gauged from a mere statement of the total value of production from year to year. If measured by mere value, increase of price would have the effect of making an equal production with that of a time when prices were lower, and shew an increase which would, of course, be misleading. For example, the annual figures shewing the estimated value of production from the Commonwealth industries do not directly shew whether there has been any increase in the quantity produced, since the price-level at the time is itself a factor in the determination of the values. Before, therefore, any estimate of the relative increase or decrease in production (that is, in the relative quantity of output) can be formed, the variations due to the price element must be eliminated. This is done in the following table, in which Column I. shews the estimated value of production (a) in the aggregate and (b) per head of mean population. In Column II. the estimated value of production per head of population is shown in the form of index-numbers with the year 1911 as base; that is to say, the production per head in 1911 is made equal to 1000, and the values for the other years computed accordingly. In Column III. Wholesale and Production price index-numbers are given; it is assumed that these index-numbers reflect, with substantial accuracy, variations in Wholesale and

Production prices in the Commonwealth as a whole. The figures in Column IV. are obtained by dividing the figures for each year in Column II. by the corresponding figures in Column III. They show the estimated relative productive activity per head of population, taking the year 1911 as the basic or standard year, the fluctuations due to variation in prices having been eliminated.

**ESTIMATED RELATIVE PRODUCTIVE ACTIVITY IN COMMONWEALTH FOR THE YEARS SPECIFIED, 1871 TO 1918.**

Year.	I.		II.	III.		IV.	
	Estimated Value of Production.			Relative Value of Production per Head (Year 1911 = 1,000).	(a)	(b)	Estimated Relative Productive Activity (Year 1911 = 1,000).
	(a) Total. (000 omitted)	(b) Per Head of Population.	Wholesale Price Index-Number (Year 1911 = 1,000).		Production Price Index-Number (Year 1911 = 1,000).		
	£	£				*	†
1871 ..	46,700	27.46	665	1,229	..	541	..
1881 ..	71,116	30.83	747	1,121	..	666	..
1891 ..	96,087	29.65	718	945	..	760	..
1901 ..	114,585	29.96	726	974	..	745	..
1906 ..	147,043	35.94	871	948	..	919	..
1907 ..	166,042	39.90	967	1,021	..	947	..
1908 ..	164,934	38.97	944	1,115	1,070	847	882
1909 ..	174,195	40.29	976	993	995	983	981
1910 ..	187,741	42.43	1,028	1,000	973	1,028	1,057
1911 ..	188,595	41.28	1,000	1,000	1,000	1,000	1,000
1912 ..	206,748	43.68	1,058	1,170	1,101	904	961
1913 ..	218,103	44.77	1,085	1,088	1,050	997	1,033
1914 ..	209,495	42.40	1,027	1,149	1,266	894	811
1915 ..	251,620	51.02	1,236	1,604	1,426	771	867
1916 ..	270,411	55.47	1,344	1,504	1,498	894	897
1917 ..	283,629	57.47	1,392	1,662	1,604	838	868
1918 ..	298,669	59.37	1,438	1,934	1,763	744	816

\* Relative Production computed by application of Wholesale Price Index-numbers. † Index-numbers computed by application of Production Price Index-numbers.

The total production from all industries during 1918 was £298,669,000, equal to an average of £59.37 per inhabitant.

In Year Book No. 5 (page 1217) will be found the value of production in each State at decennial intervals since 1871, and for the year 1909. Details for individual States are not available for subsequent years owing to discontinuance by the Customs Department of the collection of statistics of interstate trade.

## § 10. Norfolk Island.

1. Area, Location, etc.—Norfolk Island, discovered by Captain Cook in 1774, is situated in latitude 29° 3' 45" south, longitude 167° 58' 6" east. Its total area is 8,528 acres, the island being about 5 miles long and 3 miles wide. From Sydney it is distant 930 miles, and from New Zealand 400 miles. The coast line is 20 miles, and its form that of an irregular ellipse. Except on the south-west, inaccessible cliffs rise from the water's edge. The climate is equable, the temperature ranging between 56° and 82° with a mean of 68°. The average annual rainfall is 55 inches. It has been said that the salubrious climate coupled with the beauty of its land and sea scapes should combine to render Norfolk Island "the Madeira of the Pacific."

2. **Settlement.**—The first colonisation, in 1788, was by Lieutenant King, who in H.M.S. *Sirius* established a small penal station as a branch settlement of that at Port Jackson. The settlement was abandoned in 1806, and thence for 20 years its chief use was as a whaling station and place of call for British warships.

From 1826 to 1855 it was again made a penal station. In 1844 it was annexed to Van Diemen's Land (Tasmania).

The descendants of the *Bounty* mutineers, having become too numerous to subsist on Pitcairn Island, were removed thence to Norfolk Island in 1856. The new community numbered 193—94 males and 99 females—and were the descendants of British sailors and Tahitian women.

In 1856 the island was severed from Tasmania, and created a distinct and separate settlement under the jurisdiction of New South Wales. In 1897 it was made a dependency under the Governor of that Colony, and was administered by the Chief Secretary's Department through a resident Chief Magistrate, in whom was vested the executive government of the settlement, and the penal supervision of its affairs. In 1913, however, a Bill was passed by the Federal Parliament providing for the taking over of the island as a territory of the Commonwealth. The Act came into force on 1st July, 1914, and the island is now administered by the Department of Home and Territories, Melbourne, through an Administrator and Chief Magistrate.

3. **Population and Live Stock.**—The population on 31st December, 1918, was 346 males, 420 females, a total of 766, exclusive of 49 Melanesians, of whom 47 were males, and 2 females. Births in 1918 numbered 11, and deaths 11. The latest returns of live stock shew that there are on the island 1,971 cattle, 680 horses, 536 sheep, and 250 pigs. In addition there are about 6,000 head of poultry.

4. **Production, Trade, etc.**—The soil throughout is rich, and is specially suitable for the cultivation of citrus fruits, bananas, and (in parts) coffee. Various other sub-tropical fruits thrive. During 1918–19 the production of oranges was given as 24,335 bushels; lemons, 220,970 bushels; bananas, 222,800 dozen. About 52,000 bushels of guavas, 839 dozen pineapples, and 6,840 bushels of passion fruit were also raised, as well as 44,764 lbs. of coffee. Local production of butter was estimated at 16,000 lbs. The island is visited annually by schools of whales, both of the sperm and hump-backed variety, and whaling was at one time an important industry, but in recent years it has been allowed to languish. Preparations were, however, in progress for a revival of the industry, but were dislocated by lack of shipping. Edible fish in large variety are found in abundance in the ocean waters in the vicinity of the island. In 1918–19 the imports were valued at £13,398. The exports were valued at £5,238, the chief items being fruit and fruit pulp; lemon juice, peel, and seeds; and fish. Nearly all the export trade was with the Commonwealth, only small amounts going to New Zealand and the South Sea Islands. Under ordinary circumstances a monthly steam service is maintained with Sydney, but in 1918–19 only five trips were made by the "Makambo" from Australia, and six trips to Australia. Communication was afforded with New Zealand twice a year by the Melanesian Missionary Yacht "Southern Cross," but the Mission is preparing to change its headquarters from Norfolk Island to some island nearer the centre of its field of operations. The "all red" cable from Great Britain *via* Vancouver, Fanning Island and Fiji bifurcates at Norfolk Island, one line connecting with New Zealand, the other with Brisbane.

5. **Social Condition.**—Education is free and compulsory up to the age of fifteen years. The school is under the N.S.W. Department of Public Instruction, with standards corresponding to the State public schools, but the salaries and allowances of the teachers are paid by the Norfolk Island Administration. The number of scholars enrolled on the 30th June, 1919, was 143 (70 boys and 73 girls). A mission station has for many years been in existence for the education and general training of Melanesians, mostly from the Santa Cruz and Solomon Islands.

The magistrate's court has criminal jurisdiction in all crimes except capital offences, civil jurisdiction in all matters, and authority to grant probate and letters of administration.



### § 11. Lord Howe Island.

1. **Area, Location, etc.**—Between Norfolk Island and the Australian coast is Lord Howe Island in latitude 31° 30' south, longitude 159° 5' east. It was discovered in 1788. The total area is 3,220 acres, the island being seven miles in length and from one-half to one and three-quarter 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, with shady forests, 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, it is a dependency of New South Wales, and is included in the electorate of Sydney. A Board of Control manages the affairs of the island and supervises the palm seed industry referred to hereunder.

3. **Population.**—The population at the Census of 3rd April, 1911, was 56 males, 49 females—total 105, and on the 31st December, 1918, was estimated at 113.

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.

### § 12. Interstate Conferences.

1. **General.**—Reference to Inter-State Conferences held in 1914, 1915, 1916, and 1916-17, will be found in earlier issues of Official Year Book—See No. 8, page 1081; No. 11, pages 1191-3; No. 12, pages 1194-5. Considerations of space preclude repetition in present issue.

2. **Premiers' Conference, Sydney, 1918.**—On 8th May, 1918, and following days, a Conference of Premiers was held at Sydney. The substance of the more important resolutions is given below:—

- (i) *Uniform Company Law.* That it is desirable that an amended company law be introduced in each State as far as possible upon uniform lines.
- (ii) *Adoption of Uniform Food Standards.* That the New South Wales Government be requested to draft a model Pure Food Act and submit it to the other States for their consideration.
- (iii) *Uniform Secret Commissions Act.* That it is desirable that uniform Secret Commissions laws should be passed by the States.
- (iv) *Guarantee to Wheat Growers for 1918-19 and 1919-20.* That, subject to the Governments of the Commonwealth and of the States retaining control of the wheat scheme and of responsibility therefor, this Conference recommends that the wheat-growers of 1918-19 and 1919-20 be guaranteed 4s. 4d. per bushel, less freight from point of delivery, except in the case of New South Wales, where the arrangements already announced should be adopted; that the manner and the amounts of payment for wheat delivered and the allocation of responsibility between Commonwealth and States shall be the subject of early negotiations.

- (v) *Definition of Industrial Matters.* That this Conference affirms the desirability of defining the industrial matters which should with advantage be referred to the exclusive jurisdiction of the Federal Arbitration Court, and those that should be regarded as within the exclusive jurisdiction of the State Industrial Courts.

### § 13. Interstate Commission.

In accordance with the provisions of the Commonwealth Constitution Act (sections 101 to 104, see page 29), an Act providing for the appointment of the Commission was assented to on the 24th December 1912. The *personnel* of the Commission was, however, not decided until the 11th August, 1913, when Messrs. A. B. Piddington, K.C. (Chief Commissioner), Hon. George Swinburne, and N. Lockyer, C.B.E., I.S.O., were appointed. On the 8th September, 1913, a request was received from the Government of the Commonwealth that the Commission should make an investigation in regard to the Tariff. This investigation was made, and in all 70 reports were issued in connexion therewith. (*Vide* Official Year Book No. 9, p. 1134, and No. 10, p. 1140.)

In January, 1915, complaints were lodged with the Commission in respect to contravention of the provisions of the Constitution relating to trade and commerce. In this connexion, the case of the Commonwealth of Australia *v.* The State of New South Wales and another was subsequently heard before the Commission, but on an appeal to the High Court against its decision it was held that under section 101 of the Constitution the Interstate Commission had not been given judicial powers. It has been announced that the Government proposes to introduce legislation to confer judicial powers on the Interstate Commission.

On the 14th September, 1915, the Minister for Trade and Customs requested the Commission to furnish for the information of Parliament a report as to the new industries which, in its opinion, could with advantage be established in the Commonwealth, and in pursuance of this request such report was prepared and presented.

On the 7th March, 1916, the Commission was entrusted with an enquiry into the subject of British and Australian trade in the South Pacific, with the result that a report was furnished which deals with all factors affecting the progress of the island possessions in which Great Britain and Australia are interested.

On the 19th April, 1916, the Commission was invited by the Postmaster-General, on behalf of the Commonwealth and the several States, to act as arbitrator on the question of charges, etc., by the Railway Commissioners of the States for the carriage of mails. Subsequently sittings were held in this matter and decisions and awards made.

On the 9th August, 1917, the Prime Minister, as the result of complaints made to him, requested the Commission to inquire into the causes of increased prices of food, clothing, house rent, etc. This inquiry is now completed. In connexion with this investigation a regulation under the War Precautions Act was passed to permit each Commissioner to sit alone, and while so sitting to exercise all the powers of investigation conferred by the Interstate Commission Act of 1912.

On the 31st March, 1919, the Commissioners and Mr. Mills, Comptroller-General of Customs, were appointed a Royal Commission to inquire into and report upon the Sugar Industry. The Commission took evidence in Victoria, New South Wales and Queensland, and presented a report dated 27th February, 1920, to His Excellency the Governor-General.

There is at present a vacancy on the Commission, the Hon. George Swinburne having resigned his position thereon.

## § 14. Commonwealth Institute of Science and Industry.

1. **General.**—An account of the origin of this Institute was given in Official Year Book No. 9, p. 1135, while the progress of its activities was outlined in succeeding issues.

Under the Institute of Science and Industry Act 1920, assented to on the 14th September, 1920, provision is made for the establishment of the Institute on a permanent basis. By that Act it is declared that there shall be a Commonwealth Institute of Science and Industry, which will be a body corporate. The Act provides for the creation of (a) A Bureau of Agriculture, (b) A Bureau of Industries, and (c) such other Bureaux as the Governor-General determines. Power is given for the establishment of a General Advisory Council and Advisory Boards in each State to advise the Director with regard to—

- (a) The general business of the Institute or any Bureau thereof, and
- (b) Any particular matter of investigation or research.

The Director of the Institute is to be appointed for a period of five years. He is to be eligible for reappointment, and shall receive such salary as the Governor-General determines. The Act specifically imposes upon the Director the duty of co-operating as far as possible with existing State organizations in the co-ordination of scientific investigations. The statutory powers and functions of the Director are as follows:—

- (a) the initiation and carrying out of scientific researches in connexion with, or for the promotion of, primary or secondary industries in the Commonwealth;
- (b) the establishment and awarding of industrial research studentships and fellowships;
- (c) the making of grants in aid of pure scientific research;
- (d) the recognition or establishment of associations of persons engaged in any industry or industries for the purpose of carrying out industrial scientific research and the co-operation with and the making of grants to such associations when recognised or established;
- (e) the testing and standardization of scientific apparatus and instruments, and of apparatus, machinery, materials and instruments used in industry;
- (f) the establishment of a Bureau of Information for the collection and dissemination of information relating to scientific and technical matters; and
- (g) the collection and dissemination of information regarding industrial welfare and questions relating to the improvement of industrial conditions.

2. **Work of the Institute.**—The Institute has made investigations into several matters of importance to the Commonwealth, and has issued bulletins and pamphlets shewing the progress made. A list of these publications is given at the end of this section. The more important subjects which have been or are at present under consideration are as follows:—

### A.—Agricultural and Pastoral Industries.

(i) *Cattle Tick Pest.* (ii) *Worm Nodule Disease.* (iii) *Tuberculosis in Stock.* (iv) *Sheep Blow Fly.* (v) *White Ant Pest.* (vi) *Prickly Pear.* This weed covers in Australia an area of about 23,000,000 acres, and is spreading at the rate of about 1,000,000 acres annually. (vii) *Flax Industry.* The area under flax has been increased from 400 to 2,000 acres. (viii) *Cotton Growing.* Varieties of seed specially suitable for cultivation in Australia are being introduced, and the Government has guaranteed a minimum price for cotton cultivated in Australia. (ix) *Seed Improvement.* (x) *Natural Grasses and Fodder Plants.* (xi) *Viticultural Problems.* (xii) *Castor Beans.* (xiii) *Sorghum.*

### B.—Forest and Vegetable Products.

(i) *Paper Pulp.* (ii) *Tanning Materials.* (iii) *Zamia Palms.* (iv) *Grass Tree Resin.* (v) *Western Australian Sandalwood.*

C.—*Manufacturing Industries.*

- (i) *Leather and Tanning.* (ii) *Pottery.* (iii) *Power Alcohol.* (iv) *Posidonia Fibre.*  
 (v) *Mechanical Cotton Picker.* (vi) *Engineering Standardization.*

D.—*Mining and Metallurgy.*

- (i) *Mode of Occurrence of Gold.* (ii) *Ferro-alloys.* (iii) *Alunite.*

E.—*Miscellaneous.*

- (i) *Road-making Materials, etc.* (ii) *Weights and Measures.* (iii) *Leather.* (iv) *St. John's Wort.*

In addition to these investigations, a Bureau of Information has been established, with a library of scientific books and journals catalogued and indexed. Information has also been furnished to a large number of persons on scientific and technical matters.

3. **Publications.**—The following is a list of the publications issued to 30th June, 1920, by the Institute:—

1. *Bulletins.*

1. The Cattle Tick in Australia. (Out of print. Sec No. 13.)
2. Worm Nodules in Cattle.
3. The Alunite Deposits of Australia and their Utilization.
4. The Factors Influencing Gold Deposition in the Bendigo Goldfield. Part I. (Out of print.)
5. Wheat-storage Problems (Damaged Grain and Insect Pests).
6. Power Alcohol. Proposals for its Production and Utilization in Australia. (Out of print.)
7. Agricultural Research in Australia. (Out of print. The individual papers contained in this Bulletin can be supplied separately.)
8. The Factors Influencing Gold Deposition in the Bendigo Goldfield. Part II.
9. The Manufacture and Uses of Ferro-alloys and Alloy Steels.
10. Substitutes for Tin-plate Containers.
11. Paper-pulp: Possibilities of its Manufacture in Australia.
12. The Prickly Pear in Australia.
13. The Cattle Tick Pest in Australia.
14. An Investigation of the Marine Fibre of *Posidonia Australis*.
15. Welfare Work.
16. The Factors Influencing Gold Deposition in the Bendigo Goldfield. Part III.

2. *Reports.*

1. Reports of Executive Committee from Date of Appointment to 30th June, 1917.
2. Report of Executive Committee 1917-18.
3. Report on Organization and Work of Permanent Institute of Science and Industry.
4. Organization of Scientific Research Institutions in United States of America, by G. Lightfoot. (Out of print.)
5. The Work and Present Position of the Temporary Institute of Science and Industry (June, 1920).

3. *Pamphlets.*

1. Recent Developments in the Organization of National Industrial Research Institutions, by G. Lightfoot.
2. *Engineering Standardization*, by G. Lightfoot.

4. *Australian Standard Specifications.*

1. Structural Steel.
2. Tramway Rails and Fishplates.

5. "*Science and Industry.*"

(Monthly Journal.)

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### § 15. Department of Chemistry, South Australia.\*

In South Australia, a Department of Chemistry was formed in 1915. The Department is principally engaged in general routine chemical examinations and analyses in pursuance of various Acts of Parliament and for Government Departments, but the chemical investigation of local products and industries forms an important branch of its work. In this connexion a series of Bulletins is in course of preparation. Up to July, 1918, nine Bulletins have been issued, as indicated below. Although publication of Bulletins had to be suspended for a time, it is hoped to continue the series as soon as possible.

No. 1.—*Paper Making*: An investigation into the prospects of establishing a paper-making industry in South Australia. A number of local materials have been investigated, and special attention is directed to straw as the most valuable available material, owing to the very large supply obtainable at a low price and near to the principal sea-ports. No. 2.—*Potash*: Its economic sources in South Australia. Many local sources have been investigated, and wool scour is indicated as especially worthy of attention. *Lanoline*: A process for obtaining wool fat from locally scoured wool is described. No. 3.—*Cream of Tartar*: An examination of local grape products as sources of cream of tartar. No. 4.—*Marine Fibre*: The fibrous portion of the leaf sheath of the sea plant *Posidonia Australis* grows abundantly in the shallow waters around the coasts of South Australia, and on other parts of the Australian Coast. This Bulletin has been written to gather together and publish all the available information respecting it. The sum of £220,000 has already been spent in this industry, and a large amount of experimental work has been done in finding methods of collection and purification and market uses. No. 5.—*Boiler Waters*: Foaming and priming of boiler waters have been studied with a view to the suggestion of a remedy for these faults. No. 6.—*Grass Tree*: An investigation of the economic products of the species *Xanthorrhœa*. The trunk, leaves, and resin were examined. Special attention is drawn to the resin as similar to the high-priced resins, such as dragon's blood, benzoin, etc. It was found that 8 per cent. of para-oxy-benzoic acid was readily obtained from the gum. No. 7.—*Gypsum and Plaster of Paris*: An investigation of the gypsum deposits in South Australia and their uses, with special reference to the manufacture of plaster of paris. No. 8.—*Alcohol as a Source of Power*: This Bulletin discusses the use of alcohol as a motor fuel, details tests carried out under practical conditions, and indicates sources from which alcohol can be obtained. No. 9.—*Bonedust*: Its adulteration with Phosphate Rock. The results of this particular form of adulteration are dealt with, and a method of detection described.

### § 16. Anthropometrical Measurements of Military Cadets.

1. *General*.—Under the Defence Act of 1910, the principle of compulsory training was brought into operation in Australia on 1st January, 1911. Advantage was taken of this to secure a record of certain measurements and other particulars in respect of the cadets subjected to inspection, and an analysis of the data so obtained concerning height, weight, and minimum chest measurement, according to age, was given in Official Year Book No. 11, pages 1203-1209, for the year ended 30th June, 1912.

### § 17. Characteristics of the Development of the Population of Australia and the Effect of the War thereupon.

The population of Australia at 31st December in each of the years 1900 to 1919 is shewn in the following table. Figures are also given shewing the relative populations, that at the date (1st January, 1901) on which the Commonwealth came into existence being taken as 10,000. An analysis of the variations in the population is also furnished in the columns which shew the natural increase (excess of births over deaths), the net

\* Information supplied by the Director, Dr. W. A. Hargreaves, D.Sc., M.A., F.I.C.

**CHARACTERISTICS OF THE DEVELOPMENT OF THE POPULATION OF 1127  
AUSTRALIA AND THE EFFECT OF THE WAR THEREUPON.**

migration (the difference between arrivals and departures), and the total increase for the several years.

**CHARACTERISTICS OF THE DEVELOPMENT OF THE POPULATION OF THE  
COMMONWEALTH OF AUSTRALIA DURING THE FEDERATION PERIOD,  
1901 TO 1919 INCLUSIVE.**

Year.	Population at 31st December.	Relative Population that at 31st December, 1900 = 10,000.	Natural Increase (Excess of Births over Deaths).	Net Immigration (Excess of Arrivals over Departures).	Total Increase.	Total Increase Per Cent. Per Annum for Year Ended.
1900 ..	3,765,339	10,000	..	..	..	%
1901 ..	3,824,913	10,158	56,615	2,959	59,574	1.58
1902 ..	3,875,318	10,292	54,698	— 4,293	50,405	1.32
1903 ..	3,916,592	10,402	51,150	— 9,876	41,274	1.07*
1904 ..	3,974,150	10,555	60,541	— 2,983	57,558	1.47
1905 ..	4,032,977	10,711	61,427	— 2,600	58,827	1.48
1906 ..	4,091,485	10,866	63,557	— 5,049	58,508	1.45
1907 ..	4,161,722	11,053	65,042	5,195	70,237	1.72
1908 ..	4,232,278	11,240	65,119	5,437	70,556	1.70
1909 ..	4,323,960	11,484	69,899	21,783	91,682	2.17†
1910 ..	4,425,083	11,752	71,211	29,912	101,123	2.34†
1911 ..	4,568,707	12,134	74,324	69,300	143,624	3.25†
1912 ..	4,733,359	12,571	80,911	83,741	164,652	3.60†
1913 ..	4,872,059	12,939	83,925	54,775	138,700	2.93†
1914 ..	4,940,952	13,122	86,263	— 17,370	68,893	1.41‡
1915 ..	4,931,988	13,098	82,089	— 91,053	— 8,964	— 0.18‡
1916 ..	4,875,325	12,948	77,229	— 133,892	— 56,663	— 1.15‡
1917 ..	4,935,311	13,107	81,936	— 21,950	59,986	1.22‡
1918 ..	5,030,479	13,360	75,490	19,678	95,168	1.93
1919 ..	5,247,019	13,935	56,360	160,180	216,540	4.30§

\* The season 1902-3 was one of drought. † The large increases are due to immigration. ‡ This is the effect of emigration (despatch of soldiers oversea, etc.). § The large value is due to return of soldiers, and would have been appreciably larger but for the loss of about 14,000 through an epidemic of influenza.

The effect of the war was to stop immigration and to increase the number going abroad, as for example, the soldiers fighting for the Empire. Moreover, the gain by excess of births over deaths fell off from 86,263 in 1914 to 56,360 in 1919, the decline in the latter year being accentuated by the influenza epidemic. The rate of increase from 1st January, 1901, to 31st December, 1913, was 2 per cent. per annum. If this rate had been uniform, the increase for the years 1914 to 1919 would have been as shewn hereunder:—

**THE DEVELOPMENT OF POPULATION, HAD IT BEEN GOVERNED BY PRE-WAR  
CONDITIONS.**

Year.	Population on Assumption of Uniform Increase of 2 Per Cent. Per Annum.	Increase on Basis of 2 Per Cent.	Actual Increase.	Excess of 2 Per Cent. Increase over Actual Increase.
1913 ..	4,872,059	..	..	..
1914 ..	4,969,500	97,441	68,893	28,548
1915 ..	5,068,890	99,390	— 8,964	108,354
1916 ..	5,170,268	101,378	— 56,663	158,041
1917 ..	5,273,673	103,405	59,986	43,419
1918 ..	5,379,146	105,473	95,168	10,305
1919 ..	5,486,729	107,583	216,540	— 108,957
Total ..	..	614,670	374,960	239,710

Hence the difference between the two may be regarded as very largely the consequence of the war, though of course other causes also have contributed. We may note, however, that, as shewn on the first table, the rate of increase was itself increasing. Thus, we might very fairly suppose that the rate from the end of the year 1907, which for the first year was 1.70 per cent. per annum, tended to increase uniformly 0.4 per cent. per annum. This would give for successive years 2.10, 2.50, 2.90, 3.30 per cent., which would be the increase of 1912 over 1911. Let us assume that this last rate, which is of course high, remained constant: then we should get the following figures for the successive years, viz., those shewn hereunder, and these may well have been the actual figures but for the incidence of the war if we had maintained steadily our large net immigration:—

Year.	Population as Computed.	Increase.	Year.	Population as Computed.	Increase.
		%			%
1907 ..	4,161,722	..	1913 ..	4,863,620	..
1908 ..	4,232,471	1.70	1914 ..	5,024,119	3.30
1909 ..	4,321,353	2.10	1915 ..	5,189,915	3.30
1910 ..	4,429,387	2.50	1916 ..	5,361,182	3.30
1911 ..	4,557,839	2.90	1917 ..	5,538,101	3.30
1912 ..	4,708,248	3.30	1918 ..	5,720,858	3.30
1913 ..	4,863,620	3.30	1919 ..	5,909,646	3.30

On 31st December, 1919, we should, on this supposition, have had a population of 5,909,646, or 662,627. more than the actual population (5,247,019). It is, therefore, abundantly clear that the population of Australia is between 240,000 and 660,000 less than it would have been but for the war.

In this connexion it may be mentioned that, with regard to the proposal to create a Capital at Canberra, the Commonwealth Statistician on the 23rd December, 1909, estimated the probable population for 1920 as 5,227,000. On the 31st March, 1920, it had reached 5,274,444, so that the increase prior to the war was somewhat larger than had then been anticipated. This, however, was due to the large net immigration which commenced in 1909, and continued till 1913 inclusive. The two results are thus in very fair agreement, since the prediction was for a point of time between ten and eleven years ahead. Of course, if the increase in the rate of advance for the years 1909 to 1913 could have continued, the loss would be still greater.

### § 18. The Influenza Epidemic of 1918-19.

In common with other countries, Australia was visited during 1918-20 by an epidemic of influenza, which was by far the most severe on record. In the following pages is given a brief analysis of its salient features. The average death rates per 100,000 of the mean population for the first three successive quinquennia of this century, for the four years 1915-18, and for 1919 are shewn hereunder:—

#### DEATH RATES, ALL CAUSES, PER 100,000, 1900-19.

Period.	Males.	Females.	Persons.
1900-4 .. ..	1,322	1,052	1,194
1905-9 .. ..	1,200	957	1,084
1910-14 .. ..	1,189	945	1,072
1915-18 .. ..	1,197	883	1,040
1919 .. ..	1,466	1,098	1,288

This conspicuous increase during 1919 was largely due to deaths from influenza. Of the 65,930 deaths which were registered during that year, no less than 11,989 (7,046 males and 4,943 females) were classified as due to influenza.

The table hereunder shews for each State and the Commonwealth as a whole the deaths and death rates from influenza in 1919:—

## DEATHS AND DEATH-RATE PER 100,000 PERSONS FROM INFLUENZA, 1919.

Particulars.	N.S.W.	Vic.	Qld.	S. A.	W. A.	Tas.	N. T.	F. T.	C'wealth.
Number of deaths—									
Metropolitan areas	3,350	2,413	377	334	230	77	..	..	6,781
Remainder of State	2,630	1,148	734	206	310	163	16	1	5,208
Whole State ..	5,980	3,561	1,111	540	540	240	16	1	11,989
Death rate per 100,000 persons—									
Metropolitan areas	413	329	203	136	167	177	..	..	314
Remainder of State	228	157	137	98	167	97	333	43	174
Whole State ..	304	243	156	118	167	114	333	43	233

A reference to Graph No. 1 (a) discloses the fact that there were marked epidemics of influenza in 1891, 1894-5, and 1899, and that the epidemic of 1918-19-20 was much more severe than any of the preceding ones. The annual death rates per million persons from influenza for the periods 1880-1893 (fourteen years), 1894-1906 (thirteen years), and 1907-18 (twelve years) were 104, 202, and 98 respectively, while the rate for 1919 was 2,331, which was 23.8 times that of the average for the twelve years 1907-18.

It appears that apart from the epidemics there is a secular fluctuation in the frequency, i.e., in the degree of regularity with which the deaths for individual years vary on the positive or negative side. This oscillation is shewn on Graph 1 (see curve 1 (b)), and can be represented by the formula—

$$D = 124 + t - 100 \cos (10^{\circ}t); \quad t = Y - 1880.$$

Where D denotes the number of deaths per annum per million of population, and Y the calendar year.

There is evidently no clearly defined and regular secular period for this disease. It is at once obvious from the graph that the last epidemic was very much more severe than previous epidemics; the differences from the oscillation curve being of the following order, viz.—

Year 1891, 570; year 1899, 220; year 1907, 68; and year 1919, 2,255.

Though there is no very marked correlation between the mortality-frequencies of influenza and most other diseases, it appears to be fairly definitely associated with pneumonia and heart disease, as the following table shews:—

## DEATHS PER 1,000,000 FROM INFLUENZA, PNEUMONIA, AND HEART DISEASE.

	Influenza.	Pneumonia and Broncho-pneumonia.	Heart Disease.
1880 .. ..	35	527	701
1885 epidemic .. ..	77	865	820
1890 .. ..	130	681	757
1891 epidemic .. ..	739	809	805
1894 epidemic .. ..	257	623	685
1895 epidemic .. ..	277	702	722
1899 epidemic .. ..	462	760	829
1900 .. ..	147	670	848
1907 epidemic .. ..	219	653	922
1910 .. ..	74	529	1,002
1918 .. ..	170	647	798
1919 epidemic .. ..	2,331	776	1,140



The association of these three diseases was conspicuous in 1891 and 1919, and the deaths—recorded as due to influenza and to pneumonic influenza—indicate that on the whole these two causes are closely related. Thus the average number of deaths per month for 1911-17 and the number during each month of 1918 and 1919 were as follows:—

**MONTHLY NUMBERS OF DEATHS FROM INFLUENZA AND PNEUMONIC INFLUENZA.**

Particulars.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Ordinary influenza—													
1911-17* ..	14.7	9.0	10.6	14.0	18.4	27.7	34.0	52.7	59.6	42.9	33.3	17.7	334.3
1918 ..	12	5	7	12	13	26	41	52	173	275	130	102	848
1919 ..	17	30	72	81	119	293	408	242	103	54	42	37	1,496
Pneumonic influenza—													
1919 ..	62	465	230	1,845	1,491	2,129	2,339	1,074	494	202	84	28	10,493

\* Annual averages.

**DEATH RATES FROM INFLUENZA PER ANNUM PER MILLION PERSONS DURING EACH CALENDAR MONTH.**

Period.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1907 ..	132	54	55	62	74	32	120	550	676	503	220	127	219
1908-12	47	27	32	43	67	88	143	177	184	145	109	63	94
1913-17	34	26	27	36	44	67	60	100	131	94	76	43	62
1918 ..	29	13	17	29	31	63	97	123	421	647	316	239	170
1919 ..	185	1,276	817	4,605	3,712	5,745	6,276	2,995	1,397	578	293	146	2,331

The fluctuation of annual period of ordinary influenza is shewn in the following table:—

**DEATH RATES PER ANNUM PER MILLION PERSONS DURING EACH EQUALISED MONTH AND THE RATIOS OF EACH TO THEIR MEAN VALUE.**

Month.	Equalised Month.	Difference from Yearly Mean.	Ratio to Average.	Month.	Equalised Month.	Difference from Yearly Mean.	Ratio to Average.
January ..	40.1	- 34.5	- .462	July ..	92.3	+ 17.6	+ .236
February ..	26.5	- 48.1	- .645	August ..	132.3	+ 57.5	+ .771
March ..	29.2	- 45.4	- .608	September ..	153.2	+ 78.6	+ 1.053
April ..	39.2	- 35.4	- .474	October ..	114.4	+ 39.8	+ .533
May ..	54.2	- 20.5	- .275	November ..	88.5	+ 13.9	+ .186
June ..	76.5	+ 1.8	+ 0.24	December ..	49.4	- 25.3	- .339

The figures in Column I. are the geometric means between the arithmetic means of the periods 1907-12 and 1913-17.

The curve equivalent to the values represented in the third column of the above table is shewn by the curve I. on graph No. 2. For Influenza the maximum of the periodic oscillation of death rate occurs in Australia about September 11, and has the value of 1.124 times the average for the year, and the minimum (by graphic determination) occurs about February 24, and has the value 0.656 of the average for the year. It has but one maximum and one minimum. For the 1919 epidemic, including both ordinary and pneumonic influenza, the following variations in the relative frequency per calendar month throughout the Commonwealth are shewn:—

**DIFFERENCE IN ANNUAL DISTRIBUTION OF ORDINARY AND PNEUMONIC INFLUENZA (CALENDAR MONTHS).**

Influenza.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Ordinary ..	-.463	-.646	-.611	-.479	-.282	+.017	+.227	+.769	+1.061	+.544	+.195	-.332
Pneumonic	-.932	-.501	-.649	+.964	+.634	+1.460	+1.786	+.308	-.440	-.777	-.901	-.951

This difference is due in part to the fact that the appearance of the disease was not simultaneous for the several States of the Commonwealth. These results indicate three maxima, viz., February, April, and July, and three minima, occurring in March, May, and December. The maximum death rates in each State occurred as follows, viz., Victoria, February, May, and July; New South Wales, April and July; Queensland, June; South Australia, May, August; Western Australia, August; and Tasmania, September.

The characteristics of the age-incidence of the epidemic are sharply differentiated from those of ordinary influenza. The deaths from influenza per 1,000,000 males and per 1,000,000 females of each age-group during the nine years 1907-15, and during the three years 1916-18, were as shewn in the table hereunder, and were very nearly identical. Graph No. 3 (Curves 1 and 2 for males, and 1' and 2' for females) shews the frequency. Curves 3a and 3'a illustrate the age incidence in the case of the recent epidemic, and disclose its characteristic difference from the age incidence of ordinary influenza, also given for both males and females in the table hereunder. Curves 4 (males) and 4' (females) indicate—for comparison—the age incidence of pneumonia during the period 1907-15, and it will be noticed have the same general character as the curves of ordinary influenza.

## AUSTRALIAN DEATH-RATES FOR INFLUENZA PER MILLION.

Age Group.	Deaths per Million <i>Males</i> in each Age Group.			Deaths per Million <i>Females</i> in each Age Group.		
	1907-15.	1916-18.	1919.*	1907-15.	1916-18.	1919.*
Under 1 year ..	341	240	1,531	250	186	1,286
1 ..	82	41	903	85	49	784
2 ..	35	31	886	38	34	829
3 ..	34	24	659	26	28	427
4 ..	24	12	568	11	23	577
5-9 ..	16	18	250	21	19	340
10-14 ..	9	12	423	15	8	347
15-19 ..	21	31	932	18	12	772
20-24 ..	25	40	1,862	31	13	1,673
25-29 ..	33	46	4,649	29	15	3,309
30-34 ..	27	35	6,243	31	23	3,685
35-39 ..	56	48	5,764	54	33	3,378
40-44 ..	71	50	4,380	46	41	2,468
45-49 ..	101	76	4,283	68	55	2,477
50-54 ..	109	87	3,862	103	67	2,791
55-59 ..	170	153	3,557	122	145	4,113
60-64 ..	248	343	3,852	296	278	3,611
65-69 ..	468	446	3,409	528	437	3,335
70-74 ..	848	759	3,084	1,018	766	3,499
75-79 ..	1,407	1,472	3,712	1,917	1,535	3,860
80-84 ..	2,240	1,967	2,544	2,340	2,221	2,797
85-89 ..	3,274	4,777	3,398	3,839	3,891	3,057
90-94 ..	6,038	3,939	4,201	5,285	2,837	2,356
95-99 ..	5,333	3,016	7,752	7,276	6,726	..
100 and over ..	..	..	..	24,096	..	..

\* Ordinary and pneumonic influenza combined.

There is an extraordinary difference in the incidence of the mortality in respect to age. While in the mortality from ordinary influenza it continually increases with age for both males and females after the age of, say, 12½ is passed (see results for 1907-15 and 1916-18), in the pneumonic form it reaches a maximum—about 6,300—at age 36.4 for males and about 3,700 at age 32.6 for females.\*

The masculinity of death from influenza is also peculiar. If the excess of males over females in 10,000 persons be ascertained, this number may be termed the masculinity per 10,000. Thus if the masculinity be 1,754 per 10,000, it means that the number of

\* For females the results for the higher ages are irregular, being based on small numbers.

cases of males and females were in the proportions:— $\frac{1}{2}$  (10,000 + 1,754) males to  $\frac{1}{2}$  (10,000 - 1,754) females = 5,877 to 4,123. The masculinity figures per 10,000 persons of the mortality from Influenza, Broncho-Pneumonia, Pneumonia and Heart Disease are as follow:—

**MASCULINITY OF DEATHS FROM INFLUENZA, ETC.**

Disease.	1907-12.	1913-19.	1918.	1919.
Influenza .. .. .	575	60	967	1,754
Broncho-Pneumonia .. .. .	1,021	938	175	739
Pneumonia .. .. .	2,441	2,469	2,395	1,694
Heart Disease .. .. .	1,327	1,371	981	1,047

Thus for influenza the masculinity (as defined) greatly increased in 1919; for broncho-pneumonia it distinctly increased over its value for 1918 though it was less than for the period 1907 to 1917; for pneumonia itself it conspicuously diminished; while for heart disease it did not greatly change.

The periods at which the number of deaths from influenza became greater than the normal in each of the States were as follows:—New South Wales—September to December, 1918. Recrudescence March, 1919, to January, 1920. Victoria—September to November, 1918. Recrudescence January to December, 1919. Queensland—July, 1918, to February, 1919. Recrudescence May to December, 1919. South Australia—August to October, 1918. Recrudescence April to November, 1919. Western Australia—July, 1918, to January, 1919. Recrudescence June, 1919, to January, 1920. Tasmania—October to December, 1918. Recrudescence August, 1919, to February, 1920. Commonwealth—July, 1918, to February, 1920.

The number of deaths attributable to the epidemic of influenza involves an analysis of the mortality from all diseases and of the mortality from this disease in normal circumstances. Moreover, since certain other diseases shew an increase they may be brought into account in estimating what may possibly have been the indirect effect of the influenza. Proceeding thus the following results are obtained for the excess deaths:—

**EXCESS IN THE NUMBER OF DEATHS FROM INFLUENZA, PNEUMONIA, AND HEART DISEASE OVER NORMAL NUMBER, 1918-1919.**

Disease.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Influenza ..	65	482	339	1,912	1,587	2,396	2,724	1,280	666	453	196	133	12,233
Pneumonia	31	- 3	- 1	160	68	216	166	4	11	- 3	- 80	- 34	535
Heart Disease	30	26	53	121	130	135	303	239	222	257	103	141	1,760
Total ..	126	505	391	2,193	1,785	2,747	3,193	1,523	899	707	219	240	14,528

NOTE.—Minus sign indicates that deaths were less than normal.

As the table shews, there were 14,528 deaths during 1918-19 (590 in 1918 and 13,938 in 1919) more than would have occurred normally. This number was the death-tribute for the two years owing directly and indirectly to the epidemic of influenza, on the supposition indicated, viz., that the increase in deaths from pneumonia and heart disease were associated more or less directly therewith.

This result can be otherwise confirmed. The death-rates for all causes of death per 100,000 of population for 1913 to 1919 were as follows:—

**DEATH RATES, ALL CAUSES, 1913-19.**

Year .. .. .	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Rate per 100,000 ..	1,078	1,051	1,066	1,104	980	1,009	1,282

Obviously the rate for 1919 is very much above the average. If 1918 be taken as substantially normal (since the average for 1913-1917 was 1,056) and allowance be made for the fact that the population in 1919 was 1.03268 times that of 1918, the expected number of deaths in 1919 was 51,891. The actual deaths were 65,930, or 14,039 in excess of the expected number which agrees very well with the number (13,938) given above for 1919.

## § 19. Past Glacial Action in Australia.\*

### 1. Introductory.

One of the most remarkable facts brought to light by geology is the great contrasts of climate that have occurred in the same geographical areas at different periods of the world's history. An arboreal flora, such as is characteristic of temperate regions in the present day, has flourished at certain times in the past both within the Arctic and Antarctic circles. The seas of the Antarctic regions have also, at one time, been tenanted by coral-like organisms, which, together with allied forms of marine life, built reefs in the ocean, indicating a climate that is quite inconsistent with permanent ice-caps and floating ice.

On the other hand, there are unmistakable evidences that many parts of the world, which are now included in the warmer temperate and sub-tropical latitudes, have passed through periods in which permanent ice covered much of the land surface, or the local seas were invaded by floating ice. Geologists are not agreed as to the cause of these remarkable fluctuations of climate, but the facts are indisputable.

The evidences on which these deductions have been reached are based on the fact that the sculpturing of the land surfaces by ice is of a kind that is peculiar, and easily distinguishable from that of other denuding agents. Just as distinctive land forms are developed under arid conditions, and another class of sculpture is developed as the result of a moist climate and running water, so, again, there is a distinct and typical glacial topography which follows as a consequence of ice erosion.

To give in detail the full scope of such evidences would involve too much space, but, stated generally, in a glaciated region the hard rocks that form the floor over which the ice moves, are rounded, polished, and grooved (*roche moutonnée*); and the valleys are wide, flat-bottomed, with steep sides shewing an absence of spurs, and, generally speaking, follow a straight or gently-curved course. The tributary valleys often join the main valley at high levels, giving rise to waterfalls. The detrital matter in the valleys is of a morainic type—that is, stones and clay confusedly mixed (till), large blocks being often carried on the surface of the ice and left stranded in peculiar positions. Many of the ice-carried stones have travelled long distances, and may have been transported across minor watersheds, and are called "erratics," as being foreign to the localities in which they occur. The stones contained in the boulder-clay, or "till," are commonly ice-scratched, unevenly scraped, faceted, and irregularly worn. A glaciated country usually possesses lakes, some of which are held in rock basins that have been excavated by the ice, while others are caused by transverse moraines, left by the retreating glacier, and which act as dams to impound the drainage.

### 2. Periods of Glaciation in Australia.

(i.) **General.**—The present climate of Australia, as a whole, is in keeping with the latitudes in which it is situated, and is in no sense abnormal as compared with other countries that occupy a similar position in relation to the climatic zones; yet, at three distinct geological periods, there has been permanent ice, to a greater or less extent, within its geographical limits. Each of these glacial periods has left its records. In some cases the glacial features are interbedded with other sediments of a remote age, and, in others, they form the present landscape which has been fashioned in its larger contours by the heavy passage of the ice-plough over its surface.

The three glacial periods of Australia are as widely separated from each other in time as they could well be, occurring, respectively, near the top, bottom, and middle of the sedimentary rocks. Beginning with the latest, they are as follows:—(i.) Pleistocene and (?) Recent Glaciations; (ii.) Permo-Carboniferous Glaciations; and (iii.) Cambrian Glaciations.

\* Contributed by Walter Howchin, F.G.S., Professor of Geology and Palæontology, University of Adelaide.

(ii.) Pleistocene and (?) Recent Glaciations.—(a) *General*.—No part of the Australian continent is, at the present time, included within the permanent snow-line, although in the highest portions of the south-eastern part of the mainland and on the central plateau of Tasmania, snow may fall at any time of the year, and, in sheltered nooks, may outlast the summer. There are abundant evidences, however, that within comparatively recent times snow was not only a permanent feature of these highlands, but valley glaciers of considerable extent existed and continued through a sufficient length of time to leave their tool-marks on the topography of the districts concerned.

(b) *The Glaciers of Kosciusko*.—Mount Kosciusko, which attains a maximum height of 7,328 feet, is the culminating peak of an extensive plateau that forms part of the border lands between New South Wales and Victoria, and forms the "knot" that unites the main eastern and southern ranges at the south-eastern angle of the continent. In the first instance, when the question came under discussion, several conflicting reports were received from observers as to the occurrence of glacial features on Kosciusko, but the observations of Lendenfeld, published in 1885; Helms, in 1893; David, Helms, and Pittman, in 1901; and, again, David, in 1908, placed the existence of such features beyond all doubt.\*

The zone of glaciation is embraced between the heights of 7,150 feet and a mean of about 5,600 feet. The eastern side gives greater evidence of glacial action than the western. This is what might be expected on the general law that the snow-fields of the world have their greatest development on the side of greatest precipitation. At Kosciusko the moisture-laden winds come from the east, while the relatively warm and dry north-westerly winds that blow from the interior of Australia would tend to limit the accumulation of snow on the side of the range which was exposed to their influence. According to Professor David, "the ice-sheet extended to at least 12 miles N.E. from Mount Kosciusko, and moved in a general S.E. to E.S.E. direction from the main dividing range, between the Snowy and Murray rivers, towards the valley of the Thredbo . . . while the total area covered by the ice-calotte of Kosciusko, during the maximum glaciation, was probably about 80 to 100 square miles." It is estimated that, at this period, the ice-sheet, in places, reached a thickness of not less than 1,000 feet. The largest and longest glacier was that which filled up the Snowy River Valley and its tributaries, and made an ice-fall over into the Thredbo Valley, coming down to within 4,500 feet of the present sea-level, having a length of  $4\frac{1}{2}$  miles.

On the western side of the divide, draining into the River Murray valley, several smaller glaciers existed, of which the Wilkinson Valley glacier was the principal. Some of the finest glaciated rock surfaces occur on this side, together with much morainic material, including erratics up to 20 feet in length, as well as impounded lakes. On this side of the watershed the glacial features come down to within 6,300 feet of sea-level.

The highest points of the range, in a zone of about 200 feet, exhibit the effects of atmospheric weathering only—which has probably arisen from the thinness of the *névé* at the summit and consequent absence of driving force, as well as the mechanical effects of frost acting on exposed faces of rock—but within the intermediate zone, as defined above, the usual features of glacial topography are strikingly manifest. The period of maximum glaciation is responsible for the excavation of the U-shaped valleys and the rock basin of Lake Merewether, as also for most of the ice-scratched and ice-polished rock-faces (*roches moutonnées*), one of which, according to Lendenfeld, is 3 acres in extent.

When this period of maximum glaciation had passed, the gradual retreat of the ice-sheet was marked by the stranding of the morainic debris left by the glaciers at halting stages in their recession, first as high-level lateral moraines, and later in successive transverse moraines which were piled up as terminals at the glacier snouts. The lowest down of these transverse moraines are the largest (up to 200 feet in height), and they decreased in size as the glaciers shrank upwards, forming barriers to the drainage and giving rise to lakes and tarns. Of these the principal are Lake May (Cootapatamba), situated in Ramshaw Pass, on the southern slopes of Mount Kosciusko, which is a quarter of a mile in length, 17 feet in depth, and is held up by a moraine 75 feet in height; Lake Albina, about the same size as Lake May, situated on the eastern slopes of Mount Townsend, above where the valley plunges steeply down on the western flanks into the head waters of the River Murray; and the Blue Lake and Hedley Tarn, which occupy

\* See *Proc. Linn. Soc. N.S.W.*, vol. X. (1885), pp. 44-53; vol. XVIII. (1893), pp. 349-64; vol. XXVI. (1901), pp. 26-74; vol. XXXIII. (1908), pp. 657-68.

the valley passing from Mount Twynam down to the Snowy River. Some of the more interesting features of the later glaciations are found in connexion with the Blue Lake (or Lake Merewether, the largest of the glacial lakes on the plateau), which was carefully surveyed by Professor David. It is, partly, a rock basin, caused by overdeepening at the time of maximum glaciation, but has been subsequently enlarged by a large transverse moraine left at its lower extremity, 20 chains wide, with a present height above the level of the lake (which David proved to be 75 feet in depth) of 160 feet. Another interesting glacial feature of these U-shaped valleys is the occurrence of "hanging-valleys," in which some of the lateral valleys show a discordance of level up to 150 feet with the trunk valleys. Glaciated erratics are common in the ground moraines.

An attempt has been made to estimate the interval of time that has elapsed since the south-eastern highlands had their capping of ice. The time factor must be estimated on three counts:—(a) the initial stages of glaciation leading up to a maximum, indicated by the amount of glacial erosion; (b) the later stages of glaciation marked by ice-shrinkage and moraine building; and (c) the fluviatile stage which has intervened between the close of the ice-period and to-day. Since the ice-sheet withdrew from the Snowy River valley at a certain level, the stream has cut a V-shaped gorge; first, through the impounding moraine, and then through a bar of solid granite to a depth of 60 feet. Professor David calculated that, to do this, would require from 50,000 to 100,000 years; and that the height of the ice-flood, or maximum glaciation, speaking roughly, occurred some 100,000 to 200,000 years ago, but that only 10,000 to 20,000 years separates the present time from the close of the period of glaciation on the Kosciusko plateau.

(c) *The Glaciers of Tasmania.*—Until comparatively recent times Tasmania formed a part of the mainland, and owes its present isolation to a faulted segment in the earth's crust that sank below sea-level and formed Bass Strait. The island consists mainly of highlands (a continuation southwards of the eastern ranges of the Australian continent) which form a great central plateau reaching a maximum elevation of a little over 5,000 feet, the edges of which are broken by deep gorges and isolated peaks, varying in height from 2,000 feet to 5,000 feet. The elevation is inferior to that of the Kosciusko plateau, but as the country is situated some 6 degrees of latitude further south, it might be expected that at the time of the Kosciusko glaciation a permanent ice-field would also exist in the higher regions of Tasmania.

No expedition for the specific object of investigating the Pleistocene glacial remains of Tasmania has been undertaken, but incidental observations bearing on the subject have been made by several travellers who were visiting the country in pursuit of other objects. We are particularly indebted, in this respect, to Mr. E. J. Dunn,\* Mr. T. B. Moore†, and Prof. J. W. Gregory,‡ whose observations were limited to the region of the West Coast Range and the Eldon Range. It is probable that further investigations will prove that this glacial field is of greater extent.

On the evidence of the travelled erratics, as well as of the direction of the striæ, the central plateau formed the great gathering ground of the *névé* which found its outlet by the western valleys, the glaciers moving in a westerly and south-westerly direction. The greater heights of the Eldon Range, Mounts Tyndall, Sedgwick, Lyell, and Owen, attaining an elevation of approximately 4,000 feet, supplied their tributary glaciers, which at such levels probably coalesced and formed a general ice-cap. One of the main glaciers occupied the valley between Mounts Tyndall and Sedgwick, flowing westward, and in its retreat left Lake Margaret in its course. Another important glacier taking its rise on the Eldon Range flowed southward by the valley of the King River, one branch passing westward between Mounts Sedgwick and Lyell, and another continuing southward to the eastern base of Mount Owen, a portion overflowing the ridge separating the Linda and Queen valleys.

The usual glacial phenomena are much in evidence in this area. The pre-glacial valleys have been widened and deepened, rocks along the paths of the glacier are smoothed and scored (*roches moutonnées*), glacial lakes and tarns are plentiful, extensive moraines cross the valleys and intercept the drainage, ice-worn and striated boulders occur in typical boulder clays, and erratics, some of immense size, have been far-carried. These and other characteristic features place the fact of the glaciation of the region beyond all question.

\* Dunn, *Proc. Roy. Soc. Vict.*, vol. VI. (1894), N.S., pp. 133-38.

† Moore, *Papers and Proc. Roy. Soc. Tasmania*, 1894, pp. 147-149.

‡ Gregory, *Quar. Jour. Geol. Soc. London*, vol. LX. (1904), pp. 37-53.

The Gormanston moraine, which originally crossed the Linda valley, on the eastern side of Mount Lyell mine, has been much eroded by the Linda Creek, but the fragment left on the southern bank of the stream is a mile long and half-a-mile wide, and rises to a height of 320 feet above the level of the creek. The west coast railway shows numerous cuttings intersecting moraines and boulder clays. In the Pieman valley the glacial marks come down to within 400 feet of present sea-level, but as there has been a considerable uplift of the land within recent times in that part of Tasmania, it is not improbable that some of the glaciers came down to sea-level.

There is an apparent correlation between the Australian Pleistocene glaciations and similar features in other parts of the world. The Pleistocene period in the Northern Hemisphere was specially characterized by the "Ice Age" of Europe and North America. About the same time New Zealand, so far as the South Island is concerned, was largely buried under ice, and it is interesting to note that concurrently with the disappearance of permanent ice-fields from Australia and Tasmania there has been a gradual decrease in the size of the ice-covered areas of New Zealand. The ice-flood period of that country has long since passed its maximum, and the wasting glaciers are slowly shrinking upwards towards their source and, in many cases, are now confined to the central portions of their flat-bottomed valleys.

(iii.) *Permo-Carboniferous Glaciations.*—(a) *General.*—The Permo-Carboniferous System is the last of the great geological systems that make up the Palæozoic Division in the classification of the stratified rocks. It is a very remote period in the history of this world, and belongs to a time that antedates the beginnings of all the higher vertebrates in the Animal Kingdom. It marks a most important era in the development of this continent, being the period when the plants that formed the coal of the great Sydney Coal Basin flourished in luxuriant growths, and it is their accumulated remains, preserved by a slow subsidence of the land, that yield the greatest source of mechanical energy in the industries of Australia to-day.

The Permo-Carboniferous period is also remarkable for its widespread glacial conditions that have left their evidences in many countries and on both sides of the equator to an extent that may well suggest that it was the most important "Ice Age" that this world has experienced. Australia possesses one of the greatest of these extinct ice-fields and, while the evidences are most marked in the southern portions of the continent, it is remarkable that each of the respective States of Australia give some evidences of ice action belonging to this period, extending northwards into low latitudes that border on the tropics. The time that has elapsed since the Permo-Carboniferous beds were laid down is so vast, and the geological changes that have occurred in the interval have so altered the face of things, that the glacial remains of the period occur only as isolated patches. How far these were originally united to form a more or less continuous ice-sheet cannot be determined, but the evidences shew that, in some localities, the ice was terrestrial and formed ice-caps of great extent; while, in other parts, the deposits were laid down by floating ice under marine conditions. The presence of marine sediments of this age in many parts of Australia and Tasmania makes it probable that, at that time, the land masses formed islands rather than continental areas.

(b) *Victoria.*—The absence of marine beds of Permo-Carboniferous age from the southern portions of Australia makes it probable that at that time most of South Australia and Victoria, together with Bass Strait and the north-western portions of Tasmania, formed a continuous land area. This is also suggested by the fact that the only remains of that age known to exist within the areas mentioned are such as indicate terrestrial conditions, and, particularly, the existence of land ice on a large scale. The interstratification of true tillites with mudstones, sandstones, and conglomerates suggests the presence of both glacial and fluvio-glacial agencies.

In Victoria, disconnected fragments of these glacial remains occur both on the northern and southern slopes of the Dividing Range. On the northern side of the range, Mr. E. J. Dunn\* has observed them at Wahgunyah, Rutherglen, The Springs, El Dorado, Wooragee, Tarrawingee, Baddaginnie, to the north-east of Costerfield, and at Wild Duck Creek, west of Heathcote. The glacial beds are also met with in exploiting the auriferous beds in the deep leads of the district. The beds occupy a trough or valley in the Ordovician rocks, by which they have been protected from erosion. The best exposures

\* Dunn, *Report Aus. Assoc. Adv. Science*, vol. II. (1890), pp. 452-458.

on the northern side of the Divide are in the neighbourhood of Wild Duck Creek, where the area covered amounts to  $35\frac{1}{2}$  square miles. The floor over which the ice moved is glaciated in places, the striae having a nearly north and south direction. The erratics are numerous and very varied, apparently gathered from the older rocks that form the geological axis of the country. The boulders scattered over the surface are very often faceted and ice-scratched, and, in some instances, reach a diameter of from 20 to 30 feet. The best locality to study the features is at a point where the railway from Heathcote to Bendigo crosses the Wild Duck Creek. As in the case of the Bacchus Marsh section (referred to below), the upper beds consist of a soft sandstone carrying impressions of the fern *Gangamopteris*.

The most important exposures of the glacial beds on the southern side of the Dividing Range occur in the gorges of the Lerderberg Ranges, a few miles to the westward of Bacchus Marsh. Excellent sections can be seen in the Werribee River and its tributaries, Pike's Creek, the Myrning and Korkuperrimul Creeks, also in the Lerderberg River and its tributaries.

The beds consist of variously-coloured mudstones (the thickest of these measures 193 feet), with numerous erratics, up to  $5\frac{1}{2}$  feet in diameter, many of which are strongly glaciated; sandstones and conglomerates, which occasionally contain glaciated erratics, and, in the upper members, sandstones that have an average thickness of 30 feet,\* carrying plant-remains. Sandstone is a bad medium for the preservation of plant-remains, but three species of *Gangamopteris*, as well as the remains of *Schizoneura*, and *Zeugophyllites* have been determined, which are all characteristic forms in the Permo-Carboniferous flora. The presence of these plants near the top of the series is a very important item of evidence, as it fixes the date of the glaciation as not later than the Permo-Carboniferous, and probably not much, if any, earlier than that period.

The inference that it was land ice that gave rise to the deposits in question is based on two factors; one that the Ordovician rocks on which they rest have been deeply fluted, scored, and polished by glacier movement; and the other that the ploughed up material of which the mudstones consist has been worn away from the local rocks over which the glacier moved. Another conclusion, based on the direction of the glacial striae, is that the ice came from the south and travelled in a north-easterly direction.

(c) *Tasmania*.—The Permo-Carboniferous System in Tasmania is extensively developed, making surface features over about half of the island, and is very generally distributed. Tasmania, at that period, appears to have formed a coastal fringe bordering a mainland, as the sediments show alternating conditions of dry land, fresh water, carbonaceous swamps, and shallow seas.

The Permo-Carboniferous glacial features of Tasmania are of two kinds, the one indicating land ice and glaciers, situated in the north; and the other, floating ice, which dropped its burden of stones and mud in a shallow sea in the south. The most important section in the country belongs to the first of these kinds, and outcrops on the north coast (at a low angle of dip) for a distance of 5 miles, in the neighbourhood of Wynyard. The beds aggregate a thickness of over 1,200 feet,† and consist of tillites, conglomerates, and thinner beds of sandstones and shales. Glaciated erratics, measuring up to 5 feet in diameter, are plentiful in the section. The existence of three striated pavements, at various levels in the beds, noted by Professor David, is an interesting feature, and probably represents an advancing ice-sheet over its own bed after a temporary recession. The western end of the glacial outcrop is capped by the fossiliferous Tertiary beds of Table Cape, and the eastern end or basal portion is covered by a narrow basaltic flow in an old Tertiary valley, which unfortunately obscures the junction of the glacial beds with the older rocks, but as the Ordovician slates form the outcrop on the other side of the basaltic cap there can be no doubt that they form the glacial floor. Many of the erratics included in the tillite shew a very close resemblance to the rocks occurring around Heazlewood and Zeehan and about 30 miles to the southward, which shew a northerly trend for the ice, and also agree with the direction indicated by the striated pavements, the latter trending from S.S.W. towards the N.N.E.

\* For a complete section of these beds see David, *Quar. Jour. Geol. Soc. London*, vol. LIII. (1896), pp. 289-301.

† For a detailed section of the beds see David, *Report Aus. Assoc. Adv. Science*, vol. XI. (1907), p. 278.



There are no marine beds in the Wynyard section, and a microscopical examination of the finer material of the boulder bed, near its base, shews it to be composed of Ordovician shales and quartzites in a triturated condition. As the latter formed the floor over which the ice moved it is confirmatory evidence of its terrestrial character. There is also a very close analogy in the lithological features between the Victorian and Wynyard sections, and it is probable that the latter represents the southern extension of the terrestrial ice-sheet which had its greater developments in the regions now represented by South Australia and Victoria.

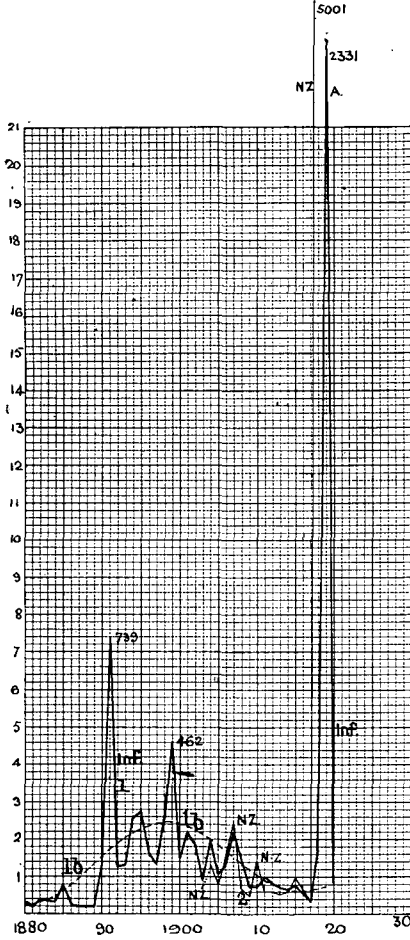
In the southern portions of Tasmania, dark-coloured muds carrying glaciated stones foreign to the neighbourhoods in which they occur, are found in many places. Examples may be seen in the Derwent Valley, Bruni Island, Maria Island, Little Peppermint Bay, in the neighbourhood of Port Cygnet, and other places. These boulder beds either carry marine fossils, intermixed with the glacial erratics, or are closely associated with marine beds, giving evidence that the glaciers in those localities came down to sea-level and, together with shore-ice, became the means of distributing the morainic material from the adjacent land over the sea floor.

(d) *South Australia*.—In connexion with this subject South Australia is distinguished in two ways. It was in South Australia that the first evidence of ice action was discovered on the Australian continent, and it is the State in which the most extensive evidences of Permo-Carboniferous glaciation occur. In 1859, Mr. A. R. C. Selwyn, Government Geologist of Victoria, when passing through the Inman Valley, recognised an ice-smoothed surface in the bed of the River Inman, and stated, "this is the first and only instance of the kind I have met with in Australia." Later observations proved that the glaciation was of Permo-Carboniferous age. This discovery of Selwyn's attracted little notice and remained unverified for many years. In 1877, the late Professor Tate discovered a glaciated pavement on the sea cliffs at Hallett's Cove, 30 miles north of Selwyn's discovery and within 15 miles of Adelaide. Subsequent investigations proved that the Hallett's Cove example was only a small outlier (two miles long and half-a-mile broad) of a much greater glacial field further to the south, covering many hundreds of square miles.

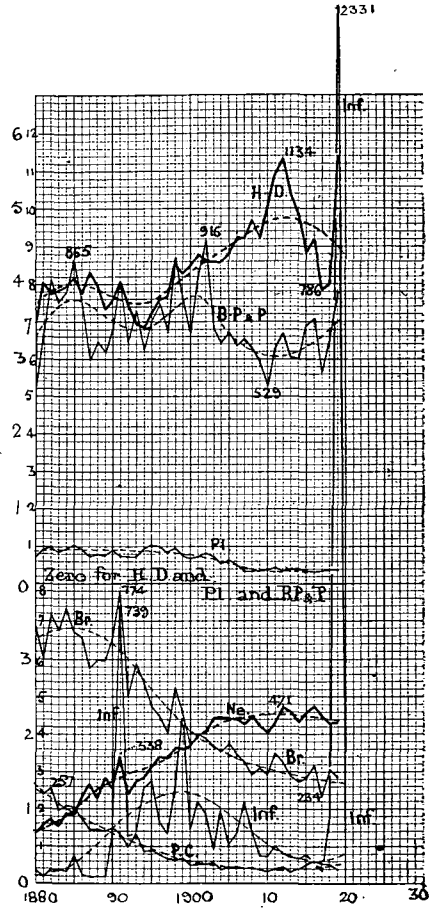
Since the Permo-Carboniferous ice-period the plateau of the Mount Lofty Ranges has been elevated and broken up into very large faulted blocks that have undergone much waste in the interval. The Hallett's Cove fragment is the only survival of the glacial mantle that once overspread the earth-block that, in its present configuration, has Mount Lofty as its highest point, and which dips away southwards to the base of the Willunga Ranges. The last-named ranges form the northern scarp of another faulted block that slopes again southwards to the southern coast. This region is largely covered with glacial debris and ice-marks. The area in which such features are especially manifested takes in most of the Cape Jervis peninsula from Myponga following the coastline by Second Valley to Cape Jervis, and from Myponga in a north-easterly direction by Mount Compass to near Bull's Creek and Strathalbyn. On the east it is bounded by the Strathalbyn and Victor Harbor railway as far as the last-named township. Then, in a westerly direction, it follows the coast again, to Cape Jervis. This block of country includes the glacial valleys of the Myponga and Yankalilla Creeks, the Inman, the Hindmarsh, and the Finnis Rivers, in addition to several ice-smoothed granite islands lying off the coast.

The Inman Valley forms one of the most striking features in this region. The Inman and Hindmarsh valleys together represent an old Palæozoic valley of erosion having an average width of 5 miles, which in its later stages became deluged with an ice flood that has moulded its physical features into a characteristic glacial topography. The ice filled the valley and overflowed the present watersheds, to do which would require an ice-sheet of, approximately, 2,000 feet in thickness. Wherever the glacier floor has been laid bare (which has been noted in over a dozen places, in one of which the exposure is 100 yards in length), it is seen to be powerfully glaciated. All rock prominences on the floor of the valley are ice-smoothed, shewing the characteristic gentle slope on the advancing side of the ice-sheet and the crag face on the lee side. Erratics, up to 25 feet in diameter, in countless numbers, are scattered over the face of the country, many shewing the usual glacial outline and scratches, while typical examples of till can be seen in the banks of the river Inman and elsewhere. Most of the larger erratics have been ploughed up from the granite zone, bordering the southern coast, and have been carried in a N.N.W. direction. The present superimposed drainage is slowly acting on the glacial clays and

SECULAR FLUCTUATION IN THE FREQUENCY OF INFLUENZA AND OTHER DISEASES.



GRAPH NO. 1.



GRAPH NO. 1A.

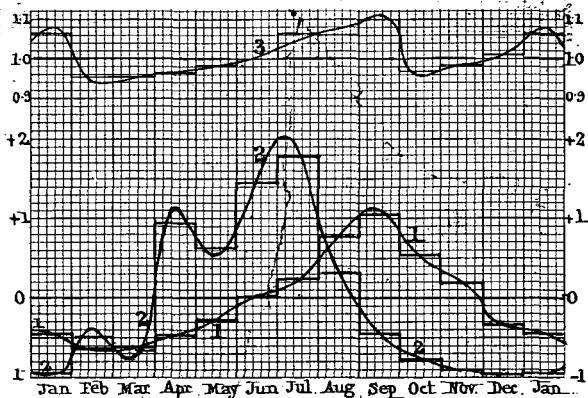
No. 1. Curve 1 represents the death rate per million persons from influenza 1880 to 1919. The light line is the corresponding death rate for New Zealand from 1904 to 1918. The oscillation is shown by the broken line 1b.

No. 1A. The death rates per million persons are given for various diseases as follows:—

- |             |                                     |      |                          |
|-------------|-------------------------------------|------|--------------------------|
| H.D.        | .. Heart disease.                   | Br.  | .. Bronchitis.           |
| B.P. and P. | .. Broncho pneumonia and pneumonia. | Ne.  | .. Nephritis.            |
| Pl.         | .. Pleurisy.                        | P.C. | .. Pulmonary congestion. |
|             |                                     | Inf. | .. Influenza.            |

In the vertical scale each small square represents a death rate of 20 per million persons.

## FLUCTUATION OF THE ANNUAL PERIOD OF INFLUENZA.



GRAPH NO. 2.

No. 2. Curve 1 shows the ratios of death rates per annum for million persons during each calendar month to their mean annual value.

Curve 2 shows the difference in annual distribution of influenza during 1919, and curve 3 the normal distribution in calendar months.

## AGE-INCIDENCE GRAPHS (see next page).

Curves 1 and 1' show the deaths from influenza per million of males and per million of females of each age group during the 9 years 1907-15, curves 2 and 2' for the 3 years 1916-18, and 3a and 3'a for 1919. Curves 4 and 4' are the corresponding figures for pneumonia for the 9 years 1907-15.

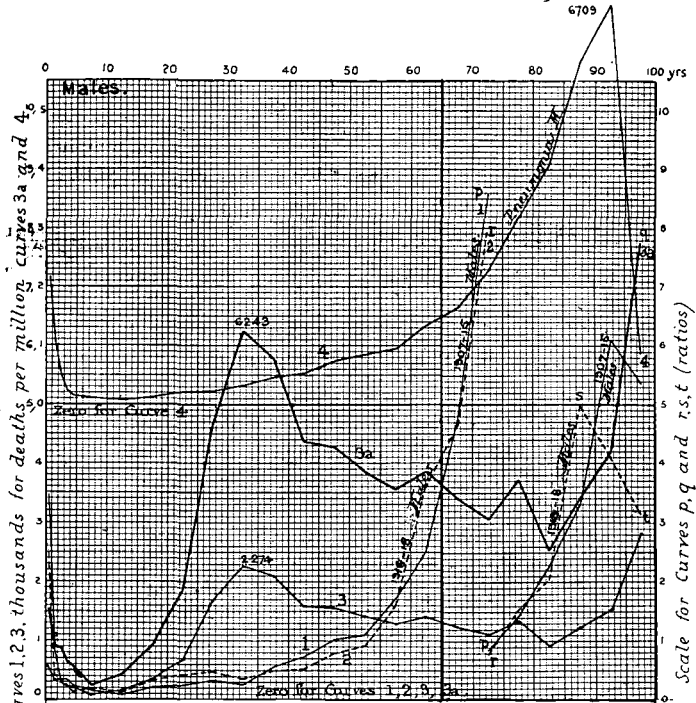
Curves 3 and 3' represent the ratio of deaths per million males and females of same age to deaths per million males and females of all ages.

To compare the death rates per million per annum take curves 1, 2, 3a and 1', 2', 3'a.

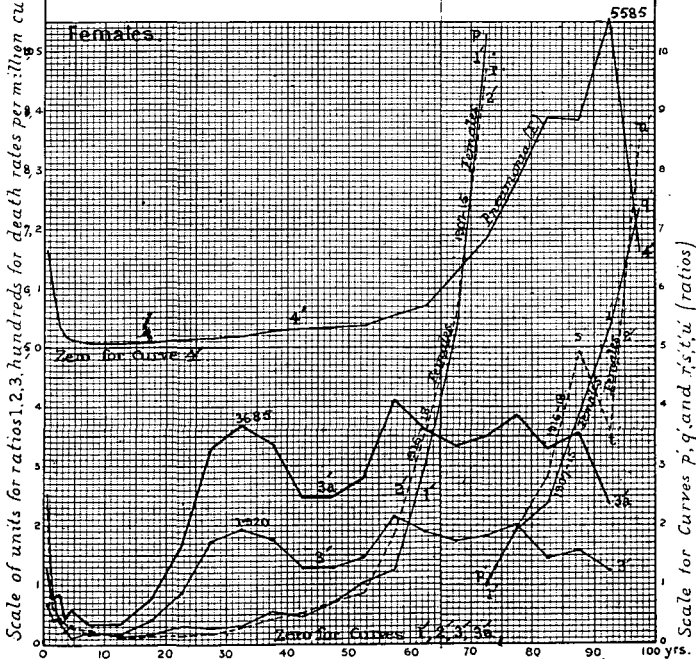
To compare the death rates if the total deaths were equal take curves 1, 2, 3 and 1', 2', 3'.

CHARACTER OF THE AGE-INCIDENCE IN THE MORTALITY FROM INFLUENZA.

GRAPH NO. 3.



GRAPH NO. 4.



(For explanation of Graphs see preceding page).

the same extent as that of the other two, and the effect of the latter is to increase the amount of the former. The result is that the amount of the former is increased, and the amount of the latter is decreased. The result is that the amount of the former is increased, and the amount of the latter is decreased.

sandstones, thereby exposing a buried landscape that was shaped by the conditions of waste that were operative, by water and ice, as far back as Palaeozoic times, and therefore ranks as one of the oldest examples of surface features that the world can shew.

The eastward extension of this old ice-field has been obliterated by the important earth movements connected with the Murray plains, (where there has been a great subsidence below sea-level since the Permo-Carboniferous ice period), but to the westward it is strongly in evidence over the southern half of Yorke Peninsula and the north-eastern portions of Kangaroo Island, and undoubtedly covered the intervening areas now drowned by the sea. A bore put down at Kingscote (Kangaroo Island), at sea-level, penetrated 1,094 feet of boulder clays before reaching bed-rock.

What remains of the great Permo-Carboniferous ice-field in South Australia indicates an area of glaciation at least 130 miles by 100 miles, but the actual extent must have been much greater than this. It is significant that in Northern Tasmania, as well as in Victoria and South Australia, the ice-sheet was travelling from south to north, which proved that one centre of radiation was to the south of the continent and is now probably submerged. In South Australia, from the mouth of the River Hinámars, near Victor Harbor, to Cape Jervis, the coast is severely glaciated and burdened with morainic material, while the coastal islands show similar glaciated features, with the glacial striae pointing south and north. There is plenty of scope for the imagination in restoring the physical features of those remote days with its limitless landscapes of ice and dazzling surface of snow.

(e) *New South Wales*.—When, in 1885, Mr. R. D. Oldham, the Director of the Geological Survey of India, was visiting New South Wales, he was greatly struck with the resemblance which certain beds at Branxton bore to the Talchir glacial beds of India, of a similar geological age, and after a little searching he was rewarded by finding a definitely glaciated pebble in these beds. This was the first discovery of its kind in New South Wales, and was the forerunner of many similar ones in later years.

The glacial features as developed in New South Wales are of a quite different kind from those found in the southern States. While the highlands of Victoria, South Australia, and North-western Tasmania were above sea-level and ice-capped, in Permo-Carboniferous times, the great Sydney coal basin was slowly sinking below sea-level. The system reaches a maximum thickness of 17,000 feet, and includes three well-defined glacial horizons.

The lowest series of glacial beds is included in the Lochinvar stage, of which they form the base, and is over 200 feet in thickness. They consist of mudstones, shales, and sandstones, and while not of the nature of a till, they carry water-worn pebbles, with occasional ice-marked boulders. The beds, in their earlier members, indicate fresh-water conditions, but pass up into marine sediments which, classed under the general name of the Lower Marine Series, have a thickness of 4,800 feet.

A period of emergence followed, when the land was covered with vegetation which took the form of fern brakes and peaty swamps yielding layers of carbonaceous material that formed the Greta and Clyde coal measures, the maximum thickness of which is 250 feet.

Following on the interval of dry land conditions which produced the Greta Coal, a second submergence of the land took place, which resulted in 5,500 feet of marine sediments being deposited, forming the Upper Marine Series, which contain a great assemblage of organic remains. The lower half of the Upper Marine Series is known as the Branxton beds, and towards their upper portions is a well-marked glacial horizon. Mud and stones brought by icebergs, or other forms of floating ice, were scattered over the sea floor, and ice-scratched stones are found mingled with marine forms of life. Where this bed comes to the surface it makes good hunting ground for erratics, some of which reach a weight of over 2 tons, and indented the mud into which they were dropped.

A few hundreds of feet higher in the series than the Branxton horizon, just referred to, are the Muree beds, consisting of fossiliferous sandstones and conglomerates, in which glacial erratics again make their appearance. There are thus, in the Permo-Carboniferous System of New South Wales, three distinct periods of ice aggression and two interglacial periods. The absence of ice-borne material between the Lochinvar stage and the Branxton stage, and the same between the latter and the Muree stage, appears capable of explanation by the well-known fact that glacial intensity is subject to various modifying causes. We may assume that the three occasions when floating ice reached the

latitude of the Sydney basin were periods of maxima in the ice floods of the highlands, while the intervals in which the seas in question were left free from glacial detritus, corresponded with periods in which warmer conditions prevailed when the land ice failed to come down to sea-level. The Muree stage, in the development of the Permo-Carboniferous of New South Wales, appears to be the latest at which there is evidence of glacial conditions of that age. The amelioration of climate, dependent on certain physical changes of which we have no knowledge, led to the disappearance of the permanent ice-cap; first, the glaciers failed to come down to sea-level, and then the tongues of ice, slowly shrinking, receded to higher altitudes until the permanent snow-field ceased to exist.

(f) *Queensland.*—The Permo-Carboniferous System passes northwards from the New South Wales border into Queensland, and occurs in several disconnected areas as far north as Townsville. Upper and Lower Marine beds alternate with Upper and Lower Coal Measures, the latter including very thick and valuable coal seams. No typical tillites or well-defined boulder beds occur in the series, but, in places, boulders of granite and other stones foreign to the series occur, either singly or in groups, included within the finer marine sediments, which is suggestive of similar glacial conditions to those which existed in New South Wales and Western Australia at that time. These sporadic pockets of boulders probably represent the northern limits of the floating ice of the period on the north-eastern portions of the continent.

(g) *Western Australia.*—The Permo-Carboniferous System of Western Australia includes the Collie Coal-field (an isolated fragment, 500 square miles in extent, situated to the east of Bunbury), an outlier in the Irwin River district, and a somewhat narrow zone extending in a north and south direction from the Murchison River, in the south, to Kimberley, in the north. With the exception of the Collie Coal-field the beds are supposed to be of marine origin, and carry a rich Permo-Carboniferous fauna with an admixture of forms that shew a close relationship with the true carboniferous marine fauna of the Northern Hemisphere and Indian types, which feature distinguishes the Western Australian beds from those of a similar age in the eastern States of Australia.

As in other parts of Australia, the Permo-Carboniferous System of Western Australia includes a glacial horizon, known as the Lyons Conglomerate, which, although limited to a few feet in thickness, is very persistent. The most southerly exposure of the glacial conglomerate is in the River Irwin district, where it can be traced for a distance of 24 miles. It is next seen in the Wooramel Valley, about 180 miles north of the Irwin, and continues from there, northwards, in an uninterrupted outcrop for over 200 miles. In this district it crosses the valleys of the Gascoyne, the Minilya, the Lyndon, and other rivers, in which excellent sections are visible. The bed is interstratified with calcareous shales and limestones which are generally highly fossiliferous, and the glacial conglomerate itself is sometimes fossiliferous. The beds usually dip at a low angle, so that notwithstanding the limited thickness of the glacial bed it often makes a considerable spread over the flats adjacent to the rivers, which become covered with erratics weathered out from the matrix. Many of these are glaciated and some are very large—one on the Irwin is 18 feet long and 13 feet wide, and is exposed 7 feet out of the ground. The erratics are said to have been derived from the older rocks which occur in outcrops further to the eastward. The glacial bed has been followed in its northward extension beyond the Lyndon Valley, into the tropics, in about 23° south latitude.

(h) *General Remarks on the Permo-Carboniferous Glaciation.*—So distinctive a feature as an Ice Period suggests more or less contemporaneity in its phenomena, as well as in the associated beds, within the regions concerned. Thus, the Permo-Carboniferous Ice Period is represented in a wide circle of countries, including the Falkland Islands, Brazil, South Africa, India, and Australia, which together comprise what has come to be known as Gondwanaland. Notwithstanding the great extent of the earth's surface involved there was a remarkable similarity in the flora of these countries during the Ice Period which they experienced in common. There is reason to think that on account of the refrigeration of the climate and the prevalence of land ice, which often reached to sea-level, the flora of these countries became greatly changed. With some measure of exception in the case of South Africa, the typical plants of the Coal Measures of the Northern Hemisphere (*Lepidodendra*, etc.), which were of the nature of a rank-growing and warm-climate flora, died out very suddenly, and their place was taken by a dwarfed

herbage, characterized chiefly by the ferns *Glossopteris* and *Gangamopteris*. These plants and some other associated types flourished abundantly in the countries named at the time of the great ice-flood (possibly during interglacial warmer periods), and in many places were the origin of important coal seams. The effect of the cold seems equally evident in the marine life of the period. Floating ice would chill the water and produce uncongenial conditions for some forms of life. Corals, some of which were reef-building, were abundantly developed in Carboniferous seas, as well as certain characteristic brachiopods. These warm-water forms (with the exception of a few survivals in the Western Australian region) became extinct within the Australian area before the Lochinvar glacial deposits were laid down, while some new forms took their place which find their analogues in corresponding beds in India and South Africa.

[NOTE.—By the courtesy of Professor David I have received (under date of 23rd January, 1920) an advance statement of an important discovery made by him and Mr. Süsmilch of glacial beds below what has hitherto been regarded as the base of the Permo-Carboniferous System of New South Wales. He states, "We have now proved glacial conglomerates and their tillites, with occasional striated pebbles interstratified with our *Rhacopteris* (Middle Carboniferous, or even Culm) beds at several places east of Maitland. These glacial conglomerates and their tillites underlie conformably the base of our Lower Marine Permo-Carboniferous System. There may, perhaps, be disconformity, but it does not look like it." This important discovery may mean, either that the Permo-Carboniferous Ice Period began earlier than has been estimated hitherto, or we have, in this latest find, a distinct glacial period that took place in Australia in an older geological system.]

(iv.) **Cambrian Glaciations (the Sturtian Tillite).**—(a) *General.*—While the Permo-Carboniferous glaciation is included in the highest system of the Palæozoic Division of the stratified rocks, the Cambrian glaciation belongs to the lowest member of that Division. The length of time that separates us from that remote period is inconceivably great, for the Permo-Carboniferous Ice-Age, remote as it is, takes us only about half-way to the glaciation that occurred in the Cambrian Period.

(b) *South Australia.*—South Australia holds the distinction of being the first to give definite evidences of glaciation at so early a stage in the geological history of the world\*. The discovery was made in 1899, and the first public announcement in 1901†. With the exception of an extension of the glacial beds to the Barrier Ranges, on the New South Wales side of the borders, the Cambrian tillite on the Australian continent, so far as is known, is limited to South Australia.

Notwithstanding the great age of the glacial beds, their resemblance to a recent boulder clay, or till, is very striking. The matrix is a bluish or brownish, flaky mudstone, irregularly indurated, gritty in texture, and contains angular and subangular erratics of all sizes up to 10 feet in diameter. Many of the boulders are faceted and glacially striated. At the Appila Gorge, 155 miles to the north of Adelaide, the beds are nearly vertical and shew a thickness of about 1,526 feet. The basal portion of the section consists of an unstratified boulder clay, or tillite, 750 feet in thickness; then follows a middle series of shales, quartzites, and thin limestones, containing few erratics, totalling 656 feet; and an upper tillite, 120 feet in thickness.

The Cambrian tillite has been traced, in a north and south direction, from the southern banks of the River Onkaparinga (18 miles south of Adelaide) to the Willouran Ranges near Marree (Hergott Springs), a distance of 450 miles; and in an east and west direction, from the ranges near Port Augusta to the Barrier Ranges in New South Wales, a distance of about 200 miles. The beds probably, at one time, formed a continuous sheet over this vast area, but, through folding, the anticlinal curves have been worn away, and by downthrow faulting the continuity of the deposits has been broken.

The Sturt Valley may be regarded as the type locality for these beds. It was there that their glacial origin was first recognised, and in the gorge of the Sturt River some of the grandest exposures of the tillite can be seen. It is on such considerations that the name of the "Sturtian Tillite" has been applied to the formation as a whole. The type

\* For particulars of other ancient tillites, see Howchin's *Geology of South Australia*, pp. 505-509, Education Department, Adelaide.

† Howchin, "Preliminary Note on the Existence of Glacial Beds of Cambrian Age in South Australia," *Trans. and Proc. Roy. Soc. S. Aus.*, vol. XXV. (1901), pp. 10-13. "Glacial Beds of Cambrian Age in South Australia," *Quar. Jour. Geol. Soc. of London*, vol. LXIV. (1908), pp. 234-259.



locality begins about 9 miles south of Adelaide, and is included in the area bordered by the Adelaide to Melbourne railway on the eastern side and the Sturt Gorge on the western. It forms an isolated patch, rather more than a mile square, the base being on the south-eastern side and the upper limits on the north-western, while the beds are determined on the northern side by an east and west fault.

Within the area that has come under observation in South Australia it is probable that the glacial material was dropped from floating ice. The grounds on which this deduction is made are as follows:—(a) The great extent of country covered and the (original) continuity of the deposits within the area. (b) The absence of any glacial floor or evidence of unconformity at the base. (c) The erratics have not been gathered from the beds which, for several thousands of feet, underlie the glacial horizon, but are gathered from the Pre-Cambrian complex that formed the boundaries of the Cambrian geosyncline on the south and west. (d) While the beds consist, for the most part, of a characteristic till, the latter, in places, is interbedded with laminated shales, sandstones, grits, and impure limestones, which are either destitute of erratics or possess these to a sparing degree, suggestive of intervals when the absence of floating ice permitted ordinary sedimentation of suspended matter in the water to take place. On the other hand, there are evidences that indicate that the permanent snow-field and centres of dispersion were at no great distance. Many of the erratics can, with some degree of confidence, be identified as belonging to Pre-Cambrian forms that occur in the outcrops of rocks of that age in southern Yorke Peninsula, Port Lincoln region, and the Gawler Ranges—regions which, at that remote period, probably formed a highland plateau. As the Pre-Cambrian basement occurs as far south as the Neptunes and Kangaroo Island, it is probable that the ice-clad plateau extended far into what is now the Southern Ocean.

### 3. Persistence of Natural Records.

These climatal facts, as bearing on the earth's condition in the past, are of very great importance in influencing geological deductions. It had previously been thought, chiefly on account of the very wide distribution of certain genera and species in these early times, that there was a marked uniformity of temperature on the earth's surface at this period, and that it was of a mild type. It is now evident that there were temperature zones on the earth's surface in Cambrian times as strongly marked as they are in the present day—extensive regions in which permanent snow and ice must have existed and which, in some localities, must have come down to sea-level. It supplies a further proof of the uniformity and persistence of natural processes, and in the preservation of such frail indications as scratches left by moving ice, fossil rain-pits left by a passing shower, and the track of a marine worm that had crawled over the sand on the shore, we have remarkable instances of conservation in Nature. Nature has blazed her track through the ages, with her tool marks, her fitful changes, her ideals of animal structure, her derelicts, leaving at every step her footprints and an imperishable record of the stages by which she has risen from a primitive simplicity to the complexity of the present age.

## § 20. International Currency.

1. *Coinage*.—Half a century ago economists were much concerned with the possibility of establishing an international coinage. For this purpose it is not necessary that the coinage of every country in the world should be unified. But, if the currency systems of the most important trading countries of the world are examined, it will be found that very close relationships can be established between simple multiples of their units. Thus, the British sovereign contains 7.32238 grams of fine (pure) gold: the American 5-dollar piece 7.52299 grams: the French 25-franc piece—if such a coin were in circulation—would contain 7.25805 grams: the German 20-mark piece 7.16846 grams: and the Japanese 10-yen piece 7.50000 grams. The nearness of these results suggests that if these nations could be induced to make such alterations in their respective currencies as to bring these five values into exact agreement, then one single piece of gold-money could be struck, circulating in the British Empire as a sovereign, in America as a 5-dollar piece.

in France and the Latin countries as 25 francs, in Germany as 20 marks, and in Japan as 10 yen. Such a coin, with its decimal subdivisions, would then constitute an international coinage, and be current in all countries.

The initial work involved in such a transformation would, of course, be considerable, but this would be offset by solid advantages. Firstly, the work of the cambist in passing from one currency to another would be immensely lightened; and, incidentally, it would be still more lightened if the sovereign were decimalised. Secondly, the interpretation of the foreign exchanges would be very much simplified, since the mint pars of exchange would be expressed in simple integers (*e.g.*, the par of exchange with France would be 25 instead of 25.2215). Thirdly, great encouragement would be given to backward monetary countries to reform their currency. By taking the international coin as their highest coin of account they would secure immediate recognition in the larger countries, and thus help in the establishment of a uniform coinage and the dissipation of the present confusion.

For fifty years the matter has been largely an academic one, until the European war led to a revival of interest therein. The following table gives the main points for consideration in connexion with any inquiries into the subject. By "weighting" the coins according to the populations in which they circulate, it is found that the mean weight is 7.33381 fine grams, only slightly in excess of that of the British sovereign.

## INTERNATIONAL COINAGE (GOLD).

Suggested International Coin.	Value, in Pence.	Countries using Coin or its Equivalent.	Population Involved, in Millions.	Weight, in Fine Grams (Gold).	Deviation from Mean Weight (a)	Deviation from Mean Value (b).
Sovereign	240.000	United Kingdom, New Zealand, Australia, South Africa, Chili, Ecuador	59	7.32238	Fine Grams. -0.01143	pence. -0.374
20 marks	234.955	Germany ..	65	7.16846	-0.16535	-5.419
10 yen ..	245.822	Japan, Mexico ..	78	7.50000	+0.16619	+5.448
5 dollars	246.575	United States, Canada	110	7.52299	+0.18918	+6.201
25 francs	237.891	France, Spain, Italy, Belgium, Balkan States, Finland, Argentina (c), Netherlands (d), Scandinavia (e), Russia (f)	295	7.25805	-0.07576	-2.483
			607			

(a) Mean weight is 7.33381 fine grams; (b) Mean value is 240.374 pence; (c) Argentine dollar = 5 francs exactly; (d) 12 florins = 25 francs exactly; (e) 18 kroner = 25 francs exactly; (f) 7½ roubles = 26 francs exactly.

N.B.—1 fine gram of gold = 32.7762 pence.

(ii) *International Unit of Exchange*.—When international units of exchange were discussed sixty years ago the proposals centred entirely round coins, since economists then appear to have thought mainly in terms of money. The latest proposals on the subject reflect the changed attitude in this matter. A proposition has been made in two forms: one due to Dr. Vissering, president of the Netherlands Bank, and the other to two Swedish experts (Axelson and Bittner). The nature of their suggestions may be illustrated by the following extracts from the recent presidential address by Dr. Walter Leaf to the Institute of Bankers, London:—

"Both pamphlets deal, on somewhat different lines, with the same problems, the pressing and urgent need of some combined action to rescue the distressed nations of

Europe from the frightful economic crisis through which they are passing. But both suggest the same means as a practical method of dealing with the purely financial side, the technical difficulties of which are enormously increased by the chaotic state of the exchanges throughout Europe. Both think it necessary that machinery for the barter of goods, to which the world has now practically been reduced, should be created in the form of *an international unit of exchange based on gold*; a purely book currency, not represented by any coins, but following the lines of the old 'mark Banco' of Hamburg. The bank mark served for about a century as a common unit for the whole of the petty German States, each of which had its own system of coinage; the confusion that resulted was such that German trade would have been paralysed had there not been one common denomination to which all could be reduced, and in which all important transactions alike between the German States, and between Germany and other countries, were in fact carried out."

"The Swedish authorities have drawn up a detailed scheme for the foundation of what they call an Associated Bankers' Clearing—A B C for short. No money movement between different countries is to be legal except through the A B C. The effective capital is to be four times the amount of metal coins and securities in its vaults. Each country is to deposit metal coins or securities corresponding to its presumable importations, against which it will be granted a credit of four times that amount. The credits will be granted in denominations called 'Monos,' the 'Mono' being a value in account equal to about 5 francs, 4 shillings, 2 yen, one American dollar, and so on."

It is to be noticed that the new currency is a money of account only. The obligations are only ultimately convertible into gold, and meanwhile would be simply a medium of barter, convertible in each country into the currency of the country. Dr. Leaf expresses no opinion as to the practicability of the larger scheme. But, as regards the financial machinery, he suggests that there are obvious theoretical advantages in an international unit of exchange, especially at a time of confusion like the present. In normal times the pound sterling might have acted as an international unit, but it has lost a certain amount of prestige, which will probably not be restored until London is re-established as a free market for gold.

It will be seen from the foregoing that the idea of an international unit of exchange—so far from being academic—has become intensely practical. It might become necessary at a later stage to assign a value to the "mono," and then the table prepared for this article would become of interest. It might be considered advantageous to link up the international monetary unit with the international system of weights and measures. In that case the "mono" could be defined as the exact equivalent of  $1\frac{1}{2}$  grams of fine gold. This would make it precisely equal to two Japanese yen, or two Mexican pesos, and its value in English currency would be about 49½d.