

This page was added on 03 December 2012 to included the Disclaimer below.
No other amendments were made to this Product

DISCLAIMER

Users are warned that this historic issue of this publication series may contain language or views which, reflecting the authors' attitudes or that of the period in which the item was written, may be considered to be inappropriate or offensive today.

CHAPTER XV.

THE TERRITORIES OF THE COMMONWEALTH.

A. GENERAL.

1. **Classification.**—The Territories of, or under the control of, the Commonwealth are of three classes—

- (a) Territories originally parts of the States which have been surrendered by the States to the Commonwealth. These are the Northern Territory (formerly part of the State of South Australia) and the Federal Capital Territory (formerly part of the State of New South Wales).
- (b) Territories, not parts of States, which have been placed under the authority of the Commonwealth by Order in Council under section 122 of the Constitution. These are Papua and Norfolk Island.
- (c) Territories which have been placed under the administration of the Commonwealth by Mandate issued by the League of Nations. These are the Territory of New Guinea and (administered in conjunction with the British and New Zealand Governments) Nauru.

The Territories in class (a) only are parts of the Commonwealth.

2. **Forms of Executive Government.**—The Territories differ in their forms of Government. Papua is administered by a Lieutenant-Governor and a nominated Executive Council, who, except in matters of high policy and in certain matters prescribed by law, are not controlled by the Commonwealth Government. Norfolk Island and the Territory of New Guinea are each under an Administrator who is controlled by the Commonwealth Government; and in each of these Territories there is an Advisory Council. The Northern Australia Act 1926 divided the Northern Territory into two parts, one comprising the area north of the 20th parallel of south latitude, and the other the area south of that line. The Act provided for a Government Resident and an Advisory Council in each part and for a Development Commission directly under the Minister for Home and Territories. In the Federal Capital Territory some local institutions under the law of New South Wales continue, otherwise the Federal Capital Commission has definite responsibilities in regard to the government. In Nauru the Executive Government is vested in an Administrator who is subject only to the general control of the Government controlling the Administration.

3. **Legislative Power.**—The laws of the Parliament of the Commonwealth are in force in the Territories which are parts of the Commonwealth, but are not applicable to the Territories not parts of the Commonwealth, unless expressly extended thereto.

In Papua, there is a nominated Legislative Council, which has full power of legislation, subject to the assent of the Governor-General. In New Guinea, the Northern Territory, Norfolk Island and the Federal Capital Territory, there are no Legislative Councils, and Ordinances are made for these Territories by the Governor-General, subject to such Acts of the Parliament of the Commonwealth as are in force there.

In Nauru the legislative power is vested in the Administrator, subject to instructions from the Governments controlling the Administration.

4. **Laws.**—In the Northern Territory, Papua and Norfolk Island, the laws existing at the dates when these territories came under the control of the Commonwealth have remained in force subject to later legislation by or under the authority of the Commonwealth Parliament; in the Federal Capital Territory there still remain in force some of the laws of the State of New South Wales; in New Guinea, the former German law was repealed at the date of the establishment of civil government.

Three volumes containing the "Statute Law of the Territory of Papua" in force on 31st December, 1916, were published by the Government Printer, Port Moresby, in 1918 and 1919; subsequent Ordinances and the regulations under Acts and Ordinances are published in the *Government Gazette* of Papua and in annual volumes. The South Australian statutes in force in the Northern Territory will be found in the collected editions and annual volumes of the State of South Australia: Ordinances made by the Governor-General are published in the *Commonwealth of Australia Gazette*, and regulations under

Ordinances in the *Northern Territory Gazette*. The laws in force in Norfolk Island at the time of its coming under the control of the Commonwealth were collected in the *New South Wales Government Gazette* of 24th December, 1913, and printed separately as "The Consolidated Laws of Norfolk Island"; Ordinances made by the Governor-General and regulations made by the Administrator, are published in the *Commonwealth of Australia Gazette*. Ordinances made by the Governor-General for the Federal Capital Territory are published in the *Commonwealth of Australia Gazette*. Ordinances made by the Governor-General for the Territory of New Guinea are published in the *Commonwealth of Australia Gazette*, and regulations made by the Administrator in the *New Guinea Gazette*; the statute law in force in New Guinea on 31st December, 1925, has been published as Vols. I.-IV. of "Laws of the Territory of New Guinea," and subsequent Ordinances and regulations are collected in annual volumes. Ordinances made by the Administrator of Nauru are promulgated locally and are printed in the annual report to the League of Nations on the Administration of Nauru.

5. **Finances.**—Papua is autonomous in its finances, but receives an annual grant from the Commonwealth Government. The Administration of the Northern Territory is maintained by the Commonwealth Government; a grant is made towards the expenses of administration of Norfolk Island, but taxes are raised locally which meet part of the expenditure; expenditure in the Federal Capital Territory is defrayed by the Commonwealth, and to a small extent by local rates; New Guinea has its own budget, and the local revenues have hitherto been sufficient to maintain the Administration; Nauru is self-supporting.

The sum expended by the Commonwealth Parliament in 1927-28 on the Territories outside the Commonwealth was £70,478, exclusive of £52,051 for mail services to these Territories and to other islands in the Pacific.

B. THE NORTHERN TERRITORY.

§ 1. Area and Population.

1. **Introductory.**—Upon the extension of New South Wales westward to the 129th meridian in 1827, the Northern Territory was incorporated in that colony (see Chapter I.), and in 1863 was annexed by Royal Letters Patent to the province of South Australia. With the adjacent islands, it was transferred to the Commonwealth on 1st January, 1911.

2. **Area and Boundaries.**—The total area of the Territory is 523,620 square miles, or 335,116,800 acres. Its length from north to south is about 900 miles, while its breadth from east to west is 560 miles. Its eastern boundary, dividing it from Queensland, is the 138th meridian of east longitude; and its western boundary, separating it from Western Australia, the 129th meridian. Its southern boundary is the 26th parallel of south latitude, dividing it from South Australia. The northern boundary is the coast line of those parts of the Indian Ocean known as the Timor and Arafura Seas. Near the mouth of the Wentworth River, in the Gulf of Carpentaria, the coast line is met by the eastern boundary; at Cape Domett, near Cambridge Gulf, the western boundary cuts the northern coast line. The length of coast line is about 1,040 miles, or 503 square miles of area to one mile of coast line.

3. **Population.**—(i) *Europeans.* The problem of increasing the European population of the Northern Territory is one of considerable difficulty. Its solution will, of course, depend on the economic development of the country, and past experience tends to show that the task of developing its resources will involve large expenditure. At the Census taken in 1881 there were only 670 Europeans in the Territory. The total increased slowly, reaching its maximum in 1919 with 3,767 persons. Owing mainly to the closing down of the meat works at Darwin a decline then took place, and at the Census taken in 1921 the white population had decreased to 2,459, while on 30th June, 1928, it was approximately 2,800.

(ii) *Asiatics.* With the exception of a few Japanese, Filipinos and others, the Asiatics in the Northern Territory consist mainly of Chinese. The South Australian Government introduced 200 Chinese in the early seventies to assist in the promotion of agriculture, while the discovery of gold resulted in many others coming on their own account. Their numbers increased considerably in connexion with the construction of the railway from Darwin to Pine Creek, in 1887-88, and there were at that time upwards of 4,000 Chinese in the Territory. The total gradually dwindled thereafter, and the number at the Census of 1921 was only 722. The total number of all non-European persons (excluding Aborigines), is approximately 1,200.

(iii) *Total Population.* The highest recorded population of all races, except aborigines, was 7,533 in 1888, while at the end of 1928 it was 3,982. The estimated population for the last five years is given in the following table :—

NORTHERN TERRITORY.—POPULATION (EXCLUSIVE OF ABORIGINES),
1924 TO 1928.

Year.	Males.	Females.	Total.
1924	2,538	1,059	3,597
1925	2,550	1,106	3,656
1926	2,773	1,125	3,898
1927	3,137	1,224	4,361
1928	2,739	1,243	3,982

The Census population (4th April, 1921) was 2,821 males, 1,046 females, total 3,867.

(iv) *Movement of Population.* The following is a summary of movement of population in 1928 (excluding overland migration) :—

NORTHERN TERRITORY.—MOVEMENT OF POPULATION, 1928.

Immigration ..	710	Emigration ..	1,101	Excess of immigration over emigration ..	-391
Births	83	Deaths	71	Excess of births over deaths ..		12
Increase	793	Decrease	1,172	Net Increase ..	-379

The immigration and emigration of the Territory for the five years ending 1928 are shown in the following table :—

NORTHERN TERRITORY.—IMMIGRATION AND EMIGRATION, 1924 TO 1928.

Year.	Immigration.	Emigration.
1924	496	467
1925	567	511
1926	731	498
1927	1,163	692
1928	710	1,101

(v) *The Aborigines.* A special article contributed by Dr. W. Ramsay-Smith on the subject of the Australian aborigines, was incorporated in Year Book No. 3 (pp. 158-176). The chapter "Population," in Year Book No. 17, contained information regarding the number and distribution of aborigines and the measures taken by the States (in the case of the Northern Territory, by the Commonwealth) to protect and preserve the aborigines. In the Northern Territory large numbers of the aborigines are still outside the influence of Europeans. The total number of full-blood aborigines in the Territory at 30th June, 1928, was estimated at 21,000, of whom 2,350 were in regular employment. The greatest difficulty which confronts the Administration in dealing with the natives is due to the circumstance that they are nomads, without fixed abode, merely wandering about hunting for native food within the limits of their tribal boundaries, and making no attempt at cultivation or other settled industry. In their natural state, compared with those of other tropical countries, the natives are very healthy, but in contact with new settlers, white or Chinese, they rapidly fall victims to disease, and to degradation from drink or opium. (See also Chapter XXIV.—Population, hereinafter.)

§ 2. Legislation and Administration.

1. *Transfer to Commonwealth.*—(i) *The Northern Territory Acceptance Act.* A short historical sketch is given in Year Book No. 6, pp. 1113-4. On 1st January, 1911, the Territory was transferred by South Australia to the Commonwealth, upon terms previously agreed upon by the respective Cabinets, and ratified by the Commonwealth *Northern Territory Acceptance Act* (No. 20 of 1910). The terms were outlined in Official Year Book No. 15, page 940.

(ii) *The South Australian Surrender Act.* The State Act approved and ratified the agreement surrendering the Territory.

2. *Administration.*—(i) *The Northern Territory (Administration) Act, 1910.* The Act provided for the appointment of an Administrator and officials. South Australian laws were declared to continue in force as laws of the Territory, and certain Commonwealth Acts to apply. Power was given to the Governor-General to make Ordinances having the force of law.

(ii) *Northern Australia Act, 1926.* Under this Act the Territory is divided into two parts separated by the 20th parallel of south latitude, each administered by a Government Resident, while, in addition, Advisory Councils and a Development Commission are provided. The above officers were appointed and took charge as from 1st March, 1927.

(iii) *Northern Territory Ordinances.* In Official Year Book No. 18, pp. 619-20, a summary was given of the main provisions of the Ordinances passed up to June, 1924. For similar information regarding Ordinances passed during 1925, see Official Year Book No. 19, page 87; during 1926, No. 20, page 103; during 1927, No. 21, page 85; and during 1928, page 86, of this issue.

3. *Representation in Commonwealth Parliament.*—The Northern Territory elects a member to the House of Representatives. He is not entitled to vote, but may take part in any debate in the House. (See Year Book No. 19, p. 563.)

§ 3. Physiography.

1. *Tropical Nature of the Country.*—The Territory is within the torrid zone, with the exception of a strip $2\frac{1}{2}$ degrees wide, which lies south of the Tropic of Capricorn.

2. *Contour and Physical Characteristics.*—The low flat coast line seldom reaches a height of 100 feet. Sandy beaches and mud flats, thickly fringed with mangroves, prevail. Sandstone, marl, and ironstone form the occasional cliffy headlands. The sea frontage of more than 1,000 miles is indented by bays and inlets, and intersected by numerous rivers, many of which are navigable for considerable distances from their estuaries.

The principal features of the coast line are enumerated in Year Book No. 1, p. 66; the rivers in Year Book No. 2, p. 76; the mountains in Year Book No. 3, p. 67; the lakes in Year Book No. 4, p. 77; the islands in Year Book No. 5, pp. 71, 72, and the mineral springs in Year Book No. 6, p. 65.

Inland, the country generally is destitute of conspicuous landmarks. From the coast there is a general rise southwards to the vicinity of the 17th or 18th parallel of south latitude, where the higher lands form the watershed between the rivers that flow northwards to the sea and those that form the scanty supply of the interior systems. Towards the centre of the continent the land over a wide area is of considerable elevation, and there are several mountain ranges, generally with an east and west trend.

§ 4. Climate, Fauna and Flora.

1. **The Seasons.**—There are two main climatic divisions—the wet season, November to April, and the dry season, May to October, with uniform and regular changes of weather. Nearly the whole of the rainfall occurs in the summer months. Fuller particulars will be found in Year Book No. 6, p. 1116.

2. **Fauna.**—The ordinary types of native Australian fauna inhabit the Territory. As elsewhere on the continent, the higher *Theria* are rare, but marsupials, birds, crocodiles, fresh-water tortoises, snakes (mostly non-venomous), and frogs abound. There are many varieties of freshwater fish and littoral mollusca. Butterflies and beetles are strongly represented. The white ant is a pest, anthills in the Territory sometimes attaining great dimensions. Mosquitoes and sandflies are very troublesome, particularly in the wet season. Native fauna are in some cases protected. Buffalo formerly existed in large herds, but their numbers have been greatly reduced by indiscriminate shooting in recent years.

3. **Flora.**—The vegetation is North Australian in type, but a number of the forms belongs to the Malayan and Oceanic regions. The timber trees are not of great commercial value, but in the coastal regions tropical vegetation grows luxuriantly to the water's edge. On the wide expanses of plain country in the interior there is little vegetation. The principal orders represented in the Territory are—*Euphorbiaceæ*, *Compositæ*, *Convolvulaceæ*, *Rubiaceæ*, *Godeniaceæ*, *Leguminosæ*, *Urticææ*.

Fuller particulars regarding fauna and flora are given in Year Book No. 6, pp. 1116–7.

§ 5. Production.

1. **Agriculture.**—Up to the present agriculture has made little progress in the Territory, although it has been proved that rice, tobacco, coconuts, mangoes, bananas, cotton, various fodder plants, and peanuts can be successfully grown. Expense of harvesting is, at present, an obstacle to the economic production of rice, and until labour-saving machinery is procured it cannot be produced with profit. Some 5 miles from Darwin a coconut plantation, about six acres in area, is thriving, and at a small plantation at Shoal Bay the palms planted along the sea-shore are giving excellent results. There is a large stretch of first-class coconut land on the coast, but hitherto planting has not been attempted on a commercial scale. Cotton was planted in 1924 by settlers at Stapleton, Grove Hill, Daly Rivers, Pine Creek, and the Katherine, and there were experimental plots at Mataranka, Borroloola, and on the lower Roper River. The small number of settlers and the difficulty in obtaining labour for picking militate against progress. Native labour is very uncertain, and the time of picking comes at a period of the year when the aboriginals can get plenty of native food. In 1926 only 40 acres were under cotton compared with 123 acres in 1925. The year 1927 showed a further decline, while in 1928 no cotton was grown. Peanuts have become the principal crop in the Northern Territory.

2. **Pastoral Industry.**—The pastoral possibilities of certain parts of the Northern Territory were recognized at an early date, and in 1866 stock was brought into the Macdonnell Range country from South Australia. Six years later cattle were brought from Queensland to the northern parts of the Territory, and in 1879 Mr. Giles reached the Katherine River with 2,000 head of cattle and 12,000 sheep from South Australia. For various reasons sheep-raising did not succeed. The cattle industry progressed slowly and the number of cattle on 31st December, 1927, was about 835,400. A great impetus was given to this industry in 1917 by the opening of extensive meat works at Darwin. Unfortunately the works closed down in 1920, but they were partly reopened in 1925; killing ceased again in September of the same year and has not been resumed since. The number of cattle exported by land during the year 1927–28 was 51,416, and by sea (to Manila) 5,433. The cattle industry has been retarded by the ravages of ticks and by the difficulty of travelling stock through waterless country. These difficulties are however, gradually being overcome, the former by the introduction of the practice of “dipping,” and the latter by adding to the number of wells on the various stock-routes and the creation of stock reserves. Horses thrive well, and in 1927 numbered about 40,000. Buffaloes thrive in the coastal districts, but their number has been greatly reduced by indiscriminate shooting for the sake of the hides, of which 10,444 were exported during 1927–28.

The estimated number of live stock in the Territory at various periods is given in the table hereunder :—

NORTHERN TERRITORY.—LIVE STOCK, 1910, 1915, 1921, AND 1924 TO 1927.

Year.	Horses.	Cattle.	Sheep.	Pigs.	Goats.	Camels.	Donkeys.	Mules.
1910 ..	24,509	513,383	57,240	996	..	..	..	..
1915 ..	19,957	483,961	57,827	500	..	..	..	..
1921 ..	39,565	568,031	6,349	452	19,385	494	558	192
1924 ..	45,059	855,285	6,914	1,000	30,000	1,000	500	300
1925 ..	46,380	970,342	8,030	382	21,859	452	1,113	280
1926 ..	42,801	863,597	6,407	343	22,318	410	1,062	413
1927 ..	40,108	835,390	9,589	292	20,103	402	1,137	499

The stock in 1927 was distributed between North Australia and Central Australia as follows :—

Area.	Horses.	Cattle.	Sheep.	Pigs.	Goats.	Camels.	Donkeys.	Mules.
North Australia..	24,012	675,447	300	291	10,225	120	787	456
Central Australia..	16,096	159,943	9,289	1	9,878	282	350	43

3. **Mining.**—(i) *General.* Alluvial gold-digging in the Northern Territory commenced in 1869, and up to the end of 1880 gold to the value of £79,022 had been produced. In 1881 the gold production reached its maximum, the value for that year being £111,945. During the following years it fluctuated considerably, but as long as the alluvial deposits lasted the output was satisfactory. In the transition period from alluvial to reef mining the industry declined considerably. The production of metals other than gold has suffered from vagaries of prices, and from the disadvantages of high cost of transport and of white labour. The year 1927–28 showed a decline from the previous year in all the principal metals. There was a small increase in mica and tantalite. In the case of gold the year’s production was the lowest on record, the value amounting to only £431. The only mineral produced in Central Australia was mica, but the opening of the railway, this year, to Alice Springs is expected to give a fresh impetus to gold mining.

(ii) *Mineral Production.* The following table shows the total mineral production for the last five years :—

NORTHERN TERRITORY.—VALUE OF MINERAL PRODUCTION,
1923-24 TO 1927-28.

Year.	Gold.	Tin Ore.	Silver- Lead Ore.	Copper Ore.	Mica.	Tantalite.	Total Value all Minerals.
	£	£	£	£	£	£	£
1923-24	3,270	12,855	..	239	2,718	..	19,138
1924-25	1,939	15,966	617	15	2,835	..	21,715
1925-26	593	15,852	447	60	2,132	..	19,085
1926-27	468	18,754	379	..	2,596	8	22,205
1927-28	431	10,828	22	..	3,280	65	14,626

(iii) *Coal and Mineral Oil.*—Five licences for mineral oil and coal were in existence in 1927-28, covering an aggregate area of 5,000 square miles. The area known as Anson Bay was the only district in which prospecting work was carried out.

4. *Pearl, Trepan, and Other Fisheries.*—In 1884 mother-of-pearl shell was discovered in the harbour of Port Darwin. Difficulty in working, principally through heavy tides and muddy water, retarded the development of the industry for many years. During 1927-28, 19 boats were operating, employing 60 Japanese and Timorese, and a few aboriginals. The year's output was 119 tons, valued at £19,800, compared with 63 tons in the previous year. The territorial waters teem with fish, but the hope of establishing a salt and dried fish trade has not materialized. In the procuring of trepan, 4 boats and 7 persons, beside aboriginals, were engaged.

§ 6. Land Tenure.

A description of the system of land tenure in force in the Territory will be found in Chapter V.—Land Tenure and Settlement.

§ 7. Commerce and Shipping.

1. *Trade.*—No record is kept of the direction of trade between the Commonwealth States and Territories. The value of the direct oversea trade for 1901 and for each of the years 1923-24 to 1927-28 is given hereunder :—

NORTHERN TERRITORY.—VALUE OF DIRECT OVERSEA TRADE,
1901 AND 1923-24 TO 1927-28.

Items.	1901.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	£	£
Imports	37,539	14,432	20,636	34,168	36,814	30,387
Exports	29,191	8,000	41,944	35,902	29,786	29,265
Total	66,730	22,432	62,580	70,070	66,600	59,652

The principal items of overseas export in 1927-28 were cattle, £20,725 ; pearl-shell, £5,084 ; trepan, £695 ; and fish and fish products, £125.

2. **Shipping.**—The Territory is dependent for its shipping facilities chiefly on the services of vessels trading between Sydney and Singapore. Other vessels make occasional visits, while a sixty-days' service between Fremantle and Darwin is carried out by the "Koolinda," belonging to the West Australian State Shipping Service.

NORTHERN TERRITORY.—SHIPPING, 1923-24 TO 1927-28.

Period.	Arrivals.		Departures.	
	No. of Vessels.	Tonnage.	No. of Vessels.	Tonnage.
1923-24	35	96,099	34	96,004
1924-25	56	124,715	52	124,564
1925-26	48	118,478	49	118,665
1926-27	50	126,765	50	126,999
1927-28	54	125,533	45	121,451

The foregoing figures are exclusive of particulars of coastwise shipping. During 1927-28, 19 vessels of 270 tons net were entered as coastwise.

§ 8. Internal Communication.

1. **Railways.**—Under the agreement ratified by the Act, the Commonwealth is to construct the Northern Territory portion of the transcontinental railway line (connecting Adelaide and Darwin, via Port Augusta).

The Northern line from Adelaide terminated at Oodnadatta, about 100 miles south of the southern boundary of the Territory, but has recently been extended to Alice Springs, an addition of 292 miles. The line from Darwin to Katherine River, about 200 miles, is being extended to Daly Waters, an addition of approximately 160 miles. A railway bridge across the Katherine River was completed in May, 1926. The completion of the remainder of the gap would permit of the development of the broad belts of pastoral and mineral country towards the centre of Australia. The Commonwealth also acquired on 1st January, 1911, the property in the line from Port Augusta to Oodnadatta (478 miles), and on 1st January, 1926, the control of the line was transferred to the Commonwealth Railways Commissioner. (See under Federal Railways).

2. **Posts.**—Postal communication is maintained by vessels belonging to Burns, Philp and Co., who carry on a monthly service between the Territory and the Eastern States. In addition, the vessels belonging to the State Steamship Service of Western Australia give a service once every 60 days between Fremantle and Darwin. Inland, the northern part of the Territory receives its mail via Darwin, while the southern districts are served via Adelaide.

3. **Telegraphs.**—The transcontinental telegraph line, covering a length of 2,230 miles, was completed on the 22nd August, 1872, at a cost of nearly half-a-million sterling. The line runs in a northerly direction from Adelaide to Darwin, whence telegraphic communication is provided with Asia and Europe, via Banjoewangie (Java), Singapore, and Madras. Between Darwin and Banjoewangie the submarine cable is duplicated.

High-power wireless stations have been constructed by the Federal Government at Wave Hill, in the Territory, and at Camooweal, just over the eastern boundary, in Queensland.

§ 9. Finance.

1. Revenue and Expenditure, 1927-28.—In the Commonwealth finance statements separate accounts are given for Northern Territory administration. Receipts and expenditure for 1927-28 are given below :—

REVENUE AND EXPENDITURE.—NORTHERN TERRITORY, 1927-28.

REVENUE.	£	EXPENDITURE.	£
Customs and Excise ..	9,813	Administrative Staff ..	80,330
Postal, Telegraph, and Telephone	10,856	Northern Territory Railways	233,373
Darwin-Katherine River Railway	68,844	Interest and Sinking Fund, Northern Territory Loans..	345,591
Central Australia Railway ..	191,115	New Works, Artesian Bores, Roads, etc.	25,553
Territorial	770	North Australia Commission	49,977
Land and Income Tax ..	4,860	Miscellaneous	68,283
Lighthouses and Light Dues..	604		
North Australia Commission	50,600		
Miscellaneous	19,455		
Deficiency on year's transactions	446,190		
Total	803,107	Total	803,107

2. Northern Territory Debt.—The items making up the total debt of the Territory as at 30th June, 1928, are as follows :—

	£	£
Debt at date of transfer to the Commonwealth, 1st January, 1911		3,931,086
Redeemed under Commonwealth Loan Acts ..	2,357,362	} 2,818,112
Redeemed from Consolidated Revenue ..	460,625	
Redeemed from Sinking Fund	125	
Balance, 30th June, 1928		1,112,974

In addition, the balance of the Port Augusta—Oodnadatta Railway Loans taken over from South Australia amounted at the same date to £975,796, making a total of £2,088,770.

C. THE FEDERAL CAPITAL TERRITORY.

1. Introductory.—In Year Books Nos. 4 and 5, information was given in Section XXXI., in regard to the events leading to the selection of the Federal Capital Territory and the necessary legislation and the progress of operations in connexion with the establishment of the capital city. The physiography of the Territory was dealt with *in extenso*, and topographical and contour maps accompanied the letterpress, as well as reproductions of the premiated designs for the laying out of the city. Considerations of space, however, preclude the repetition of this information. On the 12th March, 1913, the official ceremony to mark the initiation of operations in connexion with the establishment of the Seat of Government was carried out. At this ceremony the selection of "Canberra" as the name of the capital city was announced.

2. Transfer of Parliament.—On the 24th March, 1927, the Senate and House of Representatives sitting in Melbourne, resolved that the next meeting of Parliament should be at Canberra on the 9th May, 1927. On that day the Parliament House at Canberra was officially opened by His Royal Highness Albert, Duke of York, the occasion being the 26th anniversary of the opening of the first Parliament of the Commonwealth at Melbourne by His Royal Highness George, Duke of Cornwall and York—now His Majesty the King—on the 9th May, 1901. (For particulars of the opening ceremony see Year Book No. 21, page 604.)

3. **Administration.**—In Year Book No. 18, a summary was given of the development of the administration up to the taking over of the control of the Territory by the Federal Capital Commission.

The administration of the Territory entered upon a new phase when the Federal Capital Commission took over the control of its affairs at the beginning of 1925. The Commissioners were appointed for terms of five years, four years and three years respectively, in accordance with the provisions of the *Seat of Government (Administration) Act 1924*. This Act defined the powers and functions of the Commission, which include the control and management of lands, the carrying out of works and building construction, and, generally, the municipal government of the Territory. Subject to parliamentary and ministerial authority, it has been empowered to raise loans for all the purposes of its administration. The *Seat of Government (Administration) Act 1924* was amended in 1926 with the object of further defining the powers and functions of the Commission, and, since the passing of the Act the Commission's powers have been extended to include public instruction and education, the provision of police services, the conduct of hotels and similar places of accommodation, and the operation of motor omnibus services. The powers of the Commission have also been enlarged to enable it to arrange loans to persons desirous of purchasing homes under the provisions of the *Commonwealth Housing Act 1927-1928*. An amendment in the constitution of the Commission was made by the *Seat of Government (Administration) Act 1928*, which provided that the Third Commissioner should be elected by the people of the Territory who were owners of leases or occupiers with a tenancy of a certain annual value. The first election for Third Commissioner took place on the 2nd February, 1929. It is provided that the Third Commissioner shall only attend meetings of the Commission, and shall not take any part in its executive or administrative work.

The departmental association with the administration of the Territory has become limited to the general authority of the Minister for Home Affairs, and responsibility of the Department of Works to assist when required in the designing and construction of works and buildings.

It was provided in the *Seat of Government (Acceptance) Act 1909* that all laws in force in the Territory, at the date of its acquisition by the Commonwealth, should continue in force, as far as applicable, until other provision is made.

The *Seat of Government (Administration) Act 1910*, which forms the basis for the Government of the Territory, came into force on the 1st January, 1911. It provided that certain State Acts, including those imposing taxation, were to apply no longer to the Territory, but that other State laws should, subject to any ordinance made by the Governor-General, be the law of the Territory. This Act also provided that the inferior courts of New South Wales should exercise, until other provision is made, the same jurisdiction as they had before.

The inferior courts of New South Wales are still being used for the administration of justice in the Territory, and many State statutes relating to the criminal and other law are still in force, although they have been modified in several respects in the State. A progressive review of the law is, therefore, proceeding in order that already obsolete or unsuitable State law still in force, may be replaced by modern legislation, befitting the peculiar position of the Territory under a Commission which has quasi-governmental as well as municipal functions. This review has resulted in the elimination of many State laws and the enactment of ordinances suitable to the conditions of the Territory.

Canberra has now assumed many of the aspects of a large city, and the Commission has developed its organization under special departments and branches to deal with the many diverse governmental and municipal matters for which it is responsible. These include General Administration, Construction of Works and Buildings, Roads and Bridges, Water Supply, Sewerage and Power Services, Levying of Rates, Housing, Local Government and other Registration, Education, Control of Motor and other Traffic, Transport and City Omnibus Service, Hotels and Boarding Houses, Public Health, Regulation of Shops, Factories, and Trading Concerns, Lands Administration and allied subjects—such as Stock Control, Dairy Supervision, Meat Control, Extermination of Vegetable and Animal Pests, Agriculture, Economic Forestry, Parks and Gardens, and numerous other activities requiring the employment of all classes of workmen.

4. *Progress of Work.*—The general progress of the work of construction up to the time when the Territory was taken over by the Commission was outlined in Year Book No. 18. The Commission has continued the policy of developing the city according to the approved plan, and prior to the opening of Parliament House on 9th May, 1927, it had devoted itself primarily to the completion of the basic engineering services, viz., roads, water supply, sewerage, drainage and electric supply, and the official and residential accommodation necessary to enable the Seat of Government to be transferred, and to enable either the whole or portion of the various Departments of the Public Service to function effectively after the transfer.

Parliament House was completed prior to the opening ceremony, but the accommodation provided for the public was subsequently increased by the construction of additional galleries in the House of Representatives.

A departure from the scheme prepared by the Federal Capital Advisory Committee was approved in the case of offices for the Central Administration of Commonwealth Departments, a permanent building being decided upon instead of a group of structures of a provisional nature. As a result of an architectural competition a design was selected for this building and the foundations were laid. For financial reasons however, it was decided that the completion of this building, which being of a monumental description involved a large expenditure, should be deferred. It was necessary in any event to make other provision for housing the administrative Departments as the permanent building if erected, would have taken several years to build. Two provisional buildings were therefore constructed, known as Commonwealth Offices, East and West Block, and these contain accommodation for most of the Departments, and additional space that is immediately necessary has been obtained by leasing accommodation in commercial buildings in the city. The Commonwealth Offices, East and West Block, are substantial brick buildings, generally similar in construction to Parliament House. Schemes are now under investigation for the provision of additional temporary buildings to provide the accommodation which would otherwise have been provided in the permanent administrative building referred to above.

The Commonwealth Works Department has been transferred to the Seat of Government and housed in a provisional building, the property of the Commonwealth, which has been removed from Melbourne and re-erected in the City Division, and will conveniently serve the purposes of this Department for a number of years, pending the provision of accommodation of a more permanent description. An Automatic Telephone Exchange and a Central Post Office are located in part of the East Block, Commonwealth Offices. A Government Printing Office was erected and in operation by the time Parliament was transferred to Canberra.

It was decided that the Australian War Memorial should take the form of a monumental structure to house the War Memorial Museum and provide a record in a suitable form of the names of those who perished as a result of the War. A competition for Australian architects within the Empire was conducted, and two of the authors of premiated designs were commissioned as architects for the building. They completed their design, which has been adopted, and they are now making preparations in order that tenders for the construction of the Memorial may shortly be called. The site chosen for the Memorial is on the main access of the city, and occupies a commanding position at the foot of Mount Ainslie, whose dark wooded slopes form a fitting background to throw into relief the Memorial, which will be finished in material of light colour. The building of the Memorial was inaugurated by the laying of a Commemoration Stone on Anzac Day, 1929, by His Excellency the Governor-General.

Other Federal institutions for which provision is being made include the Australian Institute of Comparative Anatomy, which also contains a museum to house the collection of examples of Australian fauna presented to the Commonwealth by its first Director, Sir Colin MacKenzie, the Institute of Scientific and Industrial Research, for which administrative buildings, entomological and botanical laboratories and technical structures are being erected in an area set apart for scientific work, adjoining the site reserved for the future University; a Solar Observatory, which has been erected at Mount Stromlo; and the Australian School of Forestry, which has been established on the western side of the City Area, a special feature of the building being the inclusion in its construction of a large range of representative Australian joinery timbers.

Official residences have been provided for the Governor-General and the Prime Minister.

A building known as the "Albert Hall" has been constructed to serve the purpose of a city hall until such time as it may be expedient to erect a "Town Hall" in the city.

The Hospital has been remodelled and extended and is now a complete general and obstetric hospital.

Visitors to Canberra have been provided for by the erection of eight hotels or large guest houses. Hotel Canberra, situated near the Governmental area, is the largest of these, with accommodation for 200 guests. Hotel Kurrajong, on the other side of the Governmental area, has a capacity for 130 guests. Hotel Acton, on the north side of the Molonglo River, will accommodate 120 guests, and Hotel Ainslie, also on the north side, has accommodation for 50 persons. The other buildings, which include Hotel Wellington and Brassey House on the south side of the river, and Beauchamp House and Gorman House on the north side of the river, each has a capacity varying between 50 and 80 persons. Most of this accommodation is being utilized for members of the Civil Service transferred from Melbourne.

Satisfactory progress has been made in the cottage construction programme, and the Commission has been able to arrange for the completion of approximately 730 houses.

The problem of accommodation for workmen during the period of initial construction has been met satisfactorily by the erection of portable wooden cottages (having water supply, sewerage, and electricity available) in specially selected areas, and all roughly constructed hutments and camps have as far as possible been eliminated.

The construction of main avenues and roads according to the approved plan has been continued. Many miles have been formed and a considerable proportion metalled or improved with harder material. A commencement has also been made with the construction of permanent roads within the City Area. Several roads have been regraded and the construction of kerbs and gutters and the preparation of plantations are being undertaken progressively as areas are developed. A scheme has been approved to provide for a Federal Highway from Canberra to Sydney, and this involves the construction of a new road for portion of the distance, commencing with a section of 6 miles within the Federal Territory. The construction of this road is at present being carried out. When completed, the distance to Sydney from Canberra by road will be shortened by 26 miles.

Other engineering services have been extended to meet the requirements of construction and settlement, and steady progress has been made in the planting of belts of trees for shelter, and of various city parks. The formation of avenues and streets and other ornamental features has been carried out, as well as a large amount of afforestation work on the outskirts of the city.

A scheme for the planting of selected native trees in the Zoological Park has been adopted, and is now being carried out.

Water supply service reservoirs have been provided on Red Hill and Mount Russell, and mains through the city are being laid as required. The outfall sewer and treatment works have been completed, and the district sewers connected to the main sewerage scheme of the city.

Electric lighting and power services have been extended to serve the residential districts and areas where various construction works are proceeding, many miles of transmission line having been erected.

A central Power House with a capacity of 2,800 kilowatts has been established, and electrical energy is conveyed to the various factories—where the manufacture of bricks, tiles, cement products, and other requirements for constructional purposes is carried on—and is in general use for street and park lighting. An agreement has been concluded with the Government of New South Wales by which Canberra will shortly obtain hydro-electric power from Burrinjuck which will be of considerable advantage in supplying the Capital with electric light and power under favourable conditions. The transmission line has been erected, and the supply will be available in September, 1929. The present Power House will then be utilized as an emergency station.

Fire services have been provided, including the installation of special fire alarms for the protection of buildings and depots throughout the city. Public abattoirs to meet the requirements of a population of 12,000 are in active operation.

Provision has been made for the maintenance of roads, buildings, and other services in the Territory, and many works and buildings of a minor character have been constructed.

The proposal to dam the waters of the Molonglo River near Yarralumla for the formation of part of an ornamental lake system was referred to the Parliamentary Standing Committee on Public Works, which decided that the construction of the dam should be postponed, as it was not an immediate necessity. The matter is, however, being given further attention, owing to the necessity for regulating the flow of the river which, in winter, is liable to heavy floods.

The activities undertaken by private enterprise have been considerably augmented. During the years 1926 to 1929, 509 plans for the erection of privately-owned buildings, comprising residences, shops, offices, banks, and schools, were approved by the Commission.

The main shopping centre has been established on the north side of the City, where two blocks of buildings have been constructed by lessees and are now being used as banks, business offices and retail trading concerns. Buildings in the main shopping area and the subsidiary shopping blocks in other parts of the city must be constructed to a design already prepared for each block as a whole. This principle is adopted in order to secure dignity in design and exterior architectural expression in keeping with the important location of the buildings. The difficulties experienced by local authorities, where there has been little or no co-ordinated design for shops or business premises, are therefore, to a great extent, being obviated.

5. *Lands.*—(i) *In the Federal Territory Proper.* Reference has been made in Chapter V. to the general conditions of land tenure in the Territory for the Seat of Government and to the area of alienated and leased land.

As considerable portions of the Territory lands are not required in connexion with the establishment of the city, large areas have been leased under special improvement conditions in regard to the extermination of noxious weeds and the destruction of rabbits and other noxious animals. The lands are classified into three grades of agricultural and three grades of grazing land. About 167,632 acres, comprising 332 holdings, are at present held under lease for periods varying from quarterly tenure to 25 years.

The first auction sale of city leaseholds was held on 12th December, 1924, and 239 residential and 104 business sites were offered at Eastlake, Manuka Centre, Blandfordia, Red Hill, Civic Centre, and Ainslie. Of these, 146 blocks were immediately disposed of at prices averaging from £6 to £58 per foot for business sites, and from 10s. to £3 4s. per foot for residential sites. Of the remainder, 139 blocks (including all the business sites offered) were sold subsequently. A further 64 residential blocks in the original subdivisions offered were withdrawn from lease, and are being built upon by the Commission for the housing of public servants.

In view of the demand for sites, a further 18 business and 80 residential sites were offered for lease by public auction on the 29th May, 1926, and the whole of the business sites were sold at prices varying from £24 to £150 per foot. Of the residential sites offered, 21 were sold at the day of auction and a further 34 sold up to 8th April, 1927.

The lease of a site for an Amusement Hall at Manuka Centre was sold by public auction on the 10th February, 1926, at a capital value of £7,000, representing approximately £54 per foot.

A further auction sale of city leases was conducted on 9th April, 1927, when 12 business, 3 boarding house, 4 minor industrial, 1 motor service station, and 57 residential blocks were offered. With the exception of 10 residential blocks, the whole of the sites offered were sold at the following prices:—Business sites, £95 to £175 per foot; minor industrial sites, £19 to £22 per foot; boarding-house sites, £7 6s. 8d. to £9 3s. 4d. per foot; residential sites, £1 10s. to £7 per foot; the motor service station, £113 per foot. The terms of the lease require the purchasers of these sites to commence and complete the erection of approved buildings within specified periods.

Seven leases for church purposes have been granted under the *Church Lands Leases Ordinance 1924–27*, which require the lessees to submit a definite building programme within a specified period, and a further seven leases have been granted for church and scholastic purposes under the *Leases (Special Purposes) Ordinance 1925–27*.

The number of leases granted under the *City Area Leases Ordinance* 1924–26 to the 30th June, 1928, was 442, representing a capital value of £258,644. Of these, 42 leases representing a capital value of £46,812 have been surrendered or forfeited.

A Maternity Hospital has been erected on a site made available by the Commission to meet a demand for private hospital facilities. Sites for further maternity and general private hospitals have been allocated, and are available when development is justified.

Under the terms of the *City Area Leases Ordinance* 1924–26, each block is leased for a period of 99 years at a rental of £5 per centum per annum of the unimproved capital value as assessed by the Commission or bid at auction.

Several sites have also been leased under the *Church Lands Leases Ordinance* 1924–1927, which permits the granting of leases in perpetuity at a rental of 1 per cent. of the unimproved capital value, which is not subject to re-appraisal; also under the *Leases (Special Purposes) Ordinance* 1925–1927, which provides for leasing of city lands for non-commercial purposes.

Designs for the buildings are governed by regulations, and leases are not transferable until buildings have been erected on the land as prescribed, or where the Commission is satisfied that a building is being, or about to be, erected on the land.

(ii) *Land at Jervis Bay.* The Commonwealth has acquired from the State of New South Wales sovereign rights over the area comprising about 28 square miles of land and water at Jervis Bay for possible use as a port in connexion with the Federal Capital. The Royal Australian Naval College has been established in this area on a site known as Captain's Point, and portions of the remaining lands have been leased.

6. *Railways.*—Canberra is connected with the railway system of New South Wales by a line $4\frac{1}{2}$ miles long to Queanbeyan. This line was opened for goods traffic on the 25th May, 1914, and for passenger traffic on the 15th October, 1923, and is being worked by the New South Wales Railways Commissioners for, and on behalf of, the Commonwealth.

A public railway station has been established at Kingston, and is the terminus of the existing line.

A direct and convenient passenger service is in operation connecting Canberra with Sydney and Melbourne, and trains leave both cities for Canberra daily except Saturdays. Improved facilities for goods traffic have also been provided.

A trial survey of the Canberra—Jervis Bay line has been completed, and plans prepared to enable an estimate of the cost of the line to be obtained, but no action in regard to this project is contemplated at present.

Under the provisions of the *Seat of Government Surrender Act* 1909 of New South Wales, and the *Seat of Government (Acceptance) Act* 1909 of the Commonwealth, an agreement exists between the Commonwealth and the State of New South Wales in relation to the construction of a railway from Canberra to Yass—a distance of, approximately, 43 miles, of which about 32 miles extend through New South Wales. The State is required to construct its portion of the line as soon as the Commonwealth builds a line to the boundary of the Territory.

The permanent survey of this line has been completed, and the proposal has been the subject of an inquiry by the Commonwealth Works Committee, whose report thereon is still under consideration.

7. *Population.*—The census return of population on the 30th June, 1929, was 7,936 in the Federal Capital Territory and 392 in Jervis Bay Territory, or a total of 8,328 persons.

8. *Live Stock.*—The live stock, according to the latest return, comprises:—

Horses	..	..	..	963
Cattle	..	..	..	5,192
Sheep	..	..	..	220,004

9. **Educational Facilities.**—Arrangements have been made with the New South Wales Education Department to continue for the time being the administration of education in the Territory, the expenditure involved being refunded annually by the Commission to the State. There are fifteen schools in the Territory, including one at Jervis Bay. The largest of these is Telopea Park Intermediate High School, which is situated on the south side of the city area. It has accommodation for 1,000 scholars, and its curriculum provides a standard of education comparable in range of subjects with that provided at the best of the Government High Schools in New South Wales, thus permitting scholars to qualify for entrance to the Universities.

The School also provides for Junior Technical, Commercial, and Trades School Branches, as well as Evening Commercial and Matriculation Classes.

The Trades School, which is excellently equipped, supplies the necessary training for apprentices and to journeymen who are desirous of improving their respective trade qualifications.

Provision at the School has also been made for Domestic Science and Dressmaking Sections.

An Infants' School, to accommodate 450 children, has been erected on the north side of the city, where for the present scholars of the primary standard on the north side of the river are being catered for. Apart from three other smaller schools in the temporary section of the city settlement, the balance are small rural schools serving the needs of leaseholders settled in the Territory.

A report by a committee of experts upon a University scheme was considered by the Commission and submitted to the Government. The Government agreed that there should be a University at Canberra, but has not yet authorized any expenditure in connexion therewith. Further investigations, however, have been made in regard to the project, and additional expert advice tendered to the Government. A University Association has, meanwhile, been formed by many of those interested in the project, with the object of establishing centres of extension lectures immediately, and also pressing forward as much as possible the whole University project.

There are at present three private schools in the Territory. The Canberra Grammar School for boys under the direction of the Council of the Monaro Grammar School, St. Gabriel's Church of England Grammar School for Girls, and St. Christopher's Convent—all of which have facilities for primary and secondary education.

It is anticipated that other private educational institutions will be established in the near future.

10. **Social Service.**—During 1925 the Commission inaugurated a social service movement aiming at co-operation in social activities between the Commission and the citizens of Canberra. This movement was responsible for the stimulation of co-operative effort among the residents in many spheres of activity essential for the welfare of the people, e.g., indoor and outdoor recreation, libraries, children's playgrounds, women's and children's welfare.

After being directly fostered by the Commission for three years during the period of settlement, the social service movement was taken over by the citizens, subject to some assistance from the Commission.

One of the aims of this movement is the provision of recreational and other facilities by voluntary labour. A hall accommodating about 600 people has been built at The Causeway, and other halls have been similarly created, the Commission supplying the materials. Children's playgrounds have also been made in nine centres, and others will be established in settled suburbs of the city area. The movement is also responsible for providing tennis courts and other sports grounds.

The Mothercraft Society, affiliated to the association, was responsible for the establishment at Canberra of Baby Health Centres. The Commission assisted this movement in order that the society might provide suitable headquarters and trained nursing assistance. A Community Library has also been established.

A Parents and Citizens' Association, which is a medium of expression of public opinion on the subject of education, has been actively working for some years, and takes a lively interest in measures for the recreation and entertainment of school children.

Other societies which have been formed under the ægis of the association are the Arts and Literary Society and the Musical Society.

The Social Service Organization has fulfilled a valuable purpose in assisting, during the earlier developmental period, the establishment of various educational, social and recreational institutions and activities in Canberra, and the necessity for its continuance has therefore to a large extent ceased. The Federal Capital Commission recently decided that it was unnecessary any longer to provide a financial subsidy to the association, which has accordingly wound up its affairs and gone out of existence.

11. Expenditure.—(i) *General.* The capital expenditure on the Seat of Government during the period 1901 to 1911, and for each year thereafter up to the 30th June, 1924, was published in Year Book No. 18.

Details of the expenditure for the period 1924–25 were published in Year Book No. 19.

Expenditure for the period 1925–26 amounted to £1,476,207, including £1,467,517 on construction and £8,690 on acquisition of land.

Expenditure for the period 1926–27 amounted to £1,911,693, including £1,887,571 on construction and £24,122 on acquisition of land.

(ii) *Expenditure 1927–28 and 1928–29.* Details of expenditure for the years 1927–28 and 1928–29 are given hereunder :—

FEDERAL CAPITAL TERRITORY.—EXPENDITURE, 1927-28 AND 1928-29.

Particulars.	Amount.	
	1927-28.	1928-29.
	£	£
Buildings—		
Parliament House	59,627	1,245
Permanent Administrative Offices	49,939	14,578
Secretariat Buildings	17,546	1,056
Forestry School	4,974	1,506
Government House, Yarralumla	5,181	516
Printing Office (including Pneumatic Tubes)	3,252	..
Hotels, Boarding Houses, etc.	22,702	14,594
Prime Minister's Residence	1,607	..
Commission Offices	2,940	7,155
Primary Schools	20,885	2,279
Abattoirs	1	1,374
Canberra Hospital	9,463	13,308
Cottages	276,419	61,159
Temporary Accommodation for Workmen	14,964	..
Store Building	4,937	2,696
Transport Garages	6,779	..
Assembly Hall	24,007	3,970
Solar Observatory	21,772	13,646
Physical Testing Laboratory and Equipment	413	..
Hog Farm .. .. .	..	3,865
Institute of Anatomy .. .. .	..	2,239
	547,408	145,186
Water Supply and Sewerage—		
Water Supply	27,942	10,580
Sewerage	27,690	7,929
Stormwater Drainage	40,119	..
Intercepting Channels	9,652	26,208
	105,403	44,717
Roads and Bridges	266,338	150,736

FEDERAL CAPITAL TERRITORY.—EXPENDITURE, 1927-28 AND 1928-29—
continued.

Particulars.	Amount.	
	1927-28.	1928-29.
	£	£
Electric Light and Power (Power House and Mains) ..	54,897	42,325
Recreation Grounds	784	4,471
City Beautification, Parks, etc.	21,605	27,868
Garden Formation (Parliamentary Area)	1,246	..
Molonglo River Improvements .. .. .	..	..
Farmhouses—Additions and Improvements .. .. .	..	..
Interest on Loans	159,016	8,997
Plant and Equipment (including £24,625 on Brickworks) ..	38,498	19,439
War Memorial Competition	291	..
Forestry	5,835	8,960
Commissariat Equipment	2,260	7,015
Miscellaneous	23,959	6,741
	308,391	125,816
Social Service	3,241	3,114
New Fencing	3,368	1,748
Land Acquisition	13,943	
	17,211	1,748
Total	1,247,992	471,317

12. Revenue.—The revenue for the Federal Capital Territory from 1st July, 1924, to 30th June, 1929, was as follows :—

For the half year ended 30th June, 1925 ..	£51,338
For the year ended 30th June, 1926 ..	154,380
For the year ended 30th June, 1927 ..	370,038
For the year ended 30th June, 1928 ..	514,438
For the year ended 30th June, 1929 ..	563,917
	£1,654,111

D. 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." At present the island is visited annually by a fair number of tourists, but with improved shipping facilities the traffic would considerably increase.

2. Settlement.—The first colonization, 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 1813, and for 13 years thereafter 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.

3. **Administration.**—In 1856 the island was created a distinct and separate settlement under the jurisdiction of New South Wales. In 1896 it was made a dependency under the Governor of that Colony. In 1913, however, the Federal Parliament provided for the taking over of the island as a territory of the Commonwealth, and since the 1st July, 1914, the island has been administered by the Department of Home and Territories, through an Administrator and Chief Magistrate. There is an Advisory Council, consisting of twelve members, presided over by the Administrator. Six of the members are elected by the residents, and six are nominated by the Administrator. The powers and duties of the Council were laid down in Ordinance No. 2 of 1925. According to this Ordinance the Executive Council has the oversight of public roads and reserves, etc. It may transmit to the Administrator for submission to the Minister proposals for new Ordinances or for the repeal or amendment of existing ones, and it may make by-laws in connexion with local matters.

4. **Population.**—The population on 30th June, 1928, was 471 males and 431 females, a total of 902. In the year 1927—28, 13 births, 12 deaths, and 10 marriages were recorded.

5. **Live Stock.**—The latest returns of live stock show that there are on the island 1,625 cattle, 658 horses, 223 sheep, and 72 pigs. In addition, there are 5,201 head of poultry.

6. **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 well. During 1927—28, the export of oranges was 759 cases; bananas, 11,068 cases; passion fruit and pulp, 566 cases; lemon juice and pulp, 202 casks; and lemon peel, 67 cases. There are many thousands of lemon trees and guavas growing wild throughout the island.

Large numbers of whales pass the island throughout the season but whaling has now practically ceased. The preserved fish industry also offers a field for commercial energy; such fish as trevalla, kingfish, schnapper, and many others, are plentiful. Banana-growing, for which the island is well suited, is making great progress. 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. A monthly steamship service between Norfolk Island and Sydney is carried on by Burns, Philp and Co., while the New Zealand Government steamer *Hinemoa* has established a regular service with Auckland.

Imports and exports for the last five years are given hereunder:—

IMPORTS AND EXPORTS, 1923-24 TO 1927-28.

Heading.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	£
Imports	22,023	17,190	18,882	27,869	42,756
Exports	3,170	3,961	6,156	13,578	19,254
Total	25,193	21,151	25,038	41,447	62,010

7. **Social Condition.**—Education is free and compulsory up to the age of fifteen years. The school is under the New South Wales 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. A Parents' and Citizens' Association has been formed in connexion with the school, and a school-paper is printed. The number of scholars enrolled at the 30th June, 1927, was 137.

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

8. **Finances.**—The receipts and expenditure for the year 1927–28 were as follows:—

NORFOLK ISLAND.—RECEIPTS AND EXPENDITURE, 1927–28.

Heading.	Receipts.	Heading.	Expenditure.
	£		£
Brought forward ..	3,124	Salaries	3,114
Commonwealth Subsidy ..	4,000	Repairs of Government Buildings	1,891
Tariff Collections in Sydney ..	1,645	Miscellaneous	1,945
Interest on Funded Stock ..	114	Purchase of Liquor ..	2,409
Postal Department ..	152	Balance carried forward ..	2,923
Fees, etc.	523		
Sale of Liquor	2,414		
Miscellaneous	310		
Total	12,282	Total	12,282

Traffic in intoxicating liquor is prohibited, and the item "Sale of liquor" in the table refers to liquor dispensed under medical prescription.

E. NEW GUINEA.

1. THE ISLAND OF NEW GUINEA.

1. **Geographical Situation of New Guinea.**—New Guinea lies to the north of Australia, between 0° 25' and 10° 40' S. latitude, and between 130° 50' and 150° 35' E, longitude. Its estimated area exceeds 300,000 square miles, the greatest length being 1,490 miles, and the greatest breadth 430 miles.

2. **Discovery.**—The island was probably sighted by Abreus in 1511. The first visit by Europeans was apparently either that by the Portuguese Don Jorge de Meneses on his way from Goa to Ternate in 1526, or that by the Spaniard Alvaro de Saavedra in 1528. In 1606 Torres, having parted company with De Quiros at the New Hebrides, sailed, on his way to the Philippines, through the strait which separates the island from Australia, and which now bears his name.

3. **Colonization.**—In 1793, New Guinea was annexed by two commanders in the East India Company's service. Since that date the Dutch have made extensive surveys of the western portion, and the British and Germans have occupied and colonized the eastern. In September, 1914, German New Guinea was seized and occupied by Great Britain by means of a force raised and dispatched by the Australian Government.

4. **Partition.**—The three colonizing powers agreed to the partition of New Guinea, each having suzerainty over islands adjoining its own territory. The whole of the portion west of the 141st degree of latitude, comprising about 150,000 square miles, or nearly half the island, belongs to the Dutch. The eastern half was divided in almost equal portions between Great Britain and Germany, the area possessed by each (with adjacent islands), being about 90,000 square miles. An Anglo-German boundary commission appointed for the purpose of defining the boundary between the territories of the two nations, started operations on 26th December, 1908, and completed the field-work on 27th October, 1909. The total length of boundary delimited was 66½ miles. The Dutch colony forms part of the residency of Ternate in the Moluccas, and has not been extensively developed. The German protectorate, where considerable commercial development had taken place, included the northern part of the eastern half of the main land, formerly known as Kaiser Wilhelm's Land, and the islands of the Bismarck Archipelago, as well as the two northernmost islands of the Solomon Group. The south-eastern portion of New Guinea nearest Australia is a dependency of the Commonwealth of Australia. The German Pacific protectorate was terminated in 1914, and is now held under a mandate by the Commonwealth of Australia.

2. PAPUA.

§ 1. General Description of Papua.

1. *Early Administration.*—Particulars of the early administration of Papua were given in Official Year Book No. 19, p. 576, but owing to limitations of space have not been included herein.

2. *Administration by Commonwealth of Australia.*—The Territory was placed under the authority of the Commonwealth on 1st September, 1906, by proclamation issued in pursuance of Letters Patent of the 18th March, 1902, and was accepted by the Commonwealth by the Papua Act 1905, which came into force by virtue of the proclamation aforesaid. The transfer was made under the authority of section 122 of the Constitution (see p. 33 hereinbefore). The Territory is now under the administration of the Commonwealth, but not included within it, and is divided into eleven magisterial districts.

3. *Area, etc.*—Papua lies wholly within the tropics. The northernmost point touches 5° S. latitude; its southernmost portion, comprising Sudest and Rossel Islands, lies between 11° S. and 12° S. latitude. It is separated from Australia by Torres Strait. The length of Papua from east to west is upwards of 800 miles; towards either end the breadth from north to south is about 200 miles, but about the centre it is considerably narrower. The Territory comprises also the islands of the Trobriand, Woodlark, D'Entrecasteaux and Louisiade groups. The length of coast-line is estimated at 3,664 miles—1,728 on the mainland, and 1,936 on the islands. The total area is about 90,540 square miles, of which 87,786 are on the mainland, and 2,754 on the islands. A reference to the physical characteristics of the Territory appears in previous issues of the Official Year Book (see No. 18, p. 633).

§ 2. Population.

The white population of Papua on 4th April, 1921, was 1,343, made up of 961 males and 382 females. Included in these figures were 79 persons, who were passengers and crew of the s.s. *Marsina*, which was at Samarai at the taking of the Census. The following table gives the white population in each of the last five years:—

WHITE POPULATION OF PAPUA, 1924 TO 1928.
YEAR ENDED 30TH JUNE.

1924.	1925.	1926.	1927.	1928.
1,276	1,371	1,452	1,366	1,428

The chief occupations of the non-indigenous population at the taking of the Census were:—Government officials and employees, 132; commercial pursuits, 150; shipping, 124; tropical agriculture, 266; missionary work, 144; mining, 159.

It is not possible to give exact data regarding the number of natives, because a large area of the interior is not yet under Government control. The official estimate is 275,000. Such censuses of the native population as have been taken during recent years point to a slight increase. The coloured population, other than Papuans, numbered on 4th April, 1921, 577, and included many mission teachers from Samoa, Fiji, and other Pacific Islands. On the same date, half-castes, with one of the parents a European, totalled 158. An Immigration Restriction Ordinance prohibits the immigration of persons who fail to pass the dictation test, or who are of bad character, or likely to become a charge upon the public. Exemptions may, however, be granted by the Lieutenant-Governor to persons of special skill required for employment as overseers or foremen.

§ 3. Native Labour, Taxation, Health, etc.

1. **Native Labour.**—(i) *General.* The rights of both employer and labourer are conserved by the Native Labour Ordinances. Service on the part of the native is voluntary, and he must be justly treated, and properly housed and fed. Employers may recruit personally, or obtain their natives through a licensed recruiter. Contracts of service must be in writing entered into before a magistrate or other qualified officer, and the natives must be returned to their homes on completion of engagement. During the period of service the recruiter or employer is responsible for the native's welfare. Refusal to work after an engagement, or desertion from service, renders the labourer liable to imprisonment. On the other hand, a magistrate may terminate an engagement where unjust or harsh treatment by the employer is proved. The term of indenture must not exceed three years, and in the case of miners and carriers the limit is eighteen months, but re-engagements may be made. The magistrate must satisfy himself that the remuneration is fair, that the native is willing to undertake the service, and that there is no probability of unfair treatment or detention. Wages must be paid in the presence of an officer. A medicine-chest stocked with necessary drugs and first-aid instruments must be kept by all employers. The employment of free labour in place of contract labour is being encouraged by the Government. The table hereunder gives particulars regarding native labour during the last five years :—

PAPUA.—NATIVE LABOUR, 1924 TO 1928.

Year ended 30th June—	Natives Engaged.	Natives paid Off.						
		Number.	Wages Paid.	Average Annual Wage per Native.				
					£	s.	d.	
1924	6,206	4,959	42,776	7	8	8	12	6
1925	6,817	4,661	46,019	14	5	9	17	5
1926	6,716	6,317	63,082	17	5	9	19	8
1927	5,566	6,666	62,086	12	8	9	6	4
1928	6,485	6,269	62,246	17	2	9	18	7

The number of natives under contract of service on 30th June, 1928, was 8,653.

Hitherto the supply of native labour has been sufficient to meet the demand.

Natives in charge of vessels owned by Europeans, drivers of launches and motor lorries, carpenters and other skilled labourers receive from £3 to £10 per month.

2. **Native Taxes.**—Under the Native Taxes Ordinance, passed in 1918, a tax not exceeding £1 may be imposed on natives, excepting native constables, mission teachers, natives unfit for work, and those who have not less than four living children. The proceeds of the tax must be expended on education, or devoted to purposes directly benefiting the natives, as may be prescribed.

The taxes collected in 1927–28 amounted to £15,497, of which £4,983 was transferred to the Native Education Fund, and £8,974 to the Native Benefit Fund. The Native Education Fund during the year 1927–28 disbursed to primary and technical education £3,156 and to agricultural education £1,974, leaving a credit balance of £28,506. From the Benefit Fund the expenditure included :—Anthropology £791, health £6,145, village improvements £632, family bonuses £1,313.

3. **Care of Half-caste Children.**—An Ordinance was passed in 1922, to provide for the care and maintenance of neglected half-caste children. The Ordinance provides that a sum of £26 per annum shall be paid to the Commissioner for Native Affairs by the adjudged father of the child until the child, if a boy, shall reach the age of 16 years, or, if a girl, 18 years.

4. **Health.**—During the year natives to the number of 1,829 were admitted to the native hospitals in Port Moresby and Samarai. The chief complaints treated were yaws, ulcers, lung affections, and gonorrhœa. Three travelling medical officers and four European medical assistants were employed, and native medical assistants are being

trained by them. Two qualified doctors are now employed by mission societies, and these have assisted greatly in improving the health of the natives. The work done consisted chiefly of dealing with cases of yaws by means of the latest arsenical drugs, the distribution of hookworm treatment, and the control of venereal diseases. Out of an average of 8,411 native labourers employed by Europeans, 94 died, as compared with 131 during the previous year.

§ 4. Land Tenure.

1. *Method of Obtaining Land.*—(i) *The Land Laws.* The broad principles upon which the land laws of Papua are based are :—(a) No land can be alienated in fee-simple ; (b) the rental of the land leased is assessed on the unimproved value and is subject to reassessment at fixed periods.

A detailed account of the method of obtaining land was given in Official Year Book No. 6, pp. 1083-4.

(ii) *The Leasehold System.* With a view of attracting pioneer settlers, an ordinance was passed in 1906 under which leases were granted on very liberal terms. No rent was payable for the first ten years, the heavy expense of survey was borne by the Government, and no charge was made for the preparation and registration of the leases. Under this system, the area under lease increased in four years from 2,089 acres to 363,425 acres ; about 140 plantations were started, and nearly 1,000 acres planted during that period. Since 1st June, 1910, however, no leases exceeding 5,000 acres in extent have been granted, and rent at the rate of 3d. per acre must be paid from the commencement of all leases exceeding 1,000 acres in area.

2. *Holdings.*—(i) *General.* On the 30th June, 1928, the lands of the Territory were held as follows :—

PAPUA.—HOLDINGS, 1928.

Description.	Area.
	Area.
Land held by the natives	56,926,995
Crown land	825,244
Freehold land	22,934
Leasehold land	170,427
Area of Territory	57,945,600

Private sales of land in the Territory have now practically ceased. The Government buys from the natives, and then leases to planters, who are forbidden to have direct dealings in land with Papuans.

(ii) *Leaseholds.* The position as regards leasehold tenures may be seen from the following table :—

PAPUA.—LEASEHOLDS, 1923-24 TO 1927-28.

Year ended 30th June ..	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
Land held under lease .. acres (as recorded)	190,124	188,348	186,966	169,956	170,427

Of the total area of 170,427 acres shown above, agricultural leases accounted for 154,179, pastoral leases for 14,570, special leases for 880, mission leases for 500, and other leases for 298 acres.

The area of land acquired by the Crown in 1927-28 was 1,480 acres.

The total area surveyed in the Territory is 21,694 acres of freehold, and 259,152 acres of leasehold.

§ 5. Production.

1. **General.**—The products of the Territory are obtained from its agricultural, forestal, fishing, mining, and manufacturing industries. For many years gold-mining yielded the largest returns, but the production has dwindled considerably owing to the exhaustion of the alluvial deposits. There is a possibility of obtaining petroleum in marketable quantities. Amongst plantation products, copra occupies the foremost place, but little planting has been done in recent years. Portions of the Territory appear well suited for cotton cultivation.

2. **Agriculture.**—(i) *Soil and Rainfall.* The physical features of Papua are favourable to agriculture. Rich soils at varying elevations, and heavy and evenly distributed rainfall favour the cultivation of a variety of tropical products including sugar cane, coconuts, sago palm, bread fruit, dyewoods, spices, ginger, nutmegs, bananas, and other fruits. There are large areas of rich alluvial and volcanic soils along the coast, and fertile land is found at elevations up to 6,000 feet. Heavy rainfalls occur, except over a belt of country which runs back from the coast to the hills, and which has its dry season from May to November. This “dry” area is admirably suited for the production of tobacco, fibres, cotton, etc. There are 21 meteorological stations throughout the Territory, and an economic museum and agricultural library have been established.

(ii) *Plantations.* On 31st December, 1927, there were 316 plantations. Agricultural settlement has been mostly in the Central and Eastern Divisions, and the area planted was 61,370 acres, as against 62,725 in 1926. The principal plantation crops are coconuts, rubber, and sisal hemp. There is also some cultivation of bowstring hemp, kapok, coffee, tobacco, cotton, vanilla, cocoa, tapioca, cinnamon, tea, rice, and maize. The natives are compelled by an ordinance to plant coconuts for food supply. In addition to the coconuts in these plantations, many more are planted over small and widely scattered areas by the older natives in accordance with custom. A recently promulgated ordinance, the *Native Plantations Ordinance*, is an attempt at establishing plantations in which the Government and the natives are joint partners. The following table shows the areas under the different cultures at the end of December, 1927 :—

PAPUA.—AREA OF PLANTATIONS, 1927.

Description.	Area.
	Acres.
Coconuts	49,244
Rubber	8,212
Hemp	3,000
Kapok	300
Coffee	28
Rice	7
Cotton	40
Other cultures (including fruit trees)	538
Total	61,369

The quantities of copra and rubber exported during the year ended 30th June, 1928, were :—Copra, 9,824 tons; rubber, 811 tons. There has been a slight decrease in the acreage under coconuts, and an increase in the acreage under rubber. The acreage under cotton shows a considerable decline.

(iii) *Government Plantations.* There are two Government plantations, the Orangerie Bay coconut plantation, and the Kemp Welch rubber plantation. The profits from these plantations last year were £4,362, as against £7,543 in 1926–27.

3. **Forestry.**—According to the Commonwealth Forestry Adviser the principal softwood timber is known as “ilimo,” while among satisfactory timbers of the lowlands are “nara,” “medobi,” and “melila.” There is a large number of woods, varying from the softest to the hardest, including beautiful cabinet woods, but research is necessary to determine their usefulness. The development of a coniferous belt at the higher altitudes offers great possibilities. It is believed that teak and sandalwood are well suited for cultivation.

4. **Live Stock.**—On 31st December, 1927, the live stock in the Territory consisted of 826 horses, 6,144 head of cattle, 145 mules, 21 donkeys, 3,388 goats, and 838 pigs. A Government stud-farm has been established for the breeding of horses. The introduction of rabbits, foxes, hares, and monkeys is prohibited.

5. **Fisheries.**—Pearl-shell fishing occupies an important place in the industries of Papua. A considerable number of luggers is licensed, but the returns are mostly credited to Queensland, whose boundary approaches to within a few miles of the Papuan coast. The species of tortoise which supplies the commercial tortoise-shell is also a native of the Territory. Bêche-de-mer and trochus are found along the shores and reefs, and form valuable articles of export.

6. **Mining.**—(i) *Variety of Minerals.* Minerals have been found over a wide range of country. Those discovered so far are—gold, copper, tin, lead, zinc, cinnabar, iron, osmiridium, gypsum, manganese, sulphur, graphite, chromite, brown coal, lignite, and petroleum. The existence of petroleum has been traced at scattered intervals over a large area. There are several mineral oil and coal licences in existence. The Anglo-Persian Oil Company for the Commonwealth and the Vogel Petroleum Coy. Ltd., near Cape Vogel, have been working almost continuously, while the Oriomo Oil Limited and the New Guinea Oil Company have boring plants working. The others have done practically no work during the year under review. Several bores have been put down, one to a depth of 2,700 feet, but so far oil in payable quantity has not been struck.

Of precious stones, only the topaz and beryl have been obtained. Large beds of apparently good coal also exist.

(ii) *Gold.* In 1888 the first gold was discovered, and the search gradually spread over every division, finds being reported wherever the explorers went. The yield in 1923–24 was the lowest recorded since 1895, it then improved, but last year again shows a considerable decline.

The total quantity, in fine ounces, and the value as returned of the gold yield for the last five years are given below :—

PAPUA.—GOLD YIELD, 1923–24 TO 1927–28.

1923–24.		1924–25.		1925–26.		1926–27.		1927–28.	
Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
fine ozs. 1,441	£ 6,704	fine ozs. 4,153	£ 17,642	fine ozs. 6,388	£ 27,135	fine ozs. 6,150	£ 26,124	fine ozs. 1,704	£ 7,240

Most of the rivers, with the exception of those flowing into the Gulf of Papua, have been declared open to gold-dredging, and good yields have been obtained. The total value of gold won to 30th June, 1928, was £1,740,576.

(iii) *Copper.* Owing to the very low prices ruling for copper in the world's market, the copper mines in Papua have suspended operations. During the year 1926–27 the shipments to Australia amounted to about 531 tons of copper matte, and 51 tons of blister copper of a gross total value of £35,799. The total value of the copper exported to the 30th June, 1928, was £366,405.

(iv) *Osmiridium*. The existence of osmiridium had been known for several years, but for some time no serious attempt was made to collect it, the alluvial gold miner often picking out the larger slugs of the metal from his gold parcel and throwing them away. The production in 1927-28 amounted to 37 ozs., valued at £550.

(v) *Other Minerals*. Some good samples of galena (sulphide of lead) have been obtained, while cinnabar (sulphide of mercury), graphite (or plumbago), zinc-blende, native sulphur, and other minerals are known to exist. In 1924 a deposit of lignite was discovered on Smoky Creek, a tributary of the Era River.

A mineral laboratory and museum have been fitted up, and are available to prospectors and others interested.

7. **Water Power**.—Most of the rivers in Papua carry a large volume of water from a great height over a relatively short distance, thereby offering opportunities for the installation of hydro-electric power plants. It is estimated that there are at least 10,000,000 h.p. available for this purpose.

§ 6. Finance, Trade, Postal and Shipping.

1. **Finance**.—Owing mainly to the closing down of the New Guinea Copper Mines at Bootless Inlet towards the end of 1926, but partly to other causes, the revenue has declined during the last couple of years. The principal sources of revenue were as follows:—Commonwealth Grant, £50,000; Customs and Excise, £53,498; Government Plantations, £15,496; Fees of Office, £8,544; Land Revenue, £4,748; Post Office, £2,935; Port and Wharfage Dues, £2,718; and Miscellaneous, £13,227.

The expenditure on Public Works was £13,360 less than in the previous year, while that on Lands and Agriculture increased by £7,110.

Returns of revenue and expenditure for the last five years, exclusive of Commonwealth grants, are given hereunder:—

PAPUA.—LOCAL REVENUE AND EXPENDITURE, 1923-24 TO 1927-28.

Item.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	£
Revenue	77,750	82,909	116,367	111,508	107,052
Expenditure	131,640	143,831	157,203	167,727	158,964

2. **Trade**.—The value of imports and exports for the last five years is shown in the table below:—

PAPUA.—VALUE OF IMPORTS AND EXPORTS, 1923-24 TO 1927-28.

Particulars.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	
Imports	354,965	459,080	470,774	455,904	403,561
Exports	239,408	367,629	649,373	454,462	350,363
Total Trade ..	594,373	826,709	1,120,147	910,366	753,924

The great drop in the value of exports is due to a fall in prices for copra and rubber, and to the closing down of the copper mines. In the case of copper the export value dropped from £201,732 in 1925-26 to £35,799 in 1926-27, and £208 in 1927-28.

As in all new countries, the imports consist chiefly of articles necessary for the primal needs of the community, such as agricultural products and groceries, drapery, machinery, tobacco, oils, paints, beverages, wood, wicker and cane, drugs, etc. The chief items of export during the last five years are as follows :—

PAPUA.—PRINCIPAL EXPORTS, 1923-24 TO 1927-28.

Article.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	£
Bêche-de-Mer	10,441	10,351	10,205	16,193	14,907
Copper Ore	120	41,674	201,732	35,799	208
Copra	136,659	172,905	204,097	186,837	194,019
Cotton	550	3,761	4,866	824	59
Gold	6,792	14,980	22,320	29,115	6,364
Hemp	1,125	13,141	7,695	33	..
Osmiridium	3,553	3,630	1,500	430	550
Pearls	16,600	19,300	13,249	8,968	827
Pearl Shell and Trochus Shell	6,120	8,773	14,317	7,576	12,537
Rubber	33,334	68,507	194,849	156,274	102,158

3. **Shipping.**—The following table shows the number and tonnage of oversea vessels entered and cleared at ports during the years 1923-24 to 1927-28. All the vessels except two were of British nationality.

PAPUA.—OVERSEA SHIPPING, 1923-24 TO 1927-28.

Year.	Vessels.	Tonnage.
1923-24	99	68,170
1924-25	120	78,613
1925-26	115	129,553
1926-27	143	226,948
1927-28	159	226,784

Throughout, the figures are exclusive of ships of war and Government vessels.

§ 7. Progress of Papua.

1. **Statistical Summary.**—As already stated (§ 2, *supra*) the Territory was placed under the Commonwealth control on 1st September, 1906. The following table indicates the progress that has been made since that date :—

PAPUA.—STATISTICAL SUMMARY, 1907 TO 1928.

Items.	Year ended 30th June—	
	1907.	1928.
White population	690	1,428
Native labourers employed	2,000	8,653
Number of white civil servants	65	136
Armed constabulary	185	284
Village constables	401	1,106
Territorial revenue	£21,813	£107,052
Territorial expenditure	£45,335	£158,964
Value of imports	£87,776	£403,561
Value of exports	£63,756	£350,363
Area under lease acres	70,512	170,427
Area of plantations acres	1,467	61,369
Meteorological stations established	3	23
Gold yield fine ounces	12,439	1,704
Live stock in Territory—		
Horses	173	826
Cattle	648	6,144
Mules	40	145

3. THE TERRITORY OF NEW GUINEA.

§ 1. General Description.*

1. **Area and Geographical Position.**—The present Territory of New Guinea comprises that portion of the German New Guinea Protectorate which lay south of the equator (excepting only the island of Nauru, see F hereinafter), and which was known in German times as the "Old Protectorate." The principal islands (with their German names if these differ from those now in use) and their approximate areas are as follows :—

AREA OF TERRITORY OF NEW GUINEA.†

Particulars.	Approximate Area.
	Square miles.
North-East New Guinea (Kaiser Wilhelm's Land)	70,000
Bismarck Archipelago—	
New Britain (Neu Pommern)	13,000
New Ireland (Neu Mecklenburg)	3,000
Lavongai (New Hanover or Neu Hannover)	600
Admiralty Islands and North-Western Islands	1,000
Solomon Islands—	
Bougainville	3,200
Buka	200
Total	91,000

2. **North-East New Guinea.**—(i) *General.* North-East New Guinea (Kaiser Wilhelm's Land) is the north-eastern part of the island of New Guinea. Much of the interior, which is rugged and mountainous, with heights reaching to over 13,000 feet, is still unexplored. The mountain ranges approach the coast, leaving comparatively little flat land near sea level, but this narrow strip is very fertile. All trade and communications are by sea along the coast, and the interior is left almost wholly to the native population.

(ii) *Coast-line.* The coast-line, which is over 900 miles long, is in parts fringed with coral reefs, and there are many small, lofty islands along its course. Except for Huon Gulf in the little developed east of the country, there are no deep inlets. Langemak Bay has commodious anchorage in deep water, and Finsch Harbour has landlocked anchorage for small vessels. Astrolabe Bay has two or three sheltered harbours, including Melanua, Madang (Friedrich Wilhelm Harbour) and Sek, which are the best on the coast. There are many other anchorages suitable, in certain winds, for schooners and small steamers.

(iii) *Rivers.* There are many rivers, of which the most important are the Sepik (Kaiserin Augusta) and the Ramu (Ottilien). The Sepik rises near the junction of the boundaries of Dutch New Guinea and Papua, and flowing easterly reaches the coast in latitude 4° S. It is navigable for 60 nautical miles by large ocean steamers, and for 300 nautical miles by steamers drawing from 10 to 13 feet. In 1914, a vessel of 50 tons ascended the river for 450 miles; it was then in flood and 7 fathoms deep at this distance, while at low water the depth was said to be 4 fathoms.

The Ramu rises in about 6° S. latitude and, flowing northwards, enters the sea near the mouth of the Sepik. It has been navigated, though with great difficulty, by flat-bottomed steamers for nearly 200 miles from its mouth.

3. **Bismarck Archipelago and Solomon Islands.**—(i) *General.* The islands of the Bismarck Archipelago and the Solomons are generally mountainous, with level ground near the coasts alone. The only low-lying islands are some in the Duke of York and Admiralty Group. The islands of Bougainville and Buka (Solomons) are equally rugged; Bougainville contains mountains reaching 10,000 feet. The soil is usually fertile, except on the low coral islands, where fresh water is scarce.

* A map of the Territory was published in Official Year Book No. 16, p. 665.
 † In regard to geographical position, see Year Book No. 16, p. 660.

(ii) *Coast Line.* The coasts of the large islands often rise steeply from the water, with bold headlands; but as a rule there is a beach, frequently overgrown with mangroves. Sunken rocks and coral reefs fringe many of the coasts, especially of the low islands. There are many good harbours, the chief being Blanche Bay, in New Britain, containing the good anchorages of Matupi Harbour and Simpson Harbour; Kavieng Harbour in New Ireland; Mioko in the Duke of York Islands; Peter Harbour in the Vitu Islands; Nares Harbour in Manus Island; and Queen Carola Harbour in Buka Island.

(iii) *Rivers.* Most of the streams in these islands are too shallow and too rapid for navigation.

§ 2. Climate and Health.

1. *General.*—The Territory has a moist tropical climate, with small differences between daily and seasonal extremes of temperature. There is no cool season, rain falls in all months, and the humidity is high. The Territory is outside the area of typhoons, but strong winds are not uncommon, and damage is occasionally done to plantations.

2. *Temperature.*—The mean annual temperature on the coast is about 26° to 27.5° C. (79° to 81° F.)—a moderate temperature for the latitude—and the difference between the means of the coldest and warmest months is not more than 2° F.

3. *Rainfall.*—There is no really dry season. At Rabaul the period of the north-west monsoon, November to April, is wetter than that of the south-east trade from May to September or October; but in some other places, especially the south coast of New Britain and in the vicinity of Finsch Harbour, the south-east trade brings the principal rains. The position of the coast with regard to the direction of the prevailing winds is the decisive factor in the rainfall. The annual rainfall amounts, at nearly all the stations at which observations have been made, to over 80 inches. Additional information under this heading is given in Official Year Book No. 18, page 642.

4. *Humidity.*—The humidity is very high. Observations taken at Rabaul during the years 1916 to 1921 showed an average humidity of 75 per cent., and the variation in the monthly means was only from 69 per cent. (October) to 80 per cent. (April). At Madang, during the same period, the yearly average was 80 per cent., the lowest monthly mean 77 per cent. (August), the highest 83 per cent. (April). During the same period at Kieta (Bougainville) the mean was 78 per cent., the minimum 74 per cent. (August and October), and the maximum 80 per cent. (June.)

5. *Influence on Health.*—The climate in North-East New Guinea and at many places in the Bismarck Archipelago and the Solomon Islands is enervating for Europeans. At some places, however, and notably at Rabaul, the heat and humidity are tempered by the constant breezes, and it is possible for Europeans, with careful attention to diet and exercise, and precautions against diseases, to maintain good health. When the measures taken against malaria and other diseases have produced their full effect, and use has been made of places in the mountains suitable for sanatoria, it is hoped that a satisfactory average of health will be maintained.

§ 3. Government.

1. *The Military Occupation.*—On the 17th September, 1914, the Acting Governor of German New Guinea signed terms of capitulation with the officer commanding a Naval and Military Expedition sent from Australia, and thereafter the Territory was under military administration until the establishment of Civil Government in May, 1921.

2. *Mandate.*—The Mandate in accordance with which the Territory of New Guinea is administered by the Commonwealth was issued by the League of Nations in December, 1920. The terms of the Mandate appear in Official Year Book No. 16, p. 662-3.

3. *New Guinea Act.*—In anticipation of the issuing of the Mandate, the Commonwealth Parliament had already, in September, 1920, passed the New Guinea Act 1920, by which the Governor-General was authorized to accept the Mandate when issued. The Territory was, by the Act, declared to be a Territory under the authority of the Commonwealth, by the name of the Territory of New Guinea.

The Act provided for an Administrator, while power to legislate for the Territory was to be exercised by the Governor-General, and provision was also made for the observance of safeguards in the interests of the natives as set out in the Mandate.

4. **Establishment of Civil Government.**—Official Year Book No. 19, p. 586, contains an account of the establishment of Civil Government in the Territory. Owing to considerations of space, however, the information is not repeated here.

5. **Expropriation.**—The Treaty of Peace provided that German nationals resident in her former colonies might be repatriated; and that the property rights and interests of German nationals in former colonies might be retained and liquidated by the Allies the proceeds being credited to Germany in part payment of the reparation payable by her under the Treaty. In pursuance of these powers, in September, 1920, the property of the principal German companies in the Territory, and in March, 1921, that of a large number of German planters, was vested in the Public Trustee; and the management of their businesses and plantations was entrusted (pending the sale or other disposal of the properties) to the Expropriation Board. (See Year Book No. 17, p. 631). In 1926 and 1927 these plantations were transferred to private owners.

6. **Departments and Districts.**—The Administration is organized in seven Departments—Government Secretary; Treasury; Native Affairs; Public Health; Customs and Shipping; Lands, Mines, Surveys, and Forestry; and Agriculture.

For administrative purposes the Territory is divided into nine Districts, generally named after the principal stations in them. They are as follows:—New Britain, comprising New Britain and adjacent islands; on the Mainland—Morobe, Madang, Aitape, and Sepik; in New Ireland and Lavongai (New Hanover)—Kavieng and Namatanai; in Admiralty Islands and adjoining islands—Manus; in Solomon Islands—Kieta. Alterations in regard to districts have been made from time to time. Each district is under a District Officer, assisted by a small staff.

7. **Statute Law.**—The Acts of the Commonwealth Parliament do not (unless expressly so stated) extend to the Territory, but the *Laws Repeal and Adopting Ordinance* 1921, provided that certain Acts and Ordinances should be applied thereto. (See Year Book, No. 17, p. 631.)

8. **Reports to the League of Nations.**—Eight reports have been rendered to the League of Nations in compliance with Article 6 of the Mandate, the latest being for the year ended 30th June, 1928.

§ 4. Population.

1. **White Population.**—The increase in the white population at various intervals since 1885 is shown in the appended tabulation. On 4th April, 1921, it was 1,288, of whom about 250 were missionaries, and 262 were persons engaged in administration, 715 were British subjects, and nearly all the remainder were nationals of former enemy countries. On 30th June, 1928, the number of Europeans was about 2,400.

TERRITORY OF NEW GUINEA.—WHITE POPULATION, 1885 TO 1928.

Year.						Number.
1885	..	..	..	..	..	64
1895	..	..	..	..	..	203
1910	..	..	..	..	..	687
1914	..	..	..	..	..	1,027
1921	..	..	..	..	..	1,288
1927	..	..	..	..	..	1,800
1928	..	..	..	..	..	2,400

2. **Asiatic Population.**—Malays seem to have been the first Asiatics brought by the Germans to German New Guinea; 37 of them are recorded on the mainland in 1885. About 1889 the New Guinea Company began to bring Chinese, Malays, and Javanese in growing numbers from Singapore and Java to work on its plantations; by 1892 there were about 1,800 on the mainland. By 1898 the number had decreased to 300 or 400, while at present it is less than 250.

About ten years later, Chinese were brought from China to the Protectorate; in 1911 there were 555, in 1914, 1,377, in 1921, 1,424, and in June, 1928, about 1,250.

In 1895 there were 2 Japanese in the Protectorate, in 1911 there were 25, in 1914, 103, in 1921, 87, and in June, 1928, about 50 residents. The total Asiatic population was 1,681 in 1914, and 1,778 in 1921. There were also, in 1921, 28 Polynesians and 69 half-castes.

The number of Asiatics has slightly decreased. In 1927–28 the births of Chinese exceeded the deaths by 35, but departures exceeded arrivals by 30. The number of Japanese remained stationary.

The Chinese provide the skilled artisans of the Territory, and many of them are small traders. Most of the Japanese residents are employed in the plantations, ship-yards, and stores.

3. **Native Population.**—As a large portion of the Territory is not under Government influence it is not possible to obtain reliable figures in regard to the number of the natives.

The following table shows the number enumerated in 1927–28.

TERRITORY OF NEW GUINEA.—NATIVE POPULATION, 1927–28 (EXCLUSIVE OF INDENTURED LABOURERS).

Places.	Children.			Adults.			Total.		
	Males.	Females.	Persons.	Males.	Females.	Persons.	Males.	Females.	Persons.
New Britain ..	15,113	12,551	27,664	22,165	21,953	44,118	37,278	34,504	71,782
New Ireland ..	7,180	5,632	12,812	12,810	13,132	25,942	19,990	18,814	38,804
Admiralty Group	2,585	2,406	4,991	3,993	4,580	8,573	6,578	6,986	13,564
Solomon Islands	7,582	5,972	13,554	12,017	12,896	24,913	19,599	18,868	38,467
N.G. Mainland ..	34,146	27,028	61,174	50,108	49,385	99,493	84,254	76,413	160,667
Total ..	66,606	53,589	120,195	101,093	101,996	203,089	167,699	155,585	323,284

The total native population in the Territory is estimated roughly at about 435,000. Whether the number is increasing or decreasing cannot yet be ascertained with certainty. The number of natives indentured as labourers, mostly for plantation work, on 30th June, 1928, was 28,253, compared with 27,002 in the previous year.

§ 5. The Natives.

1. **General.**—A brief description of the native inhabitants of the Territory was included in Year Book No. 16, page 670. It may be noted here that the natives are divided into two main groups—Melanesian and Papuan—the former, with odd exceptions constituting the population of the Bismarck Archipelago, the Solomon Islands, and the coastal districts of the New Guinea mainland; while the latter inhabit the interior of the mainland. Odd tribes of Negroes are known to exist in the mountains of New Guinea. In the Admiralty Islanders there is a strain of Papuan, and, possibly, of Polynesian blood, while the Western Islanders and the inhabitants of the small islands east and south-east of New Ireland are Micronesians.

2. **Land Tenure.**—Native customs in regard to the ownership and use of land may be briefly outlined as follows:—The ownership and use of the land are generally individual, although, in some rare cases, particularly in North Bougainville, the communal system exists. In districts where a great many coconut-bearing palms are growing on native lands it is often found that the land is the property of a chief or of one of the old men of the tribe, and that the coconut palms growing thereon are divided into small groves, and are the property of several members of the tribe. Customs with regard to the use of unoccupied forest lands vary. Right of inheritance to land is almost invariably through the maternal branch. (See Year Book No. 17, p. 634.)

3. **Research Work.**—During the German occupation of the Territory a certain amount of research work was carried out, partly by scientific expeditions, and partly by missionaries and by a local resident. An anthropologist has been appointed by the Commonwealth Government to consolidate the work already done, and to extend it to parts of the Territory which have not yet been covered. The results of his work appear in special reports.

4. **Education.**—The education of the natives was provided for in the "Education Ordinance of 1922" under which the Administrator was authorized to establish schools, grant money therefor, prescribe instruction, and arrange for the training of teachers and other matters. Simultaneously a Native Education Trust Fund was inaugurated, over which the Administrator was given control, and for the benefit of which he was empowered, within certain limits, to levy taxes on the natives and on employers of native labour. The expenditure on native education in 1927–28 was £10,057. Though the natives are liable to pay education tax none has been collected since 1922–23, whereas a considerable sum annually is obtained from a tax levied on employers of native labour.

Government educational establishments have been founded at Malaguna, near Rabaul and at Kavieng. For some time the Administration has been collecting details of the systems of education in force in other native countries. It is proposed later to appoint a Committee to study the question of native education as regards New Guinea, and to submit recommendations for the establishment of a system that will adequately meet the needs of the Territory. (See Year Book No. 17, p. 635.)

A considerable amount of educational work is carried out by the missions, the schools maintained being of three classes—(a) elementary schools in villages; (b) intermediate boarding schools at head-quarters; and (c) high schools and technical schools. At the end of June, 1928, the various missions maintained 1,288 schools, employing 242 European teachers, 4 Asiatic and 1,276 native teachers. The pupils numbered 36,812.

The granting of assistance to mission schools is authorized by the Education Ordinance, but no grants have hitherto been made.

5. **Health of Natives.**—In a report dealing with the health of the natives in New Britain submitted before the war, it was stated that "the natives in the districts examined are not degenerate; but they are sick." The same qualification undoubtedly applies to the native population throughout the Territory.

The diseases taking the greatest toll of native life—directly, or through lowering vitality—are:—Malaria, respiratory diseases, dysentery, frambœsia, yaws, tropical ulcer, hookworm, filariasis, and beriberi. Further reference to this subject will be found in Official Year Book No. 18, p. 647.

The Health Department in Rabaul possesses:—(i) a staff of medical officers and orderlies, including travelling doctors; (ii) Native Hospitals at Government stations and sub-stations (its staff also supervises hospitals on plantations); (iii) a laboratory; (iv) training system for natives as medical orderlies; (v) scheme of distribution of medical necessaries; (vi) a leper-station near Madang; and (vii) undertakes the general oversight of sanitary conditions.

6. **Missions.**—There is a number of mission societies working in the Territory. The Society of the Sacred Heart of Jesus works in the Bismarck Archipelago, the Society of the Holy Ghost along the coast of North-East New Guinea from Sek to the Dutch border, the Marists in Buka and Bougainville. These are Roman Catholic Missions. The Protestant Missions are the Australian Methodist Mission in New Britain and New Ireland, the New Zealand Methodist Mission in Bougainville, the Liebenzell Mission in the Admiralty Group, and the Lutheran Mission (supported and staffed by the Lutheran Churches in Australia and America), which work along the coast of North-East New Guinea from Sek to the Papuan border. All these societies combine teaching and planting with their missionary work. The missionaries working in the Mandated Territory in 1927 numbered 373, comprising American, 28; Austrian, 7; Belgian, 1; British, 53; Dutch, 40; French, 25; German, 197; Italian, 2; Luxemburgese, 6; Polish, 11; Free City of Danzig, 1; Czecho-Slovak, 2. Some of the societies have small printing plants by which reading matter in one or other of the native languages is produced.

§ 6. Land Policy.

1. **Acquisition of Land.**—A short account of the modes of acquiring land appears in Official Year Book No. 19, p. 590, but considerations of space preclude its repetition herein.

2. **Land Policy of the Present Administration.**—The Land Ordinance 1922–24 provides for sale as well as leasing of land belonging to the Crown. The divergence from the policy usually adopted by the British in the Pacific (including Papua), which provides for leasehold only, was made with a view to disposing by sale of the freehold properties taken over from Germans, and which until recently were controlled by the Expropriation Board. Reference to the leasehold system in force will be found in Official Year Book 18, page 648.

A total area of 253,761 hectares (about 634,000 acres) had been alienated up to the 30th June, 1928. The area alienated in 1927–28 was 1,311 hectares (about 3,240 acres).

3. **Registration of Titles.**—Under German law there was a system of registration of titles in a “Ground Book,” but registration did not confer an indefeasible title. The German system has been replaced by one modelled on the Torrens plan, embodied in an Ordinance entitled the “Lands Registration Ordinance,” 1924.

§ 7. Production.

1. **General.**—The Territory possesses great natural resources, but their development has barely commenced, and progress in this direction will depend largely on the possibility of securing an adequate supply of suitable labour.

2. **Agriculture.**—(i) *General.* No estimate has yet been made of the area of land suitable for agriculture; but it is certain that the area already alienated, if planted to its full capacity, would be far greater than the present native population could cultivate.

The natives have been described as a people of peasant proprietors, and everywhere they practice a crude form of agriculture. Their gardens afforded but a small amount of produce for oversea trade, and the exports of the Protectorate grew only as European plantations were made. The average of the latter increased slowly, for the Protectorate is almost everywhere covered with forest, and the clearing and planting of the land, even if labour can be had, necessarily occupy considerable time. At the present stage, roads fit to carry wheeled transport are of paramount importance.

Under the supervision of the Director of Agriculture, soil analyses have been undertaken in different parts of the Territory, experimental stations have been founded in Rabaul, Bita Paka, and in the Markham Valley, and an agricultural school is being established at Kerawat, 28 miles from Rabaul where natives will be trained in tropical agriculture. A laboratory and a herbarium have been established, and two travelling inspectors appointed for the purpose of combating plant pests. Experiments are being carried on with a variety of crops; these in conjunction with the *Papua and New Guinea Bounties Act 1926*, and the preference given by the Commonwealth Tariff to certain produce grown in the Territories are expected greatly to stimulate agriculture.

(a) *Tobacco.* This crop has been cultivated with success at Astrolabe Bay in North-East New Guinea, and in the Bismarck Archipelago. Tobacco of high quality, rivalling the best Sumatra leaf, is said to have been produced. Later, the growing of tobacco on European plantations was abandoned, partly, it is said, for want of intelligent labour, although it continued to be grown by the natives for their own use.

(b) *Cotton.* In 1924–25 the Government obtained 1,615 lb. of cotton seed, and experiments are being carried on at the experimental stations as well as by private planters, including a few natives.

(c) *Sisal Hemp.* There was a steady although small export of sisal hemp in German times. The quantity exported in 1913 was 10 tons, but none seems to have been exported since 1914.

(d) *Cocoa.* Cocoa has been successfully grown, principally at Vitu (French Islands); in 1913, 137 tons were exported. The yield in 1927–28 was 73 tons.

(e) *Coffee*. The area under coffee increased in 1927-28 to 82 acres.

(f) *Rubber*. On the mainland a small area has been planted with *Ficus elastica*, but in consequence of the low price of the inferior rubber produced from this source the trees are not being tapped.

(g) *Copra*. Indigenous in most of the islands, the coconut palm yielded copra to the traders from the beginning of European trade, and the plantations, commenced in 1883, have steadily extended in area and production. The quantity exported in 1927-28 was 65,285 tons, an increase of 17,672 over the figures for the previous year. The area under coconuts increased from 76,845 acres in 1914 to 187,665 acres on 30th June 1928, of which 152,123 were in bearing.

(h) *Other Crops*. The climate and soil of the Territory are suitable for the cultivation of rice, Manila hemp, cinchona, nutmeg, vanilla, peanuts, kapok and maize, but hitherto their cultivation has either not advanced beyond the experimental stage or has been attempted on a small scale only. Sugar-cane of many varieties flourishes, and the natives cultivate extensive areas for their own use; other indigenous food-producing plants include the sago palm and the cassava.

(i) *Plants Yielding Power Alcohol*. It seems probable that alcohol for power purposes will be obtainable economically from the Territory. The sago palm and nipa palm yield as much as 60 gallons a ton, and in places are very abundant.

(ii) *Area of Plantations*. The area of plantations and the principal crops grown thereon are shown in the table hereunder for the year ended 30th June, 1928. The figures are exclusive of native plantations. (One hectare equals 2.4711 acres).

TERRITORY OF NEW GUINEA.—PLANTATIONS, 30th JUNE, 1928.

Particulars.	Government Plantations.	Privately owned Plantations.	Total.
Area of Holdings hectares	1,287	169,963	171,250
Area Cleared "	992	82,254	83,246
Area Cleared and Planted "	874	78,266	79,130
Coconuts—			
Area Planted hectares	855	75,089	75,944
Area Bearing "	671	60,890	61,561
Rubber—			
Area Planted hectares	..	1,468	1,468
Area Bearing (a) "	..	1,468	1,468
Cocoa—			
Area Planted hectares	..	513	513
Area Bearing "	..	266	266
Coffee—			
Area Planted hectares	..	33	33
Area Bearing "	..	7	7
Maize—			
Area Planted hectares	..	94	94
Area Bearing "	..	55	55
Native Food (b)—			
Area Planted hectares	29	1,543	1,572
Area Bearing "	16	1,219	1,235

NOTE.—(a) Rubber not tapped. (b) Native food of all kinds is mostly grown between young coconut palms not yet in bearing, therefore the total area cleared and planted does not agree with the detailed areas under various crops.

The area of plantations at various periods from 1885 to 1928 is shown hereunder. As in the case of the previous table, the figures are exclusive of native plantations :—

TERRITORY OF NEW GUINEA.—PLANTATIONS, 1885 TO 1928.

Year.	Total Area.		Area under Coconuts (including Area not in Bearing).
	Acres.		Acres.
1885	148		(a)
1895	2,152		(a)
1911	58,837		51,510
1914	84,941		76,845
1924	179,163		172,373
1928	195,538		187,665

(a) Not recorded.

3. **Live Stock.**—There is little natural pasture in the Territory, but the coconut plantations are now of a sufficient area to maintain numerous live stock, the stock being depastured on the indigenous grasses growing between the rows of trees. In 1928 there were 932 horses, 14,223 cattle, 2,275 sheep, 5,893 goats, and 5,263 pigs (exclusive of the large number of pigs kept by the natives). (See also Official Year Book No. 16, page 677.)

4. **Timber.**—An investigation of the timber resources of the Territory has been made by the Commonwealth Forestry Adviser, and a report in connexion therewith was published in 1926. According to this report, while offering no prospects of immediate gain to large saw-milling interests the Territory possesses forest potentialities of a high order. The timber required for house and ship-building and for other purposes is mostly obtained locally. In North-East New Guinea the Neuentdelsauer Mission and the Holy Ghost Mission both possess up-to-date saw-milling plants, while most of the timber required in the Archipelago is supplied by the Sacred Heart Mission's saw-mill, and by two privately-owned mills, all at the eastern end of New Britain.

The Timber Ordinance 1922 provides for the issue of permits and licences to cut timber. Timber growing on native lands cannot be acquired by private purchasers directly from the natives, but must be obtained through the Administration. A royalty is to be paid on all timber exported. Six timber permits were issued in 1927–28.

5. **Fisheries.**—The wealth of the waters of the Territory has so far been little exploited. Fish is caught at many places along the coast to supply the small local demand of the natives and of the few resident Europeans. Pearl-shell is exported in fair quantities, while trepang, shark fins, trochus-shell, and tortoise-shell also figure amongst the exports. The value of marine products exported in 1927–28 was £34,911, compared with £30,923 in the previous year.

6. **Mining.***—Except for gold there has been little mining in the Territory, and knowledge of the mineral resources is as yet but scanty. Gold has been discovered on the Waria, the Ramu, the Francisco, and the Markham Rivers, etc. Rich gold was discovered in the Morobe District in 1926; the field is not very extensive and is situated 60 miles inland. Communication has been established with the coast by a regular aeroplane service. Osmiridium is reported to have been found on the upper tributaries of the Ramu, and platinum on the Kabenau River. Copper has been discovered in the form of chalcopyrite and malachite in the Baining District. Iron occurs as magnesite and hæmatite in the Baining District, apparently in large quantities. Sulphur occurs in several localities in the volcanic regions of the Territory. Phosphates suitable for use in the making of manures are found in the Purdy Islands. Brown coal has been found on the mainland in the vicinity of Astrolabe Bay, and in the southern portion of New Ireland.

* Fuller details in regard to minerals in the Territory will be found in E. R. Stanley's Report on Salient Geological Features and Natural Resources of the Territory (printed as Appendix B. to the Report for 1921–22).

The following table shows the quantity of gold exported, and its value during the last four financial years :—

Year.				Quantity.	Value.
				Ounces.	£
1924-25	..	..	..	7,417	18,512
1925-26	..	..	..	10,067	25,169
1926-27	..	..	..	84,760	195,428
1927-28	..	..	..	113,874	256,216

By the Mining Ordinance of 1923, private companies incorporated or registered in the Territory, two-thirds of whose shares are held by British subjects, became eligible to engage in prospecting and mining for mineral oil and coal. On the 30th June, 1928, 7 licences to search for mineral oil were in force.

§ 8. Trade.

1. Total Trade.—The value of the imports, exports, and total trade at various periods since 1887, and during each of the last five years, is given in the table hereunder :—

TERRITORY OF NEW GUINEA.—TRADE, 1887 TO 1928.

Year.				Imports.	Exports.	Total.
				£	£	£
1887	..	..	..	17,133	19,580	36,713
1897	..	..	..	36,713	31,352	68,065
1907	..	..	..	166,585	97,563	264,148
1923-24	..	..	..	485,634	718,535	1,204,169
1924-25	..	..	..	537,940	858,990	1,396,930
1925-26	..	..	..	568,339	1,105,158	1,673,497
1926-27	..	..	..	660,753	1,079,855	1,740,608
1927-28	..	..	..	811,832	1,471,026	2,282,858

The import values are exclusive of money and Government stores. In 1927-28 the imports were distributed as follows :—From Australia, £725,622; America, £16,910; China, £32,496; Germany, £14,164; Straits Settlements, £11,451; Japan, £10,303; and Caroline Islands, £886.

2. Principal Items of Imports.—From Australia the principal items of imports are foodstuffs and beverages, tobacco, apparel, foot-wear, textiles, machinery, hardware, building material, etc.; from America petrol, kerosene, motor vehicles and lubricating oil; from China and Straits Settlements rice; from Germany cement, building material, wood and wicker manufactures, motor vehicles and sewing machines; from Japan textiles.

3. Principal Items of Export.—Values of the principal items of export for the last five years are shown hereunder :—

TERRITORY OF NEW GUINEA.—EXPORTS, VALUE OF ITEMS, 1923-24 TO 1927-28.

Commodity.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	£	£	£	£	£
Copra	686,519	815,938	1,016,930	849,852	1,176,040
Cocoa	3,602	6,949	6,510	3,500	3,859
Stone and Ivory Nuts	192	312	456	152	..
Trepang	908	1,975	8,246	13,750	11,259
Shell	9,574	15,009	47,434	17,000	23,436
Tortoise Shell	877	295	413	173	216
Gold	16,542	18,512	25,169	195,428	256,216
Miscellaneous	321	..	..	..	..
Total	718,535	858,990	1,105,158	1,079,855	1,471,026

4. Exports of Copra and Cocoa.—The next table shows the quantities of these items exported during the last five years:—

**TERRITORY OF NEW GUINEA.—EXPORTS OF COPRA AND COCOA,
1923-24 TO 1927-28.**

Commodity.	1923-24.	1924-25.	1925-26.	1926-27.	1927-28.
	Tons.	Tons.	Tons.	Tons.	Tons.
Copra	34,974	39,151	45,806	47,613	65,285
Cocoa	70	135	113	65	73

Most of the copra is shipped direct to European and American ports.

5. Banks.—There are two banks operating in the Territory, the Commonwealth Bank of Australia, and the Bank of New South Wales.

§ 9. Shipping and Communication.

1. General.—A subsidized mail service between the Territory and Australia is maintained by Burns, Philp and Co. Ltd. There is a regular service between the East and Australia with Rabaul as a port of call. Shipping within the Territory is regulated by the *Coastal Vessels Regulations, 1920*, and the *Wharfrage and Berthage Regulations* made during the Military Administration of the Territory.

2. Oversea Tonnage in 1927-28.—The number and net tonnage of oversea vessels which entered and cleared the Territory during the year 1927-28 are shown hereunder:—

TERRITORY OF NEW GUINEA.—SHIPPING, 1927-28.

Nationality.	Entered.		Cleared.		Total.	
	No.	Net Tonnage.	No.	Net Tonnage.	No.	Net Tonnage.
American	4	4,966	4	4,966	8	9,932
British	44	87,773	39	84,569	83	172,342
Japanese	6	10,519	6	10,519	12	21,038
Swedish	1	3,470	1	3,470	2	6,940
Total	55	106,728	50	103,524	105	210,252

Country from which Entered or for which Cleared.	Entered.		Cleared.		Total.	
	No.	Net Tonnage.	No.	Net Tonnage.	No.	Net Tonnage.
Australia	32	62,215	27	55,852	59	118,067
Caroline Islands	3	801	3	801	6	1,602
China	4	10,692	3	8,019	7	18,711
European Ports	1	185	10	27,615	11	27,800
Japan	3	9,718	..	..	3	9,718
New Caledonia	2	6,447	..	..	2	6,447
New Zealand	2	5,496	..	..	2	5,496
Ocean Island .. .. .	..	..	1	1,922	1	1,922
Papua	3	3,578	2	108	5	3,686
Straits Settlements	2	2,801	1	879	3	3,680
Solomon Islands	2	2,538	..	..	2	2,538
United States of America	1	2,257	3	8,328	4	10,585
Total	55	106,728	50	103,524	105	210,252

3. **Local Shipping.**—A service between Rabaul and the various outports not visited by the mail steamers is maintained by small steamers and motor craft.

4. **Land Communication.**—Means of communication on land are scanty. There are no railways. Roads lead from Rabaul to places within 30 or 40 miles, and there is a road 170 miles long in New Ireland. Elsewhere there are few roads outside plantations and the stations of the District Officers. The large rivers of the mainland are as yet but little used.

There is a high power wireless station at Bita Paka near Rabaul, and low power stations at the out-stations. Since 1st July, 1921, all these have been placed under the control of Amalgamated Wireless (Australasia) Limited.

5. **Communication by Air.**—The discovery of gold in New Guinea has resulted in great aviation activity in the vicinity of the gold-fields. On account of the mountainous country and dense undergrowth between the coast and the gold-fields the task of transporting food and stores to the fields and of bringing the gold to the seaboard by land is an irksome and costly process. The fields are situated about 60 miles inland from Salamaua, and whereas aircraft cover the distance in approximately an hour, the nature of the country is such that a journey by other means occupies more than a week.

Several companies and individual pilots are now operating in the Territory, and the number of machines there or *en route* at 30th June, 1928, was 13, and licensed pilots engaged numbered 9.

During the year ended 30th June, 1928, 821 flights were carried out. The hours flown numbered 1,534 and the approximate mileage covered was 107,208 miles. 908 passengers (814 paying and 94 non-paying) and 518,831 lbs. of goods were carried.

§ 10. Revenue and Expenditure.

1. **Revenue.**—Details of the revenue collected from various sources during each of the last two years are given hereunder:—

TERRITORY OF NEW GUINEA.—REVENUE, 1926-27 AND 1927-28.

Heading.	1926-27.		1927-28.	
	£	s. d.	£	s. d.
Revenue from Taxation (direct and indirect) ..	206,525	6 11	249,550	1 5
Revenue from Public Services and undertakings ..	40,226	15 11	50,504	15 2
Other receipts	35,765	9 0	49,744	14 4
Appropriation of former years	87	6 5	193	16 7
Transfer from Trust to Revenue of amount recorded as due to the Commonwealth of Australia in respect of stores and services supplied by the Defence Department, payment of which has been waived for the present by the Commonwealth ..	22,916	19 9	..	..
Reimbursement by Nauru of moneys expended by the Territory in the administration of Nauru from 1914 to 1921 .. .. .	..	..	14,587	6 5
	305,521	18 0	364,580	13 11

2. **Expenditure.**—The expenditure for the financial year 1927-28 was distributed as follows:—

TERRITORY OF NEW GUINEA.—EXPENDITURE, 1927-28.

Secretary and Central Administration	£19,195	Trade and Customs	£13,654
Justice	4,741	Agriculture	6,543
Treasury	28,775	Public Health	57,535
Audit	3,425	District Services	101,854
Lands and Survey	19,778	Miscellaneous	4,423
Native Affairs, Police, and Prisons	16,872		
Public Works	54,502	Total	331,297

F. NAURU.

1. **General.**—Nauru is an oval-shaped atoll about 12 miles in circumference having an area of 5,400 acres, of which approximately four-fifths is phosphate-bearing. It is situated in long. 166° E., and is 26 miles south of the Equator. Portion of the island between the sandy beach and the coral cliffs is fertile, and it is there that the native Nauruans have established themselves. With the exception of a small fringe round an inland lagoon, the plateau which contains the phosphate deposits possesses few food plants and is uninhabited, but portion of the area has been planted with fruit trees. The system of land tenure is governed by old custom, and, with the exception of small allotments held by the Government and Missions, the whole of the island is owned by individual natives. The climate is hot, but not unpleasant, the average shade temperature ranging between 72 and 95° F., and the average humidity between 70 and 80. The average rainfall is 120 inches, but droughts occasionally occur, and in 1916 and 1917 only 40 inches were received for the two years.

2. **History.**—The island was annexed by Germany in 1888, and prior to 1914 was part of the protectorate of German New Guinea.

In November, 1914, Nauru was occupied by a detachment from the Australian Expedition at Rabaul, and it was included in the cession of colonies made by Germany in 1919 to the Allied and Associated Powers, whose representatives agreed that a mandate over it should be given to His Majesty the King. On 2nd July, 1919, the British, Commonwealth, and New Zealand Governments agreed that the administration of the island (which, since 1915, had been in charge of an official appointed by the British Colonial Office) should be vested in an Administrator; the first Administrator was appointed for a term of five years by the Australian Government; his term of service having expired in February, 1926, it was extended for another five years. The Agreement between the three Governments was approved by the Commonwealth Parliament in the Nauru Island Agreement Act 1919, and is printed in the Schedule to that Act. The first Administrator appointed by the Commonwealth Government assumed duty in June, 1921.

The Mandate for Nauru, issued by the Council of the League of Nations in December, 1920, is in terms similar to that for the Territory of New Guinea.

3. **Administration.**—The Administrator has all the powers of government—administrative, legislative, and judicial—in the island. An advisory Council has been created which consists of two Europeans chosen by the Administrator, and two native chiefs elected by the natives. All expenses of administration are met from local revenue. Native industries such as canoe-building, fishing, mat-making, etc., are encouraged by the provision of prizes at annual competitions. A branch of the Commonwealth Savings Bank has been established. There is a co-operative store managed by the natives themselves, the books, however, being audited by Government officers. Natives are not allowed to carry firearms, and the use by them of intoxicating liquors and deleterious drugs is prohibited.

4. **Population.**—Figures for population from 1924 to 1928 are given hereunder:—

NAURU.—POPULATION, 1924 TO 1928.

Population.	31st December, 1924.	31st December, 1925.	1st April, 1926.	1st April, 1927.	1st April, 1928.
Europeans	125	124	117	115	131
Chinese	785	827	822	761	1,051
Nauruans (a)	1,219	1,239	1,251	1,266	1,297
Other South Sea Islanders	11	10	27	21	20

(a) The natives of Nauru are Micronesians.

The birth rate among the Nauruans in 1928 was 52.43 per 1,000, the death rate 13.88 per 1,000, and the rate of infantile mortality 73.53 per 1,000.

5. **Health.**—There is no malaria, but cases occur of other diseases known in the Pacific. Venereal disease is rare, but at the end of 1928, 218 cases of leprosy were under treatment. An area has been set apart for the segregation of lepers, and the latest methods of treatment are applied to cope with the disease. Two hospitals are maintained on the island, one by the Administration for Nauruans, and one by the British Phosphate Commission for its employees. In common with other natives, the Nauruans are very susceptible to tuberculosis and influenza, and in 1921 an influenza epidemic caused the deaths of 230 islanders. Dysentery, both amoebic and bacillary, is endemic. The usual steps are being taken by the authorities to improve the water supply and to provide efficient sanitation generally. A baby clinic has been established to give help and advice to Nauruan mothers in regard to infant nurture.

6. **Education.**—On the 1st October, 1923, the Administration took over the education of the Nauruans and other native children, and native schools were established in four districts and at the leper station. Previously education had been looked after by the Missions subsidized by the Government. A school for European children is presided over by a teacher on loan from the Education Department of Victoria, who also supervises educational matters generally. The curriculum is similar to that of corresponding schools in Australia, and the teaching is, as far as possible, wholly in English. Education is compulsory between the ages of six and sixteen. After the termination of ordinary school attendance, twelve months are devoted to technical training. Officers from the Missions visit the schools to give religious and moral training. A museum for the preservation of Nauruan antiquities is in process of formation.

7. **Religion.**—The London Missionary Society (Protestant) and the Sacred Heart of Jesus Mission (Roman Catholic) operate in Nauru, and in 1928 the adherents to the former numbered 861, and to the latter 460.

8. **Phosphate Deposits**—(i) *General.* Since 1906 the deposits have been worked by the Pacific Phosphate Company, which also worked the deposits on Ocean Island (about 165 miles east of Nauru and part of the Gilbert and Ellice Islands Colony administered by the Colonial Office). The quantity on the two islands has been estimated at not less than 100,000,000 tons, and the rock phosphate, as shipped, averages 85 per cent. to 88 per cent. of tribasic phosphate of lime. About 4,000,000 tons have already been removed.

The interests of the Pacific Phosphate Company in the two islands (though not in other islands in the Pacific in which it has workings) were bought by the British, Commonwealth, and New Zealand Governments in 1919 for £3,500,000, the purchase money being contributed in the proportions of 42, 42, and 16 per cent. respectively. The Agreement of 2nd July, 1919, provides for the working of the deposits by the British Phosphate Commission of three members, one appointed by each Government; and the three countries are to receive the output in the same proportions of 42, 42, and 16 per cent.

(ii) *Output.* The output from the two islands in 1913, the last year before the war, was 350,000 tons. During the five years 1922–23 to 1926–27 exports were as follows:—

NAURU AND OCEAN ISLAND.—EXPORT OF PHOSPHATES, 1922–23 TO 1926–27.

Year.	Total.	To Australia.	To New Zealand.	To United Kingdom.	To other Countries.
	Tons.	Per cent.	Per cent.	Per cent.	Per cent.
1922–23	311,650	65.43	16.54	..	18.03
1923–24	450,924	70.67	13.46	..	15.87
1924–25	473,647	71.11	21.01	..	7.88
1925–26	393,032	69.76	24.97	..	5.27
1926–27	594,825	77.96	22.04	..	..

From Nauru alone, during the calendar year 1928, the export was 318,845 tons, of which 255,520 tons went to Australia, and 63,250 tons to New Zealand.

(iii) *Accounts of Commission.* A statement for the five years ended June, 1927, is given hereunder.

NAURU AND OCEAN ISLAND.—SALES OF PHOSPHATES, 1922-23 TO 1926-27.

Receipts from Sales of Phosphate, Etc.	1922-23.	1923-24.	1924-25.	1925-26.	1926-27
	£	£	£	£	£
Receipts from sales, etc. ..	542,348	695,940	705,293	611,654	780,070
F.o.b. cost, including interest on capital, Sinking fund, etc. ..	538,099	651,102	635,675	607,256	720,439

The f.o.b. cost of phosphate was 37s. 10d. in 1920-21; 40s. 7d. in 1921-22; 34s. 6d. in 1922-23; 28s. 10d. in 1923-24; 26s. 10d. in 1924-25; 31s. 1d. in 1925-26; and 24s. 6d. in 1926-27.

The amount due by the Commission to the partner Governments for purchase money and other capital sums was £3,666,457 on 30th June, 1921, and at 30th June, 1927, this had been reduced to £3,429,401. The contribution to the sinking fund paid by the Commission provides for interest at 6 per cent. and extinction of the capital sum in 50 years from 1st July, 1920.

(iv) *Employees.* Apart from a limited number of Europeans and a few Pacific Islanders the employees are Chinese, engaged under a three years' contract. A few Nauruans are from time to time employed, but they are not partial to sustained labour of any kind.

9. *Trade.*—Information regarding imports and exports for years 1924 to 1928 is appended herewith :—

NAURU.—IMPORTS AND EXPORTS, 1924 TO 1928.

Heading.	1924.	1925.	1926.	1927.	1928.
	£	£	£	£	£
Imports	100,254	63,576	104,117	82,650	240,229
Exports—	tons.	tons.	tons.	tons.	tons.
Phosphate	280,990	224,260	274,935	318,185	318,845
Copra	383	170	117	263	181

10. *Revenue and Expenditure.*—The revenue and expenditure of the Administration during the years 1924 to 1928 were as follows :—

NAURU.—REVENUE AND EXPENDITURE, 1924 TO 1928.

Heading.	1924.	1925.	1926.	1927.	1928.
	£	£	£	£	£
Revenue	18,200	15,175	16,424	17,041	19,903
Expenditure	13,580	15,257	13,963	17,243	18,267

Of the revenue in 1928, £7,856 was royalty on phosphate, £4,819 consisted of Customs receipts, £1,674 of capitation taxes, and £774 of harbour dues. The total credit balance on the 31st December, 1928, amounted to £15,794.

G. STRUCTURE AND SCENERY OF THE FEDERAL CAPITAL TERRITORY.

*By W. G. Woolnough, D.Sc., Geological Adviser to the Commonwealth Government.
Formerly Professor of Geology, University of Western Australia.*

CONTENTS.

- | | |
|---|---|
| <p>§ 1. Introduction.</p> <p>§ 2. Geological Structure.</p> <p>1. General—</p> <p>(i) The Origin of the Rocks—</p> <p>(a) Igneous Rocks.</p> <p>(b) Sedimentary Rocks.</p> <p>(c) Altered Rocks.</p> <p>(ii) Fossils.</p> <p>(iii) Geological History.</p> <p>2. Ordovician.</p> <p>3. Silurian—</p> <p>(i) Sediments.</p> <p>(ii) Fossils.</p> <p>(iii) Igneous Rocks.</p> <p>(iv) Economic Geology—</p> <p>(a) General.</p> <p>(b) Metals.</p> <p>(c) Building Stones.</p> <p>(d) Brick-making Materials.</p> <p>(e) Quality of Soil.</p> <p>4. Devonian—</p> <p>(i) General.</p> <p>(ii) Middle Devonian Marine Beds.</p> <p>(iii) Upper Devonian Red Beds—</p> <p>(a) General.</p> <p>(b) Fossils.</p> <p>(c) Age of Beds.</p> <p>(iv) Igneous Activity.</p> <p>5. Post-Devonian Formations.</p> <p>6. Cainozoic.</p> <p>§ 3. Fundamental Principles of Physiography.</p> <p>1. Popular Fallacies.</p> <p>2. The Conception of the Peneplain—</p> <p>(i) The Work of Running Water.</p> <p>(ii) The Ultimate Result.</p> <p>(iii) Characteristics of a Peneplain.</p> <p>(iv) Interruption by Earth Movement.</p> | <p>§ 4. Geographical Unity of Eastern Australia.</p> <p>§ 5. Life History of a River.</p> <p>1. The Age of a Valley—</p> <p>(i) Human Analogy—</p> <p>(a) General.</p> <p>(b) Youth.</p> <p>(c) Adolescence.</p> <p>(d) Maturity.</p> <p>(e) Senility.</p> <p>(f) Limitation of the Human Analogy.</p> <p>2. River Piracy—</p> <p>(i) Interdependence of Rivers.</p> <p>(ii) Migration of Divides.</p> <p>§ 6. Application of General Principles to the Federal Capital Territory.</p> <p>1. The Rounded Hills.</p> <p>2. Canberra Plains.</p> <p>3. The Trans-Murrumbidgee Mountains—</p> <p>(i) Murrumbidgee Fault.</p> <p>(ii) Continuity of Earth Movement.</p> <p>(iii) Moulding of the Fault Scarp.</p> <p>4. Canberra Valley—</p> <p>(i) Majura Lake.</p> <p>(ii) Piedmont Beds.</p> <p>(iii) Breccia Accumulations.</p> <p>(iv) The Future of the Molonglo.</p> <p>(v) Clay Deposits.</p> <p>§ 7. Lake George.</p> <p>§ 8. The Upper Murrumbidgee.</p> <p>§ 9. Conclusion.</p> <p>Appendix.</p> |
|---|---|

STRUCTURE AND SCENERY OF THE FEDERAL CAPITAL TERRITORY.**§ 1. Introduction.**

A consideration of the physical features of the Federal Capital Territory cannot be circumscribed by the arbitrary limits which bound it. It is necessary to look somewhat further afield in order to obtain a proper perspective with regard to the objects within the immediate range of vision.

Canberra has been studied geologically in some detail by Pittman, Mahony, and Taylor. Monaro and Kosciusko have received attention at the hands of Clarke, David, Andrews, Taylor, Sussmilch, Browne, and others. The classical fossil localities of Yass and Cavan have been the Mecca of geologists, and have been described in detail by Shearsby, Harper, and others.

Andrews has codified our knowledge of the physiography of Eastern Australia, and has revealed the golden thread of unity which runs through all the intricate details of its fabric.

These and other authorities must be consulted by those who desire to obtain an intimate acquaintance with the basic structure which underlies the rolling hills and broad plains of beautiful Canberra.

§ 2. Geological Structure.

1. *General.*—(i) *The Origin of the Rocks.* The rocks which build up that limited superficial part of the earth's mass accessible to direct observation fall primarily into two categories.

(a) *Igneous Rocks.* *Firstly*, there are those which have cooled and solidified from a molten condition. These are termed "igneous rocks"* from their mode of origin. They include the "lavas" and "ashes" produced by volcanoes; but are by no means limited to such types. Enormously more important from every point of view are those masses of igneous rock forced upwards from the earth's interior, but not possessing sufficient driving force to bring them to the surface, which have come to rest at depths often very considerable. Such masses having cooled slowly and under enormous pressure assume characteristic textures; they bake and alter the pre-existing formations with which they come into contact, and, not infrequently introduce new and sometimes extremely valuable constituents into those formations.

The presence of such "intrusive" rocks at the surface now is due to the gradual wearing away of the rocky overburden, amounting in many instances to miles in thickness.

(b) *Sedimentary Rocks.* *Secondly*, there are the products of disintegration of rocks of various kinds at the earth's surface. These fragmental products are collected in various situations, but chiefly under water, and are gradually solidified and hardened into new rock types. Such rocks are grouped under the generic title of "sedimentary rocks." It is obvious that the materials composing a sediment may have been used over and over again.

(c) *Altered Rocks.* From either of the fundamental types of rock a third great group known as the "altered rocks" is derived. The alteration or "metamorphism" is produced either as a result of baking by intrusive rocks, or through the heat and pressure generated during the slow earth movements by means of which the mountains are elevated.

(ii) *Fossils.* Animals and plants living in the sea, in lakes or on land are entombed in the sediments as the latter are laid down, or leave their tracks on beach or mudbank. Such evidences of contemporaneous life are termed "fossils." Marine animals with hard shells or skeletons have the best chance of preservation, soft-bodied land animals the worst.

Fragmentary though the record of life on the earth necessarily is, it unfolds the pageant of evolution, and reveals the steps by which highly generalized progenitors, extinct millions of years ago, have gradually developed into the varied flora and fauna of the present-day world.

(iii) *Geological History.* Each type of rock gives evidence in its composition and structure of the long history and the many changes through which it has passed; and the geologist is able to trace with considerable certainty the kaleidoscopic changes which have affected any given region of the earth's surface.

It is possible to determine the order of succession of the different groups of rocks ("geological formations"), to discover the types of plants and animals living at the time they were deposited, and even to ascertain the geographical and climatic conditions under which they were produced.

The whole "geological record" is divided, for convenience, into "groups" and "systems."† These provide the materials for a history extending over something like 1,600 million years.

Of course, not the whole of this history is found in its completeness in any one place. There are huge gaps everywhere; but, by comparing the records in various lands, the entire history can be pieced together into one continuous whole.

In the pages which follow a summary is given of the geological formations encountered in and about the Federal Capital Territory. These accounts are, of necessity, condensed, and for detailed information the reader is referred to the more technical accounts which have been published.

* In nearly every instance, inverted commas indicate the use of words in a special technical sense.

† For table of geological systems see Appendix, p. 638.

2. **Ordovician.**—Along the north eastern fringe of the Territory there occur quartzites and black slates of Upper Ordovician age. These are amongst the oldest rocks encountered within the borders of New South Wales, with the exception of the area west of the Darling, which belongs, geologically, to South Australia.

Laid down originally as horizontal sheets of sand and mud on the ocean floor, these sediments were consolidated compressed and tilted until they now stand on end with their worn and ragged edges presented to the sky.

These changes took place before the deposition of the next succeeding geological system, and point conclusively to the action, even in those far-off days, of the same forces as those which act to-day, and have acted throughout the whole of the geological record.

The newer formations were laid down on the disturbed and eroded edges of the older ones, and such breaks or "unconformities" are the punctuation marks of geological history.

Careful search will reveal narrow bands amongst the black slates literally crowded with graptolites, sponges and other fossil forms; but great masses of these ancient ocean muds are barren of recognizable organic remains. It is not certain whether these Ordovician rocks are anywhere met with actually within the Territory.

They are intruded by masses of granite, apparently older than the granite of the great bosses like that of Tharwa, mentioned below.

3. **Silurian.**—(i) *Sediments.* Most of the rocks in the immediate vicinity of the city are of Silurian age. Now consisting of quartzites, slates and limestones, they were deposited originally as the sands muds and coral-reefs of a warm and moderately shallow ocean. It is as a result of baking by masses of hot rock intruded into them and through the crushing and twisting involved in slow earth movements during hundreds of millions of years, that they have been bent into remarkable folds, such for instance, as those which are to be observed in the road cutting behind the post office, hardened to their present consistency, and traversed by the joints and cleavages so conspicuous in the more massive members, as, for instance, in the road cutting north of Commonwealth Bridge.

(ii) *Fossils.* Although the seas of the period contained abundant animal life, fossils are by no means easy to find. The small, isolated coral reefs, like those behind the Bachelors' Quarters at Acton, and others at Red Hill, Coppin's Crossing, Jerrabomberra Creek, Paddy's River, Majura and elsewhere, are built up of somewhat obscurely preserved corals of types long since extinct.

Shells of various types are recorded from a number of different localities, including Woolshed Creek on the Yass-Canberra Road, Red Hill and Coppin's Crossing. A very prolific shell bank under the road-bridge over Majura Creek near Duntroon yields beautifully preserved *Spirifers*, and trilobites and gastropods can be found by the enthusiast who is prepared to make a patient search.

Well preserved trilobites are recorded from Majura, Woolshed Creek, Red Hill and Coppin's Crossing.

The fossil collector must be prepared for long and often discouraging search as the price to be paid for a real "prize."

(iii) *Igneous Rocks.* During the deposition of the sediments, volcanoes of great size spread their ashes and poured out their lavas over large parts of the area. In many instances the molten material, instead of escaping at the surface in the form of lava floods, was squeezed or "intruded" amongst the sediments already deposited. It is not always easy to determine whether a given mass of *quartz porphyry*, as the massive igneous rocks of this series are termed, was "extrusive" (a lava) or "intrusive"; and much interesting and important field and laboratory work awaits the budding geologists of Canberra.

In some cases, as on the slopes of Mt. Ainslie, it is quite easy to show that the rocks were formed above ground as lavas and ashes.

Towards the south, the Silurian sediments and quartz porphyries are intruded by great "bosses" of granite (e.g., Tharwa). These granites were injected, in molten condition, amongst the older rocks far beneath the earth's surface. They are not the

* See footnote on page 628.

products of "volcanic action" as so often thought, but their presence at the surface now is due to the gradual wearing away of the miles of rock overburden by which they were formerly covered.

(iv) *Economic Geology.* (a) *General.* Economically, the rocks of this system are not of great value. The heated waters, accompanying and emanating from the igneous intrusions, brought with them small amounts of metalliferous minerals, often associated with white quartz, "reefs" of which are not uncommon. Usually, however, the quartz was introduced without the metals.

(b) *Metals.* "Colours" of gold can be obtained almost anywhere along the creeks and rivers of the Territory. Small veins of lead, zinc and copper have been discovered, and have even been worked on a small scale. Outside the Territory there exists, at Captain's Flat, a very extensive and highly complex deposit of lead, zinc, copper and iron sulphides.

(c) *Building Stones.* The limestones in and about the Federal Territory are of considerable potential value as a source of lime and cement, and as building stones. The quartzites and sandstones of Black Mountain have been used for building materials to a small extent; but are not very suitable for the purpose. While some of the granites are of great beauty, and would make excellent building stones, their economic exploitation presents considerable difficulties.

(d) *Brick-making Materials.* Good bricks can be made from some of the shaly beds, but rapid variations of chemical composition, and the presence of considerable lime in certain strata, tend to make the lot of the brick-maker a far from happy one.

(e) *Quality of Soil.* Some of the soils derived from the decomposition of the rocks are of very fair quality, but most are rather poor and some very much so.

4. *Devonian.*—(i) *General.* At numerous places round the borders of the Territory there are wide extents of Devonian sediments, and they can probably be recognized within the bounds of the area at its north-eastern corner. How extensively developed they are in other parts of the district future investigation will show.

Two rather strongly contrasted types of sediment are referable to the Devonian system.

(ii) *Middle Devonian Marine Beds.* Some 25 miles below the junction of the Molonglo with the Murrumbidgee River there occur, at Cavan and Taemas, immense reefs of pure limestone interbedded with other sediments. This series has yielded a rich and varied marine fauna of Middle Devonian age, and represents the coral reefs and sediments of a warm and shallow sea.

(iii) *Upper Devonian Red Beds.* (a) *General.* Around Goulburn and Tarago, and between Talbingo and Tumut, there is a great development of red or chocolate shales, associated with sandstones and other rock types. Still more extensive occurrences of the same kind are encountered about Rydal, Koorawatha, Pambula and Eden in New South Wales, and there is an immense development of them in Eastern Gippsland. Consensus of opinion regards these deposits as essentially "sub-aerial" in origin. They were laid down on the continental surface, and not in ocean basins. Some authorities regard the red colouration as a criterion of aridity of climate at the time of deposition. In places, at all events, a slight degree of salinity favours this view; but the question of climate cannot be considered as definitely settled.

(b) *Fossils.* On the whole, fossils are rare, but some of the earliest types of land plants and fish of most archaic aspect have been recorded at various localities. The presence of beds containing marine shells at Mt. Lambie and Wolumla points to local and occasional incursions of sea water into the areas of deposition.

(c) *Age of Beds.* In age these beds are generally regarded as very late Devonian. They are certainly more recent than the limestones of Cavan, and indicate an extensive "emergence" of the continent and a retrocession of the ocean towards the end of Devonian time.

(iv) *Igneous Activity.* While, as stated above, it seems certain that some of the quartz porphyries of the Canberra area were formed contemporaneously with the deposition of the Silurian sediments, it is probable that these are in the minority.

Most of the intrusive and extrusive quartz porphyries of New South Wales and north-eastern Victoria were of Lower Devonian age. The criteria which prove this are much more clearly defined in Gippsland than in New South Wales.

That there was considerable volcanic activity just before the "red beds" began to be deposited is proved by the occurrence of lavas of very remarkable types at Twofold Bay and at Briagalong in Victoria. Such lavas may occur within or close to the Federal Capital Territory, and should be looked for about Talbingo and Tumut.

Most of the granite masses in and about the Territory are of Devonian and Carboniferous age, but too little detailed investigation has been carried out to enable the distinction to be made. The baking and alteration of the Silurian sediments (e.g., at Red Hill, etc.) and the introduction of such mineral deposits as there are probably belong to this latter period of igneous activity. Between St. John's Church and the river there is a considerable "blow" of white quartz. This appears to be due to the replacement of a small mass of limestone by quartz, as a result of the "intrusion" of the Ainslie quartz porphyries.

5. Post-Devonian Formations.—There is an immense gap in the local geological record after the close of Devonian time. There is no trace anywhere within the region of any marine sediments later than Devonian; and even fresh-water sediments belonging to formations between Devonian and Pleistocene are lacking. This hiatus is expressive of the fact that, for hundreds of millions of years, this particular part of Australia existed as dry land. At intervals it became ridged up into high mountains. These were worn down to their very roots by the gnawing tooth of time, and the granite masses which had been injected into their cores were revealed. Again they were raised, and again worn down; and so the age-long process was repeated. Occasionally and locally subsidence occurred, but the prevailing movement was upward.

The waste from the highlands was transported into the seas and lakes which came into being about their feet: came and vanished. Climates changed and varied; twice at least, thrice in all probability, they were covered with sheets of ice. At other times they were clothed with forests of sub-tropical luxuriance.

These and other changes can be read with perfect certainty and clearness in the deposits which build up the geological formations of New South Wales and Victoria.

6. Cainozoic.—And so we come to yesterday in a geological sense, a yesterday of not more than, say, a mere million years ago. The story of this last short span of time is written in characters different from those of the archaic alphabet of the geological record; but the history is clear and fascinating.

It is necessary to digress slightly, to explain the principles underlying the modern science of physiography, in order to make clear the sound basis upon which rests the interpretation of this recent history.

§ 3. Fundamental Principles of Physiography.

1. Popular Fallacies.—That small minority of people who ponder at all upon the why and wherefore of mountain and valley, recognizes that the stupendousness of the elements of the scenery calls for some stupendous factor in their genesis. In all probability the vast majority of this thoughtful minority appeal to stupendousness of *force* and *power* as the explanation of what they see. Earthquake, volcano and deluge, each capable of producing terror and devastation, must surely, they imagine, be the forces which alone could be capable of calling into being mountain heights and valley depths.

This impression is quite incorrect. Earthquake, volcano and deluge play their parts and leave their scars on the landscape; but their effects are transient and insignificant in comparison with those produced by the gentler, but more constant and continuous forces of nature. Slow and almost inappreciable earth movement, the rotting of the rocks under the action of air and moisture, the constant drag of gravitation, the blowing of the winds, and, far transcending everything else, the scour of running water, these are the forces which mould the continents, build the mountains and carve the valleys. Stupendousness is needed and is not absent; but it is the stupendousness of *time*—not of *force*.

2. **The Conception of the Peneplain.**—(i) *The Work of Running Water.* One of the most fruitful scientific conceptions of the last generation was that of the peneplain, developed by W. M. Davis of Harvard, some 35 years ago.

A land-mass having been uplifted well above sea level by earth movement, and its rocks having been disintegrated by weathering, running water transports every loosened particle down hill. Not in one wild rush, but step by step, with long pauses, and in most leisurely style, in general, the rock grains make their grand tour. Though the particles may lie for centuries *en route* in lake bed or river terrace, their ultimate resting place, in the vast majority of instances, is the sea.

Broadly speaking, the quiet forces of geological change tend literally to cast down the mountains and carry them into the midst of the sea. So long as there is an effective *gradient* for the streams the work goes on—rapidly where the grade is steep, slowly where the slope is gentle. The work is twofold—destructive and constructive: destructive in the higher lands, constructive in the depressions. Its net result is to smooth out all irregularities. In the earlier stages, while the topographic “relief” is high, the work is extremely rapid (in a geological sense); but, as the gradients become lower, it becomes exceedingly slow; and its latest stages are enormously protracted.

(ii) *The Ultimate Result.* Given sufficient time, the ultimate stage of perfection of erosion is the production of a slightly undulating land-surface, sloping upwards very gradually from sea level. To such a surface Davis applied the name “peneplain.” The prefix is an important part of the word: a perfect peneplain is *almost* level, not absolutely so.

(iii) *Characteristics of a Peneplain.* A typical peneplain surface possesses some very characteristic features, amongst which deep weathering of the rocks is included. Under some climatic conditions the thick mantle of weathered rock material is covered by a case-hardened “skin” of chemically formed rock—a very characteristic feature in the scenery of the greater part of the interior of Australia, but not conspicuously present in the district under discussion.

(iv) *Interruption by Earth Movement.* So enormously protracted are the last stages in the process of peneplanation that this restless old world generally becomes impatient before perfection is attained. While there are still hills to be eroded and valleys to be “aggraded” (filled with sediment), earth movement supervenes.

If the land-surface sinks it is partially *drowned* by encroachment of the sea, and a new coastline is formed, the characteristics of which depend upon the degree of perfection attained by the process of peneplanation. Sydney Harbour, for instance, is a drowned immature river valley, Port Phillip a drowned old land-surface.

If, on the other hand, the land-surface is uplifted, a new “cycle of erosion” is instituted. The gradients of the streams are increased and their energies are “rejuvenated.” They set to work with renewed vigour to carve a new landscape out of the “uplifted peneplain.” Its *nearly level* surface is attacked and roughened; new valleys are carved out; and, as the process develops, only “residuals” of the peneplain surface are left as *isolated hills rising to one general level*.

§ 4. Geographical Unity of Eastern Australia.

The later stages of the geological history outlined above were extraordinarily favourable for the development of features of the type just described. Andrews has shown that the major geographical features of Eastern Australia, from Tasmania to Cape York Peninsula, are due to the development of one great peneplain, and to its subsequent modification by successive warpings, differential uplifts, saggings and founderings. Rising to 7,328 feet at Kosciusko, and to over 6,000 feet at Bellenden Ker, it sinks just to sea level at Botany Bay; and, lest it be thought that excursions so far afield savour of undue stretching of the liberty demanded in the first paragraph of this article, it must be stated that the heights of Canberra and the summits of the mountains of Tidbinbilla and Brindabella are remnants of this same peneplain.

§ 5. Life History of a River.

1. **The “Age” of a Valley.**—(i) *Human Analogy.* (a) *General.* In order to understand the individual elements of scenery about Canberra, it is essential to examine in slightly greater detail the “life history of a river.” It will be found that

there is an extraordinary analogy, in many ways, between the life history of a human being and that of a river. In a new sense, different from that of the Greeks, we can personify the streams and follow their lives as individuals, families and tribes.

(b) *Youth.* A stream is born when the uplift of a land-surface produces a gradient down which the water can flow. In its hasty and turbulent youth the stream dashes noisily along its course, wholly destructive in its energies, and with neither time nor "inclination" to wait and build up anywhere the damage it has done. In sober fact, the work of the stream at this stage is erosional. It is engaged in cutting its channel as a deep narrow notch in the upland surface. Its gradient is steep enough to give it the necessary kinetic energy to do this, and the inclination of the bed is too great to permit of the building up of deposits of any but the most temporary kind. The cross section of a "young river valley" is V-shaped.

From the human standpoint young streams have their uses. Actively eroding fresh and undecomposed rock structures, they reveal mineral deposits of economic value, the presence of which could not be detected, by ordinary methods, under a deep mantle of weathering. By reason of the narrowness of their valleys and the solidity of their sides, they offer favourable sites for the engineer to construct his weirs for water conservation and hydro-electric schemes. The Cotter River, and the Murrumbidgee at Burrinjuck spring to the mind at once.

Unsuited for agriculture or sheep-farming, their rugged slopes breed a small population of hardy cattle-men and timber-getters.

(c) *Adolescence.* As time goes on the stream, having reduced its gradient considerably, passes into the stage of adolescence. Still hasty, irresponsible and destructive in gorge and rapid, its more sober periods are marked by quiet reaches; and, in these, it begins its work of repair of the land-surface by depositing alluvial flats of rich silt. No longer in such a desperate hurry to reduce its channel to sea level, it spreads itself laterally, attacks its banks, first on one side, then on the other, and begins to widen out its V-shaped cross section.

(d) *Maturity.* The coming of maturity finds the stream sobered down considerably. Still subject, at considerable intervals, to periods of mild excitement where it sweeps over an occasional rapid, its flow is mostly placid, and its activities are almost wholly constructive. Its broad U-shaped valley is filled with fertile alluvial lands supporting an agricultural population with thriving towns. The moderate slopes of its valley sides favour human transportation and activity of all kinds, and the amenities of life are more abundant in mature river valleys than in any other situation.

(e) *Senility.* Senility of river development is synonymous with local perfection of peneplanation. The old-age stream meanders sluggishly through low-lying silty plains of its own making. These are often marshy, mosquito-infested and unhealthy. Only low and occasional remnants of the older land-surface protrude as inconspicuous mounds from the uniform monotony of the silt plains. Yet, in spite of their somewhat depressing characteristics, old river valleys, by virtue of their extent and the richness of their soils, support teeming populations.

(f) *Limitation of the Human Analogy.* The human analogy must not be pressed too far. Though we speak of "an old head on young shoulders," the members of the human body mature and age simultaneously. Not so in a river. The degree of development of any part of a river is only partially dependent on the lapse of time. Environment has a far more potent effect than it has on the physical characteristics of a man. Topography and rock structure impose their effects locally, and it is the rule rather than the exception to find the criteria of age of a river valley alternating with one another in different parts of its course. Universally, we find characters of youthfulness at the source of a stream, and maturity towards its mouth; but it is by no means uncommon to find mature sections up-stream and juvenile ones down-stream, as the result of local peculiarities. Thus, the Molonglo is highly mature at Foxlowe and Canberra, but exceedingly juvenile between Burdong and Queanbeyan. The Murrumbidgee exhibits the characteristics of early maturity at Point Hut Crossing, but those of youthfulness at Tharwa and Kambah.

The causes of some of these peculiarities will be considered later.

2. *River Piracy.*—(i) *Interdependence of Rivers.* Rivers, like human beings, do not live to themselves alone; they form families and communities, and the activities of each stream profoundly affect those of its neighbours. Space does not permit any

detailed analysis, but it may be pointed out that, just as a rain gutter on a road spreads its tentacles and encroaches on the roadway unless its depredations are checked, so each stream and each group of streams is constantly increasing the area of its watershed by increase in length at its sources.

(ii) *Migration of Divides.* Sooner or later keen competition for territory sets in at each "divide." In a general way, the stream most favoured in point of volume and gradient encroaches on the watershed of its less powerful neighbour. Divides, at first level upland, become carved into steep ridges. The line of the divide migrates into the territory of the weaker stream, and very numerous instances exist where quite considerable rivers have been "beheaded" and "dismembered" by the process of "river piracy."

§ 6. Application of General Principles to the Federal Capital Territory.

1. *The Rounded Hills.*—One of the most characteristic features of the Territory is the existence of a series of beautifully rounded summits, rising hundreds of feet above the plains. Majura (2,920 feet), Mt. Ainslie (2,762 feet), Black Mountain (2,668 feet), Red Hill (2,368 feet), Mugga Mugga (2,672 feet), Stromlo (2,520 feet) and others all show a marked family resemblance to one another. All are "residuals" of the Kosciusko Peneplain, still more extensive remnants of which form the wooded plateaux east and north of Queanbeyan. The intervening valleys and plains must be filled up in imagination, and we see the undulating surface of the peneplain reconstructed. Since this surface was produced, by the method described above, *at or near sea level*, the present summit levels indicate a net uplift of at least about 3,000 feet in this area.

It is to be noted that the rounding of the summits suggests that erosion has already carved away the whole of the original level surface, and has commenced to eat into the immediately underlying portions of the crust. The actual peneplain level was probably somewhat higher than even the summit of Mt. Majura.

2. *Canberra Plains.*—That this uplift was not completed in a single mighty act is shown by the development of the Canberra Plains. Stretching their fingers out amongst and between the hills, these extensive plains form a gently undulating surface at about the 2,000-ft. contour.

This has all the characteristics of a mature river valley, and such it is. Called into being by an uplift of something under 1,000 feet in this particular part of Australia, the streams set to work to dissect the uplifted peneplain. Aided by a very protracted period of stability of the earth's crust, their valleys attained a high degree of maturity. Not only were valleys carved in the uplands, but these valleys encroached on one another until, as pointed out above, the intervening "residuals" of the peneplain lost their flat tops. In some instances, notably in the Queanbeyan Hills, they remain as long flat ridges, but, about Canberra itself, more uniformly distributed and somewhat deeper erosion has isolated them as rounded summits. It follows, then, that erosion has removed the whole of the actual peneplain surface immediately round Canberra, and that the existing hills do not reveal the full altitude of the original level of that uplifted structure.

The "Mature Valley Level" forming the Canberra Plains is as widely distributed in Eastern Australia as is the peneplain itself. The difference in altitude between the two erosion levels varies from place to place; a fact which, taken in conjunction with the varying altitude of the peneplain levels referred to above, shows that uplift was differential, and that considerable warping of the surface occurred.

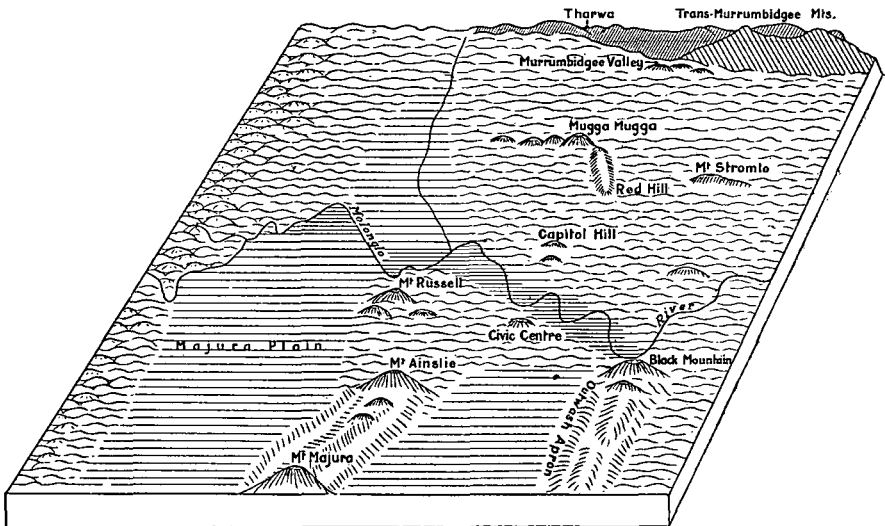
3. *The Trans-Murrumbidgee Mountains.*—(i) *Murrumbidgee Fault.* To the west of the Murrumbidgee there rise two parallel ranges of mountains, between which lies the valley of the Cotter River. In the eastern group there are such peaks as Tidbinbilla (5,134 feet), McKehey (4,915 feet), and Orroral (5,266 feet). The western group includes some of Australia's highest mountains, such as Gudgenby (5,694 feet), Kelly (6,000 feet), Bimberi (6,262 feet), Gingera (6,092 feet), Franklin (5,400 feet), and Coree (4,657 feet).

All of these peaks, belonging to one original structure, are also remnants of the Kosciusko Plateau. Their conspicuously greater altitude, as compared with the Canberra Hills, is due to the existence of a mighty "fault" running along the Murrumbidgee Valley. Owing to the development of earth stresses the crust was

fractured, and differential movement occurred on opposite sides of the crack. Since parts of the original peneplain have been rendered discontinuous, this movement must have occurred since the date of development of the peneplain, and probably well within the last million years.

(ii) *Continuity of Earth Movement.* It must be remembered that this movement is not due to earthquake or volcanic eruption. Both earthquakes and volcanic eruptions undoubtedly accompanied the movement; but they were effects, not causes. The movement did not take place as one mighty cataclysm, but in a series of small warps and jumps. Each of these doubtless caused a severe earthquake. That the movement may not have ceased completely even yet is shown by the fact that this part of Australia is subject to slight earth tremors, and that, very occasionally, these attain appreciable dimensions.

(iii) *Moulding of the Fault Scarp.* So relatively slow was the movement of dislocation that erosion was able to proceed to quite a marked degree simultaneously, so that the "fault scarp" of the left bank of the Murrumbidgee, instead of rising as a sheer 2,000-ft. precipice, has been rounded, moulded and breached by stream action.



Much generalized block diagram illustrating the distribution of physical features in the neighbourhood of Canberra.

The relatively juvenile character of the whole process is shown by the youthfulness of development of streams like the Cotter and Paddy's River, which flow through the fault block.

The valley of the Murrumbidgee was not the cause of the fault; but, *vice versa*, the Murrumbidgee Valley has followed and eroded the line of earth weakness produced by the fault.

4. *Canberra Valley.*—(i) *Majura Lake.* Since the date of the formation of the "Mature Valley Level," the purely local sculpturing action of the forces of nature has been preparing the valley for the building of the National Capital.

Owing, probably, partly to slight earth movement, partly to the deposition of sediment, a considerable part of the Majura Valley appears to have been converted into a fairly extensive lake basin. This became filled up and reclaimed by the deposition in it of sediment. These lake-beds are being dissected by the present-day streams, and interesting sections are exposed in the banks of Majura Creek and elsewhere.

It is known that giant marsupials like *Diprotodon*, *Nototherium*, *Thylacoleo* and others, now extinct, inhabited Australia during the periods of formation of the peneplain and the "mature valley." There is an extremely high degree of probability that their

remains, and even those of ancient aboriginal man himself, will be revealed in these lake-beds by careful search. Such search can be recommended to the nature-loving section of Canberra's population. Any bones or other relics discovered in these beds should be submitted to expert investigation, lest valuable scientific data be lost.

(ii) *Piedmont Beds.* Wet-weather streams, rushing down the steep hill slopes, carried with them torrents of mud and stones. Slackening in speed as they reached the plains, the streams deposited their loads of debris as flat cones in front of each gully. By gradual accretion, these individual "alluvial fans" came into confluence, and formed a sloping "outwash apron" along the foot of the hills. After any fall of rain this process can be seen, exquisitely developed on a pocket-edition scale, along the sloping bank just west of the post office. This homely example will help the observer to appreciate the origin of similar structures, on a very much grander scale, along the eastern foot of Black Mountain and elsewhere.

(iii) *Breccia Accumulations.* In this "outwash apron" of Black Mountain there are contained immense beds of "breccia" composed of angular fragments of rock, heaped up pell-mell, and cemented together. The origin of these breccias calls for considerable research; but it is suggested that they are the product of a "pluvial epoch" contemporaneous with the glaciation of Kosciusko. It is well known that the heights of the Australian Alps were covered with ice caps for thousands of years. It is fairly certain that, in the lower lands about Canberra, the rainfall at that time was exceedingly heavy. Torrents produced in this way would certainly be competent to produce breccias of the type described.

(iv) *The Future of the Molonglo.* An interesting stage in physiographic development has been reached at the present time. As pointed out above, the hollow in which Canberra stands is a typically mature river valley. Through it the Molonglo flows, with characteristics rather those of adolescence than of maturity. Down-stream from Coppin's Crossing its gradient to the Murrumbidgee is steep, and its characteristics are juvenile.

As a result of the rapid deepening of the Murrumbidgee during "post-mature-valley time" the Molonglo is experiencing rejuvenation. Our very distant descendants will be faced with the problem of dealing with the erosion of the rejuvenated stream, and, slowly but surely the stream will conquer. As this contest will not become acute within the next 50,000 years or so, it need cause no immediate anxiety.

(v) *Clay Deposits.* In a few places where actual remnants of the peneplain surface have escaped erosion, the products of deep weathering of that surface (§ 3, part 2, above) have been preserved.

In the Gungahlin District, certain hill tops are composed of very pure white clay, capped with ironstone, which represents the "skin" of chemically formed rock. Similar deposits are known at Bungendore.

That these clays do not consist of deposits washed down and left in a depression is shown by the fact that they are intersected by exceedingly fine, but continuous quartz veins, exactly like those which traverse the unweathered slates. These veins were introduced at the time of injection of the igneous rocks, and therefore antedate by hundreds of millions of years the formation of the peneplain. Such thin and fragile structures are quite incapable of withstanding the slightest mechanical transport, so that the clays must have been formed in the place where they are found.

It is probable that these local, high-grade clays, the discovery of which is extremely recent, will form the basis of a thriving local ceramic industry.

§ 7. Lake George.

Although not falling strictly within the scope of the present article, attention must be directed briefly to two structures in the near vicinity of the Federal Capital Territory, and closely associated with the development of its physical features.

As the traveller approaches Canberra from the Sydney side Lake George forms a striking feature. It is bounded on the west by a precipitous line of hills, unbroken save by Geary's Gap. A curious fact is that this valley constitutes a local "area of internal drainage." Water enters it from a small local catchment to the east; but no water leaves it except by evaporation.

Taylor has shown that it is an extremely recent and most interesting physiographic feature.

The western scarp is a north and south "fault" or earth crack, resembling, on a small scale, the great fault which has formed the Murrumbidgee Valley. This fault has allowed the country to the east to sag to the extent of several hundred feet. Before the movement occurred, the headwaters of the Yass and Molonglo Rivers flowed in a westerly direction across the area. As the barrier gradually rose across their courses, the feeble streams attempted to saw their way through it. The Molonglo was *just* sufficiently powerful to succeed in the attempt. With no energies to spare for the widening of its valley, it just managed to carve a narrow gorge through the fault block, and, as a result, we have the picturesque scenery north of Queanbeyan.

Lake George Creek, less powerful than its southern neighbour, kept up the unequal fight for a long time, and carved out Geary's Gap. Overcome in the struggle, it had to confess itself vanquished. It ceased to reach the Yass River, and now empties its limited contributions into the exit-less basin of Lake George.

In considering the development of Lake George it must be borne in mind that the climate of the region has not always been the same as it is now. While weather statistics fail to reveal any short-period variation of considerable amount, there is ample evidence of very profound change in sub-recent times, geologically speaking. Reference has been made to the proofs of ice action at Kosciusko, and to the probability that there was, contemporaneously, a very rainy period at these lower levels. The greatly increased erosion of the land surface, and the correspondingly increased amount of sediment carried by the streams, are evidenced by the cutting of Molonglo Gorge, and by the building of extensive lake terraces in Lake George. In these lake terraces, of which several may be recognized at different levels, it is well nigh certain that extraordinarily interesting fossil remains await the patient searcher.

§ 8. The Upper Murrumbidgee.

The upper course of the Murrumbidgee is extraordinary.

The river rises in peaty depressions on the high plains which constitute the Kosciusko Plateau. Its upper reaches exhibit the characteristics of maturity. The gentle gradients of the high uplands are insufficient to cause deep erosion of the channel, and the deep young valley encountered further down stream has not yet had time to work its way backwards into the high plains.

After flowing north for some distance it swings round to the west, then turns south, then east, and finally north again. Thus, it flows in a veritable spiral. At Michelago it passes through country less than 2,300 feet above sea level. Apparently without rhyme or reason it plunges northwards, and saws a difficult channel through a rampart of granite mountains towering to heights of over 6,000 feet above sea level.

Space does not permit a description of the details of this extraordinary feature. These details have been elucidated by Taylor and Sussmilch. Here it must suffice to say that the Murrumbidgee originally rose in the high mountains about Tharwa and Naas, and flowed north. The streams which now form its headwaters belonged originally to southward flowing rivers, such as the Snowy and the Genoa. These streams have been diverted, and, in part, *reversed* as a result of faulting earth movement and the accumulation of floods of lava.

The beds of some of the ancient streams were filled with molten "basalt," and remain to this day as witnesses of the changes which have taken place. Preserved under these lava cappings are ancient gold-bearing alluvials, forming "deep leads" like those of Kiandra, and from them a considerable amount of gold has been won. Well preserved in these old-time alluvial deposits are the seeds and leaves of forest trees of European aspect, which antedated the period of ascendancy of the eternal gum-tree of Australia.

§ 9. Conclusion.

In a general way the major features of the geology and physiography of the Federal Capital Territory are reasonably well known. In matters of detail there is an almost untrodden field, and even in the larger aspects of the question there are many problems awaiting investigation.

APPENDIX.

TABLE OF GEOLOGICAL SYSTEMS.

	Recent.
	Pleistocene.
Cainozoic	{ Pliocene.
	{ Miocene.
	{ Oligocene.
	{ Eocene.
Mesozoic	{ Cretaceous.
	{ Jurassic.
	{ Triassic.
Palaeozoic	{ Permo-Carboniferous.
	{ Carboniferous.
	{ Devonian.
	{ Silurian.
	{ Ordovician.
	{ Cambrian.
	Pre-Cambrian.

Absolute Age of geological formations cannot be determined with any considerable degree of accuracy. Approximate estimates are possible. Thus, for instance, Ordovician rocks are believed to be *of the order of 500 millions years old*, but the margin of error is great. Of much greater importance is the *relative age* of a given formation. This is determinable from its fossil contents.

Fossils are few and usually ill-defined in rocks older than Cambrian. Given suitable conditions of deposition, most formations from Cambrian up are fossiliferous.

(The names given above are those recognized in Australia.)