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AUSTRALIA AND OCEANIA

ON THE MURRAY RIVER

Descriptive Geographies from Original Sources

AUSTRALIA

AND

OCEANIA

SELECTED BY

F. D. HERBERTSON, B.A. (Lond.)

26074

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PREFACE

THE modern teaching of geography, like that of history, lays increasing stress on the value of original authorities. One of the first steps in this direction was the bibliography appended to Sir Archibald Geikie's *Teaching of Geography*, followed in 1897 by Dr. H. R. Mill's *Hints to Teachers and Students on the Choice of Geographical Books*, compiled at the request of the Geographical Association. The present series goes a step farther, and attempts to depict the world in the language of men who have seen it.

The task of preparing the present volume has not been an easy one. Our colonies at the other side of the world are too new to offer many attractions to travellers, and most of the available books of travel lay more stress on the material aspects of city life than on the natural geographical features; the rate of progress is so rapid that authorities soon get out of date. Great use has been made of the official publications of the various Colonial Governments, and teachers are advised to apply for samples to the Agents-General of the various colonies, who will supply some of them at a nominal cost. The journals of the Australasian Geographical Society often contain useful articles, but are practically inaccessible in this country. For the Asiatic and Pacific Islands there are several standard books of travel.

The editors desire to express their thanks to Lord Brassey, H. M. Cadell, Esq., of Grange, Dr. H. O. Forbes, Dr. Furness, Dr. F. H. H. Guillemard, Dr. A. C. Haddon, Professor S. J. Hickson, Dr. A. R. Wallace, and other authors; to Messrs. W. H. Allen and Co., A. and C. Black, Longmans, Macmillan, Sampson Low, Sonnenschein, the Religious Tract Society, and other publishers; and to the Royal Geographical Society, the Royal Scottish Geographical Society, and the National Geographic Society (U.S.A.), for permission to make use of copyright works, and to H. M. Cadell, Esq., and Dr. A. C. Haddon for the loan of photographs.

Oxford, 1903.

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INTRODUCTION

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Australia and Oceania

In the present volume the islands of South-Eastern Asia, the continent of Australia, and the islands of the Pacific Ocean are described. It will be convenient to discuss each separately.

The Islands of South-Eastern Asia

The islands which lie between the mainlands of Asia and Australia, strictly speaking, belong to Asia, and the dividing line between the two continents may be drawn along the margin of the Australian continental shelf west of New Guinea and the Aru Islands. Two outer bands of islands form their southern and eastern boundaries. The southern margin, 2300 miles long, is composed of Sumatra (pp. 1-6), Java (pp. 7-13), and the smaller Sunda islands of Bali, Lombok, Sumbava, Flores, with the outlying islands of Sumba, Timor, and Timorlaut. The eastern margin, 1750 miles long, is made up of the Philippines (pp. 22-29), and the Moluccas, or Spice Islands (p. 31). In the midst of the area thus bounded lie Borneo (pp. 14-22), and Celebes (pp. 29-31). The total area is about 900,000 square miles.

The marginal lands are remarkable for the number of volcanoes, active and extinct, which rise close to the ocean (pp. 1, 8, 22, 32). Among the more important volcanic peaks are Korinchi, formerly called Indrapura (12,250 feet), in Sumatra; Krakatoa (p. 1), in Sunda Strait; Semeru (12,000 feet), and Tenuger, a little lower, with a crater 6 miles by 4½ miles, in Java; Mt. Allas (*ca.* 12,250 feet), in Timor; the twin volcanic peaks of Ternate, in the Moluccas (p. 31); and

the perfect cone of Mayon (8900 feet), in Luzon, the largest of the Philippines.

The central lands are not volcanic, but represent the fragments of an old continental mass. Both Borneo and Celebes have a star-shaped distribution of mountains. Between the ranges of Borneo navigable rivers of considerable size flow across alluvial plains, whereas in Celebes the sea forms great gulfs between the ranges, so that the outline of the island recalls that of a starfish. Halmahera, or Jilolo, the largest of the Moluccas, is a miniature of Celebes in outline (p. 31). The granitic Kinabalu (13,700 feet), in North Borneo, is the highest mountain.

Climate. — Except the northern part of the Philippines, all these islands lie within 10° of the equator. They have a most equable climate, the temperature never varying more than a few degrees from 80° F. The seasons are determined by the rains, which are heaviest when the Sun is highest in the heavens, and, except in sheltered places, amount to over 80 inches a year. Monsoonal rains occur on both sides of the equator, and in the Philippines the western slopes receive their moisture mainly in the northern summer, while the eastern slopes facing the north-east trade wind are watered chiefly in the northern winter. (See pp. 11 and 12.)

Productions.—The variations in vegetation depend on height and exposure and not on latitude. The dense wet jungle of the lowlands and the succession of opener forest to savana, and fern gullies of the higher ground, are described on pp. 4-6 14, 15. Coco-nuts are found near the shore (pp. 9, 10, 24); camphor and many timber trees, such as teak, areca, or betel-nuts (p. 24); and gutta-percha (pp. 15, 24), sago-palm (pp. 33-35) in the forest. Bananas (pp. 27-28), pine-apples (p. 27), and other fruits are abundant. In the plantations, sugar (pp. 10, 24, 27), rice (pp. 10, 27); on the lowlands, coffee (pp. 10, 29-31), and spices, especially nutmeg (pp. 32, 33), tobacco (pp. 24, 27), and in Java tea and cinchona are grown on the hill slopes, where cereals, such as maize and barley, are planted, and the graceful and useful bamboo (pp. 5, 10, 19, 24) flourishes.

Manila hemp or abaca is a special production of the Philippines (p. 24).

Trepang, or *bêche-de-mer*, and pearls are found in the sea, and edible birds'-nests (pp. 19-20) are taken from limestone caves for

the Chinese market. Cattle are reared on the upland savanas. Tin is found on the islands of Banka and Billiton, which are outliers of the Malay Peninsula, where it also abounds (see *Asia*, pp. 202, 304); petroleum is tapped in Sumatra; gold and other minerals exist in the Philippines.

Peoples.—The population is estimated at about 45½ millions. Dark negrito tribes exist in the interior of many islands; but the majority of the people are olive-complexioned Malays (pp. 6, 7, 28), with lank hair, most of them half civilised, especially in Java, where there are remains of magnificent ruins. The Dyaks of Borneo (pp. 14-19) live in houses built on piles and gather forest produce. Chinese are numerous (pp. 4, 28). Europeans are found chiefly in the Philippines and in Java (p. 13), while a considerable population of mixed blood exists, especially in the former (p. 28).

Political Divisions

	Area in Square Miles.	Estimated Population.	Chief Town.
United States—			
Philippines . . .	128,000	8,000,000	Manila.
Britain—			
Sarawak . . .	52,000	500,000	Kuching.
North Borneo . .	31,000	160,000	Sandakan.
Brunei	3,000	25,000	Brunei.
Total . . .	86,000	685,000	
Portugal—			
Timor (eastern half) .	7,000	300,000	
Netherlands—			
Java and Madura . .	50,500	30,000,000	Batavia.
Sumatra . . .	161,500	4,000,000	Padang.
Celebes	71,500	850,000	Makassar.
Borneo	212,000	1,200,000	Banjermassin.
Moluccas . . .	44,000	400,000	Ternate.
Small Islands . .	45,000	1,000,000	
New Guinea . . .	152,000	200,000	
Total . . .	735,000	*ca.* 37,650,000	

The Philippines were formerly Spanish, and are described on pp. 22-29. The most important centres are Manila (220,000), on the island of Luzon, Ilo-Ilo (19,000), in Panay, and Cebu (31,000), in Cebu.

In *Borneo* the north and north-west are British. Sarawak and Brunei are protectorates, and North Borneo a territory administered by a Chartered Company, who have built a railway from Brunei Bay for over 120 miles into the interior.

Dutch Borneo has many river valleys filled with thick forests. The chief are the Kapuas, with Pontianak as chief centre, in the west; the Barito, with Banjermassin at its mouth, in the south; and Kotei, with Samarinda, in the east.

Java (pp. 7-13) is by far the most important of these islands. Batavia (pp. 12-13), not far from the entrance to the Sunda Strait, is the capital of the Dutch East Indies. Railways connect it with the plantations throughout the island, and join it to Buitenzorg, with its marvellous Botanical Garden (p. 13), and to the other centres, such as Samarang and Surabaya on the north coast, Surakarta in the interior, and Jokjokarta on the south coast.

Sumatra (pp. 1-6) is an elongated island, mountainous on the south-west, a low moist plain on the north-east. Padang (p. 3) and Benkulen are ports in the west; and Palembang, the chief centre in the eastern lowlands, is built where a maze of waterways converge near the south.

Celebes is not well known except in the south and in the east of the northern or Minahassa peninsula, which is famous for its coffee (pp. 29-31).

The Spice Islands (p. 31) consist of three groups of islands—(1) Halmaheira, or Jilolo, with the fine harbour of the volcanic Ternate on the west; (2) Buru, manufacturing Kajuput oil; (3) Ceram, or Serang, near which is Amboyna, to which island at one time the cultivation of the nutmeg was restricted by the Dutch.

The Smaller Sunda Islands lie in two lines—Bali–Wetta in the north, Sumba, Timor, and Timorlaut in the south. At one time it was thought that a sharp line could be drawn between Bali and Lombok, separating the Australian from the Oriental animal realms, and this was known as Wallace's line. The Moluccas are probably the only islands of South-Eastern Asia which

should be grouped with Australia from a faunal point of view. The climate is much drier ; savanas are commoner than forests in the east than in the west.

Timor is half Dutch, half Portuguese.

The Continent of Australia

The continent of Australia consists of the island of that name, the large islands of New Guinea and Tasmania, and numerous smaller ones, which all rise above the same continental shelf. It has a total area of about 3,312,000 square miles.

New Guinea

New Guinea is nearly 340,000 square miles in area, and extends for 1500 miles from west to east between the equator, and 11° S. It has a mountainous axis, known as the Charles Louis range in the west, and as the Owen Stanley range in the east (Mount Victoria, 13,200 feet), extending beyond the island in the Louisiade Archipelago. The Bismarck range rises parallel to this axis in the north to over 14,000 feet, and is sometimes capped with snow. There are many large rivers, of which the Kaiserin Augusta in the north and the Fly in the south are the most important. Little is known of the interior, especially in the Dutch part, which lies west of 141° E. East of this the north is German as far as 148° E., and the south and south-east are British.

The southern part has a climate resembling North Australia, the northern part is wetter and more Malayan in character, with rain all the year round, most falling during the north-west monsoon, and least during the south-east monsoon, which brings most rain to the south.

Similarly, the vegetation is richer and more Malayan in the north than in the south, where eucalyptus and mimosa savanas exist of Australian type. Dense wet jungles are the prevailing type of vegetation.

The fauna is more Australian in type, though Malayan species are found.

The inhabitants, the Papuans, are a branch of the frizzy-haired Melanesians (pp. 38-42).

The chief centres are Port Moresby, Samarai, and Daru in British, Friederich-Wilhelms Hafen in German, and Doré in Dutch New Guinea.

The Australian Commonwealth

Australia extends from 10°40′ N. to 39°10′ S., and from 113° E. to 153°40′ E., and is 2000 miles from north to south (Cape York to Wilson's promontory), and 2300 miles from west to east (Steep Point to Cape Byron). Tasmania, 120 miles to the south across Bass Strait, reaches to 43°40′ S.

Coasts and Islands.—The coasts are regular, the great inlets being the flat-shored Gulf of Carpentaria in the north, and the Great Australian Bight, which is bounded by steep and lofty cliffs, in the south. At the eastern end of the Bight, Spencer Gulf and the Gulf of St. Vincent, separated by the Yorke Peninsula, form narrower inlets which penetrate much more deeply into the land. Kangaroo island shuts in St. Vincent Gulf in the south as Melville island does Van Diemen's Gulf in the north ; while Dirk Hartog island in the west has its counterpart in Great Sandy island in the east. Small islands rise above the waters of the Bass and Torres Straits. The most remarkable coast is the north-east, which is bordered by the Great Barrier Reef (pp. 43-46), which lies between 25 miles from the coast in the north to 120 miles in the south, and forms an excellent natural breakwater. There are numerous small inlets which form excellent harbours, of which those of Port Jackson (see pp. 111-113) and Port Phillip (p. 118) may be specially mentioned.

Configuration.—Above the eastern coastal plain, which is nowhere of any great width, rise the denuded highlands, which are best termed the Eastern Highlands, but are often collectively termed the Great Dividing Range. They extend from the Cape York peninsula to Tasmania (pp. 133-134), and culminate in the north-east, where the Kosciusko mass (Mt. Townsend, 7350 ft.) forms the highest district in the islands. East of this they are known as the Australian Alps (pp. 60-63), while to the north the Blue Mountains (pp. 104-109), and the Liverpool, Denham, and Leichhardt Ranges may be selected from the many names which are given to different parts of this

extensive highland (pp. 82-84, 89-92). The descent to the east is much more abrupt than that to the west, where the rolling landscape immediately west of the divide is called downs, *e.g.* Darling Downs (pp. 92-98).

Few important rivers flow to the east; the Burdekin, Fitzroy, Brisbane, and Hunter may be mentioned. The rivers flowing to the west are of greater length. They form the Darling-Murray system (pp. 57-69) in the south; Cooper's Creek and Diamentina systems, which evaporate in salt lakes or in the dry areas of the Central Lowlands; and the numerous rivers which reach the Gulf of Carpentaria.

These rivers all flow down the gently sloping land of the Central Lowlands, which extend from Spencer Gulf to the Gulf of Carpentaria, broken here and there by N.-S. trending hills or mountains such as the M'Kinley, Grey, Stanley, and Mt. Lofty ranges (p. 122). The western part is a tableland, the mountains rising in the centre of the island in the M'Donnell and Musgrave ranges to over 4000 feet, and terminating in a western escarpment, which, seen from the west, appears a range of mountains —called the Darling (p. 130), Herschel, and Victoria ranges— passing from south to north.

Climate.—The island of Australia is crossed by the tropic of Capricorn almost half-way between north and south. The temperature is always hot in the north, is characterised by great extremes, both diurnal and annual in the centre, and is very hot in summer but cool in winter in the south. It must be remembered that the Earth is nearest the Sun in January. The excessive heat and aridity of the Australian desert have hampered its exploration (see pp. 76, 77). The northern part receives heavy summer rains. The southern part extends to the limits of the stormy west wind area, being north of it in summer, within it in winter. The whole east coast is subject to the prevailing south-east trade-winds, which bring abundant rains to the eastern mountain slopes and coastal plain. Beyond the mountains the rainfall diminishes very rapidly, and the interior is dry. The west coast in the lee of the S.E. trades is dry, but in the north receives summer rains; in the south, winter rains. Tasmania lies within the western storm wind belt.

Hydrography.—The chief rivers have already been mentioned.

Those of the northern and eastern and extreme southern rainy regions alone flow continuously ; and are fullest during the rainy season. Only in the south-east does the melting of snow on the higher regions contribute to the river waters. The majority of rivers flowing westward from the Eastern Highlands are more or less intermittent, some becoming very shallow streams (Darling) or a series of pools (Cooper's Creek) in the dry season. The great floods that rush down the water-courses after heavy rains wash out the river channel (see pp. 67-69).

More than half of Australia is not drained to the sea. In the lower parts of the arid region water accumulates in salt lakes, such as Eyre, Torrens, Frome, Gairdner, Amadeus, and an infinite number of smaller ones, which vary greatly in area, covering vast surfaces after floods, and in many cases becoming mere salt-covered hollows after dry spells (pp. 69-70).

Vegetation.—The hot, wet northern regions, subjected to the N.W. monsoon, are covered with wet jungles (p. 47) which pass into rich savanas, then to scrub, and finally to desert as the moisture diminishes towards the interior. The east coast is also wooded, with tropical species in the north, with temperate trees and great ferns in the south (pp. 53-55, 60-61, 89-92). Beyond the divide are the grassy downs (pp. 92-98), which also merge into scrub (pp. 70-73) and scrub into desert (pp. 73-76). Forests, too, occur in the regions of winter rains, in Victoria and Western Australia. In the extreme south-west are found the beautiful hard woods jarrah and karri. Tasmania is well wooded (p. 134). A systematic account of the vegetation of Australia will be found on pp. 46-53.

Animals.—The Australian region is remarkable for its peculiar animals. The birds and mammals both differ greatly from those of other parts of the world, and Australia forms in this respect a very distinct division of the globe (pp. 55-57). The sheep (p. 96), cattle, horses, pigs, camels (p. 77), and other useful animals have been introduced by the Europeans.

Population.—There are between 60,000 and 80,000 aborigines in Australia. These are probably of mixed origin. The men have usually beards, many have wavy hair, but others have the wiry hair, and the majority are broad-nosed and prognathous. They are hunting people at a very low stage of civilisation.

The first Europeans to settle in Australia were a band of

convicts and their guardians, who came to Botany Bay in 1788, and for long Australia was a penal colony. The discovery of gold in the fifties attracted many prospectors to New South Wales and Victoria. The present population is almost exclusively composed of settlers from the British Isles or their descendants. Chinese and Kanakas from the Pacific Islands are the chief non-European element in the population, excluding the aborigines. The policy of the Australians is to eliminate as far as possible all but English-speaking whites.

Political Divisions

States.	Area. Square Miles.	Population.[1]	Capital.	Population. 1901.
New South Wales .	310,700	1,600,000	Sydney .	592,000
Queensland . .	670,500	552,000	Brisbane .	138,000
South Australia .	903,690	407,000	Adelaide .	178,000
Tasmania . .	26,200	185,000	Hobart .	25,000
Victoria . . .	87,900	1,270,000	Melbourne	550,000
Western Australia .	975,900	268,000	Perth .	51,000
Total . . .	2,974,890	4,282,000		1,534,000

Economic Divisions.—Australia possesses many natural resources, but its economic development is greatly retarded by droughts and by the sparseness of its population. Over a third of the inhabitants are confined to the capitals of the six states, and more than a quarter to two of them—Sydney and Melbourne.

Few settlers live in the rich wet northern forests and savanas, where the white man cannot profitably exploit the soil himself.

The wet east coastal area is divided into a northern sugar (pp. 84-89), a central maize, and a southern wheat and dairy region (pp. 109-111). In the first Kanakas, from Pacific Islands, do most of the manual labour.

In the mountain region there are many goldfields, the Palmer, Charters Towers, Mount Morgan (pp. 101-103), in

[1] Estimated end of 1901. The 1901 census gave a population of 3,783,000, compared with 3,183,000 in 1891.

Queensland; those round Bathurst (pp. 110, 111), in New South Wales; of Bendigo and Ballarat (pp. 120, 121), in Victoria, and in Tasmania. Other minerals are of importance, coal more particularly round Ipswich (Queensland), Newcastle, Illawarra (N.S.W.), brown coal in Gippsland (Victoria), and tin at Herberton (Queensland), on the Queensland New South Wales border, and in Tasmania.

The Downs are cultivated (pp. 96-98) with wheat and other temperate cereals, vines, tobacco, and many other plants; and sheep farming is important on other drier areas (pp. 98-101, 114-118), where cultivation is only possible round the artesian wells, or where water can be obtained from the rivers, as in the irrigation colonies of Renmark and Mildura (p. 117) near the Murray. All kinds of Mediterranean fruits flourish in such areas, and on the sunny northern slopes of the moister southern lands with winter rains, where hard wheat is also grown (pp. 123, 124). Copper at Cloncurry (Queensland), Cobar (N.S.W) and Moonta (S.A.), and silver in the Barrier or Stanley Range, are among the minerals of this area.

The western plateau is very arid, and only the south-western and north-western margins are wet enough for timber cultivation, or vegetation for pasturage. The hard and beautiful karri and jarrah of the south-west are the most important timbers. The gold which has been found in many districts has led to settlement, especially round Coolgardie, Kalgoorlie, and Menzies, the water supply being derived from Mundaring, 350 miles away (pp. 131-133). Coal is mined near Collie.

Railways and Towns.—In Queensland numerous short railways run inland from ports, such as Normanton, Cooktown, Cairns, Bowen, Mackay; and three great lines penetrate far into the interior—from Townsville by Charters Towers to Winton, from Rockhampton to Longreach, and from Brisbane (p. 101) to Cunnamulla. The line runs on the coast or parallel to it on the plateau from Gladstone through Maryborough, Brisbane, and Warwick in Queensland to Newcastle and Sydney (p. 109) in New South Wales. From Sydney a line runs to Bourke on the Darling, and two railways, one by Bathurst, the other by Goulburn, converge and run to Albury on the Murray, sending off branches, one of which goes to Tumut, the proposed federal capital. From Albury the line crosses Victoria to

Melbourne on Port Phillip (pp. 118-120), from which lines radiate to the important manufacturing town of Geelong on the same bay, to the gold towns, through Gippsland, and to the Murray. The line through Ballarat passes to Adelaide (pp. 124-126) in South Australia, which is connected with its ports Glenelg and Port Adelaide, with the silver mines of the Barrier Range in New South Wales, and Oodnadatta in the north, along the line of the overland telegraph (pp. 126-127) to Palmerston or Port Darwin.

In Western Australia, Perth (p. 128) on the Swan river has Fremantle as its port, and railways join it to the Murchison and Coolgardie goldfields and to Albany (pp. 127-131), an excellent harbour on King George's Sound, as well as to Bunbury and the coal mines of Collie.

In Tasmania a line connects Launceston on the Tamar in the north with Hobart (pp. 136-137) on the Derwent in the south.

Except a few mining centres, all the large towns are on or close to the sea.

New Zealand

New Zealand lies 1000 miles east-south-east of Australia, between latitudes 34° S. and 47° S. (*cf.* Italy, 36½° N. and 46½° N.), and has a total area of 104,750 square miles. It consists of two large islands, the North Island and the South or Middle Island, beyond which is a third and much smaller island, Stewart Island.

Configuration.—The mountains run from N.E. to S.W., forming the east of the North Island and the west of the Middle Island. The west of the North Island is mainly volcanic—Ruapehu, Tongariro, and Egmont being the chief cones—and it extends with irregular outlines to the north-west, forming the Bay of Plenty between it and the eastern range. Lake Taupo in the centre of the volcanic district is drained by the Waikato, the most considerable river in New Zealand. Here are found hot lakes, geysers, sinter terraces (pp. 140-144). The east of the Middle Island forms the Canterbury Plains in the centre (pp. 152-154), beyond which the volcanic Banks Peninsula projects; in the south a branch of the mountain system turns to the south-east. The transverse coasts of Cook Strait between the two large islands have many picturesque inlets

(*rias*). The finest scenery, however, is in the lofty and glaciated south-west (pp. 149-150), where great fiords, such as Milford Haven, penetrate the rugged land, and on the east long narrow lakes, such as Hawea, Wanaka, Wakatipu, Te Anau, fill parts of the deep valleys (pp. 150-152). The coasts of Foveaux Strait and the south-east have a number of deep inlets. The variety and magnificence of New Zealand scenery are described on pp. 138-140.

Climate.—The climate of New Zealand recalls that of Britain. It is stormy, wet, and fairly uniform in temperature in the west, exposed to the stormy west winds; but dry and less uniform in temperature in the east. The Föhn winds (cf. *Europe*, pp. 102-104, and *N. America*, p. 38) blow from the mountains and cross the Canterbury Plains, where they often do damage by shaking the ears out of the rapidly ripened corn. The extreme north is in the trade wind region in summer, which is a dry season.

Productions.—The west is forested, the east is grass land, here and there cultivated, but mainly used for grazing sheep, the wool and flesh of which form the most important items in New Zealand exports (pp. 152-156).

In the northern half of the North Island the climate and productions resemble those of the Mediterranean. Here, too, the great kauri pine flourishes, the resin of which, kauri gum, obtained both from the living tree and in a fossil condition, is a constituent of varnish (pp. 144-146).

Minerals.—The mineral wealth is great. The volcanic region is noted for its medicinal springs. Gold is found in the Thames valley of the North Island, and in the rocks and river sands of Westland, in the north-west of the Middle Island, especially round Hokitika, and in Otago in the south-west, especially in the Clutha river. Good bituminous coal is mined in the west of the Middle Island, and exported from Greymouth and Westport.

Towns and Routes.—The capital Wellington, on Port Nicholson, opening out of Cook Strait, was chosen because of its central position. Auckland (pp. 146-148), the largest city, is built on a narrow isthmus of the north-western peninsula between two harbours, Manukau on the west, and Auckland opening from the Hauraki Gulf on the east, and is the port nearest to

Australia. Thames, Napier, and New Plymouth are smaller ports of the North Island. Westport, Greymouth, and Hokitika are the mineral ports of the west of the Middle Island ; Nelson and Blenheim are built on the north of Cook Strait ; Christchurch (p. 153), with its port of Lyttelton (p. 152), and Oamaru are outlets for the Canterbury Plains (pp. 152-154) ; Dunedin and Port Chalmers on Otago harbour, and Invercargill on the Foveaux Strait are the chief southern ports (p. 154).

New Caledonia

New Caledonia is an island of 7650 square miles, used by the French as a penal settlement. It extends from 20° S. in a south-easterly direction, almost to the tropic. It is described on pp. 206, 207. It is one of the chief sources from which nickel and cobalt are obtained. All kinds of tropical and subtropical produce can be grown, and many cattle live on the rich savanas which cover a quarter of the island.

Smaller Islands of the Pacific

The Island Rows.—The islands of the Pacific are volcanic or coral, or both. They seem to be arranged in long parallel rows, extending approximately from north-west to south-east, with the exception of the Kermadec–Tonga (Friendly) (pp. 196-199) line, which continues the north-easterly trend of the eastern mountains of the North Island of New Zealand, and rises above great depths of the Ocean ; the Fiji group (pp. 199-202) lying to the west of the Tongas ; and the Bonin–Marianne line which runs south from Central Japan.

Parallel to the New Guinea, New Caledonia, N.W. New Zealand line, the following island rows may be traced : (1) New Britain group (called by Germans the Bismarck Archipelago), Solomon Islands (p. 205), Queen Charlotte, and New Hebrides (pp. 202-205) ; (2) the Carolines, lying more west-east ; (3) the Marshall Gilbert groups, extending more N.N.W.-S.E., and probably passing into (4) the Ellice, Samoa (Navigator) (pp. 193-195), Cook (Hervey), and Austral (Tubai) row ; (5) Union (Tokelau) and Tahiti (Society) (pp. 186-192) ; (6) Manihiki and Paumotu (Low Archipelago) ; (7) Fanning and Marquesas ; and (8) the Hawaiian (Sandwich) (pp. 180-186) series.

The *Climate* is equable, warm and with sufficient rain.

The *Productions* are coco-nut (pp. 162-165), which is grown for its fresh nuts as well as the dried copra, the commodity most sought for in these isles. Bread-fruit (pp. 165-167), yam, taro, and banana (pp. 157-162) are also cultivated, and on the larger volcanic islands, such as Fiji and Hawaii, rice, sugar, cotton, and other crops can be profitably grown.

The *Inhabitants* consist of two very different types, the dark frizzy-haired type of Melanesians from Fiji westward, except in Tonga and New Zealand, inhabited by the tall, light wavy-haired Polynesians, who are found in the islands east of 180°. Some native arts and customs are described on pp. 168-179.

The chief *centres* are Suva in Fiji, Apia in Samoa (where Tutuila is a fine naval harbour belonging to the United States), Papeete in Tahiti (pp. 186-188), and Honolulu (p. 184) in Hawaii. Guam in the Marianne Islands is also a naval station of the United States. Herbertshöhe in New Britain (Neu Pommern), is the centre of German administration of Kaiser Wilhelmsland, which includes all the New Britain and part of the Solomon Islands, as well as German New Guinea. The Carolines and Marianne (Ladrones) Islands and part of Samoa are also German; the Bonin group is Japanese; Hawaii is United States territory; the Marquesas, Paumotu, Tahiti, and Austral groups are French; the New Hebrides are under joint British and French influence; the rest of the islands are British.

A DESCRIPTIVE GEOGRAPHY OF AUSTRALIA AND OCEANIA

I. THE MALAY ARCHIPELAGO

Through the Sunda Strait

A HAZY streak appeared on our horizon, and my eyes rested on the first of the Malayan islands, on the distant peaks of Sumatra. We anchored at Padang for a day, and in sailing southward along its coast I could not admire sufficiently the magnificence of that island, its great mountain chain running parallel to the coast, and rising into smoking peaks, clad with forest to the very crater rims. On the morrow of the second day we entered the Sunda Strait, that narrow water-pass, by the opening of which between Java and Sumatra nature has laid under grateful tribute all Cape-coming and going mariners through the Java Sea to and from the Archipelago or Chinese ports. Dotted about in this narrow channel were low picturesque islands and solitary cones of burnt-out craters, towering sheer up to a height of from 2000 to 3000 feet, all clothed in vegetation.[1] On our right the

[1] "Prominent among the latter," continues Mr. Forbes, "stood out the sharp cone of Krakatoa (1878), whose name will scarcely be forgotten by our generation at least, and will live longer in the sorrowful remembrance of the inhabitants of the shores of the Straits. The appalling catastrophe of August 27, 1883, would, however, sink into

Java coast lay in a series of beautiful amphitheatre slopes, laid out in coffee-gardens and rice-terraces; on our left were the more distant Sumatra shores, cut into large and beautiful bays between long promontories, on the easternmost of which stood out the high dome of Raja-basa. Rounding St. Nicholas Point we sailed eastward among the tree-capped Thousand Islands. The coast of Java on our right presented a singular appearance; for, for miles into the interior, it seemed elevated above the level of the sea scarcely more than the height of the trees that covered it. Nothing could be seen save the sea fringe of vegetation in front of a green plain, behind which rose the hills of Bantam and the Blue Mountains, as the old mariners called the peaks of Buitenzorg. Late in the afternoon the *Celebes* dropped her anchor in Batavia Roads, one of the greatest centres of commerce in all these seas, amid a fleet flying the flags of all nations. I had reached my destination; but, scan the shore as I might, I failed to detect anything like a town, or even a village, only a low shore with a fringe of trees, whose roots the surf was lazily lapping. As we approached the land in a steam-tender the shore opened out and disclosed the mouth of a canal, leading to the town a long mile inland.

Dr. H. O. Forbes.—*A Naturalist's Wanderings in the Eastern Archipelago.* Sampson Low. 1885.

By permission of Dr. H. O. Forbes and Messrs. Sampson Low.

Scenery of Sumatra

The island of Sumatra is undoubtedly one of the most valuable of all the Dutch possessions in the East. Its resources are almost wholly undeveloped and its interior is scarcely even known, only one or two expeditions ever having crossed the island in its widest part. It contains a great variety of mineral and vegetable products, and its

insignificance if compared with that which, while this was still an undiscovered sea, must have withdrawn the foundations of the land over which the Straits now flows."

trackless forests are filled with still unconquered tribes of men—remarkable cannibals among them—numerous rhinoceroses, and large herds of elephants. It possesses a chain of verdure-clad volcanoes which give to its west coast one of the most salubrious climates in the archipelago, and its scenery surpasses in beauty the famous scenery of Java, which has been called the most beautiful tropical island in the world. The island is held by a small force of Dutch and native soldiers, and governed by a body of Dutch officials scattered along the coast cities, whose control over the natives is more moral than physical.

The western coast of this wonderful island is as near a tropical Switzerland (if such an appellation does not convey a confused notion) as is to be found anywhere on the globe. New Zealand can boast of glaciers of surpassing beauty, justly entitling it to the place it holds as the Switzerland of the southern hemisphere; but I am confident that after the sources of the Amazon have been thrown open to the tourist, and Orizaba has been surrounded by winter hotels, the most luxuriant vegetation and most wildly fascinating scenery in the world will be sought for among the chain of volcanoes that forms the backbone of Sumatra.

The city of Padang seemed on the first night of arrival one of the hottest and wettest places it were possible for water and sunshine to concoct; but where the sunlight pours down its rays perpendicularly and the clouds every afternoon empty an almost unlimited quantity of water, palms are able to live a life really becoming such royal representatives of the vegetable kingdom.

Padang as a town has nothing to recommend it. Its public buildings and houses are embowered in the most gorgeous tropical vegetation, but they themselves are plain, and look as if they were moth-eaten. Termites work rapidly upon the corner posts, and decay soon makes new buildings old. Then, too, the malarial plasmodium finds in the region a most congenial home, and the pallid faces and slow gait of the Europeans tell too

plainly of an unequal struggle between blood corpuscles and the invading army of parasites. As the terminus of a most remarkable mountain railroad, one of the earliest cog railways ever constructed for freight purposes, Padang affords the traveller unrivalled opportunities to "get into the interior," as explorers express it. Stretches of low swampy jungle line the track on both sides. Thickets of the Atap palm, with its creeping stem and rigid upright leaves, whose leaflets flutter incessantly in the slightest breeze, rise out of deep weed-overgrown pools, suggestive of all sorts of serpents, leeches, and water insects. Immense plantations of bananas, overgrown with masses of tangled morning glories, with their light-blue blossoms, have crowded out the more varied natural vegetation in places and stand as evidences of the cultural skill and indomitable energy of those greatest of all tropical colonisers, the Chinese.

But soon the train whirled us into the klof[1] or gorge itself, and for several hours our eyes were busy with scenes of the most gorgeous freshness and beauty. This gorge is compared by the Dutch with the Gotthard Strasse below Andermatt; but they belittle it by such comparison, for the Klof van Aneh, with its countless waterfalls, rushing mountain streams, cloud-covered hillsides, and floating mists, added to its endless variety of flowering shrubs, feathery fern fronds, waving palms, and tall, imposing forest trees, makes a composition of the first rank among scenic masterpieces.

The surroundings of Padang Pandjang rival the famous scenes from the little Javanese town of Buitenzorg, accounted one of the three or four most beautiful spots in the world. The sunsets over the volcanoes Singgalang and Merapi, with their low-drifting clouds of peculiar violet, purple, and lilac hues, form sights never to be forgotten. The famous sunsets in the Indian Ocean are not more wonderful. Pathways lead off from the well-travelled road at every turn, and you have only to follow

[1] Cf. Kloof of S. Africa.

one of these for a few minutes to find yourself in the midst of the most luxuriant forest, with overtowering bamboos and tree-ferns, palms and flowering shrubs, thickets of impenetrable rattan palms, low bushes over which immense numbers of large black ants are running, moist moss-covered banks, a tangled mass of liverworts, filmy ferns, and lichens, with here and there an insect so closely resembling the bits of lichen that even an expert entomologist might pass it by unnoticed. Close by the path, in one of the most fascinating of these many valleys, there was growing a clump of bamboo, some of the shoots of which, although eighty feet or more in height, were evidently newly grown, with leaves still immature. I shook one of these young shoots lightly with my hands, and, to my surprise, the whole top, fifteen feet or more in length, snapped off, and, falling at my feet, was broken into a half-dozen fragments. Few experiences could give one a better idea of the rapid growth of plants in the tropics than this—growing like a giant asparagus shoot at the rate of a foot or more a day, in a short three months it is a tree of the forest towering above the tops of many century-old monarchs, and yet, after all, it is botanically nothing but a grass.

Fort de Kock, our next stopping-place—940 metres above the sea—is known all over the Dutch East Indies as a sanitarium for the Dutch army. From Fort de Kock to the little village of Pajo Kombo, the end of this branch of the railroad, is only a few miles.

One visits Pajo Kombo because it is the nearest point to the klof or gorge of Harau and the waterfalls of Batang-Harau, called by the Dutch the Lauterbrunnen and Staubbach respectively of their Indies. It is curious to note how the Dutch compare scenes in Sumatra with noted points of interest in Switzerland, whereas in fact there is little comparison and absolutely no similarity, the rugged grandeur of Switzerland in no sense recalling the foliage-softened outlines of Sumatra. An hour's ride in an uncomfortable native cart brought us to the entrance of this

little-known but certainly most wonderful gorge. As we approached, the tall grey marble cliffs rose perpendicularly before us to a height of 200 or 300 metres; on either side, like silken threads, we counted fifteen waterfalls tumbling down from the tableland above. The niches and crevices of this grey marble formed footholds for the most varied of tropical plants, and these in their growth covered great patches with luxuriant verdure or brilliant colouring. Bathed in spray from the waterfalls, there were countless tropical ferns and lichens, algæ, liverworts, and mosses. Through the gorge, at places not more than 70 feet wide, flowed a stream of clear water, its banks and bed clothed with insectivorous water plants and overhung with flowering shrubs and rank-growing grasses and sedges. The fall of Batang-Harau suggests by its height and volume the Staubbach near Lauterbrunnen, but at its foot is a mass of moss and fern-covered boulders instead of the barren shale, worn by tourists' feet. Instead of the flower-covered carpet of the Alps the narrow valley was filled with palms, rank grasses, small rubber trees, and a host of strange shrubs and flowering plants, among them curious melastomas and a large orange-fruited fig which decorated the cliffs with its fruit and foliage. No orchids were to be seen anywhere in the gorge, and it is possible that they had been taken out by some orchid-hunter.

D. G. Fairchild.—*National Geographic Magazine.* November 1898.

By permission of the National Geographic Society.

"The natives, although of the Malay race, are quite distinct from those of the island of Java or the peninsula of Malacca. They are a well-to-do, even wealthy race, and build costly houses of indisputable beauty, making them of teak or other wood, panelling them with great care, carving and painting them after patterns often of considerable taste and beauty. The roof structures, with their gables rising one above the other, resemble more those of the Siamese temples than any other oriental structures. The floors of nearly all sag in the middle, and the ends of the houses are raised on high posts, frequently carved, and sometimes fitted with bamboo wickerwork. They are often communal in nature, as many as three or four families living in the same dwelling. In front of each dwelling-house stands a small square

building, more highly decorated often than the house itself, which is used for a *goedang* or rice granary, and no native compound of houses is complete without such a granary. The interiors of these houses are not without modern conveniences in the way of comfortable beds, with pillows and canopies, the better of the latter being often decorated with curious and showy pendent ornaments made entirely of the white pith of some tropical plant. These houses are more comfortable than those of any other race in the Dutch East Indies."—*Ibid.*

Java

The general aspect of Java on the northern coast is low, in many places swampy, and overgrown with mangrove-trees and bushes, particularly towards the west. The southern coast, on the contrary, consists almost entirely of a series of rocks and cliffs, which rise perpendicularly to a considerable height. In the interior, stupendous mountains stretch longitudinally through the island, while others of an inferior elevation, and innumerable ranges of hills running in various directions, serve to form and confine plains and valleys of various elevation and extent. On the northern side the ascent is, in general, very gradual from the sea-coast to the immediate base of the mountains, particularly in the western parts of the island, where it has the greatest breadth, and where the mountains are situated far inland. In approaching the mountains which lie at the back of Batavia there is a gradual but almost imperceptible acclivity for about 40 miles. In other parts, where the mountains and hills approach nearer to the coast, the ascent is, of course, more abrupt. Although the northern coast is in many places flat and uninteresting, the interior and southern provinces, from the mountainous character of the country, may be reckoned among the most romantic and highly-diversified scenery in the world, uniting all the rich and magnificent scenery which waving forests, never-failing streams, and constant verdure can present, heightened by a pure atmosphere and the glowing tints of a tropical sun.

Quitting the low coast of the north, in many places

unhealthy, the traveller can hardly advance 5 miles inland without feeling a sensible improvement in the atmosphere and climate. As he proceeds, at every step he breathes a purer air, and surveys a brighter scene. At length he reaches the high lands. Here the boldest forms of nature are tempered by the rural arts of man; stupendous mountains clothed with abundant harvest, imperious cataracts tamed to the peasant's will. Here is perpetual verdure; here are tints of the brightest hue. In the hottest season the air retains its freshness; on the driest the innumerable rills and rivulets preserve much of their water. This the mountain farmer directs in endless conduits and canals to irrigate the land, which he has laid out in terraces for its reception; it then descends to the plains and spreads fertility wherever it flows, till at last, by numerous outlets, it discharges itself into the sea.

Passing from the coast to the interior of the island the stranger cannot fail to be struck with the bold outline and prominent features of its scenery. An interrupted series of large mountains, varying in their elevation above the sea from 5000 to 11,000, or even 12,000 feet, and exhibiting by their round base and pointed tops their volcanic origin, extend through the whole length of the island. They all rise from a plain but little elevated above the level of the sea. The craters of several are completely extinct: those of others contain small apertures which continually discharge sulphurous vapours or smoke. Almost all are found on examination to have the same general constitution; they are striped vertically by sharp ridges, which, as they approach the foot of the mountain, take a more winding course. Those ridges alternate with valleys, whose sides are of a very various declivity. Large rocks of basalt occasionally project, and in several instances the valleys form the beds of rivers towards the tops of the volcanoes; in the rainy season they all contain large volumes of water. Next in importance to this extensive series of primary mountains, there are various ridges of smaller mountains, or hills, extending in different directions, with nearly

an equal degree of elevation; sometimes originating from or connected with the primary volcanoes, sometimes form-

COCO-NUT PALM, NORTH BORNEO.

ing independent ranges, and rising separately and at a great distance from the great series. These, though evidently of a volcanic nature, differ in many particulars of their constitution from those of the larger series. Hills of calcareous

constitution, with only a moderate degree of elevation, occur in smaller ridges, often with a flat or tubular top; or in steep rocks and eminences. These are sometimes found in the centre of the island, covering the volcanic districts, but much more frequently near the northern and southern shores.

The soil of Java, though in many parts much neglected, is remarkable for the abundance and variety of its productions. Lying under a tropical sun, it produces all the fruits of a tropical climate; while in many districts its mountains and eminences make up for the difference of latitude, and give it all the advantages of temperate regions. The bamboo, the coco-nut tree, the sugar cane, the cotton tree, and the coffee plant here flourish in the greatest luxuriance, and yield products of the best quality. Rice, the great staple of subsistence, covers the slopes of the mountains and the low fields, and gives a return of thirty, forty, or fifty-fold; while maize, or even wheat and rye, and the other plants of Europe may be cultivated to advantage on high and inland situations. Such is the fertility of the soil, that in some places, after yielding two, and sometimes three crops in the year, it is not necessary even to change the culture. Water, which is so much wanted, and which is seldom found in requisite abundance in tropical regions, here flows in the greatest plenty. The cultivator, who has prepared his rice-field within its reach, diverts part of it from its channel, spreads it out into numerous canals of irrigation, and thus procures from it under a scorching sun the verdure of the rainy season, and in due time a plentiful harvest. Nothing can be conceived more beautiful to the eye, or more gratifying to the imagination, than the prospect of the rich variety of hill and dale, of rice plantations and fruit trees or forests, of natural streams and artificial currents, which presents itself to the sight in several of the eastern and middle provinces at some distance from the coast. The whole country, as seen from mountains of considerable elevation, appears a richly diversified and well-watered garden,

animated with villages, interspersed with the most luxuriant fields, and covered with the freshest verdure.

SIR STAMFORD RAFFLES.—*The History of Java.* Murray.

"The wealth of a province or village is measured by the extent and fertility of its land, its facility for rice irrigation, and the number of its buffaloes."—*Ibid.*

The Seasons in Java

The seasons, in all the countries situated within about ten degrees of the equator, agree in this; that as one eternal summer prevails, they are not distinguished as hot and cold, but as wet and dry. On Java the seasons depend upon the periodical winds. The period of the setting in of these winds is not determined within a few weeks; but generally the westerly winds, which are always attended with rain, are felt in October, become more steady in November and December, and gradually subside, till, in March or April, they are succeeded by the easterly winds and fair weather, which continue for the remaining half year. The heaviest rains are in the months of December or January, and the driest weather is in July and August; at which latter period, also, the nights are coldest and the days hottest. The weather is most unsettled when the season is changing, particularly at the first setting in of the westerly winds; but those violent storms and hurricanes, which are so often felt in the West Indies and higher latitudes, are here unknown. With the exception of a few days at these periods, or when the westerly winds are at their height, vessels of any description may ride in safety in most of the bays along the northern coast of the island, and on shore the wind is never so violent as to do damage. In the vicinity of the hills and elsewhere during the dry season seldom a day passes without thunder and lightning, and the lightning is extremely vivid. During the rainy season there are many days free from showers. The mornings are generally clear, and although the rains some-

times continue without intermission for several days, and frequently fall in torrents, they are not marked in Java by that decided character, either of permanence or violence, which distinguishes the periodical rains of the continent of India, neither is the dry season distinguished by that excessive aridity which attends the hot seasons of that country. Even in July and August the atmosphere is refreshed by occasional showers, and the landscape is at all times of the year covered with the brightest verdure.

Sir Stamford Raffles.— *The History of Java.* John Murray.

Batavia

Batavia is situated on both sides of the river Jacatra, or Tjiliwong, in a swampy plain at the head of a capacious bay. The streets are for the most part straight and regular, and many of them have a breadth of from 100 to 200 feet. In several cases there is a canal in the centre, lined with stone, and defended by low parapets or banks, while almost every street and square is fringed with trees. The Old Town has greatly changed from what it was in the eighteenth century. It was then surrounded by strong fortifications, and contained a number of important buildings, such as the Town House, built in 1652, and restored in 1706, the Exchange, the Infirmary, the Orphan Asylum, and the European churches. But the ramparts were long ago demolished, and most of the public edifices have either fallen into decay, or been converted into magazines and warehouses. Canals have been filled up, streets have been altered, and the general character of the place considerably modified. All the European inhabitants, except those immediately connected with the shipping, have removed to the New Town, which has gradually been formed by the integration of Weltevreden (Well Content), Rijswijk (Rice Town), and other suburban villages or stations. The situation of the modern part is higher and healthier, and the grandeur and variety of its buildings far

surpass anything to be found in the older section of the city.

ANON.—*Encyclopædia Britannica.* A. and C. Black.

By permission of Messrs. A. and C. Black.

"Morning and evening, the train whirls in a few minutes the whole European population, which tries in vain to amass fortunes like those of past times, to and from the open salubrious suburbs, the New Town of fine be-gardened residences, each standing in a grove of trees flanking large parks, the largest of which, the King's plain, has each of its sides nearly a mile in length. Here the Governor-General has his official palace—his unofficial residence being at Buitenzorg, about 35 miles to the south of Batavia—and here are built the barracks, the clubs, the hotels, and the best shops, dotted along roads shaded by hibiscus shrubs, or by the *Poinciana regia*, an imported Madagascar tree, which should be seen in the end of the year, when its broad spreading top is one mass of orange-red blossoms, whose falling petals redden the path, as if from the lurid glare of a fiery canopy above." —H. O. FORBES. *A Naturalist's Wanderings in the Eastern Archipelago.* Sampson Low.

"On our first day's drive we discover the reason for the bestowal of the name Weltevreden on this section of Batavia. If it is not an elysium it does not fall far short thereof. Wide stately avenues, worthy of Russia, bordered by the luxuriant tropical trees, stretch away in all directions. Every street, and street after street for miles, is adorned with charming houses, sitting well back on a broad green lawn amid gorgeous flowers and shrubs. There are many wide green squares, and many stately public buildings. The latter are all white, all classic, until one feels that another name, that of the White City, should be added to the titles of this most beautiful of towns." —M. M. SHOEMAKER. *Islands of the Southern Seas.* G. P. Putnam's Sons.

For Buitenzorg, 35 miles inland, and about 1000 feet above the sea, and its famous Botanic Garden, see WALLACE, *The Malay Archipelago*, p. 85 (1890 edition); FORBES, *A Naturalist's Wanderings in the Eastern Archipelago*, pp. 9-10; M. M. SHOEMAKER, *Islands of the Southern Seas*, pp. 205-208.

"Buitenzorg possesses not only a magnificent climate, but scenery of great beauty and picturesqueness. It is overlooked by two large and at present harmless volcanic mountains, the Salak with its disrupted cone into whose very heart one looks by the terrible cliff in its side, and the double-peaked Pangerango and Gede, from whose crater is ever lazily curling up white vapoury smoke from the simmering water which at present fills the summit of its pipe."—H. O. FORBES.

For the ascent of Pangerango and Gede, and an instructive account of the modification of the vegetation according to altitude, see WALLACE, *The Malay Archipelago*, pp. 88-90.

Travelling in the Forests of Borneo

For a portion of the distance we were able to take advantage of a road or path which had been made through this part of the forest, and this, though rude and wretched to a degree, was better than the untrodden soil. The country was peculiarly undulating, being a succession of knolls or small hills, about 50 or 60 feet in height, all closely covered with timber. At frequent intervals creeks and deep ravines, rivulets, and even considerable streams occurred, and on the first day's march no less than seventy of these had to be crossed. The deepest and widest were spanned by Dyak bridges, consisting sometimes merely of the trunk of a tree, which had been cut down and allowed to fall over the chasm; sometimes of a single bamboo, or two bamboos joined together, with a slender rattan railing 3 feet above to serve as a balance. Some of the latter bridges were as much as 110 feet in length, and it required no slight skill to traverse them in safety.

The first day's march terminated in a very uncomfortable manner. I had outmarched the greater part of my followers, and found to my dismay on camping for the night that none of the carriers bearing my tinned provisions was in reach. Some of the Dyaks offered to cook me some rice, but this I declined, having fresh in my memory the warning of the Sultan not to accept food from any of them, for fear of poison. Some of the party set about collecting wood for making fires, a task of no little difficulty, after the recent heavy rains; but some dry twigs were found, and the click of flint and steel was soon followed by the cheerful crackling of the blazing wood from six large fires. Then came the native cooking operations; small clay pots, and failing them, large hollow pieces of bamboo, were filled with water, and in these primitive utensils the rice was boiled.

Next morning we started early. The earth was covered with a thick mist, which rose steaming from the masses of leaves that lay rotting beneath the trees. I

was struck with the great variety and beauty of the foliage. Hardly two trees seemed alike; the colours ranging from brilliant green, through the darker shades to olive, and then graduating off to browns, reds, and yellows, now harmonised, now contrasted with each other, in effects which, if reproduced, would be called untrue to nature. Many of the forest trees assumed most curious shapes, the growth of the roots especially being often extremely curious. The roots of a tree, instead of converging underground at the trunk would grow upwards above the surface of the ground, and meet in mid air, the trunk proper springing from them at a distance of 10, 12, or 15 feet from the earth. Sometimes two, or more often three, principal roots would thus emerge from three almost equidistant points on the dense layer of leaves and tangled undergrowth, and, approaching each other at an acute angle, would unite into a single stem, giving the tree the appearance of a gigantic three-legged stool. Sometimes the number of roots and rootlets thus growing above ground and meeting in the air was beyond calculation. Some of the trunks rose to the height of 20 or 30 feet from their roots before sending out a single branch; but in the forks of the branches, and from cracks and crannies in the rough barks of many of them, grew ferns in infinite variety, with noble leaves, now of a deep dark green, now so pale as to be almost white; sometimes the dark leaves were flecked with silver or golden spots, and those of more delicate tint would be similarly dotted with dark markings. Climbers and creepers of all kinds and colours clung to the stems and overran the branches of the trees, from which they hung downwards in tangled clusters or pendulous festoons. Many of the trees, including several distinct varieties, were pointed out to me by the Dyaks as yielding gutta-percha; and I asked them to show me the method of extracting the juice. With two sharp strokes of the *mandau* a deep notch was cut in the bark from which the juice slowly oozed, forming a milky-looking mucilage, which gradually hardened and became deeper in colour as it ran down the tree. The native

collectors of gutta-percha make a track through the forest, nicking all the trees as they go, and collect the hardened sap on their return a few days afterwards.

About 5 P.M. we came to an encampment where a number of Dyaks were assembled, under two chiefs. I was not unwilling to take this opportunity, while resting for a time, of conciliating the new people among whom we had arrived. Fortunately some twenty porters, with a stock of calico, beads, buttons, and other articles, had followed close to their leader, and I distributed the greater part of the goods, giving the two chiefs 16 yards of black calico apiece, and to each of the others a few yards of print, with an assortment of beads and buttons adorned with the Dutch arms. One swarthy warrior offered me a leopard skin. These skins are very much sought after by the Dyaks, who make of them their war costume, by simply cutting a round hole below the neck, through which the warrior passes his head, leaving the skin to hang loosely down his back, and the tail trailing on the ground after him. The teeth and claws are worn as talismans and ear ornaments.

CARL BOCK.—*The Head Hunters of Borneo.* Sampson Low.

By permission of Messrs. Sampson Low.

A Borneo Long House

The long houses of this district are built along the banks of the rivers; usually a notched tree trunk is laid on the slope of the steep bank, and other logs are placed endwise from this to the house to serve as a causeway across the slippery and often foul mud. A house consists of two portions, a verandah extending along the whole length of the river frontage, and a series of domiciles opening on to the verandah. The verandah is entered at the end, and by two or three doorways at the side. The ladder consists of one or more notched tree trunks, usually with a slight hand-rail, the use of which is as often as not dispensed

INTERIOR.

EXTERIOR.

A BORNEO "LONG" HOUSE.

From photographs by Dr. A. C. Haddon.

with by the nimble, barefooted inhabitants, and even the dogs have learned to go up and down these precarious ladders. On entering a verandah the first thing that one sees is the long wooden partition, 8 to 10 feet in height, that separates the verandah from the dwelling apartments; this is pierced at fairly regular intervals by wooden doors, each of which gives access to a separate house. Each house, which is always spoken of as the door, is divided into variously sized rooms or cubicles; generally a narrow passage opens into a central room, which is the living room by day and night; the cooking may be done here or in a separate small kitchen. A long house numbers from ten to fifty, or even as many as eighty or ninety doors, so that there may be from fifty to five hundred people—men, women, and children—in one of these strange dwellings. The privacy of the home is thoroughly respected, but the society of the neighbours can always be enjoyed on the verandah, which is a broad open space that extends along one side of the house. This is practically divided into an inner common gangway, on to which the doors open, and a portion that runs along the outer wall of the house, and is generally slightly raised above the general level of the floor. The space of this outer portion of the verandah opposite each house belongs to the owner of the house, and according to his taste or means he keeps the space in good order and lays down mats. It is here visitors are received, the public business transacted, and neighbours sit and gossip and smoke, or chew betel. Most interesting it is to lounge and watch the daily life of the village, the men and women going to or returning from their gardens, and girls bringing up water. In some tribes the pounding of the rice in heavy wooden mortars is done on the verandah, and one is never tired of watching the rhythmic movements of the women as they husk the rice with long thick poles, and gradually push the grain into the mortars with their feet. After the husking is finished the rice is removed in plaited trays by standing or crouching women. Then there are the jolly children, half-fearful of the white

stranger, yet always ready for a game. Happy, contented little mortals they are, very rarely squabbling among themselves, and still more seldom troubled by their elders.

Dr. A. C. Haddon.—*Head Hunters, Black, White, and Brown.* Methuen and Co.

By permission of Dr. A. C. Haddon.

The Bamboo in Borneo

Bamboos are wonderfully useful to the Dyaks, and are turned to many purposes. In height they sometimes exceed 60 feet. During this tour I have seen them used, stretched in lengths for paths; placed notched for steps up steep ascents; as railings for rice-fields and yam gardens; as posts for houses; split, they form the floors; beaten out they are the walls of many of the dwellings, and neat and pretty they look; cut into lengths water is carried in them; joined together they form aqueducts that stretch for hundreds of yards; with them the Dyaks can strike a light; and last not least they are used to cook rice in, and they are hard enough to stand the fire until the food is ready to eat. They are put to numerous other uses, but the above enumeration is sufficient.

Sir Spencer St. John.—*Life in the Forests of the Far East.* Murray.

For a fuller description of the varied uses of the bamboo, see Dr. W. R. Wallace, *The Malay Archipelago.* Macmillan. (1890 edition), pp. 58-61.

The Edible Birds'-Nest Trade

There is one product of the Punan country which, I think, deserves a note; it is that luxury so dear to the Chinese palate, the edible nests built by swallows or swifts, in certain limestone caves. In the Niah hills[1] near the coast these caves have been the breeding-places of these birds from time immemorial.

[1] South of Baram, cape and river.

Mount Subis (one of the Niah hills) is only about 1500 feet high, and the entrance to the birds'-nest cave on the mountain side is some little distance from the base, and can be gained only by a very narrow and tortuous path round the ledges and projections of slippery limestone. Not far from the main cave is a smaller one, known as the Traders' Cave, wherein is a village of twenty or thirty huts, for the accommodation of the Chinese traders who come to pay for the nests that have been collected. The roof of the cave, frescoed with green mould and lichen, is 50 or 60 feet overhead, with irregular projections of limestone, but free from stalactites. No swallows build here, the cave is too light and shallow. The Punans' cave, beyond, is of majestic size. Just within the entrance the floor dips abruptly to a deep valley, and the roof curves upward in a vast dome; hence from the level of the valley to the roof is at least 600 feet. Insensate indeed must he be who is not filled with speechless awe as he turns from the brilliant sunshine and enters this illimitable abode of silence and night. Underfoot is a deep carpet, fully 3 feet deep, of what seemed tan-bark, but which proved to be a fine, dry, odourless guano, composed mostly of the wing covers of insects, of a dark-brown colour; the jagged sides and roof, and here and there boulders projecting through the covering of the floor, were covered with a deep green mould or lichen, except where the white limestone gleamed out in patches, and seemed almost phosphorescent. The extent beyond in the utter darkness seemed illimitable. Our presence and the echoing of our voices startled the swallows, and forth they emerged, in myriads on myriads, from the darkness, and circled round us and above us, and about the mouth of the caves like swarming bees; the whir of their wings and their twittering sounded like waves on a pebbly beach.

The nests are obtained by lashing long stout poles, end to end, and then supporting them with guy-ropes of rattan until they reach the very top of the cave. Up these poles the agile Punans climb hand over hand, and foot over foot

walking up them like monkeys; when at the top, they scrape down the nests within reach, by means of a long pole bearing a hoe-like blade, and with a home-made wax candle fastened to it, to show where the nests are. An assistant below gathers the nests as they fall. There are two varieties of nests, the black and the white; the latter

BLOWPIPE SHOOTERS, BORNEO.

sell for 2000 Mexican dollars a pieul (123 lbs.), the black nests bring only 100 dollars for the same weight. Unfortunately the Niah caves are black-nest caves, but the nests are so very abundant that the export revenue tax assessed on them by the Sarawak government amounts to thousands of dollars a year.

Dr. W. H. Furness.—*The Home Life of the Borneo Head Hunters.* The Lippincott Company.

By permission of Dr. W. H. Furness.

"There are three harvests of nests, then the season closes, and the swallows are allowed to rebuild undisturbed, and rear their broods."—*Ibid.*

"The Punans are nomads, never building permanent houses, nor remaining long in one locality. They live solely on the products of the jungle, esculent roots and plants, such as caladium, wild tapioca, a species of canna, the tender uncurled fronds of ferns, and the heart of several species of palm. The men are extremely skilful with the blowpipe, and in the construction of snares and traps. When they are not surfeited with small birds they are completely happy with roast or boiled monkey. They obtain from the jungle, far and near, those articles for which they themselves have no use, such as camphor, beeswax, etc., which they can barter with Malay and Chinese traders. Most valuable of all these articles is rhinoceros horn."—*Ibid.*

The Philippine Islands

To the south-east of the continent of Asia lies a vast archipelago, of which a considerable portion is occupied by the group called the Philippine Islands. Some of the Philippines are mere islets, too small for occupation, but others are important in size and resources and are very populous. The northern island, Luzon, on which Manila, the capital, is situated, is the largest, having an area of about 41,000 square miles. Mindanao, the southernmost island, contains about 37,500 square miles. As no accurate survey of even the larger islands has ever been made, it is impossible to make a definite statement as to the aggregate land area of the group; but the most reliable estimate is 114,350 square miles.

The islands are situated directly on the line of volcanic energy, which extends from Japan to Java. Volcanic forces have largely contributed to their formation and shaping, as is testified, not only by the existence of active volcanoes, but by the still larger number of mountains which show evidence of former igneous activity, the traces of its effects on the surrounding country, and the abundance of thermal springs which are found in different localities, in which the temperature of

the water ranges from 180° F. to the boiling-point. Although situated in a region peculiarly adapted to the growth of corals, they do not exist to any great extent on the coasts of the Philippines. All the islands are generally hilly and mountainous, but none of the summits much exceed 8000 feet in height. The loftiest peaks are, perhaps, Apo and Malindang in Mindanao, Halcon in Mindoro, and Mayon in Luzon. The latter is an active volcano, which has been the scene of several disastrous eruptions within the past hundred years. As a consequence of these subterranean forces, earthquakes are frequent and dangerous.

The extreme length of the Philippine group being from north to south, their northern extremity reaching nearly to the northern limit of the tropical zone causes considerable variety of climate, although the general characteristics are, of course, tropical. The seasons vary with the monsoons, which blow from the north-east from November to April, and from the south-west from May to October, and produce what are generally called the dry and wet seasons, though there is no abrupt change from one to the other. Between those periods are intervals of variable weather. The Spaniards describe the seasons as four months of mud, four months of dust, and four months of everything. The northern islands lie in the track of the typhoons, which develop in the Pacific and sweep over the China sea from south-east to north-west during the south-west monsoon. In the early part of the season it is the northern part of the region subject to these storms that feels their greatest force. As the season advances they gradually work southward, so that the most dangerous time in Manila is about the end of October and beginning of November. They never pass farther south than about 9° N. lat. They are always storms of terrific energy, frequently causing terrible devastation and destruction of crops and property on shore, and of shipping on the sea. Thunderstorms, often of astonishing violence, are of frequent occurrence in May and June.

In estimating the natural riches of the islands the forest growths form an important factor. Ebony, cedar, iron-wood, serpan wood, logwood, and gum-trees abound, and in addition to these familiar trees are hundreds of other varieties not generally known, even by name, which produce useful and ornamental woods available for many purposes. Gutta-percha is found in some localities, and the tall and graceful coco-nut palm is universal, and contributes in no small degree to the comfort and prosperity of the natives. Of all the indigenous vegetable products, the bamboo, which, although botanically a grass, is practically a tree, is most plentiful, useful, and ornamental. It is put to an infinity of uses, from the construction of bridges and dwellings to the manufacture of furniture, domestic utensils of all kinds, pipes for conveying water, musical instruments, mats, fences, and scaffolds—in fact the roots, trunks, branches, and leaves are all utilised. The areca palm grows to about the same height as the coco-nut tree, and produces a nut about the size of a small hen's egg. Men, women, and children all chew it. A piece of nut is wrapped in a leaf of the betel pepper, which is smeared with shell lime made into a paste with water. In the city of Manila alone there are hundreds of places devoted solely to the sale of this article prepared ready for use, and it can be found on sale in every town and village.

There is a great similarity between the agricultural products of Cuba and the Philippines; in both sugar and tobacco are the great staples, but the latter possesses a unique product which hitherto has not been found to thrive successfully elsewhere, although attempts have been made to introduce it in Borneo, Cochin-China, the Andaman Islands, and other places. It is known commercially as Manila hemp, but this is a misnomer, as it has no relation to the hemp plant. It is one of the most useful fibres known to commerce. Sugar is grown very extensively. The cane is not of the same species as that cultivated in the western hemisphere, but it is of the

CUTTING THE PLANT.

ADJUSTING UNDER KNIFE.

REMOVING OUTER COVERING AND SEPARATING THE LAYERS.

MANILA HEMP PREPARATION.

PADDY FIELD RECENTLY PLANTED.

kind common through Malaysia and Polynesia. Several varieties are raised on the islands, some of which are used as food for man and animals, and others for sugar-making. They are all rich in saccharine qualities, but the greater part of the sugar produced is coarse and of poor quality. Tobacco is an important crop, and Manila cheroots and

TOBACCO PLANT.

cigars are as famous and highly appreciated east of the Cape of Good Hope as the Havana product is among western nations. Rice is largely grown, but its use is so general, and the demand for home consumption so great, that little is left for exportation. All fruits suitable to the climate are plentiful, including the orange, tamarind, guava, and pine-apple. Of all the native fruits, however, the banana is the most prolific and useful to the people,

giving them a larger amount of nutritious food from a given area of land than any other crop, with a minimum expenditure of labour. A traveller who has partaken of a meal in a native dwelling in the Philippines, consisting of rice, boiled as only the natives can cook it, and ripe bananas full of delicious juice, melting in the mouth like cream, with the cool and fragrant water of the coco-nut as a beverage, can appreciate how much Nature has done in those regions to supply the wants of man.

The bulk of the population is of Malay origin. The Philippine Malays are a superior race to many other Asiatic people. They are orderly, amiable, courteous, honest, and hospitable, exceedingly superstitious, and when they profess Christianity they are easily influenced by the priests. Like most tropical people, they are intermittent rather than steady workers. They are lacking in energy when at peace; but their hot, tropical blood makes them fierce and revengeful in war. They are fond of music, dancing, and amusement of all kinds, but are born gamblers, and cock-fighting is their great passion. Every native, however poor, owns a game-cock, and is always ready to bet his last coin on its prowess. Every town and village has its cock-pit, and in the larger communities the spectators may be numbered by thousands.

The *mestizos*, or mixed races, form a numerous and influential part of the population. The descendants of Spanish fathers and native mothers are numerous. A large proportion of the merchants and landed proprietors are of this class, and most of the subordinate and clerical offices of the government are filled by them. Another element is the Chinese and half-breeds of mixed Chinese and native blood. Throughout the islands, or at least in all the larger towns, the bulk of the retail trade, banking and money-lending are in Chinese hands. They are industrious, persevering, and economical, and many of them possess considerable wealth. There are probably not more than 15,000 or 20,000 Spaniards, or people of pure Spanish blood, who are permanent or temporary

residents, and the number of other foreigners is not large.

F. F. Hilder.—*National Geographic Magazine*, June 1898.

By permission of the National Geographic Society.

For some primitive Philippine tribes see Dean C. Worcester's paper, *ibid.* June 1898.

In the Coffee District of Celebes

Starting from Manado in a small carriage drawn by two oxen, passing by the little market-place of Negori-baru, and the nutmeg and vanilla gardens of some of the leading planters, we arrived at Lotta, our first halting-place, a distance of 6 miles, in about two hours. The road from Lotta to the next station, Tomohon, is very steep, and runs circuitously along the slopes of the Lokon mountains. Some of the views the traveller gets as he is slowly dragged along are extremely magnificent. At one spot the wide expanse of Manado Bay, with its deep blue waters and evergreen guardian islands, spreads out beneath his feet; at another the broad and fertile plains of the river valley, extending from the Lokon to the distant Klabat mountains, form a magnificent panorama of fine rich scenery; and a little farther on he passes along the brink of a deep ravine filled with lofty palms and other trees. In many ways this portion of the road between Lotta and Tomohon affords more magnificent views of hill and dale, of plains and distant mountains, of coast and sea than any I can remember to have seen. After a meal we proceeded on our way to Tondano, but as it was quite dark we saw nothing of the beautiful scenery of this part of the road. Tondano is a large and prosperous town situated on the banks of the river, which carries off the overflow waters of the great lake. It is the centre of the coffee district, and the wide fertile plains on the shore of the lake produce an abundance of rice and Indian corn to support the large and thriving population.

A coffee plantation is formed by clearing the forest with fire and axe, and then allowing a certain number of young wild trees to grow again until they reach the height of 10 or 20 feet. These trees are for the purpose of protecting the young coffee-trees from sun and heavy rain. The young coffee-trees are planted in circular beds about 6 feet in diameter, which are carefully kept clear of weeds. The coffee-berries are first of all allowed to germinate in properly sheltered and protected places, and the young seedlings, called the *bibits*, are then transplanted to the coffee-beds. If the *bibit* shows itself to be weak and sickly after twelve months' trial, it is taken up and a new one planted close to the same spot. A coffee-bed is not abandoned until it has been tried two or three times; and it is a curious fact that very often after two or three failures the same bed will support an exceptionally good tree. The coffee-trees are allowed to grow to the height of 6 feet, and then the tops are cut off, so as to strengthen the growth of the lateral branches which bear the fruit.

The most favourable soil for coffee is the rich black volcanic ash that covers the mountain slopes in many parts of North Celebes. The trees grow and produce fine large berries up to 4000 feet above the level of the sea. The finest and largest plantations are in the Tondano district, at a height of between 1500 and 2500 feet. First-class Manado coffee is said to be the finest the world produces.

A few years ago this district was quite free from that terrible scourge, the coffee-leaf disease, but it has since made its appearance. Besides this fungus disease coffee has many other enemies. Rats and mice seem to have a fancy for the succulent stalks of the berries when they are nearly ripe, and they nibble at them until the berries fall. The large, long-haired black rat is one of the worst offenders in this respect. In every garden there are a certain number of ordinary cats which have run wild. The natives are unfortunately very fond of cats, not as pets, but as articles of food, and it is consequently necessary to make it a strict rule in every plantation that the labourers are

not allowed to catch and eat them. Unless he knew beforehand the links in the chain, a stranger might be considerably puzzled should he be asked what harm it would do to the coffee if the natives were allowed to eat cats.

Professor SYDNEY J. HICKSON.—*A Naturalist in North Celebes.* Murray.

By permission of Professor S. J. Hickson.

"The chief town in Celebes is Makassar. Makassar is the first port steamers call at in their passage to the Moluccas. It is the centre of the trade with the Moluccas, and by far the most important port east of Java. It has been aptly termed the Hong-Kong of the Dutch in the East Indies. The country round Makassar is low and swampy, and the distant range of mountains, crowned by Bonthain (10,000 feet), famous for its coffee gardens, is frequently hidden in the dense mist that rises from the surrounding plains."—*Ibid.*

"'The principal street in Makassar, running parallel with the coast line, is nearly a mile in length, and very narrow all the way. In the business quarter of the town it is lined by the warehouses of the European merchants, a few good general shops, and the smaller Tokos of the Chinamen and Arabs. Here may be purchased all the products of the Moluccas, from such things as spice and copra, coffee and cacao, to living birds of Paradise."—*Ibid.*

For other accounts of Celebes, see WALLACE, *The Malay Archipelago.* Macmillan (1890 edition), pp. 162-218; and GUILLEMARD, *Cruise of the "Marchesa,"* pp. 288-335. Murray.

"East of Northern Celebes, and separated from it by 100 miles or more of deep sea, lie the Spice Islands. I had nearly said the Moluccas, but this name, restricted in former days to the little chain of volcanic islets lying off the western coast of Jilolo, of which Ternate is the chief, now includes all the islands between Celebes and the Papuan group. As far as regards magnificence of scenery Ternate is perhaps the finest harbour in the Dutch East Indies, for it boasts of two volcanic peaks, both of them about 6000 feet in height, which are of wonderfully graceful outline. That of the island of Tidor, which shelters the anchorage to the south, rises majestically from a mass of wild and gloomy-looking hills, but Ternate consists of the volcano alone, which leaves little room for the town to nestle at its foot. Eastward, across a wide strait, are the rugged mountains of the island of Jilolo, or Halmaheira as the Dutch call it, whose quaint and spidery shape is almost a replica of Celebes upon a small scale."—Dr. F. H. GUILLEMARD. *Cruise of the "Marchesa."* Murray.

The Home of the Nutmeg

Banda, the most eastern settlement of the Dutch, lies due south of Ceram, and about 60 miles distant from its coasts. For all practical purposes the group may be said to consist of the three islands which form the harbour, Gunong Api, Banda Neira, and Banda Lontoir. The latter is half-moon shape, and produces the nutmegs which for the past three centuries have made its name famous. Opposite its concavity lie the two islands almost touching one another, the first one being the volcano, the other having built upon it the town with its three old forts. The volcano is of insignificant size, little if at all above 2000 feet in altitude, but the bareness of its slopes, and the sharpness and regularity of the cone, make it look much higher. The summit has a crater about 120 yards across, and of no great depth. From it small clouds of steam arose in various places, and the stones around were thickly coated with layers of pure sulphur. A narrow creek, the Zonnegat, only navigable by small craft, separates Gunong Api from Banda Neira. Neira is about 2 miles in length, and with the exception of Papenberg or Flag Staff Hill, an abrupt jungle-covered rock of 700 feet which dominates the town, is of no great elevation. To this we one day climbed, a steep ascent through an almost uninterrupted series of nutmeg plantations. The view looking down upon the harbour was very beautiful. At our feet lay the town, the houses of the better class with red-tiled roofs, but all furnished with the snowy-white pillars and *stoeps* that are the leading characteristics of Dutch Malaysia. Across the land-locked harbour rose the steep precipices of Banda Lontoir, dark with the large forest trees, shading its nutmeg parks, and fringed with broad shores of sandy mud. Westwards we looked down on the Zonnegat, dotted with fishing *praus*, the slopes of the volcano rising steeply from its farther bank. Behind us, from the foot of an almost perpendicular cliff, the open sea stretched away to the horizon, with the little island of Suangi in the distance.

Although considerable quantities of nutmegs are grown upon Banda Neira, it is upon Banda Lontoir that they are chiefly cultivated. They are objects of export from many settlements in the vast possession of Holland in these seas, but nowhere do they grow to such perfection as in the Banda group, for the tree is here indigenous. All the year round, as seems fitting in these gardens of Eden, it is in fruit and flower, and any and every day the natives may be seen gathering the peach-like spice. This is done with a special instrument, a bamboo pole with a hook, and a basket near the top which catches the fruit as it is detached. The fleshy exocarp is for the most part wasted; the mace is removed and dried in ovens, and the nut is kept to dry, enclosed in its outer shell, until it is ready for export. The tree requires shade and protection, and is consequently grown beneath the lofty Kanari, the noblest nut-tree in the world.

Dr. F. H. GUILLEMARD.—*The Cruise of the "Marchesa."* Murray.

By permission of Dr. F. H. Guillemard.

"Few cultivated plants are more beautiful than nutmeg-trees. They are handsomely shaped and glossy leaved, growing to the height of 20 or 30 feet, and bearing small yellowish flowers. The fruit is of the size and colour of a peach, but rather oval. It is of a tough fleshy consistence, but when ripe splits open, and shows the dark-brown nut within, covered with the crimson mace, and is then a most beautiful object."—WALLACE. *The Malay Archipelago.* Macmillan.

"Were a traveller placed in any of these Dutch Malaysian villages, he would, I am sure, have no little difficulty in discovering his whereabouts for a moment or two, even if a native of the place. If he were to catch sight of the volcano, for there is always one close at hand, he would of course soon get his bearings, as he would too if he were to come across the whitewashed Harmonie, where the Dutchmen are drinking their *pijtjes.* But the streets themselves present an iteration of tropical vegetation and native huts, of bamboo-fenced compounds and low verandahed houses that would baffle even a resident."—Dr. F. H. GUILLEMARD. *The Cruise of the "Marchesa."* Murray.

Uses of the Sago Palm

The sago-tree is a palm, thicker and larger than the coco-nut tree, although rarely so tall, and having immense

pinnate spiny leaves, which completely cover the trunk till it is many years old. It has a creeping root stem like the Nipa palm, and when about ten or fifteen years of age sends up an immense terminal spike of flowers, after which the tree dies. It grows in swamps, or in swampy hollows on the rocky slopes of hills. The midribs of the immense leaves form one of the most useful articles in these lands. They are 12 or 15 feet long, and, when very fine, as thick in the lower part as a man's leg. They are very light, consisting entirely of a firm pith covered with a hard thin rind or bark. Entire houses are built of these; they form admirable roofing poles for thatch; split and well-supported they do for flooring, and when chosen of equal size, and pegged together side by side to fill up the panels of framed wooden houses, they have a very neat appearance, and make better walls and partitions than boards. The leaflets of the sago, folded and tied side by side on the smaller midribs, form the *atap* or thatch in universal use, while the product of the trunk is the staple food of some hundred thousands of men.

When sago is to be made, a full-grown tree is selected just before it is going to flower. It is cut down close to the ground, the leaves and leaf-stalks cleared away and a broad strip of the bark taken off the upper side of the trunk. This exposes the pithy matter, which is of a rusty colour near the bottom of the tree, but higher up pure white. This pith is cut or broken down into a coarse powder by means of a tool constructed for the purpose, a club of hard and heavy wood, having a piece of quartz rock firmly embedded into its blunt end, and projecting about half an inch. By successive blows of this narrow strips of the pith are cut away, and fall down into the cylinder formed by the bark. Proceeding steadily on, the whole trunk is cleared out, leaving a skin not more than half an inch in thickness. This material is carried away in baskets made of the sheathing bases of the leaves, to the nearest water, where a washing machine is put up, composed almost entirely of the sago-tree itself. The

large sheathing bases of the leaves form the troughs, and the fibrous covering from the leaf-stalks the strainer. Water is poured on the mass of pith, which is kneaded and pressed against the strainer till the starch is all dissolved and has passed through, when the fibrous refuse is thrown away, and a fresh basketful put in its place. The water charged with sago starch passes on to a trough with a depression in the centre, where the sediment is deposited, the surplus water trickling off by a shallow outlet. When the trough is nearly full, the mass of starch, which has a slight reddish tinge, is made into cylinders of about 30 lbs. weight, and neatly covered with sago-leaves, and in this condition is sold as raw sago. It is truly an extraordinary sight to witness a whole tree trunk, perhaps 20 feet long, and 4 or 5 in circumference, converted into food with so little labour and preparation. A good-sized tree will produce thirty *tomans* or bundles of 30 lbs. each, and each *toman* will make sixty cakes of three to the pound. Two of these cakes are as much as a man can eat at one meal, and five are considered a full day's allowance; so that, reckoning a tree to produce 1800 cakes, weighing 600 lbs., it will supply a man with food for a whole year. The labour to produce this is very moderate. Two men will finish a tree in five days, and two women will bake the whole into cakes in five days more; but the raw sago will keep very well, and can be baked as wanted, so that we may estimate that in ten days a man may produce food for the whole year. The effect of this cheapness of food is decidedly prejudicial, for the inhabitants of the sago countries are never so well off as those where rice is cultivated. Many of the people have neither vegetables nor fruit, but live almost entirely on sago and a little fish.

Dr. A. R. Wallace.—*The Malay Archipelago.* Macmillan.

By permission of Dr. A. R. Wallace and Messrs. Macmillan.

With these varied uses of the sago palm compare Dr. Wallace's account of the use of the bamboo, *ibid.* pp. 58-61 (1890 edition), and the accounts given in the present volume of the bamboo, p. 19, and of the coco-palm, p. 162.

II. NEW GUINEA

The Ascent of the Astrolabe Mountains[1]

STARTING at earliest dawn from the foot of one of the spurs leading towards the summit, our route at first lay along a steep grassy ridge, broken occasionally by gigantic outcrops of volcanic rocks, from a pile of which, at an altitude of about 2000 feet above the level of the sea, a magnificent panoramic view was obtained of the whole extent of fertile country between the mountains and the ocean, extending right and left, uninterrupted by any intervening object, until fading away into obscurity among the filmy hazes that hung around the far-distant horizon. So clear was the atmosphere that even our little craft lying at anchor could be plainly distinguished, and the Barrier Reef, whose irregular but seldom broken outline skirts the coast at a distance varying from one to five miles, appeared like a delicate tinted green ribbon, separated from the deep blue expanse of the Pacific Ocean only by a light fringe of snow-white foam. Leaving this spot, the ascending route lay through a dense jungle of tropical vegetation; rattan and flowering creepers being interwoven so closely among the heads of the lofty trees as in a great measure to exclude the light of day; and the ascent was rendered the more arduous in consequence of the obvious necessity for avoiding the various foot-tracks frequented by the natives dwelling in the numerous little hamlets scattered along the mountain side, who would

[1] Near Port Moresby.

doubtless have resented an intrusion on their domains. An hour or two's hard climbing brought us, about noon, to the foot of a precipitous and lofty cliff, which, extending for many miles along the crest of the range, appeared to bar further progress; however, after skirting the base of this obstacle for some considerable distance to the westwards, a narrow cliff worn by a mountain torrent was perceived, which Jack, the Kanaka, pronounced to be a practicable breach. After a severe tooth-and-nail struggle, during which numerous large boulders, dislodged from their temporary resting-places, thundered impetuously down the face of the precipice, crashing on until lost to sight and hearing through the tangled undergrowth of ferns and creepers, we succeeded in scaling the natural fortification, and reached the summit of the range, which was merely a narrow ridge crowned with lofty and densely foliaged trees. Continuing the ascent along the ridge in a westerly direction for a mile or two, the highest peak of the range, 3860 feet above the sea, was reached. Unfortunately at this elevation misty clouds almost obscured our view of the magnificent scene that lay far down beneath us, but Jack, climbing a tree that hung in a very threatening manner over the gulf below, perceived the smoke from several native fires, and roughly determined the best route for our descent to give them as wide a berth as possible. Animal life above the region inhabited by the natives seemed as scanty as vegetable life was prolific, as a single species of jungle fowl was the only living thing we met with near the summit. The descent at this spot was comparatively easy and rapid, on the way passing through a small cluster of deserted habitations, one of which was built in the fork of a tree at a considerable elevation from the ground, access thereto being only obtained by means of a rather flimsy-looking rattan ladder. No signs of recent habitation were seen about the place. A few banana-trees growing near bore ripe fruit, upon which a requisition was levied. Continuing the descent, towards evening we arrived at a small cluster of coco-nut

palms. Jack, whose agility in climbing rendered him quite independent of foot-bands as used by all the New Guinea natives that we came across, soon secured a supply of green nuts, whose contents we found very refreshing. About 9 P.M. we reached the camp, thoroughly worn out with fatigue.

J. H. SHAW.—*Proceedings of the Geographical Society of Australasia, New South Wales and Victorian Branches*, 1883-84.

"Nowhere have I seen more splendid and beautiful scenery than in New Guinea. As you pass along the coast it is a perfect feast of ever-changing panorama, range behind range of mountains, from the steep grass-covered sides nearest to the sea, with their deep valleys and watercourses, the forest-clad hills behind, to those far-distant inland giants, the Owen Stanleys, tier above tier, growing fainter and more mist-like as they tower above and behind one another. At portions of the passage, vast precipices start out as if from the sea, sheer walls from 1000 to 1500 feet in height, with those purply masses again receding and melting into mid-heaven."—HUME NISBET. *A Colonial Tramp.* Ward and Downey.

For the Great Barrier Reef, see pp. 43-46.

A New Guinea Tribe (Port Moresby District)

The Motu are a maritime race, and depend chiefly upon fishing for a livelihood. The labour of cultivating the plantations devolves on the females, but the sterile and stony soil in the vicinity of Port Moresby rewards their efforts with but scanty and uncertain crops of yams and bananas. Among the other duties they have to perform is carrying wood and water, which latter is carried in large spherical earthenware vessels, of which a great number are made by the women for trading purposes. The clay, which is of a peculiar nature, and only to be obtained at a considerable distance from the village, is first pounded to a powder in a wooden trough, made from a worn-out canoe; water is then added, and the mass worked to the required consistence; it is then moulded over the lower half of a pot already completed, and fashioned with the hands and a small flat stick into a hemispherical form. This shape is used principally to contain food. If, how-

ever, it is desired to manufacture the globular kind, two of these bowls are placed while still soft with their edges in contact, these are united by merely patting the joint

POTTERY-MAKING, PORT MORESBY.

with the wooden spatula before mentioned until it disappears and a complete junction is effected ; an aperture is then made at the top, a rim being moulded from the material extracted. The diameter of this mouth varies according to the objects for which the vessel is intended to be used, being considerably larger for cooking purposes

than merely to contain water. After the required shape is obtained a fire of grass and light sticks is built about the pots; when sufficiently baked they are glazed by being dressed while hot with a decoction prepared from the bark of the mangrove.

With the exception of fishing, hunting is the only occupation which a Motu warrior does not consider beneath his dignity to follow. Kangaroos and wild pigs are the principal objects of pursuit. The spear is the national weapon both for the chase and war.

The Port Moresby canoes, compared with those of the natives occupying the seaboard to the eastward and westward, are rather primitive examples of naval architecture, being merely logs hollowed out with stone tomahawks and fire. The smaller ones, used for fishing, are rather lighter in construction and more shapely than the others described below; they are fitted with an outrigger of buoyant wood, to impart the requisite stability, on the poles connecting which with the dug-out is a light framework, which serves to carry such articles as would be injured by water. One or two narrow grass mat sails bent between parallel poles, which act as masts, are often set, but unless the wind is fair they are not of much service. The paddles are very roughly fashioned, their blades being generally of an oval elongated form. Towards the close of the dry season the natives of this part of the coast prepare for their annual trading voyage to the Elema district, where they barter their earthenware pottery and surplus supplies of hoop-iron, beads, and other "trade," obtained from the missionaries and casual visitors, for canoes, and last, but not least, large supplies of rather crudely prepared sago, which is the staple product of the low-lying, swampy region at the head of the great Papuan Bight. They also obtain a stock of native-grown tobacco. The large canoes, used only on these expeditions, run from 40 to 50 feet long, and are a yard or so in depth and beam. Often as many as twelve or fifteen of these uncouth dug-outs are lashed securely side by side with strong cables of rattans. Almost the

entire surface of the gigantic raft thus formed, which is further extended by a light and encircling platform, is enclosed by a seven-foot wall of neatly but strongly constructed palm-leaf thatchwork. The ends of this enclosure nearest the extremities of the supporting canoes are covered in by a slightly pitched skillion roof of similar construction, under shelter of which are the stores and quarters for the numerous crew, which comprises both sexes and several children. A small pen for live stock, in the form of pigs, occupies the centre of the court. Two masts, stepped abreast, about 18 or 20 feet high, support the large and heavy mat sails, which in general outline resemble a huge crab's claws. When all is ready for sailing westward ho! a grand festival is held by the natives, who on these occasions manœuvre their unwieldy argosies about the harbour, handling them with a skill and adroitness that their unshipshape appearance little suggests, tacking backwards and forwards abreast of the principal villages, with long streamers of stained cloth, manufactured from a fibrous bark, floating from the mastheads and lofty peaks of the grotesque-shaped sails, and steered with long paddles by men situated at the rear end of each of the several canoes that support the quaintly picturesque floating village. On the platform extending over the water groups of young girls, attired in their gayest native dress, and adorned with the bright scarlet blossoms of the hibiscus, dance merrily to the sound of the iguana-skin-covered, hour-glass-shaped drums, and the monotonous but not unmusical chant of the dusky warriors. As with all native fetes, a feast closes the entertainment. Before the close of the rainy season the trading canoes return, if successful, laden with the fruit of their owners' simple commerce; the voyagers are welcomed with great rejoicings, and for some time sago is plentiful in the land; but it not unfrequently happens that serious disasters both afloat and ashore overtake the adventurous mariners, and the dispirited survivors, returning empty-handed, are greeted with wailings and woe in place of the usual

rejoicings, and fasting, rather than feasting, is for some time the order of the day.

The villages inhabited by the Motu are situated invariably in the vicinity of salt water, their dwellings being generally elevated about breast high on numerous rather slender crooked piles, driven into the shingly beach a little below high-water mark, the tide, assisted by a numerous pack of mangy half-starved curs peculiar to the island, and a few domesticated pigs, also of an indigenous species, being the principal sanitary institution. The houses are roomy and neatly constructed, the walls and roofs being thatched with the leaf of the coco-nut or pandanus, the floor being composed of rough slabs, cut from the sides of worn-out unseaworthy canoes. Strips of bamboo, when procurable, are sometimes used for this purpose. The villages, which consist as a rule of from one to three score of these dwellings, are sheltered by a dense and gloomy grove of coco-nut palms, under the cool shade of whose closely interwoven fronds they inter their dead in shallow graves, often marked by large shells and variegated crotons, or the broken weapons and cooking utensils of the deceased.

ALEXANDER MORTON.—*Proceedings of the Geographical Society of Australasia, New South Wales and Victoria Branches*, vol. i. 1883-84.

It is interesting and valuable to compare the arts and mode of life here described with that of other primitive races. See, for example, pp. 16-19 ; 157-179.

III. AUSTRALIA

Surf on the Great Barrier Reef

THE Reef was about a quarter of a mile wide, and ran nearly due north and south for several miles. It appeared indeed to stretch to the horizon in both directions, the breaks in its continuity being so narrow as to be barely perceptible. A fresh breeze was blowing from the south-east, and rather a heavy sea running outside. The water was perfectly clear, and of great and almost unfathomable depth right up to the outer slope or submarine wall of the reef. The long ocean swell being suddenly impeded by this barrier, lifted itself in one great continuous ridge of deep blue water, which, curling over, fell on the edge of the reef in an unbroken cataract of dazzling white foam. Each line of breaker was often one or two miles in length, with not a perceptible gap in its continuity. After recovering from this leap, and spreading for some distance in a broad sheet of foam, the wave gradually swelled again into another furious breaker of almost equal height and extent with the first, and then into a third. Even then the force of the swell was not wholly expended, two or three heavy lines of ripple continually traversing the reef, and breaking here and there against the knobs and blocks of coral that rose higher than usual. There was a simple grandeur and display of power and beauty in this scene that rose even to sublimity. The unbroken roar of the surf, with its regular pulsation of thunder, as each succeeding swell first fell on the outer edge of the reef, was almost deafening,

yet so deep-toned as not to interfere with the slightest nearer and sharper sound, or oblige us to raise our voices in the least. Both the sight and the sound were such as to impress the mind of the spectator with the consciousness of standing in the presence of an overwhelming majesty and power, while his senses were delighted by the contrast of beautiful colours afforded by the deep blue of the ocean, the dazzling white of the surf, and the bright green of the shoal water on the reef.

J. B. JUKES.—*Narrative of the Surveying Voyage of H.M.S. "Fly."* Boone.

For a detailed account of the Great Barrier Reef, see *ibid.* vol. i. pp. 311-348.

The Wonders of a Coral Reef

I had hitherto been rather disappointed by the aspect of the coral reefs, so far as beauty was concerned, and though very wonderful, I had not seen in them much to admire. One day, however, on the lee side of one of the outer reefs, I had reason to change my opinion. In a small bight of the inner edge of this reef was a sheltered nook, where the extreme slope was well exposed, and where every coral was in full life and luxuriance. Smooth round masses of mæandrina and astræa were contrasted with delicate leaf-like and cup-shaped expansions of explanaria, and with an infinite variety of branching madreporæ and seriatoporæ, some with mere finger-shaped projections, others with large branching stems, and others again exhibiting an elegant assemblage of interlacing twigs of the most delicate and exquisite workmanship. Their colours were unrivalled; vivid greens contrasting with more sober browns and yellows, mingled with rich shades of purple, from pale pink to deep blue. Bright red, yellow, and peach-coloured nulliporæ clothed those masses that were dead, mingled with beautiful pearly flakes of eschara and retepora, the latter looking like lacework in ivory. In among the branches of the corals, like birds

GREAT BARRIER REEF.

among trees, floated many beautiful fish, radiant with metallic greens or crimsons, or fantastically banded with black and yellow stripes. Patches of clear white sand were seen here and there for the floor, with dark hollows and recesses, beneath overhanging masses and ledges. All these, seen through the clear crystal water, the ripple of which gave motion and quick play of light and shadow to the whole, formed a scene of the rarest beauty, and left nothing to be desired by the eye, either in elegance of form, or brilliancy and harmony of colouring. I spent a long time at low water wading about on the higher pinnacles of coral, and collecting specimens. These, however, when dry, lose half their beauty, from losing all their colour, which seems to belong wholly to the animal matter. Madrepore branches, the living tips of which were of rich blue, gradually faded towards the dead base, into the yellowish white of the corals and museums at home. Unfortunately the finest and most beautiful specimens require so much space, both to dry them at first, and to pack them in afterwards, that their transport is impossible.

J. B. Jukes.—*Narrative of the Surveying Voyage of H.M.S. "Fly."* Boone.

"I was not prepared to find such brilliancy and variety of colour on the reefs. The madrepores, which in the dried collection are uniformly white, in the living state are of a bright olive-brown colour, with growing points and polypes of bright emerald-green or violet, and the pale yellow or white starfishes of our museums seem to be studded here with rare jewels, which shine and sparkle with all the colours of the rainbow."—S. J. Hickson. *A Naturalist in Celebes.* Murray.

Two particularly good descriptions of the wonders of a coral-reef have been written by Miss Gordon Cumming, that of the Fiji reef in *At Home in Fiji.* Blackwood. Vol. i. pp. 66-70; and of the still richer coral reef of Tahiti in *A Lady's Cruise in a French Man-of-War.* Blackwood.

Vegetation of Australia

There are three great climatic zones in which the vegetation of the continent flourishes—the *tropical*, the *temperate*, and *Alpine*. These, in their turn, may be divided into

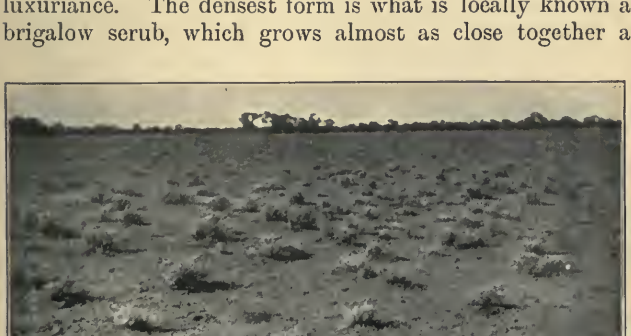
several sub-regions, denoting the character and variety of plant life.

The vegetation of the tropical coastal region flourishes with greater luxuriance than in any other subdivision of the first-named zone. The same may be said of the temperate zone. The reason for this is not far to seek. Here the rainfall is far greater than in any other portion of the continent, and the soils are rich; consequently the conditions are most favourable for the vigorous growth of plants. The wealth of the tropical forest is everywhere apparent in the stately and thickly foliaged timber trees; the impenetrable scrubs of dense vines, and other varieties; the innumerable types of lower forms of plants and profusion of the most lovely orchids. The gums predominate, but there are numerous other species, which include valuable cedar-trees, a variety of figs, and many timbers of great commercial value. This tropical flora, besides its peculiar Australian character, includes, in the northern and eastern continental regions, several Indian, Malayan, and Polynesian forms, chiefly represented by the screw pines, the mangroves, the bamboos, orchids, and several varieties of palms. The dense vine and other varieties of tropical scrubs are perhaps the least valuable of all the forms of vegetation. They cover extensive areas of country, and form a tangled mass of the densest possible description, into which it is impossible for invading man to penetrate. These scrubs have always effectually blocked the onward march of the explorer, and impede the progress of the land surveyor so greatly that he is paid an additional allowance of a hundred per cent for lines in them, and even this remuneration does not "pay," for progress is painfully slow and the labour of cutting the lines is great. The scrub lands are remarkably fertile, and when denuded of the mantle of vegetation to which they supply abundant nourishment they are capable of growing phenomenally heavy crops of many kinds of cultivated products. The scrub is apparently a valley-loving form of vegetation, invading the undulating lands and plains of the sea-board, and only occasionally in-

truding up the range and mountain slopes in localities where the rainfall is abnormal and the air excessively humid. The scrub areas are never free from dampness, even during the dry season, consequent upon the dense nature of the vegetation, which effectually excludes the solar rays. No plant is more unwelcome to the bushman than the dreaded "lawyer" vine, armed as it is with sharp, powerful spines that strike downwards and are curved inwards. This vine grows in the form of a dense tangled mass, from which it would be most difficult to extricate the unwary traveller who might happen to come in contact with it.

The flora of the interior sub-region of the tropical zone is not remarkable for vigour of growth, the forests being comparatively open, the interspersed grass areas fairly numerous and moderately extensive, and the timber trees having a slightly dwarfed appearance. The absence of a copious rainfall is fully apparent in the general condition of the vegetation of this inland belt. The luxuriant undergrowth, which might naturally be expected in a climate essentially tropical, is mostly absent, and the surface soils have a dry, unfertile appearance, which detracts greatly from the beauty of the landscape. These existing features are all the more noticeable in localities where there is an occurrence of the desert sandstone, to which the lack of natural fertility may in some measure be attributed. Generally speaking, this class of country is suitable for grazing purposes, and it extends with some notable variations over the entire central basin, into the temperate zone, and across the continent to a portion of the west coast-line; again south to the head of the Great Australian Bight, embracing the whole of the vast inland territory, except the desert region. The variations consist chiefly of the distribution of the vegetation and the denuded surface patches that are met with in remote places. On the great western plains of New South Wales and Queensland, for instance, the continuity of the forest is broken, and the timber trees are replaced by

extensive areas of grass and other short herbage, interspersed with small belts or clusters of stunted forest growths and patches of scrub. These last-named forms differ in character from the coastal scrubs in that they are not so dense and formidable, consisting as they do mostly of dwarfed varieties of acacias, existing under climatic conditions not always highly favourable to remarkable luxuriance. The densest form is what is locally known as brigalow scrub, which grows almost as close together as



SALT-BUSH IN QUEENSLAND.

the vine species, and when an opening is cut through it the appearance of a high-walled avenue is suggested. The explorers' mulga scrub, of ill-repute, is a sharp, spiny, hardy plant, found growing in the form of irregular bushes that spread out laterally and occur over very extensive tracts of the interior. Still more persistent in growth and wide geographical distribution is the dreaded spinifex (*Triodia irritans*)—an irritating and animal-torturing grass, with rigid, sharp-pointed leaves that inflict painful wounds on the feet and legs of horses and other beasts of burden commonly used in the field of exploration. Many, indeed,

are the sad and pitiable tales that have been told by the hardy pioneers of our country of hardships endured whilst traversing the terrible spinifex regions. This porcupine grass, sometimes so called, is a lover of waste lands, where water there is none, and flourishes in the arid sandy and rocky country where little else can grow. The appearance of such a region so destitute of other varieties of plant life is most uninviting.

The salt-bush plains consist of widely distributed areas of low-lying country clothed with a saline vegetation, rather stunted, fairly nutritious, and useful as a fodder plant when grass is scarce. The vast rolling downs and meadow-like plains of Eastern Australia support a rich herbage, consisting of an almost endless variety of grasses, upon which the immense flocks and herds of the squatting industry feed and thrive. Probably no country in the world produces such a number of different varieties of fodder plants as are met with in this portion of the continent. It is reckoned that of the three hundred and sixty kinds of grasses in Australia about three-fourths are met with in Queensland alone. A very interesting feature of this class of vegetation is exhibited in the remarkable vitality of the herbage. During periods of protracted drought the general appearance of the surface conditions of the ground impresses one with the idea that the grasses have been completely annihilated, and it is only after the first shower of rain that the deception quickly disappears. Then it seems as if some magical transformation had taken place in the restoration of the plant life.

The eastern and southern sub-region of this temperate zone is thickly timbered with most luxuriant sub-tropical forests, in which many varieties of the genus eucalyptus are highly developed. First of all, there are the monarchs of the forest, the giant "white gums" of the Dandenong Range (*Eucalyptus Amygdalina*). Many of the white gums that adorn the gullies and slopes of the Dandenong Range,[1] and impart to the local landscape its most striking feature,

[1] South-east of Melbourne.

are over 420 feet in height, and one mighty fallen monarch across a narrow ravine measured 480 feet in length. This latter had about 20 feet of the top broken off, so that in all probability the full height of the tree had been about 500 feet in round figures. The noble *Eucalyptus diversicolor* of the western side of the continent is little inferior in dimensions to its graceful congener of the south-eastern side, numerous examples having been found to reach fully 400 feet in height. Of the numerous species of the genus eucalyptus none are perhaps of greater value medicinally than the *Eucalyptus globulus*, from which the valuable eucalyptus oil of commerce is derived. . . . Most of the gum trees, I should think, possess antiseptic properties. In Australia the eucalyptus is represented by something like 160 species, and these are distributed over almost the entire length and

TIMBER-CUTTING (KARRI).

breadth of the continent. The timbers of the jarrah, the karri (*Eucalyptus diversicolor*), the red gum, the stringy-bark, and many other species, are of great commercial value. The timber produced by the jarrah tree (*Eucalyptus marginata*) is now in great demand for street-paving purposes, it having been found, after repeated tests, to be a hard wood of great durability. It occurs in Western Australia, where there are extensive forests of it.

The *Eucalyptus dumosa* grows in the form of a thick scrub, occupying extensive areas of the southern part of the continent. Locally it is familiarly known as the mallee scrub, and it covers a very large tract of country in the western districts of Victoria, and another one, of some 9000 square miles, in the lower basin of the Murray River, within the province of South Australia. When viewed from an eminence the dark-brown foliage of this dense mass of vegetation somewhat resembles a great sea, extending far away to the horizon, with a wavy aspect corresponding with the surface undulation of the ground.

The Alpine flora of the continent is restricted in range to the lofty mountains of Victoria and New South Wales.

Besides the more remarkable types to which I have alluded, the vegetation of Australia includes many others very striking in appearance. For instance, the peculiar bottle-tree, so appropriately named, is, in my opinion, one of the greatest novelties of the flora of the country. Its trunk is greatly bulged out, and from the middle it tapers to a narrow neck, from which the branches radiate. This tree is a lover of the inland tableland regions, where the sandstone formation is developed, and when once seen can never be mistaken.

Altogether there are probably about 10,000 species of flowering plants and ferns in Australia, many of which are very beautiful in variety of colour and luxuriance of growth. Most of the orchids are exquisitely lovely, strange in form, and very highly valued. But of all the lovely flowers that bloom, the giant "rock-lily" is perhaps

the most interesting, producing as it does an enormous flower-stalk of considerable height. The beautiful acacias are represented in Australia by about 300 species, a number of which constitute many of the various scrubs that form so conspicuous a feature of the landscape scenery.

J. P. THOMSON.—*Scottish Geographical Magazine.* February 1903.

By permission of the Royal Scottish Geographical Society.

Aspects of the Australian Landscape

The extreme uniformity of the vegetation is the most remarkable feature in the landscape of the greater part of New South Wales. Everywhere we have an open woodland, the ground being partially covered with a very thin pasture, with little appearance of verdure. The trees nearly all belong to one family, and mostly have their leaves placed in a vertical instead of, as in Europe, in a nearly horizontal position; the foliage is scanty and of a peculiar pale green tint, without any gloss. Hence the woods appear light and shadowless; this, although a loss of comfort to the traveller under the scorching rays of summer, is of importance to the farmer, as it allows grass to grow where it otherwise would not. The leaves are not shed periodically; this character appears common to the entire southern hemisphere. The inhabitants of the southern hemisphere thus lose perhaps one of the most glorious, though to our eyes common spectacles in the world, the first bursting into full foliage of the leafless tree. The greater number of the trees, with the exception of some of the blue gums, do not attain a large size, but they grow tall and tolerably straight, and stand well apart. The bark of some of the eucalypti falls annually, or hangs dead in long shreds, which swing about with the wind, and give to the woods a desolate and untidy appearance.

CHARLES DARWIN.—*Voyage of H.M.S. "Beagle" round the World.* Ward and Lock.

Another Australian traveller sees the vegetation of Australia in a more pleasing light. "On a near examination, however, this vegetation is discovered to possess much gracefulness in the form both of species and of individual trees, and many delicate or minute shades in its verdure, which, combined with the ever-changing ash-grey colour of the bark of the eucalyptus, the undulating and often broken surface upon which it thrives, and the resplendent sky above, present a world of interest and attraction. Frequently it is so grouped as to exhibit contrasts of surpassing beauty, the more striking because they are abrupt and little expected. Amid the apparent sameness of the forest may be often found spots teeming with a gigantic and luxuriant vegetation, sometimes laid out in stately groves, free from thicket or underwood, sometimes opening on glades and slopes intersected with rivulets and carpeted with the softest turf. Sometimes, again, the forest skirts an open country of hill and plain, gracefully sprinkled with isolated clumps of trees, covered with the richest tufted herbage, and enamelled with flowers of varied form and colour; or it is lost in immense thickets, where innumerable flowering shrubs, and elegant interwoven creepers, form bowers as impenetrable and picturesque as those seen in the forests of Brazil."—P. E. de Strzelecki. *Physical Description of New South Wales.* Longmans.

Marcus Clarke, the Australian novelist, in a justly-praised and often-quoted passage, presents a third aspect of the scenery of his country: "What is the dominant note of Australian scenery? That which is the dominant note of Edgar Allan Poe's poetry,—weird melancholy. A poem like *L'Allegro* could never be written by an Australian. Mountain forests are funereal, secret, stern. Their solitude is desolation. They seem to stifle in their black gorges, a story of sullen despair. No tender sentiment is nourished in their shade. In other lands the dying year is mourned, the falling leaves drop lightly on his bier. In the Australian forest no leaves fall. The savage winds shout among the rock clefts. From the melancholy gum strips of white bark hang and rustle. The very animal life of these frowning hills is either grotesque or ghostly. Great grey kangaroos hop noiselessly over the coarse grass. Flights of white cockatoos stream out, shrieking like evil souls. The sun suddenly sinks, and the mopokes burst out into peals of semi-human horrible laughter. From a corner of the silent forest rises a dismal chant, and around a fire dance natives painted like skeletons. All is fear-inspiring and gloomy. No bright fancies are linked with the memories of the mountains. Hopeless explorers have named them out of their sufferings—Mount Misery, Mount Dreadful, Mount Despair.

. . . . . .

"In Australia alone is to be found the grotesque, the weird, the scribblings of Nature learning how to write. Some see no beauty in our trees without shade, our flowers without perfume, our birds who cannot fly, and our beasts who have not yet learned to walk on all fours. But the dweller in the wilderness acknowledges the subtle charm of this fantastic land of monstrosities. He becomes familiar with the beauty of loneliness. Whispered to by the myriad tongues of

the wilderness, he learns the language of the barren and uncouth, and can read the hieroglyphs of haggard gum trees, blown into odd shapes, distorted with fierce, hot winds, or cramped with cold nights, when the Southern Cross freezes in a cloudless sky of icy blue. The phantasmagoria of that wild dreamland called the bush interprets itself, and the poet of our desolation begins to comprehend why free Esau loved his heritage of desert better than all the bountiful riches of Egypt."—MARCUS CLARKE. *Introduction to the Poems of the late Adam Lindsay Gordon.*

A Glimpse of Australian Animal Life

It is not till the new arrival gets away into the bush that he realises that he "holds his head to other stars and breathes in converse seasons." The forest is full of strange trees and the sounds of birds are unfamiliar. The sweet songsters of the English meadows and hedgerows he will undoubtedly miss, but he will find a compensation for the loss of their voices in the many novelties which awaken his interest. With the great grey marsupial, rearing itself on hind legs and tail to look at him with its gentle timid face, he is already probably familiar, the kangaroo being a striking specimen in so many zoological collections of the Northern Hemisphere. If the observer has a strong dog with him and is fairly mounted, he may look for half an hour's excitement before he amputates that huge caudal appendage for to-morrow's soup. The strong cord-like sinews, which give the tail its power, impart a glutinous quality to the soup made from it which is most palatable and nutritious. The fragrant mimosa scents the air. Great eucalypts spread their huge arms overhead, giving but a scanty shade, however, with their narrow hard leaves, and among them, like a flash, dart bright-plumaged paroquettes, while high over their topmost boughs a flock of white cockatoos go screaming homewards to some distant scrub. If our visitor carries a gun, he will probably be attracted to the creek, the course of which is indicated by the dark ti-trees and other shady foliage marking its serpentine course. Wild fowl abound on all these waters,

black duck, teal and widgeon, the delicious little pigmy goose and the stately black swan, though the last named is more often met with on the swamps and large open lagoons than in sheltered creeks. Supposing our visitor approaching the creek noiselessly to secure a murderous discharge into some bank of duck, we can imagine him suddenly arrested in his advance to watch, with wondering curiosity, the antics of the little denizens of the pool. Swimming about and emerging to dive quickly in again are several little creatures not much larger than an English mole, with dense fur and a duck's bill. This is one of Nature's greatest curiosities, the platypus, the link connecting the marsupials with the reptiles. The ducks, meanwhile, have sprung into the air before he has recovered from his astonishment, and after wheeling once or twice have made for their night feeding grounds in the neighbouring marsh. Hither, probably, our sportsman is also attracted, and, standing hidden among the reeds to await the flight time, when the wild fowl will come in rapid detachments to their feeding ground, he is able to admire the great native companion—a stork 5 feet high with dove-coloured body and red head—as he wades along the margin in search of frogs, or the pelican as he glides in slow circles over the lagoon which forms a centre to the marsh, in quest of his evening meal of fish. If our traveller has gone out to the Great Western Plains, other strange sights will interest him. For miles in every direction the great prairie heaves in gentle undulations, richly clad with the deep-rooting grasses which alone are capable of withstanding the rainless months experienced every year. A couple of miles away a line of eight or nine black dots apprise him that a flock of emus are in sight. If he is without a stout dog, it is not much use to gallop after them, but, being a new arrival, he is sure to put his horse into a canter and prepare for the chase. The emu's chief weakness is curiosity, and the birds will run round uneasily as he approaches, stopping now and then to regard his movements with a timid uncertainty. If he reins in and

stands motionless, they will probably circle round him with great swiftness, coming within 20 or 30 yards, so that he can see the startled expression of their large dark eyes and admire the wonderful grace of their movements, before they finally turn and continue their flight beyond the horizon. As he rides along he will see the plain turkey or Australian bustard, warily watching him as it sidles away through the grass or spreads its great wings to look for grasshoppers at a safer distance. This bird is excellent eating, and weighs as much as 20 lbs. It is in great abundance on the Western plains. The scrubs on the coast-side of the range also yield the sportsman excellent bags of great variety. There are many varieties of pigeons, the wonga and the gorgeous painted pigeon being the most prized. As our sportsman pushes his way through the thick tangle of undergrowth and creepers he is possibly surprised to come upon a freshly-made mound 4 or 5 feet in height, and from 15 to 20 feet in circumference. He will be astonished to learn that this is a bird's nest. The scrub turkey, an excellent table bird rather smaller than the fowl-yard specimen, constructs this great mound in which to deposit its eggs, which are hatched by the sun. Strange forms of life are interesting to any observer, but doubly so to the naturalist and man of science, and such will find an entrancing field of investigation.

The Work and Wealth of Queensland. Outridge and Co., Brisbane. 1897.

The Murray River

The primary source of the Murray River proper is in the western face of the Australian Alps, at the union of the two lateral spurs by which it is flanked on the east and west, about 20 or 30 miles north of Mount Kosciusko, whose peak of 7300 feet above sea-level marks the culminating point of the great southern Cordillera. It flows southerly between these spurs or mountain ranges,

skirting the north-western base of Kosciusko, where it sweeps towards the north-west and joins the Indi River, whose source is within the Victorian territory. The head of the upper valley of the river is characterised by the presence of a network of tributary streams or feeders spreading out like the branches of a great tree, through whose sharply-sloping and precipitous channels the thawed waters of the snow-capped ranges sweep in mighty torrents to the lower regions of the valley. The physical aspect of this part of the country is wild and rugged; heavy snow-storms, violent gales, and blinding sleet being the ruling climatic features of this great Alpine chain, whose western and northern waters cut deep into the granitic and metamorphic rocks of the range, forming steep and precipitous gorges, yawning chasms, and tortuous channels, ever deepening by the erosive action of the troubled waters of many streams. The Murrumbidgee, although one of the tributaries of the Murray, is little inferior to that stream itself. Emanating from its source in the elevated tableland at the base of Peppercorn Hill, some 5000 feet above sea-level, it traverses a tract of country possessing some remarkable features of natural beauty, especially in its upper valley, where the mountains are steep and rugged, and the lateral valleys deep and precipitous. Below this region the river flows through the celebrated Riverina district, where its flood waters often spread out over large level areas in the neighbourhood of numerous shallow watercourses which act as local distributors. In seasons of severe drought it is nearly dry in some parts of the channel, even as far down as Hay, where the bottom is sandy and consequently highly absorbent. Its principal affluent is the Lachlan, a stream of about 700 miles in length, rising in the rugged western spurs of the Great Dividing Range, north of Lake George. The highest part of its basin is about 3000 feet above sea-level, where snow seldom falls in sufficient quantities to materially influence the flow of the river. The lower valley embraces long stretches of level plains, interspersed with belts of stunted gum, mallee and salt-

bush; and in dry seasons the channel of the stream is indicated by a mere chain of water-holes with outspread arms of unequal length that extend far and away to sources remote from the parent stream. The River Darling drains the western and southern waters of the Great Dividing Range from the head waters of the Lachlan to a place slightly north of the twenty-fifth parallel, where it is met by Bucklands Tableland. Here the watershed inclines in a somewhat irregular curve westerly, following the Warrego Range to a point north-east of Mount Edinburgh, which marks its north-western limit. Including its longest tributary, the Culgoa or Condamine, whose source is in the western flank of Wilson's Peak (4032 feet) in the neighbourhood of Killarney, the total length of the Darling is about 1953 miles to its junction with the Murray at Wentworth; thence to the sea through Lake Alexandrina for 587 miles.

J. P. Thomson.—*Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia.* Vol. x. Session 1894-95.

"There is no part of Australia claiming an individuality more complete than Riverina; and under this name may be included the great plains stretching to north and south from the Murray River. Who that has ridden across the Old Man Plain, and wondered when the placid sea of grass would curl into a billow, or the sail of an inland ship, the hawker's white-ridged waggon, break against the blue sky-line, needs any description of it? This waste land without limits, summer bleached and desolate, the monotonous chaos of these endless plains, leaves impressions that can never be effaced. What Nature gives, she gives in plenty here. The clumps of box-gums clinging together for sympathy; the desert acacias; the weeping myalls standing singly out on the plain: these are cast lavishly over hundreds of miles. The free open life in this lone land has a charm for many men, and they stick to it as long as they can manage to climb into a saddle."—Donald Macdonald. *Gum Boughs and Wattle Bloom.* Cassell and Co.

"Nowhere in Australia will a shower of rain effect a transformation more rapid and complete than in Riverina. One week there is a barren waste stretching league upon league, the next a thick green carpet of succulent herbage. Where not even a withered wisp of kangaroo grass appeared a few days since there are now beautiful plots of rare summer grass. If Riverina bore such a crop everywhere the pastoralists would

be rich, and salt-bush would be a despised plant by comparison. Along the banks of the watercourses, that not long since were merely dry depressions in the land, wild melons are springing and spreading so rapidly as to give the place the appearance of a garden."—*Ibid.*

The Gates of the Murray

Hawker set spurs to his horse, and pushing through the contracted barriers of slate which closed up for the southern end of the amphitheatre, made for the broader and rapidly rising valley which stretched beyond. He soon reached the rocky gate, where the vast ridge of limestone, alternating with the schist, and running north and south in high serrated ridges, was cut through by a deep fissure, formed by the never-idle waters of a little creek, that in the course of ages had mined away the softer portions of the rock and made a practicable pass towards the mountains. He picked his way with difficulty through the tumbled boulders that lay in the chasm; and then there was a cool brisk wind on his forehead and a glare in his eyes. The chill breath of the west wind from the mountain, the glare of the snow that filled up the upper end of the valley, rising in level ridges towards the sky line. He had been in this path before; and if he had gone it a hundred times again he would only have cursed it for a rough desperate road, the only hope of a desperate man. Not for him to notice the thousand lessons that the Lord had spread before him in the wilderness! not for him to notice how the vegetation changed when the limestone was passed, and the white quartz-reefs began to seam the slaty sides of the valley like rivers of silver! Not for him to see how, as he went up and on, the hardy *Dicksonia*[1] still nestled in stunted tufts among the more sheltered side gullies, long after her tenderer sister the queenly *Alsophylla*[1] had been left behind. He only knew that he was a hunted wild beast, and that his lair was beyond the snow. The creek flashed pleasantly among the broken slate, full and

[1] Two species of fern-trees.

turbid under the mid-day sun. After midnight, when its fountains are sealed again by the frosty breath of night, that creek would be reduced to a trickling rill. His horse's feet brushed through the delicate asplenium, the Venus' hair of Australia ; the sarsaparilla still hung in scant purple tufts on the golden wattle, and the scarlet Correa lurked amongst the broken quartz. Upwards and onwards. In front, endless cycles agone, a lava stream from some crater we know not of, had burst over the state, with fearful clang and fierce explosion, forming a broad roadway of broken basalt up to a plateau 1200 feet or more above us, and not so steep but that a horse might be led up it. Let us go up with him, not cursing heaven and earth, as he did, but noticing how, as we ascend, the scarlet wreaths of the *Kennedia* and the crimson *Grevillea* give place to the golden *Grevillea* and the red *Epacris ;* then comes the white *Epacris*, and then the grass-trees, getting smaller and scantier as we go, till the little blue gentian, blossoming boldly among the slippery crags, tells us that we have nearly reached the limits of vegetation.

He turned when he reached this spot, and looked around him. To the west a broad rolling down of snow, rising gradually ; to the east a noble prospect of forest and plain, hill and gully, with old Snowy winding on in broad full curves to the sea. He looked over all the beauty and undeveloped wealth of Gippsland,[1] which shall yet, please God, in the fulness of time, be one of the brightest jewels in the King of England's crown, but with eyes that saw not. He turned towards the snow, and mounting his horse, which he had led up the cliffs, held steadily westward. His plans were well laid. Across the mountains, north of Omeo, not far from the mighty cleft in which the infant Murray spends his youth, were two huts erected years before by some settlers and abandoned. In these huts Hawker intended to lie by for a short time, until he could make his escape northwards. Onward across the

[1] The scene of the novel from which this extract is taken is laid in the middle of last century.

slippery snow! At first a few tree stems, blighted and withered, were visible right and left. Then even these disappeared, and all round was one white blinding glare. To the right the snow-fields rolled up into the shapeless lofty mass called Mount Tambo, behind which the hill they now call Kosciusko began to take a crimson tint from the declining sun. Far to the south, black and gaunt among the whitened hills, towered the round hump of Buffalo, while the peaks of Buller and Aberdeen showed like dim blue clouds on the furthest horizon. Twilight, and then night, and yet the snow but half past. There is a rock in a hollow, where grow a few scanty tufts of grass which the poor horse may eat. Here he will camp.

Morning! Long shadows of horse and man are thrown before him now, as the slope dips away to the westward, and he knows that his journey is well nigh over.

It was late in the afternoon before, having left the snow some hours, he began to lead his horse down a wooded precipice, through vegetation which grew more luxuriant every yard he descended. The glen, whose bottom he was trying to reach, was a black, profound gulf with perpendicular, or, rather, overhanging walls, on every side, save where he was scrambling down. Here, indeed, it was possible for a horse to keep his footing among the belts of trees that, alternating with precipitous granite cliffs, formed the upper end of one of the most tremendous glens in the world,—the Gates of the Murray. He was barely one-third of the way down this mountain wall, when the poor tired horse lost its footing and fell over the edge, touching neither tree nor stone for 500 feet, while George Hawker was left terrified, hardly daring to peer into the dim abyss.

He reached the base of the cliffs in safety, and forced his way through the tangled scrub that fringed the infant river, towards the lower end of the pass. Here the granite walls, overhanging, bend forward above to meet one another, almost forming an arch, the height of which, from the river-bed, is computed to be nearly, if not quite, 3000 feet.

Through this awful gate he forced his way, overawed and utterly dispirited, and reached the gully where his refuge lay, just as the sun was setting.

HENRY KINGSLEY.—*Geoffrey Hamlyn.* Ward, Lock and Co.

"Conspicuously elevated above all the surrounding heights, and swollen by many ragged protuberances, the snowy and craggy cone of Mount Kosciusko is seen cresting the Australian Alps in all the sublimity of mountain scenery. Its altitude reaches 7300 feet, and the view from its summit sweeps over 7000 square miles. In the north-eastward view the eye is carried as far back as the Shoalhaven country; the ridges of all the spurs of the Moneiro and Twofold Bay, as well as those which, to the westward, enclose the tributaries of the Murrumbidgee, being conspicuously delineated. Beneath the feet, looking from the very verge of the cone downwards, almost perpendicularly, the eye plunges into a fearful gorge 3000 feet deep, in the bed of which the sources of the Murray gather their contents, and roll their united waters to the west. To follow the course of that river from this gorge into its farther windings is to pass from the sublime to the beautiful. The valley of the Murray, as it extends beneath the traveller's feet, with the peaks crowning the spur which separates it from the valley of the Murrumbidgee, displays beauties to be compared only to those seen among the valleys of the Alps."—P. E. DE STRZELECKI. *Physical Description of New South Wales and Van Diemen's Land.* Longmans.

Discovery of the true Character of the Murray-Darling System

January 13, 1830.—The general appearance of the Murrumbidgee had been such as to encourage my hopes of ultimate success in tracing it down; but about 3 P.M. we came to one of those unaccountable and mortifying changes which had already so frequently excited my apprehension. Its channel again suddenly contracted, and became almost blocked up with huge trees, that must have found their way into it down the creeks or junctions we had lately passed. The current increasing at the same time rendered the navigation perplexing and dangerous. We passed reach after reach presenting the same difficulties, and were at length obliged to pull up at 5 P.M., having a scene of confusion and danger before us that I did not dare to encounter with the evening's light. We rose in the

morning with feelings of apprehension and uncertainty. In every reach we had to encounter fresh difficulties. On a sudden the river took a general southern direction, but in its tortuous course swept round to every point of the compass with the greatest irregularity. We were carried at a fearful rate down its gloomy and contracted banks. At 3 P.M. Hopkinson called out that we were approaching a junction, and in less than a minute afterwards we were hurried into a broad and noble river. It is impossible for me to describe the effect of so instantaneous a change of circumstances upon us. The boats were allowed to drift along at pleasure, and such was the force with which we had been shot out of the Murrumbidgee, that we were carried nearly to the bank opposite its embouchure. Whilst we gazed in silent astonishment on the capacious channel we had entered, and when we looked for that by which we had been led into it, we could hardly believe that the insignificant gap that presented itself to us was indeed the termination of the beautiful and noble stream we had thus successfully followed. In breadth it did not exceed 50 feet; and if instead of having passed down it I had been making my way up the principal streams, I should little have dreamed that so dark and gloomy an outlet concealed a river that would lead me to the haunts of civilised man, and whose fountains rose amidst snow-clad mountains.

To myself personally the discovery of this river was a circumstance of a particularly gratifying nature, since it not only confirmed the justness of my opinion as to the ultimate fate of the Murrumbidgee, but assured me of ultimate success in the duty I had to perform. We had got on the high road as it were, either to the south coast, or to some important outlet; and the appearance of the river itself was such as to justify our most sanguine expectations. I could not doubt its being the great channel of the streams from the south-east angle of the island. The stream we had just discovered had a medium width of 350 feet, with a depth of from 12 to 20. Its reaches were from $\frac{1}{2}$ to $\frac{3}{4}$ mile in

length, and the views upon it were splendid. Its transparent waters were running over a sandy bed at the rate of 2½ knots; and its banks, though averaging 18 feet in height, were evidently subject to floods. Next day the river maintained its character, and raised our hopes to the highest pitch. Its breadth varied from 150 to 200 yards, and only in one place, where a reef of ironstone stretched nearly across from the left bank so as to contract the channel near the right, and to form a considerable rapid, was there any apparent obstruction to our navigation. I was sorry, however, to remark that the breadth of alluvial soil between its outer and inner banks was very inconsiderable, and that the upper levels were poor and sandy. Blue gums generally occupied the former, while the usual productions of the plains still predominated upon the latter, and showed that the distant interior had not yet undergone any favourable change.

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January 23*rd*.—After breakfast we proceeded onwards as usual. The river had increased so much in width that, the wind being fair, I hoisted sail for the first time. Our progress was consequently rapid. We passed through a country that, from the nature of its soil and other circumstances, appeared to be intersected by creeks and lagoons. We had proceeded about 9 miles, when we were surprised by the appearance in view, at the termination of a reach, of a long line of magnificent trees of green and dense foliage. As we sailed down the reach we observed a vast concourse of natives under them, and on a nearer approach, we not only heard their war-song, if it might so be called, but remarked that they were painted and armed, as they generally are, prior to their engaging in deadly fight. As I did not wish a conflict, I lowered my sail, and putting my helm to starboard, I passed quietly down the stream in mid-channel. We were again roused to action by the boat suddenly striking upon a shoal, which reached from one side of the river to the other. To jump out and push her into deeper water was but the work of a moment with the

men, and it was just as she floated again that our attention was withdrawn to a new and beautiful stream coming, apparently, from the north.

As soon as we got above the entrance of the new river we found easier pulling, and proceeded up it for some miles. The river preserved a breadth of 100 yards and a depth of rather more than 12 feet. Its banks were sloping and grassy, and were overhung by trees of magnificent size. Indeed its appearance was so different from the water-worn banks of the sister stream that the men exclaimed, on entering it, that we had got into an English river. The various conjectures I had formed of the course and importance of the Darling passed across my mind. Were they indeed realised? An irresistible conviction impressed me that we were now sailing on the bosom of that very stream from whose banks I had been twice forced to retire. I directed the Union Jack to be hoisted, and giving way to our satisfaction, we all stood up in the boat, and gave three distinct cheers.

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February 3.—We passed some beautiful scenery in the course of the day. The river preserved a direct southerly course, and could not in any place be less than 400 yards in breadth. The cliffs still continued, and varied perpetually in form: at one time presenting a perpendicular wall to the view, at others they overhung the stream in huge fragments. Many circumstances at this time tended to confirm our hopes that the sea could not be very far from us, or that we should not be long in gaining it. Some sea-gulls flew over our heads, at which Fearn was about to shoot, had I not prevented him, for I hailed them as the messengers of glad tidings, and thought they ill deserved such a fate.

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On the morning of the 9th the wind had moderated, although it still blew fresh. We ascended every height as we went along, but could not see any new feature in the country. At length we found a clear horizon before us to

the south. The river inclined to the left, and swept the base of the hills that still continued on that side. I consequently landed once more to survey the country. The view was one for which I was not altogether prepared. We had at length arrived at the termination of the Murray. Immediately below me was a beautiful lake, which appeared to be a fitting reservoir for the noble stream that had led us into it.

CAPTAIN STURT.—*Two Expeditions into the Interior of Southern Australia.* Smith, Elder and Co.

Across this lake, to which he gave the name of Lake Alexandrina, Sturt made his way to Encounter Bay, and then returned by the same route. His narrative, which is well worth reading in full, contains minute descriptions of the scenery of the whole route.

An Australian River coming down in Flood

February 12.—I went on with an advanced party towards the Macquarie, and encamped on the banks of that river at 5 P.M. The thick grass, low forests of yarra trees, and finally the majestic blue gums along the river margin, reminded me of the northern rivers seen during my journey of 1831. Still even the bed of this was dry, and I found only two water-holes on examining the channel for two miles. One of these was, however, deep, and we encamped near it, surrounded by excellent grass in great abundance.

February 13.—Mr. Stephenson took a ride for me to the summit of Mount Foster and to various cattle stations about its base, with some questions to which I required answers, about the river and stations on it lower down. He returned early, having met two of the mounted police. To my most important question the reply was very satisfactory: namely, "Plenty, and a flood coming down from the mountains." The two policemen said they had travelled 20 miles with it on the day previous, and that it would still take some time to arrive near our camp. In the afternoon two of the men, taking a walk up the river, reported

on their return that the flood poured in upon them when in the river bed, so suddenly that they narrowly escaped it. Still the bed of the Macquarie before our camp continued so dry and silent, that I could scarcely believe the flood coming to be real, and so near us, who had been put to so many shifts for want of water. Towards evening, I stationed a man with a gun a little way up the river, with orders to fire on the flood's appearance, that I might have time to run to the part of the channel nearest our camp, and witness what I had so much wished to see, as well from curiosity as from urgent need. The shades of evening came, however, but no flood, and the man on the look-out returned to camp. Some hours later, and after the moon had risen, a murmuring sound, like that of a distant water-fall, mingled with occasional cracks as of breaking timber, drew our attention, and I hastened to the river bank. By very slow degrees the sound grew louder, and at length so audible as to draw various persons besides from the camp to the river side. Still no flood appeared, although its approach was indicated by the occasional rending of trees with a loud noise. Such a phenomenon in a most serene moonlight night was quite new to us all. At length the rushing sound of waters and loud cracking of timber announced that the flood was in the next bend. It rushed into our sight, glittering in the moonbeams, a moving cataract, tossing before it ancient trees, and snapping them against its banks. It was preceded by a point of meandering water, picking its way, like a thing of life, through the deepest parts of the dark, dry, and shady bed of what thus again became a flowing river. By my party, situated as we were at that time, beating about the country and impeded in our journey solely by the want of water, suffering excessively from thirst and extreme heat, I am convinced that the scene can never be forgotten. Here came at once abundance, the product of storms in the far-off mountains that overlooked our homes. My first impulse was to have welcomed this flood on our knees, for the scene was sublime in itself, while the subject, an

abundance of water sent to us in a desert, greatly heightened the effect to our eyes. The river gradually filled up the channel nearly bank-high, while the living cataract travelled onward, much slower than I had expected to see it; so slowly, indeed, that more than an hour after its first arrival the sweet music of the head of the flood was distinctly audible from my tent, as the murmur of waters, and the diapason crash of logs, travelled slowly through the tortuous windings of the river bed. I was, finally, lulled to sleep by that melody of living waters, so grateful to my ears, and evidently so unwonted in the dry bed of the thirsty Macquarie.

February 14.—The river had risen to within 6 feet of the top of the banks, and poured its turbid waters along in fulness and strength, but no longer with noise.

Sir T. L. Mitchell.—*Journal of an Expedition into the Interior of Tropical Australia.* Longmans, 1848.

Cf. the description of the Atbara coming down in flood, *Descriptive Geography of Africa*, p. 50.

Australian Lakes

Most of the so-called lakes of Australia are insignificant depressions filled with the storm-waters of widely expanding river channels during heavy rains. In the central regions these are spread out over extensive shallow basins, usually surrounded by a thick deposit of mud, whose surface is characterised by a hard and treacherous saline crust. Located in vast, rainless, salt-bush country, where the heat is intense, the flood waters evaporate with astonishing rapidity, and for most part of the year these lakes are simply enormous mud basins, where salt is deposited in large quantities. During the rainy season they are again filled by the flood waters of inland rivers. The largest are Lakes Eyre, Amadeus, Gairdner, Torrens, Frome, and Gregory, all more or less salt. The configuration of the continent is not favourable to the formation or

existence of large natural reservoirs for the storage of permanent fresh water in the inland regions, such as are to be found in New Zealand, and other countries, where deep lake basins occur in mountain regions and on high tablelands. Formed as Australia is, like the inverted half of a gigantic bivalve, with the eastern part high, and dipping more rapidly towards the centre than the western half, which gradually and imperceptibly slopes inwards, most of the inland basin is flat, the soil and upper stratum highly absorbent; while the lower portion of the bed in several parts is not much, if indeed at all, above sea-level.

Along the eastern seaboard there are several natural reservoirs of fresh water, such as Lakes George and Bathurst, and other smaller basins, inappropriately called lakes, but which in reality are merely lagoons. These are, however, comparatively shallow, even the largest has been known to be quite dry in times of severe and protracted droughts.

J. P. Thomson.—*Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia,* 1894-95.

In the Australian Scrub

On starting from Mount Udor our road lay at first over rocks and stones, then for 2 or 3 miles through thick scrubs. The country afterwards became a trifle less scrubby, and consisted of sandhills, timbered with casuarina, and covered as usual with triodia (spinifex). In 10 miles we passed a low bluff hill and camped near it without any water. Mr. Carmichael went to the top and informed me of the existence of low ridges bounding the horizon in every direction except to the south-south-east, and that the intervening country appeared to be composed of sand-hills, with casuarinas, or mulga scrubs. We continued until we had travelled 40 miles from Mount Udor, but no signs of a creek or any place likely to produce or hold water had been found. The only difference in

the country was that it was now more open, though the spinifex was as lively as ever. It was now too dark to go on any further, and we had again to encamp without water, our own small supply being so limited that we could have only one-third pint each, and we could not eat anything in consequence. The unfortunate horses had now been two days and two nights without water, and could not feed. Next morning, from the top of a sand-hill, I saw that the eastern horizon was bounded by timbered ridges, and it was not very probable that the creek I was searching for could lie between us and them. The western horizon was bounded by low ridges, continuous for many miles. I decided to make for our last camp on the creek, distant some 25 miles north-east. At 5 miles after starting we came upon a mass of eucalypts which were not exactly gum-trees, though of that family, and I thought this might be the end of the exhausted creek channel. There was no trace of any flow of water ever having passed by those trees, and indeed they looked more like gigantic mallee trees than gums, only that they grew separately. From here I saw that some ridges were before me at a short distance, but where our line of march would intersect them they seemed so scrubby and stony I wished to avoid them. At one point I discerned a notch or gap. The horses were now very troublesome to drive, the poor creatures being so bad with thirst. I turned on the bearing that would take me back to the old creek, which seemed the only spot in this desolate region where water could be found, and there we had to dig for it. At one place on the ridges appeared a few pine-trees. Upon approaching them I found the rocks upheaved in a most singular manner, and a few gum-trees were visible at the foot of the ridge. On approaching the rocks at the foot of the ridge I found several enormous overhanging ledges of sandstone, under which the natives had evidently encamped long and frequently; and there was the channel of a small watercourse scarcely more than 6 feet wide.

I rode over to another overhanging ledge, and found it formed a verandah wide enough to make a large cave; upon the walls the natives had painted strange devices of snakes, principally in white. Looking about with some hopes of finding the place where these children of the wilderness had obtained water, I espied about 100 yards away, and on the opposite side of the little glen or valley, a very peculiar-looking crevice between two huge blocks of sandstone, and apparently not more than a yard wide. I rode over to this spot, and to my great delight found a most excellent little rock tarn. There was abundance of water for all our requirements here; but the approach was so narrow that only two horses could drink at once, and we had the greatest difficulty in preventing the horses from precipitating themselves, loads and all, into the inviting fluid. No one, who has not experienced it, can imagine the pleasure which the finding of such a treasure confers on the thirsty, hungry, and weary traveller; all his troubles for the time are at an end.

ERNEST GILES.—*Australia Twice Traversed.* Sampson Low, 1889.

By permission of Messrs. Sampson Low.

The natives of desert Australia have acquired the art of extracting water from the roots of trees: "The eucalypts of the mallee species thrive in deserts and droughts, but contain water in their roots which only the native inhabitants of the country can discover. A white man would die of thirst while digging and fooling around trying to get the water he might know was preserved by the tree, but not for him: while an aboriginal, coming to a mallee tree after perhaps travelling miles through them without noticing one, will suddenly make an exclamation, look at a tree, go perhaps ten or twelve feet away, and begin to dig. In a foot or so he comes upon a root, which he shakes upward, gradually getting more and more of it out of the ground, till he comes to the foot of the tree; he then breaks it off, and has a root perhaps fifteen feet long—this, by the way, is an extreme length. He breaks the root into sections about a foot long, ties them into bundles, and stands them up on end in a receptacle, when they drain out a quantity of beautifully sweet, pure water. A very long root, such as I have mentioned, might give nearly a bucketful of water, but woe to the white man who thinks he can get water out of mallee."—*Ibid.*

"Travelling over this country during the daytime, with its dried-

up creeks and stony 'gibber'[1] plains, there is little which looks picturesque; but at sundown the scene becomes quite changed, and it is hard to believe that the picturesque appearance is due simply to atmospheric conditions. In the desolate gibber country near the Macumba the effect was really beautiful. Away to the east the land rose to flat-topped, terraced ranges. In the foreground were white-blue salt-bushes with pale, light-blue patches of low herbage and still lighter tufts of grass amongst them, standing out in striking contrast to the purple-brown gibbers. The country was crossed by dark lines of mulga, marking the creek beds, and streaking away up to the hills, which stood out sharply against a cold steel-blue sky, melting above into salmon pink and this into deep ultramarine. In the west was a rich afterglow, against which the stony plains and hills looked dark purple, with the mulga branches standing out sharp and thin against the sky. The colours of the Central Australian landscape at sunrise and sunset are just those which at morning and evening light up the barren ranges of Arabia; everything is soft and brilliant, but very thin."—Prof. Baldwin Spencer. *Report on the Scientific Work of the Horn Scientific Expedition to Central Australia.* London and Melbourne.

In the Australian Desert

From the level we ascended to sandy and grassy plains as before. But they were now bounded by sandy ridges of a red colour and partly covered with spinifex. I really shuddered at the reappearance of those solid waves, which I had hoped we had left behind, but such was not the case. We arrived at the base, and ascending one of them found that it was flanked on both sides by others; the space between the ridges being occupied by the white and dry beds of salt lagoons. The very aspect of these dreaded deposits, if I may call them so, withered hope. To whatever point of the compass I turned these heart-depressing features existed. We rode along the base of a ridge for about 3 miles, but as on ascending it I observed that at about a mile beyond it terminated, and that the dry bed of the lagoon on our right passed into a plain of great breadth, the character and appearance of which was very doubtful; and as it was now sunset, and we had journeyed upwards of 34 miles, I halted for the night at a puddle, rather larger than that of the night before, but with sorry feed

[1] A Queensland aboriginal word meaning stone.

for our horses. At this place we dug our second well, by moonlight, as we had dug the first, and lay down on the ground to rest, fatigued, I must candidly confess, both in mind and body.

The following morning, about a mile from where we had bivouacked, we arrived at the termination of the sandy ridge and descended into the plain I had been reluctant to traverse in the uncertain light of evening. One would have supposed from its appearance that it was a sea marsh. At 6½ miles we ascended some heavy sandy ridges. Toiling over these, at 7 or 8 miles farther, we sighted a fine sheet of water distant about 2 miles, which proved to be a lake from 10 to 12 miles in circumference. The ridge by which we had approached it terminated suddenly and directly over it: to our right there were other ridges terminating in a similar manner, with rushy flats between them; eastward the country was dark and very low; to the north there was a desert of glittering white sand in low hillocks, and on it the heat was playing as over a furnace. Immediately beneath me to the west there was a flat leading to the shore of the lake, and on the western side a bright red sandhill, full 80 feet high, shut out the view. This ridge was not altogether 1½ miles in length, and behind it there were other ridges of the same colour, bounding the horizon with ridges as sharp as icebergs.

As we approached the water the effluvia from it was very offensive, and the ground became a soft, black, muddy sand. On tasting it we found that the water was neither one thing nor the other, neither salt nor fresh, but quite unfit for use.

I was really afraid of entering on the scorching sands in our front, for we were now fully 90 miles from the creek; and it was absolutely necessary, before we should exceed that distance, to find a more permanent supply of water than the wells we had dug on our way out. I ascended the rugged termination of the sandy ridge, close to which we had been riding, and was induced, from what I then saw, to determine on a course somewhat to the

west of north, since a due north course was evidently closed upon me; for I now saw that the country in that direction was hopeless, as well as in an easterly direction. Descending, therefore, I went to a distance of 6 miles before coming to a small puddle at which I was glad to halt, it being the only drinkable water we had seen. Here we dug a third well, although like the first there was but little chance of benefiting by it. It behoved me therefore to be still more careful of increasing my distance from the creek, so that on the morning of the 17th I thought it prudent to search for water, and as the country appeared open to the south I turned to that point in the hope of success. We crossed some low sandhills to a swamp in which there was a good deal of surface water, but none of a permanent kind. We then crossed the north-west of an extensive grassy plain. It continued for many miles to the south, passing between all the sandy points jutting into it, and so closely was the desert allied to fertility at this point, and I may say in these regions, that I stood more than once with one foot on salsolaceous plants growing on pure sand, with the other on luxuriant grass, springing up from rich alluvial soil. I was sure that water was not far off, and at length we found a small, narrow, and deep channel of but a few yards in length, hid in grass. The water was about 3 feet deep, and was so sheltered that I made no doubt it would last ten days or a fortnight. The plains extended for miles to the south-east, with an aspect of great luxuriance and beauty, nor could I doubt they owed their existence to the final overflow of the large creek we had all along marked trending down to this point. Such, indeed, I had felt from the first, even when I looked on its broad and glittering waters, would sooner or later be its termination, or that it would expend itself less usefully on the Stony Desert. As yet, however, there was no indication of our approach to that iron region. The plains were surrounded on all sides by lofty ridges of sand. We next pursued a north-north-west course into the interior, and soon left the grassy plains, crossing alternate

sand ridges and flats. About noon we crossed a plain, partly covered with stones and partly bare, and at the further extremity of it passed through a gorge between two sandhills into another plain that was barren beyond description, with only salsolaceous herbs. It was surrounded on all sides by sandhills of a fiery red. From this plain we again crossed alternate sandhills and flats, the former covered with spinifex, the latter being quite denuded of all vegetation; but one of the horses at last knocking up, I was obliged to halt in the gloomy region, at the only puddle of rain water we had seen since leaving the grassy plain. We here dug a fourth well. We resumed our journey on the former bearing, the wind blowing keen from the south. At 1½ miles we reached a salt lagoon as it appeared to be in the distance, but which proved to be rather a flooded plain. We had an immense barren plain to our left, bounded all around by sandhills. Over these we toiled for 9 miles, and at 5½ miles farther, having previously crossed a small stony plain, succeeded by sand-ridges and valleys, both covered with spinifex, we ascended a pointed hill that lay directly in our course, and from it beheld the Stony Desert almost immediately beneath our feet. Coming so suddenly on it, I almost lost my breath. It was apparently unaltered in a single feature; herbless and treeless it occupied more than one-half of the visible horizon.

CAPTAIN CHARLES STURT. — *Narrative of an Expedition into Central Australia.* Boone.

The whole of these two volumes depict, in the most graphic manner, the desolate interior, and will well repay reading.

Heat in the Australian Desert

The ground was thoroughly heated to the depth of 3 or 4 feet, and the tremendous heat that prevailed had parched vegetation and drawn moisture from everything. The mean of the thermometer for the months of December, January, and February had been 101°, 104°, and 100° respectively in the shade. Under its effect every screw in

our boxes had been drawn, and the horn handles of our instruments, as well as our combs, were split into fine laminæ. The lead dropped out of our pencils, our signal rockets were entirely spoiled; our hair, as well as the wool on the sheep, ceased to grow, and our nails became as brittle as glass. The flour lost more than 8 per cent of its original weight, and the other provisions in a still greater proportion. The bran in which our bacon had been packed was perfectly saturated, and weighed almost as heavy as the meat; we were obliged to bury our wax candles; a bottle of citric acid in Mr. Browne's box became fluid, and escaping, burnt a quantity of his linen; and we found it difficult to write or draw, so rapidly did the fluid dry in our pens and brushes.

CAPTAIN CHARLES STURT. — *Narrative of an Expedition into Central Australia.* Boone.

"I remember Captain Sturt telling me, when I met him in South Australia in 1845, on his return from his arduous journey, that the sands were so hot that if a lucifer match were let fall on them it instantly took fire."—J. B. JUKES. *A Sketch of the Physical Structure of Australia.* Boone.

Camels in the Australian Desert

The arid nature of the interior country, and the semi-tropical heat which prevails during the greater portion of the year, have made communication with this distant country very difficult; but through the foresight and enterprise of Sir Thomas Elder camels were introduced, and the caravan traffic has undergone great expansion, so that the interior transport trade is done almost entirely by camels. The animals have proved themselves to be of the greatest value in times of the most severe drought, to which the interior of the continent is subject. They have been known to travel 25 miles per day for nine successive days, under a tropical sun, and heavily laden, without a drink of water, and no other feed than that furnished by the scanty bushes. The first great national work on which camels were employed was in the construction of

the Adelaide and London telegraph line in 1872, when 100 of them were made use of in carrying wire, insulators, etc. During the severe drought of 1881 a large number were the means of saving the lives of the starving population of the Albert gold-fields in New South Wales. One important feature in the use of camels in South Australia is that they are harnessed to waggons like a team of horses, eight of them taking four tons and travelling 15 miles a day.

J. F. Conigrave. — *South Australia: A Handbook for the Colonial and Indian Exhibition*, 1886.

Camels are largely used in West Australia, Queensland, and other parts of Australia. The drivers are frequently Afghans.

Glimpses of Native Life in the Central Australian Desert

We had a great many natives in the neighbourhood, but they did not approach the tents. Their families generally were on the opposite side of the river, but one man had his *lubra* (wife) and two children on our side of it. My attention was drawn to him from his perseverance in cutting a bark canoe, at which he laboured for more than an hour without success. I found that his only tool was a stone tomahawk, and that with such an implement he would hardly finish his work before dark. I therefore sent for an iron tomahawk, which I gave to him, and with which he soon had the bark cut and detached. He then prepared it for launching by puddling up its ends, and, putting it into the water, placed his *lubra* and an infant child in it, and giving her a rude spear as a paddle pushed her away from the bank. She was immediately followed by a little urchin who was sitting on the bank, the canoe being too fragile to receive him, but he evidently doubted his ability to gain the opposite bank of the river, and it was most interesting to mark the anxiety of both parents as the little fellow struck across the foaming current. The mother kept close beside him in the canoe, and the father

stood on the bank encouraging his little son. At length they all landed in safety, when the native came to return the tomahawk, which he understood had only been lent to him. However, I was too much pleased with the scene I had witnessed to deprive him of it, nor did I ever see a man more delighted than he was when he found that the tomahawk, the value and superiority of which he had so lately proved, was indeed his own. He thanked me for it, eyed it with infinite satisfaction, and then turning round plunged into the stream and joined his family on the opposite bank.

. . . . . .

It was singular that we should have pulled up close to the camp of some natives, all of whom had hidden themselves in the polygonum, except an old woman who was fast asleep. With this old lady, when she awoke, we endeavoured to enter into conversation, and in order to allay her fears gave her five or six cockatoos we had shot. Finding that the men were out hunting, and that only the women with the children were present, I determined to stop at this place till the following morning. A little before sunset the two men returned to their families. They were much astonished at seeing us quietly seated before their huts, and approached us with some caution, but soon got reconciled to our presence. One of them had caught a talpero and a lizard, but the other had not killed anything, so we gave him a dinner of mutton. The native who had killed the talpero skinned it the moment he arrived in camp, and having first moistened them, stuffed the skin with the leaves of a plant of very astringent properties. All these natives were very poor, particularly the men, nor do I think that at this season of the year they can have much animal food of any kind to subsist on. Their principal food appears to be seeds, of various kinds, as of the box-tree and grass seeds, which they pound into cakes and bake together with different kinds of roots.

. . . . . .

On gaining the summit we were hailed with a deafening

shout by 300 or 400 natives, who were assembled in the flat below. The scene was one of the most animated nature, and was rendered still more striking from the circumstance of the native huts, at which there were a number of women and children, occupying the whole crest of a long piece of rising ground at the opposite side of the flat. I checked my horse on the top of the sandhill, and gazed on the assemblage of agitated figures below me, and then quietly rode down into the flat, dismounted, and then walked to the natives. So far from exhibiting any unkind feeling, they treated us with the greatest hospitality. Several of them brought us large troughs of water, and when we had taken a little, held them up for our horses to drink, an instance of nerve which is very remarkable. They likewise offered us some roasted ducks and some cake. When we walked over to their camp they pointed to a large new hut, and told us we could sleep there; but I had noticed a little hillock, on which there were four box-trees, about 50 yards from the native encampment, on which I had already determined to remain. We accordingly went to these trees, and, unsaddling our horses, turned them out to feed. When the natives saw us quietly seated, they came over and brought a quantity of sticks for us to make a fire, wood being extremely scarce. At sunset they all left us, and went to their encampment; nor did one approach us afterwards, but they sat up to a late hour in their own camp, the women being employed beating the seed for cakes between two stones, and the noise they made was exactly like the working of a loom factory. The whole encampment, with the long line of fires, looked exceedingly pretty, and the dusky figures of the natives standing by them, or moving from one hut to the other, had the effect of a fine scene in a play.

CAPTAIN C. STURT. — *An Expedition into Central Australia.* Boone.

An Australian Native Climbing a Tree

The tree which he was about to ascend was a very large one, a blue gum, with a perfectly smooth barrel, and was estimated at 70 feet to the lowest limb, and measured 20 feet at about 4 feet from the ground. This old man had been accustomed to a stone tomahawk, and even now seemed indifferent as to whether he would use an iron one. He at once fixed upon the proper side for ascending; then, standing close to the tree, he cut two notches about 1 inch or 1½ inches deep, one at about the height of his waist and the other at about the height of his head, not immediately in line with the right, but a little to the right or left, according to circumstances. These notches were cut by a few taps of the tomahawk given alternately in a horizontal direction, and then at an angle of 45°. This notch was sufficient to place his great toe in. Standing with the ball of his right or left foot, according to circumstances, in the lowest notch he had cut, having previously cut a small piece out from the side of the tree so that he could place the tips of his fingers in to give him a hold, he cut a third notch at the height of his head; then, standing with his other foot on the second notch he had cut before leaving the ground, he cut a fourth notch at the same height, and so on until he arrived at the top. It will be observed that two notches were cut before he left the ground, and that he only ascended by one at a time. It is absolutely necessary that the body be kept close to the tree, as there is little or nothing to hold on by, and the notch affords but little standing room, admitting of no bending of the body. By making the cut about the height of his head and immediately in front of him, the climber, by raising his eyes, can see whether it is properly cut, and at the same time keep his body close to the tree, for it is necessary that the bottom of the notch be horizontal and evenly cut. It will be seen that these notches are in two parallel lines at alternate distances. In descending, the foot

is slid down the side of the tree until the notch is found. The man generally wears a 'possum belt, into which he thrusts his tomahawk, otherwise he holds it in his mouth: this enables him to use both hands while ascending.

I have witnessed this tree-climbing in many parts of the country. Some blacks use a long rope of vine, which is obtained in the dense brushes, passing it round the tree, and holding on by it as they ascend. In other parts, where the timber is smaller, slight indentations only of the bark are made. I cannot call to mind that I ever noticed a black make use of his knees whilst climbing; they invariably place the sole of the foot at once on the landing place, and use their feet like monkeys in ascending an upright tree or limb. In ascending a tree a second time fresh cuts are always made, and some trees show four or five different marks. On measuring the distance between these cuts or notches on a tree which had been felled by sawyers, I found they did not vary the fourth part of an inch.

J. F. MANN.—*Proceedings of the Geographical Society of Australasia, New South Wales and Victorian Branches*, vol. i. 1883-84.

For the native bark canoes and their management, "perhaps as remarkable a feat as that of tree-climbing," see *ibid.* pp. 31-33; and for the boomerang, the curious and ingenious native weapon which returns towards the thrower, see *ibid.* pp. 33, 34.

Natural Divisions of Queensland

The colony appears to be naturally divided into three grand divisions, each eminently adapted to its peculiar industry. Parallel with the eastern coast runs a high range of mountains, distant from 20 to 100 miles from the sea, a continuation, in fact, of the Great Australian Alps and of the Blue Mountains of New South Wales. Between this range and the ocean we find a wide belt of alluvial soil, through which meander many fine rivers and their tributary streams. Beyond the coast range is a vast tableland, with its level or gently undulating plains

stretching away, like the vast prairies of America, to the illimitable horizon. These three well-defined divisions are each devoted to different industries. The alluvial coast lands are given over entirely to agriculture and timber-getting. The banks of the river were, before the timber-getter and the farmer made their appearance, clothed with a luxuriant growth of timber. For centuries the decay of leaves, of trees, and of succulent plants had been forming layer upon layer of the richest mould. The frequent recurrence of heavy floods had assisted the formation by leaving, on their retreat, deep deposits of rich sediment. Within the shadow of these scrubs no grass grew; only stray rays of sun found their way through the tropical luxuriance of the trees, lianas, orchids, etc., which everywhere abounded. But wealth was soon to be drawn from them. The stately Moreton Bay pine-tree, the noble red cedar, and the imperishable beech, grew to enormous size on the borders of the rivers. These were soon discovered, and saw-mills sprang up in all directions. The expiring sigh of the last tree, as it fell to the lumberer's axe, was the signal for the farmer to step in. With axe and brand the jungle was quickly removed, and maize, tobacco, and cotton fields soon added another charm to the already beauteous rivers. Boats and steamers began to ply on the hitherto unploughed waters, and agriculture grew and flourished.

Across the range, which towers to a height of over 3000 feet, a different sight meets the eye. The basaltic plains of the tableland are covered with a luxuriant growth of nutritious grasses. Men, famous in the older colonies among sheep and cattle, took possession of the solitary wilds, and the face of the land is to-day dotted with flocks and herds.

In 1858 a new era was heralded in by the discovery of gold in the coast range. At this magic word the third great division resounded with the busy hum of men. Thousands of southern miners, business men, and speculators, poured into the colony, and from that day to this the

ranges have been the home of a numerous and wealthy mining community.

A. J. Boyd.—*Queensland: Its Resources and Institutions.* Official Handbook prepared by the Queensland Government for the Colonial and Indian Exhibition, 1886.

Fruits and Vegetables of Tropical Queensland

Very much of Queensland's vast territory is fairly within the tropics, and the nearest idea British gardeners can have as to the capabilities of such a climate must come from experience in hot-houses. The fruits which promise to do well there, so far as at present known, are the banana, pine-apple, mango, bread-fruit, jack-fruit, orange, lemon, lime, citron, shaddock, coco-nut and date palms, durian, mangosteen, alligator or avocado pear, persimmon, custard apple, papaw—in short, any that are common to the tropics. There are very extensive stretches of country near the coast within the tropics where the wild banana flourishes, and when the jungle and rich tropical vegetation is hewn down by the woodman, to get it in readiness for burning, a dense plantation of the wild banana springs up rapidly, completely hiding the mass of fallen timber, and making the clearing assume the appearance of a banana plantation. Where the wild banana flourishes cultivators can have no difficulties with the better-known varieties of that valuable and nutritious fruit. The sago and date palms would answer in localities where groves of indigenous palms now flourish within those latitudes, in such places mainly as are moist, or where the roots can easily penetrate to water below. Along the sea-coast the coco-nut may be grown to any extent. Between 17° and 19° S. latitude there is a vast extent of hilly country clothed with tropical vegetation of all kinds, having a fertile soil and enjoying a heavy rainfall, which must eventually become the garden of Northern Queensland. The banana, ginger, pepper, nutmeg, and numerous other fruits are indigenous there, and the vegetation of the place

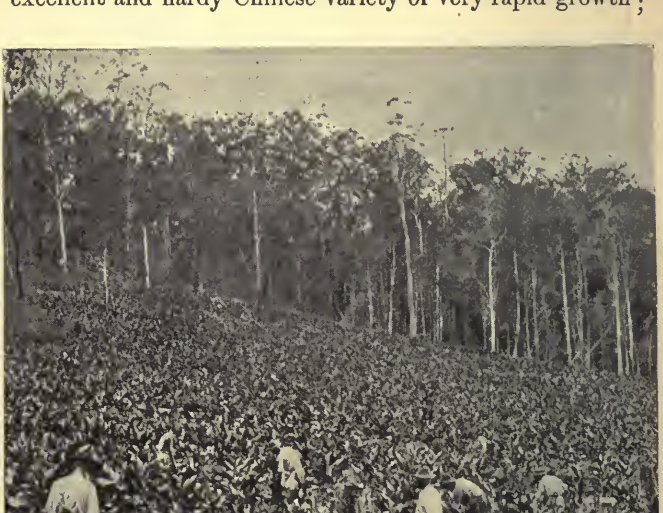
generally is so rich and varied, that it is a perfect paradise for the botanist and the lover of nature. The coffee and tea shrubs would grow in this extensive district to great perfection, and so also would vanilla, cinnamon, allspice, cloves, nutmegs, and other tropical trees and spices. As far south as Mackay, pine-apples

PINE-APPLE FIELD, QUEENSLAND.

are sometimes grown from 12 lbs. to 30 lbs. weight, and even farther south, near Rockhampton, the smooth-leaved or Cayenne pine-apple is often grown from 10 lbs. to 14 lbs. in weight, and bananas in great perfection.

Dwellers in Northern Queensland seldom enjoy the luxury of a cabbage, a cauliflower, or a dish of green peas. The vegetables grown for use are mostly identical with

the Chinese and Indian productions. Several excellent beans are perennial, growing on for many years and bearing profusely all the time. Instead of cabbage some leafy varieties of the silver beet, called Chinese cabbage, are grown; instead of the old country spinach there is an excellent and hardy Chinese variety of very rapid growth;



ARROWROOT FIELD, QUEENSLAND.

instead of the English potato there is a tuberous rooted convolvulus called the sweet potato. It is immensely prolific and good for everything. The young tops make excellent greens, and the tops altogether are highly relished as fodder by cows and pigs. The roots are cooked for the table, but are simply cut up for horses and cows, and are fed whole to pigs and fowls. An excellent flour, or what

may be called arrowroot, is made from the root. Besides those, the tropical North grows the yam, the South Sea *taro*, the large tubers of the tapioca, and in certain seasons of the year that American substitute for green peas, sweet corn.

T. WRIGHT.—*Queensland.* Official Handbook for the Indian and Colonial Exhibition, 1886.

"Between the Annan and the Bloomfield the jungles are the finest in North Queensland. Here and there the huge pink stems of the Kauri pines rise up amongst lesser trees, as thick and straight as mill chimneys, with no boughs for more than 100 feet. Then there are strange banyans of giant growth, laden with parasites, ferns, and orchids. Other immense trees are laden with clumps of fern growing on the trunks, and, higher up, perhaps elk-horn or other ferns. Tall Alexandra palms, with straight green stems, reach up through the other foliage to the sunlight above, swaying in the breeze that fans the surface of the jungle, reminding one that the breath of heaven still blows, although it does not reach the traveller in the sultry depths below.—ANON. *Parts of the Pacific.* Sampson Low.

Sugar Planting in Queensland

The country round Mackay is a dead level alluvial plain, for ten or twelve miles, and is all under cultivation for sugar growing. Our road for the first one and a half miles went through a sort of straggling township of small detached houses, each surrounded by a grass paddock. But after this we got among the cane-fields, and the sight of them was very refreshing after being shut up for weeks at sea. There are few prettier plants than sugar, and the panorama of the Mackay cane-fields is really beautiful. For miles the cane stretches away in a level sea of emerald green, here and there a tall brick chimney rising up to indicate the whereabouts of a mill. A broad belt of dark green forest marks the course of the Pioneer, winding through the plains, and beyond this again are cane-fields right away to the base of rugged mountains, thickly wooded to the very summit. All along the horizon the mountains of the coast range are piled one behind the

other in dark-blue masses, their outline rising here and there into sharp peaks against the western sky, and forty miles away towers the mighty form of Mount Dalrymple, over 4000 feet high, the second highest mountain in Queensland. On both banks of the Pioneer, at intervals of a few miles, are the residences of the planters, and certainly the lines have fallen to them in pleasant places Their houses, as a rule, are extremely comfortable, and the gardens of many of them are paradises of beauty.

HON. H. FINCH HATTON.—*Advance Australia.* W. H. Allen and Co.

By permission of Messrs. W. H. Allen and Co.

Such a garden, belonging to a settler on the Pioneer, is thus described by the same traveller: "The house itself is a large one-storied building, with a 14-foot verandah all round, covered with masses of every sort of creeper. It stands right on the river bank which rises to an elevation of 100 feet above the bed, and the view up the river is magnificent. The garden running along the top of the bank is a sight worth going to Queensland to see. There is 50 feet of black soil here. Lemons, limes, guavas, custard-apples, grapes, mangoes, oranges, and grenadillas all flourish in a state of perfection. Mangoes and oranges seem to do especially well, and the trees of the latter were absolutely weighed down with fruit. Bananas and passion-fruit grow like weeds. In the middle of the garden, on a patch of smooth green turf, stands the most magnificent poinciana-tree I ever saw, about 60 feet high, with huge spreading boughs. In summer it is literally covered with huge spiral flowers of the most brilliant crimson. The roof and side verandah of the house are overrun with masses of Bougainvillea creepers of every shade from pink to purple, and the flower-beds around are full of roses and geraniums. Gardenias grow all about in bushes 5 feet high. The back of the garden is sheltered all along by an impenetrable row of bamboos, Leichardts, and fig-trees, and in front, just along the edge of the river bank, runs a low hedge of hybiscus, blazing with scarlet flowers.—*Ibid.*

"The field work has hitherto been to a large extent performed by Kanakas, and their employment has always furnished a theme of contention for politicians. These islanders work as indentured labourers for three years, and are strictly confined to the operations connected with field cultivation. They work cheerfully under a burning sun and in the stifling cane rows, but are prohibited from working in the factory, as well as from ploughing, horse-driving, or any work suitable for white men."—*Work and Wealth of Queensland.*

Mountain Scenery of Southern Queensland

In the Bunya mountains is to be found the most unique scenery in Southern Queensland. These remarkable mountains, with their singular, bald summits, are really part of the Main Range, but their altitude is nearly twice as great as the bold escarpments around Toowoomba. Mount Mowberlan ("the Bald Head") is the highest, being 3600 feet above the level of the sea. The wide plains and grass lands around Jimbour and Dalby run like a green sea to their base, from which they rise dark and splendid against the sky. Belts of silver-plumed brigalow, with their black branches showing in charming contrast, relieved by the waving tresses of the myall and the sombre foliage of the belar, are passed through as you draw nearer the hills. Now and again you enter a tiny green plain, or natural paddock, which the brigalow has fenced on four sides with walls of silver, or drive through some rushing watercourse, with the current boiling round the horses' girths. Although the mountain bridle-tracks are steep they are quite practicable on horseback. Any slight inconvenience is more than atoned for by the unsurpassable beauty of the scrubs. Centuries old, and towering 200 feet above you, their topmost branches massed with orchids and lichen, rise the huge russet brown columns of the bunyas, the ringed, majestic heights of the hoof pine, and the smooth white pillars of the beech, 100 feet without a limb. Festoons of brilliant creepers and the thick cordage of the scrub-vine swing overhead. From the leaves of grey dead trees flakes of brown and sage-coloured moss hang pendulous. At times you pass down avenues of white and yellow orchids, past beds of arum lilies, and between dark green walls of scrub myrtle, or through a miniature forest of graceful tree-ferns. The broad emerald leaves of the stinging tree rise at intervals against a dark environment. Here the moss-covered trunk of some fallen cedar-giant shows amid a rambling mass of wild raspberry

bushes; there a huge Moreton Bay fig-tree spreads a leafy shade over the track, its hollow trunk a network of grey cable, inside which a man can climb for 40 feet. Suddenly the scrub will end abruptly and you find yourself on a grassy promontory, looking down some precipitous timber-shoot, with a stretching vista of purple hill and yellow plain beyond. Then you plunge into the scrub and climb upwards once more. The summit of Mowberlan is a gigantic, emerald, treeless mound, with outcrops of black basalt. Standing on Mowberlan with the grey eagles whirling slowly far above, the keen mountain air beating on your cheek, and the panorama of two great pastoral districts spreading in flowing purple on either hand, the mind is invested with the mystery of a grey antiquity older than all the castled heights and verdure-clad valleys of historic Europe. The bold green summit of the mountain rises out of a girdle of magnificent forest, rich with variegated foliage, rimmed with a belt of yellow wattle, behind which, in huge masses and serried lines, stand the great bunya-trees. Here, from time immemorial, the dusky generations of a primitive people have come and gone, unknown, unheeded. Here, they were wont to hold their feasts and festivals when the bunya-trees were heavy with harvest. On many of these huge trees, 15 and 20 feet in circumference, you can still find traces of steps cut by generations long since passed away.

The range itself runs south-east and north-west, and the eye can sweep the horizon for 40 miles on four sides. Looking over the Darling Downs watershed, past the serried lines of dark forest far below you, the bold heads and rough shoulders of the hills sink away in steep falls and flowing line to the low wooded levels beneath. By the dark foliage of the belar, you can trace the course of six or eight tributary creeks, winding on their way to the Condamine, whilst afar, yellow in the sun, stretch the plains of Jimbour. That cluster of silver dots in mid-landscape is Dalby, with the open forest behind it, and the wide levels of Cecil plains beyond. Those dim blue

phantom clouds are Mount Moriah, and Mount Russell,

G. W. Wilson and Co.

TREE-FERNS.

These are common in the valleys of the south-east forests of Australia and in the higher parts of the mountains nearer the equator, *e.g.* in Java and Sumatra.

whilst far to the south rises Gowrie Mountain, with the

plains that gird its base. Turning to the Nanango watershed the scene changes to a tumultuous expanse of densely-wooded summits and vales. The light and shadow play on them is wonderful; a land of cool, deep purple mountain hollows and rugged gold-smitten mountain crests. One of the grandest waterfalls is on the Nanango side. Here the dense scrub forms a semicircle round a steep emerald grassy slope, which terminates abruptly in a wide precipice of black basalt, falling sheer 400 feet into an immense gorge. Seen from the bottom the scene is of weird and impressive beauty. Above you, the huge grey walls over which the silver torrent takes its leap: the steep densely-wooded heights on either hand: the tall trees arched and festooned with vine and creeper: the huge grey boulders and deep pellucid pools: the ever-shifting drifting spray cloud, like silver smoke, with a rainbow playing in its heart.

E. Evans.—*The Garden of Queensland.* Published by the Queensland Government.

For the Cecil plains, the finest sheep country on the Downs, still retaining the old indigenous grasses, and still teeming with game, see *ibid.* pp. 79-81.

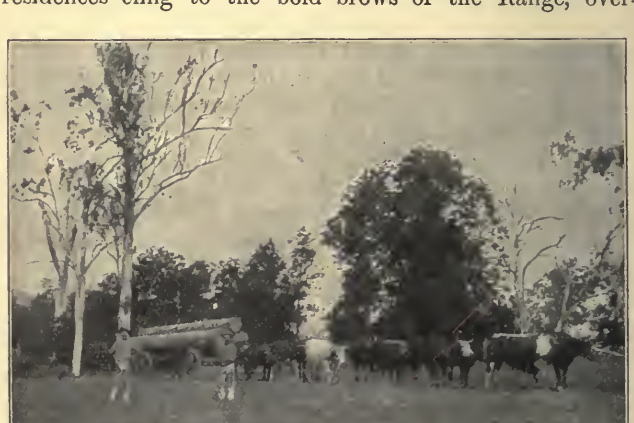
The Darling Downs

The Darling Downs district consists of a volcanic plateau rising some 1400 to 2000 feet above sea-level, and situated about 100 miles from the eastern coast-line. To north and east the Bunya Mountains and Great Dividing Range, and to the south the broken mountain regions on the New South Wales border encompass it with ramparts of purple. On its unenclosed side the ground falls away gradually to the western plains. The Condamine, rising in the Killarney ranges, and running north-west, sweeps diagonally through it, fed by scores of tributary creeks, and drains the whole basin for more than 100 miles before it leaves the Downs country with a westerly curve. The area of this beautiful tableland is computed to be slightly

over 4,000,000 acres of rich black, red and chocolate soil, ranging from 4 to 60 feet, and in some localities to an even greater depth. The country, consisting of immense open plains and undulating downs, is nevertheless diversified by gently sloping ridges timbered with apple-tree and gum-topped box, rich alluvial valleys and apple-tree flats, stretches of open forest and belts of scrub. The scrub lands on some of the mountain slopes are also exceedingly rich, the deep red and chocolate soil frequently reaching to the summits. On the crest and shoulders of the Main Range, stringy-bark, black-butt, turpentine, bloodwood, hoop, and bunya pine are to be found in large quantities, whilst the scrubs are composed of brigalow, ti-tree, myall, sandalwood, wild apple, fig, honeysuckle, interspersed with clumps of pine, cedar, beech, iron bark, and other timbers. This expansive tract of country, nearly equal in extent to the state of Illinois and Missouri, which it much resembles, is well watered throughout by numerous mountain streams and running creeks; but water can also be obtained by sinking at depths varying from 15 feet to 150 feet. The climate is temperate, resembling the Riviera. The summer lasts six months, but the nights are cool and bracing. There is no winter in the European sense, but during June, July, and August there are ground frosts and searching westerly winds. November and December is the period of thunderstorms; whilst from January to the end of March is generally the wet season. There have been two falls of snow in the last twenty years. The rainfall average is about 30 inches, the most favoured localities being along the rain belt within a radius of 20 miles of the Main Range. The district is chiefly supported by the pastoral and agricultural industries, though there is a considerable trade in timber, and some mining. The mild temperature enables all crops, vegetables, and fruits of semi-tropical and temperate climes to be grown; whilst the soil, being composed of decomposed matter and drift, cannot be surpassed for agricultural purposes.

. . . . . .

I will assume that you are a distinguished visitor, anxious to be shown over the far-famed Darling Downs. I have met you in Brisbane, and catching the Sydney mail train at 7.30 A.M., we arrive at Toowoomba, the Simla of Queensland, and capital of the Downs (101 miles from Brisbane) at 12.25 P.M. Many handsome villa residences cling to the bold brows of the Range, over-



BULLOCK TEAM DRAWING TIMBER IN QUEENSLAND.

looking a tumultuous sea of mountain summits, but the town proper is built along a beautiful, well-watered valley, and up the gentle acclivities to the west. For the last three-quarters of an hour we have been through some wonderful scenery. "The train travels round serpentine curves, along deep cuttings, across iron bridges, vanishes suddenly into short, dark tunnels, from which it as suddenly emerges into the sunlight, rising ever higher and higher, until the traveller looks out far across a vast amphitheatre of broken ranges, like the enormous waves of some primeval ocean. Far off, across the infinite blue, the

HARVEST-FIELD ON THE WARWICK DOWNS, QUEENSLAND.

eye beholds Cunningham's Gap, as though some giant smote the mountains asunder to make a pathway for that lonely pioneer. Range rises beyond range until in the remote distance the dim peaks are like blue clouds floating in the horizon." The train leaves at 12.45, and we are speeding over the magnificent Downs, dotted with homesteads, and chequered with multicoloured squares of cultivation towards Warwick, which we reach at 3.30 P.M. (68 miles from Toowoomba by rail). Leaving Warwick, a run of 38 miles through the rough granite and broken mountainous country brings us to Stanthorpe, the centre of a fine mining, grazing, and fruit-growing district, and thence on to Wallangarra on the New South Wales border, 490 miles from Sydney, and 233 from Brisbane. Here we let the mail train proceed to Sydney without us. To-morrow I will show you a bird's-eye view over the whole Darling Downs country.

Let us assume that next morning, having ascended to the height of 1000 feet, we are floating over the Ballandean and Accommodation Creek orchards, where all English fruits, such as apples, pears, cherries, plums, etc., are grown to perfection. Cooking pears, $1\frac{3}{4}$ lbs. in weight, and cooking apples 15 inches in circumference have been produced here. There is a great future ahead for the fruit-growing and grape-growing industries around here, especially the cultivation of the Hermitage variety. Away to the west we see the farms round Texas on the Severn, and farther to the north-west, the cultivation round Inglewood, at which places tobacco has been grown with success for some fifteen years, about one ton to the acre being the usual return. To the east we see the Sugarloaf settlement, and to the west the broken country round Pikedale, where silver and copper mining is carried on. We are now looking down upon the town of Stanthorpe, with its countless green orchards, once the centre of the tin-mining industry, and surrounded by about 550 square miles of mineral country. The area of tin country is about 20 miles by 35 miles; and tin to the value of £4,000,000 has been raised in the past, but copper

and silver mining are now taking its place. The town is also the centre of an extensive pastoral country, many of the sheep runs being famed for the fineness of their wool. Altering our course to the north-east, across a tract of mountainous country, we reach Killarney, about 20 miles from the head of the Condamine, the terminus of a branch line from Warwick, which runs through some of the choicest agricultural land on the Downs. Formerly the rich black soil slopes and flats which surrounded it were nearly all dense scrub, but now the land is cultivated right up to the New South Wales border. There are three saw-mills and an extensive timber trade. Some of the mountain country at the back of the village is heavily timbered with pine. There is close settlement and intense farming on all sides. The scenery is exceedingly picturesque. The scenery up the gorge of the Condamine is of wild grandeur, and the river has to be crossed nineteen times in 8 or 10 miles. Heading north-westerly, we are now passing over the magnificent Canning Downs estate, comprising 68,000 acres, of which 20,000 have been cut up and sold in small lots in the last few years. On the north-east we see a beautiful range of purple mountains intersected by long fertile valleys, forming the thickly settled districts of Farm Creek, Emu Creek, Upper and Lower Swan Creek, and Freestone. To the south we see the vast extent of Canning Downs not yet settled on, with the Condamine dividing it from the timbered country on Canning Downs South. We are now in the very heart of a farming country of great importance, supporting thousands of settlers. Hemmed in on three sides by mountains, at the base of which lie some of the richest agricultural land in the colony, the country may be described as undulating downs and open forests, rich flats, and valleys. It runs within half a mile of Warwick, the centre of all those surrounding settlements. The soil is deep alluvial along the valleys, whilst the uplands are composed of red-coloured volcanic matter. To the north-east are the old-established farming settlements of Freestone Creek, etc., a succession

of fertile valley-lands and gradual slopes, surrounded by a dark range of hills. These valleys vary in extent, the largest being about 10 miles by 4, but linked together they form a continuous belt of thick settlement from Freestone Creek to Killarney, a distance of nearly 30 miles. Nearly all these lands were once unreclaimed scrub, thought to be useless by the early settlers, who took up the grass country. Now the beauty of these valleys with their neat homesteads and well-tilled farms, waving with golden grain or green lucerne, which spread like a chessboard around the foot-hills or climb the adjacent acclivities of the purple mountains, is indescribable.

E. Evans.—*The Garden of Queensland.* Published by authority of the Queensland Government.

The imaginary voyage extends much farther, and is described in detail, pp. 26-86, including many of the most prominent stations.

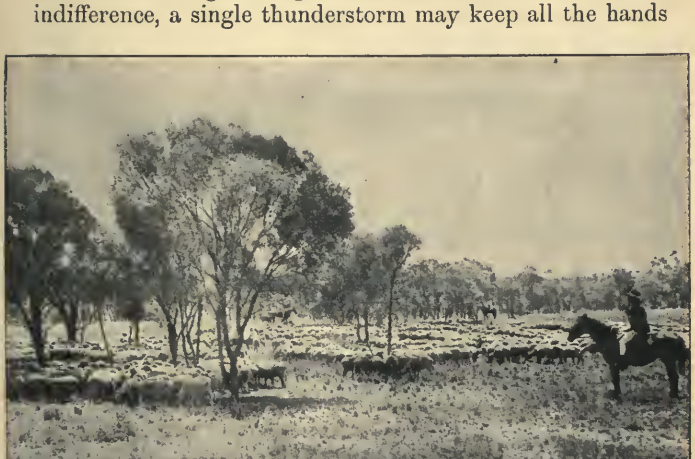
It was from the top of Mount Sturt, in 1827, that Allan Cunningham, the botanist, and discoverer of the Darling Downs, who had made his way thither from the Hunter River, across the Liverpool Range, round the eastern skirts of the Liverpool Plains, and across the New England Range, all country of the most difficult description, had his first panoramic view of the rich region into which he was the first to penetrate. Cunningham's Gap, the only visible means of crossing the mountain barrier towards Moreton Bay, was traversed in the following year.

Sheep-Shearing on a Queensland Sheep Farm

Sheep-shearing on an Australian station is a great event —indeed the great event of the year. To realise what a shearing is on a large station, where perhaps a quarter of a million sheep have their wool taken off, it is necessary to see the whole thing going on before your eyes; any description can but convey a very faint idea of the reality.

On any large and well-managed station there is a substantially built wool shed, the most approved pattern for which is T-shaped. The shed should be high, airy, and large enough to hold sheep for a whole day's work. Let us suppose there are 200,000 sheep to be shorn; if the

shed is capable of holding them, sixty or seventy shearers will be at work, besides several other men as assistants, so that often a hundred hands are employed. It is impossible to shear sheep that are damp, and unless the shed will hold enough sheep to make weather a matter of indifference, a single thunderstorm may keep all the hands



TRAVELLING SHEEP TO WATER DURING A DROUGHT.
(From a photograph in the collection of the Royal Colonial Institute.)

idle for a day or even more, to say nothing of the dew, which, unless enough sheep are housed overnight, will often delay operations for a couple of hours every morning. The usual practice is for the sheep to be driven in over night, until the shed is full. The work is all done at so much a score, the general price being 3s. 6d., and ninety sheep a day is about an average record for a good man. The men stand on what is called the shearing floor. On one side

is a pen of unshorn sheep from which they catch, while a few yards distant is the door through which the beast runs when shorn; and by the shearer stands a boy with a brush and a pot of tar, to rub into any bad cut which may be inflicted in the hurry of taking the wool off. Other men pick up the fleeces, fold them and put them in bales, when they are pressed, and sometimes "dumped," that is, subjected to hydraulic pressure to make carriage easier. On a large station on the Darling Downs sixty to seventy bales go away by rail every day during the whole shearing, all ready for shipment to England by the first steamer. So great was the saving effected by the dumping machine in the cost of carriage, that on one year's wool it amounted to more than the original cost of the apparatus. The work of shearing is very hard, not only from the stooping position in which the operator stands with the sheep, as it were, sitting between his knees, but from the strain which working the shears entails on the muscles of the hand; on the other hand, however, the pay is, even for Australia, high, not unfrequently reaching 18s. or 20s. a day, besides food. Nearly all the small farmers make it a practice to shear, and add considerably to their incomes by three months of such work. Men who have shorn for years generally work in gangs, knowing each other very well, and looking forward from year to year to spending three months in each other's company, as a pleasant change from the monotony of home bush life.

A. W. Stirling.—*The Never Never Land.* Sampson Low.

By permission of Messrs. Sampson Low.

A Queensland farm is thus described by the same traveller. "The post came once a week, by sending 15 miles to fetch it. The house was quite in the bush style, with wooden sides and an iron roof. Living, although good, was after the orthodox pattern, consisting of mutton and damper, washed down by tea at each meal. The country was of the best description, magnificently grassed with the Mitchell grass. This grass springs in tufts, often covering the ground to the height of a foot or more, and its great virtue lies in the fact that even in the driest season, unlike the finer kinds of herbage, it affords good sustenance to the sheep. A variety of the famous saltbush, so prized by the sheep-farmer, grew in profusion. This shrub forms in many places the

staple food of the sheep. It grows as a low bush, with light-green smooth leaves, and gets its name from the peculiar briny taste which the leaves have when bitten. In country where there is no variety of saltbush it is necessary to give the sheep a substitute in the form of rock salt. The chief virtue of the saltbush, however, is its capacity for resisting drought; long after the last vestige of grass has turned to dust, the saltbush remains, and the sheep thrive upon it, so that the squatter looks upon it as a sure stand-by even in the worst time." —*Ibid.*

A Queensland Gold Mine

Of all Queensland mines the most sensational by far is Mount Morgan. There is a pathetic interest about the discovery of this marvellous mine that attaches probably in lesser degree to other mineral discoveries, but which, in this instance, is brought into striking relief by the stupendous wealth missed by its original owner.

Mount Morgan is one of a low range of hills from several of which it differs in no marked manner in outward aspect. It was a portion of a selection owned by a man named Gordon, who by the necessary residence and fencing had fulfilled the conditions that made it freehold. The pasturage was poor and scanty and the country rugged, so that Gordon eked out a precarious subsistence with a few head of cattle. Two brothers, Morgan, prospectors of some experience, visited him by chance and partook of the rough hospitality extended without distinction to all travellers in the bush. Gordon mentioned his belief that the Mount contained copper, as curious green and blue stains could be observed all over it. The Morgans were led by curiosity to examine the Mount. A shower had recently wetted the rocks, and one of the brothers noticed indications which to his practised eye were startlingly significant. Taking away a few samples in their pockets, they bid their host adieu and left him to continue the hungry life which was all that the richest known spot on the globe was able to afford him. Reappearing shortly after, they offered to buy his selection, which he thought himself lucky to be able to dispose of

for £1 per acre. The portion of the Mount which was outside Gordon's fence was subsequently secured under mining lease. Of the real value of their acquisition the Morgans had no conception, but that it would pay handsomely to work they were confident. To treat the stone it was necessary to erect a battery, and for this their resources were entirely inadequate. They proposed, therefore, to a Rockhampton resident a sale of half their interest for £2000, the money to be devoted to the purchase of machinery. It was too great a risk, however, for one man to accept, but the gentleman to whom they applied invited his brother and two friends to join him in the enterprise to the extent of £500 each. In a few years all concerned were millionaires. Many difficulties had to be overcome, for the gold was contained in a ferruginous stone insensible to a large degree to the ordinary process of amalgamation. No previous experience of Australian gold-mining was of much avail, the occurrence of gold in the Mount being unique. The Government geologist has since determined the occurrence as due to a thermal spring, long since inactive, which brought up the gold, with other mineral matters (chiefly silica and iron), in solution, and precipitated them at the surface, thus gradually building up this wonderful Mount. The same process which originally distributed the gold through the substance of the mountain has since been adopted for its recovery. The precious metal is dissolved by chlorination, and runs in a sherry-coloured liquid into filters, to be there chemically precipitated. The mine has for years been the property of a company with a capital of £1,000,000, the lucky shareholders having received in dividends up to the present date over £4,550,000. The reduction works are most extensive, lit by electricity and kept going continuously night and day. The top of the Mount has been quarried away, and on this portion, which received the overflow of the Pactolian geyser, was the richest deposit. Whilst this portion was being treated, from £100,000 to £125,000 was distributed monthly in dividends, and

though these sensational returns have now ceased, the company pay £29,000 a month with perfect regularity, and are likely to continue doing so for many years. The spot where poor Gordon's cattle found bare subsistence now maintains in splendour a few very rich men, and provides well-paid employment for an army of workmen, the company employing about 1100 men. A town thrives at the foot of the Mount, and the whole district has been regenerated by the enormous expenditure of the company.

The Work and Wealth of Queensland. Outridge and Co., Brisbane.

"Parties of men, chiefly in couples, though sometimes the party is more numerous and sometimes it is a solitary individual, are continually prospecting these areas, trying the gullies for alluvial deposits and searching the ranges for reefs. Each carries in his swag a miner's right, which costs 5s., and constitutes his licence to search for gold. This must be renewed annually. The prospector's life is one of sustained interest and excitement. Hope continually beckons, and as he lies down by his camp fire in some lonely gully, he perhaps ponders on indications noticed during the day which may lead on to fortune. If he makes any valuable discovery, he is entitled to a reward claim, and, marking out his ground, he hurries off to the township where the gold-warden of the district resides, who on receiving the information proceeds to the locality indicated and pegs out the claim properly. If the results of the sinking promise well, a number of claims are pegged out—along the line, if it is a reef, but in more haphazard position if the deposit is alluvial—a canvas town spreads over the ridges, to be quickly replaced by buildings of wood and brick if the discovery proves of permanent value."—*Ibid.*

Brisbane

Originally built on a flat, partly enclosed by an abrupt bend of the river, the town has climbed the bordering ridges, crossed the stream, and spread out in all directions. The principal street, Queen Street, runs across the neck of the original riverside "pocket"; at one end it touches the wharves, at the other it meets the winding river at right angles, and the roadway is carried on by a long iron bridge across to the important suburb of South Brisbane. Queen Street possesses shops and bank-buildings which may challenge comparison with those of any Australian

city, and every year the older buildings are giving way to newer and more imposing structures. On one side of the thoroughfare the cross streets lead through the oldest part of the city; through blocks of buildings where fine warehouses and tumbledown hovels are strangely intermixed with the Parliament Houses, the public gardens, and the wharves. On the other side of Queen Street the same cross streets climb steep ridges to the terraces, where high and broken ground offers cool, breezy sites for streets filled with dwelling-houses.

An artist roaming round the town would find objects of interest everywhere. From the elevated terraces he could look down upon the main town, with the river, a broad band of silver winding through it, and his horizon would include the blue peaks of the Main Range to the westward, and the shimmer of the sunlight on the great landlocked sheet of Moreton Bay to the eastward.

H. Willoughby.—*Australian Pictures.* Religious Tract Society.

By permission of the Religious Tract Society.

"Brisbane, with its wooden houses all painted white, and the trellised verandahs round about them, some with grape vines and passion fruit clustering it, and the dripping tattered fringe of a banana-tree growing round the end, is picturesque after the first shock is over,—the first shock of eternal glare, dry dust, and white or sea sand, and fields of caked earth instead of grass."—Hume Nisbet. *A Colonial Tramp.* Ward and Downey.

Across the Blue Mountains

Early in the morning we passed the Nepean. Having crossed a low piece of land on the opposite side, we reached the slope of the Blue Mountains. The ascent is not steep, the road having been cut with much care on the side of a sandstone cliff. On the summit an almost level plain extends, which, rising imperceptibly to the westward, at last attains a height of more than 3000 feet. From so grand a title as Blue Mountains, and from their absolute altitude, I expected to have seen a bold chain of mountains

BRISBANE.

crossing the country; but instead of this, a sloping plain presents merely an inconsiderable front to the low land near the coast. From this first slope the view of the extensive woodland to the east was striking, and the surrounding trees grew bold and lofty. But when once on the sandstone platform, the scenery becomes exceedingly monotonous.

In the middle of the day we baited our horses at a little inn, called the Weatherboard. The country here is elevated 2800 feet above the sea. About one and a half miles from this place there is a view exceedingly well worth visiting. Following down a little valley and its tiny rill of water an immense gulf unexpectedly opens through the trees that border the pathway, at the depth of perhaps 1500 feet. Walking on a few yards one stands on the brink of a vast precipice, and below one sees a grand bay or gulf, for I know not what other name to give it, thickly covered with forest. The point of view is situated as if at the head of a bay, the line of cliff diverging on each side, and showing headland behind headland, as on a bold sea-coast. These cliffs are composed of horizontal strata of whitish sandstone, and are so absolutely vertical, that in many places a person standing on the edge and throwing down a stone, can see it strike the trees in the abyss below. So unbroken is the line of cliffs, that in order to reach the foot of the waterfall, formed by this little stream, it is said to be necessary to go 16 miles round. About 5 miles distant in front, another line of cliffs extends, which there appears completely to encircle the valley; and hence the name of bay is justified, as applied to this great amphitheatral depression. If we imagine a winding harbour, with its deep water surrounded by bold cliff-like shores, to be laid dry, and a forest to spring up on its sandy bottom, we should then have the appearance and structure here exhibited. This kind of view was to me quite novel and extremely magnificent. In the evening we reached the Blackheath. The sandstone plateau has attained the height of 3400 feet; and is covered as before

with the same scrubby woods. From the road there were occasional glimpses into a profound valley, of the same character as the one described; but from the steepness and depth of its sides, the bottom was scarcely ever to be seen.

January 18.—Very early in the morning I walked about 3 miles to see Govett's Leap; a view of a similar character with that near the Weatherboard, but perhaps even more stupendous. So early in the day the gulf was filled with a thin blue haze, which, although destroying the general effect of the view, added to the apparent depth at which the forest was stretched out beneath our feet. These valleys, which so long presented an insuperable barrier to the attempts of the most enterprising of the colonists to reach the interior, are most remarkable. Great arm-like bays, expanding at their upper ends, often branch from the main valleys and penetrate the sandstone platform; on the other hand, the platform often sends promontories into the valleys, and even leaves in them great insulated masses. To descend into some of them it is necessary to go round 20 miles. But the most remarkable feature in their structure is that, although several miles wide at their heads, they generally contract towards their mouth to such a degree as to become impassable. The Surveyor-General, Sir T. Mitchell, endeavoured in vain, first walking and then by crawling between the great fallen fragments of sandstone, to ascend through the gorge by which the Grose joins the Nepean; yet the valley of the Grose in its upper part, as I saw, forms a magnificent level basin some miles in width, and is on all sides surrounded by cliffs, the summits of which are believed to be nowhere less than 3000 feet above the level of the sea. When cattle are driven into the valley of the Wolgan they cannot escape, for this valley is in every other part surrounded by perpendicular cliffs; and 8 miles lower down it contracts from an average width of half a mile, to a mere chasm, impassable to man or beast. Sir T. Mitchell states that the great valley of the Cox River, with all its branches, con-

tracts where it unites with the Nepean, into a gorge 2200 yards in width, and about 1000 feet in depth. Other similar cases might have been added.

CHARLES DARWIN.—*Voyage of the "Beagle."* Ward and Lock.

"On reaching Cullenbullen the chain is granitic, and throws off a remarkable basaltic spur to the eastward, the curious sub-ramifications of which render all that sandstone locality commonly called Blue Mountains difficult to approach and yet more difficult to explore. Mount Adine, Mount Clarence, Mount King George, and Mount Tomah crown the northern branch of that spur. Mount Hay and King's Tableland surmount the southern. Between these ranges lie yawning chasms, deep winding gorges, and frightful precipices. Narrow, gloomy, and profound, these stupendous rents in the bosom of the earth are enclosed between gigantic walls of a sandstone rock, sometimes receding from, sometimes frightfully overhanging the dark bed of the ravine, and its black, silent eddies, or its foaming torrents of water. Everywhere the descent into the deep recess is full of danger, and the issue almost unpracticable. The writer, engulfed in the course of his researches, in the endless labyrinth of almost subterranean gullies of Mount Hay, and the River Grose, was not able to extricate himself and his men until after days of incessant fatigue, danger, and starvation. The ascent of Mount Hay, when these difficulties are once surmounted, repays richly the exertions and fatigue which it entails. From its basaltic top the distant views to the south and west are somewhat intercepted by King's Tableland and other mountains higher than Mount Hay; but to the east, the sea-coast bordering the interesting basin through which flow the rivers Nepean and Hawkesbury, the vicinity of Paramatta River, together with Sydney and Botany Bay are distinctly visible. At the foot of Mount Hay lies, in the foreground, the River Grose, in a sandstone ravine, the perpendicular depth of which is 1500 feet. On the farther side of the torrent rise the steep basaltic eminences of Mounts King George and Tomah, deeply clefted, and beyond in a strong relief, the predominating summits of the Payan and Coricudgy mountains."—P. E. DE STRZELECKI. *Physical Description of New South Wales.* Longmans.

"Some idea may be formed of the intricate character of the mountain ravines in that neighbourhood from the difficulties experienced by the surveyors in endeavouring to obtain access to Mount Hay. Mr. Dixon, in an unsuccessful attempt, penetrated to the valley of the Grose, until then unvisited by any European; and when he at length emerged from ravines in which he had been bewildered four days, without reaching Mount Hay, he thanked God, to use his own words in an official letter, that he had found his way out of them. Mr. Govett was afterwards employed to make a detailed survey of these ravines, by tracing each in succession, and thus by a patient survey of the whole he ascertained at length the ridge connected with Mount Hay, which he was the first to ascend. Guided by him, I was thus enabled to place my theodolite on that summit. I found the scenery

immediately around it very wild, consisting of stupendous perpendicular cliffs 3000 feet deep, at the foot of which the silvery line of the Grose meanders through a green valley."—Sir T. L. MITCHELL. *Three Explorations into the Interior of Eastern Australia.* Boone, 1839 (1171, 2).

The Blue Mountains are now crossed by the railway, a costly but necessary piece of engineering.

"Liverpool plains, perhaps the finest pastoral country in Australia, with a rich black soil is, taken as a whole, "undulating and picturesque, in many parts dotted with volcanic hills and its wide plains studded with clumps of myall, a tree that greatly resembles the drooping willow. In the old days clumps of saltbush used to surround the myall trees, and sheep, panting in the exuberance of their fat, used to be attracted to the shade, the whole forming a pastoral lookout, hard to beat."—O. DE SATGE. *Journal of a Queensland Squatter.* Hurst and Blackett.

Resources of New South Wales

The immense inland districts, stretching from the various mountain ranges to the western and north-western limit, are those in which the great pastoral runs are for the most part found, those being specially favoured which are watered by the River Darling and its tributaries. These plains, covered with saltbush, are the feeding grounds of millions of sheep and other live stock, and during the shearing season enormous quantities of wool are sent to Sydney and other ports for shipment to Europe and elsewhere.

For agricultural purposes the soil of New South Wales cannot be surpassed. The district forming the northern portion of the colony is watered by three rivers—the Tweed, Richmond, and Clarence—with an area approaching 4,000,000 acres, and is pronounced by competent authorities to be generally suitable for the cultivation of maize, sugar, the vine, silk, cotton, arrowroot, coffee, tea, and semi-tropical fruits of nearly every kind. Maize and sugar are very largely grown. Proceeding southward, we have the districts watered by the Bellinger, Macleay, Hastings, and Manning, the whole forming an area of

3,000,000 acres adapted for maize and sugar. Farther south is the Hunter River. On the lower portion corn and lucerne hay are grown in large quantities, while on the upper the vine and most cereals thrive. In the county of Cumberland, on the alluvial flats of the Hawkesbury and Nepean Rivers, the principal crops are hay and corn. Once wheat was the chief crop, but in this, the metropolitan county, grazing has naturally become more profitable. From the Illawarra district, great in dairy produce, as far as the southern boundary, a length of about 200 miles, the coast may be said to abound in fertile land adapted for dairy farms. Turning to the mountainous country, the Great Dividing Range, is found the high lands of Manaro, Braidwood, Bungendore, Yass, and Goulburn, with an area of about 15,000,000 acres, in a climate with a temperature resembling that of England. Over this wide surface wheat and all English cereals, fruits, and vegetables thrive. On the tablelands of New England and Tenterfield, about 3000 feet above the sea, the English climate, shorn of its severity, is again met with. Here there is an area of about 14,000,000 acres, suited to English cereals and fruits. The western slopes of this Great Dividing Range, for a breadth of from 100 to 150 miles, are suitable for wheat and the vine. A very large part of the territory is splendidly adapted for the vine and the silk industry, the mulberry tree thriving everywhere throughout the colony, some parts of which favour the growth of the olive, cinchona, indigo, and rice.

Official.

The late Rev. W. B. Clarke, one of the highest of mineralogical authorities, wrote respecting the mineral wealth of New South Wales:—"It is not too much to say that no sooner are we off the carboniferous areas rich in coal and its associated minerals, than we are in a region in which are tracts where gold, copper, and lead abound. And, passing from the sedimentary to plutonic rocks, we can discover granites which, however barren externally, are within frequently charged with the valuable ore of tin. So that the three great geological divisions of our colony are replete with mineral treasures that are practically inexhaustible."

. . . . . .

"The auriferous area is approximately put at 70,000 square miles; but new fields are being continually opened, and new discoveries made in localities supposed to have been thoroughly examined, and such a vast amount of gold in all probability still lies in its hidden depths that any accurate computation is rendered impossible. There are thousands of miles of territory, known to be auriferous, not yet prospected."

. . . . . .

"Few countries offer coal under such favourable circumstances and in such abundance as New South Wales. For hundreds of miles the coast districts may be said to be one vast coal-field, and the metropolis stands in the middle of the coal area. The coal measures possess no less than 16 seams, each over 3 feet thick. In a seam worked at Newcastle there is from 8 to 10 feet of coal. In the western district the same measures contain at least 11 seams, the lowest of which, 10 feet thick, crops out near the railway line. Southward from Sydney, a series of seams of coal crop out at elevations within easy reach of the sea, varying from 6 to 8 feet of clean coal at Coal Cliff, near Wollongong, to near Jervis Bay, at which the seams are found associated with immense quantities of iron ores and fire-clay. Large quantities of limestone occur within 30 miles of the same locality. The approximate coal area of the colony is 23,950 square miles."—*Ibid.*

Sydney Harbour

Sydney proper—the old Sydney of the first settlements—stands on a long neck of land at the mouth of the Paramatta River, between two deep creeks which form its harbour—that is, its inner harbour, where its docks and wharves are. Port Jackson, the harbour proper, from which these are mere inlets, is the largest and grandest in the world. A passage about a mile wide has been cut by the ocean between the wall of sandstone cliffs which stretch along the south-west Australian shores. The two headlands stand out as gigantic piers, and the tide from without and the fresh-water flood from within have formed an inlet shaped like a starfish, with a great central basin, and long arms and estuaries which pierce the land in all directions, and wind like veins between lofty sandstone banks. The rock is grey or red. Worn by the rains and tides, it projects in overhanging shelves, or breaks off into the water and lies there in fallen masses. The valleys

thus formed, and widening and broadening with age, are clothed universally with the primeval forest of eucalyptus and dark Australian pine—the eucalyptus in its most protean forms, and staining its foliage in the most varied colours, the red cliffs standing out between the branches, or split and rent where the roots have driven a way into their crevices. In some of the landlocked reaches, except for the sunshine and the pure blue of the water, I could have fancied myself among the yews and arbutuses of Killarney. The harbour is, on an average, I believe, about 9 fathoms deep. The few shoals are marked, and vessels of the largest size lie in any part of it in perfect security. Sydney itself is about 7 miles from the open sea. The entire circuit, I was told, if you follow the shore round all the winding inlets from bluff to bluff, is 200 miles.

J. A. FROUDE.—*Oceana.* Longmans.

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"Sydney harbour opens out in all its beauty as the steamer comes through the Heads: and though in other parts of Australia the phrase "our harbour," as applied to Sydney, has become a joke, it is indeed a most wonderful sight, with its labyrinth of bays and channels. One might live in Sydney a lifetime and then not quite know every arm and nook of Port Jackson. . . . On steaming up an arm of the harbour in one of the fast excursion launches it often seems as though one were rushing directly into a cliff, when suddenly a little opening is seen to one side, and another inlet opens out for miles. Each of these inlets is in a way a reproduction of the main harbour."—W. J. GALLOWAY. —*Advanced Australia.* Methuen.

"The first view of Sydney from the sea-front shows a city built largely in red and yellow sandstone upon rolling coastal ridges, with little level ground anywhere. Some of the older buildings almost overhang the sea, as one often notices in some of the Mediterranean towns; though, apart from Sydney, this is not a characteristic of Australian ports. The city itself is something of a jumble, the streets being narrow and irregular, unlike those of Melbourne, which the pioneer surveyors, who came from Sydney and profited by its mistakes, planned broad, stately, and in chessboard fashion at the start. Sydney is said to have been laid out on the lines of the cattle tracks made by the first imported cows, who wandered about the infant settlement."—*Ibid.*

SYDNEY HARBOUR.

Victoria as a Pastoral Colony

Victoria, under its old name of Port Phillip, was the first of the Australian colonies to demonstrate that merino wool of exceptional fineness, length of staple, softness, and lustre could be grown in large quantities on the wide pasturelands of Australia. Though great strides have been made by the flock-masters of other colonies, Victoria still holds her pride of place in the front rank. The advantage that Victoria possesses over other pastoral lands in the production of merino wool of the highest quality, is in a measure due to the skill of her flock-masters, but it must be admitted that the beauty of Australian wool is mainly owing to the climate and pastures of the country. In summer the heat, as measured by the thermometer, is very great, but such is the character of the atmosphere that Europeans can work under the blazing sun, and in the greatest heat, without injury to their health. In winter the cold is never excessive, snow is seldom seen save on the highest mountains. Frosts are frequent, but not so severe as to injure the stock, and the sharpest frost is dissipated before the sun is a couple of hours high. The climate much resembles that in which the merino flocks were reared in their old home in the Spanish peninsula, when they passed the summer in the mountains of Montanat, the winter on the plains of Estremadura. By some people it has been thought that in this peculiarity of climate lies the secret of the beauty of Victorian merino wool. Victoria has justly been called the Land of the Golden Fleece, for it is her golden fleeces that have brought wealth to the colony more than any other industry. This colony is another illustration of the truth of the old Spanish proverb—"Sheep have golden feet, and wherever the print of their footstep is seen the land is turned to gold."

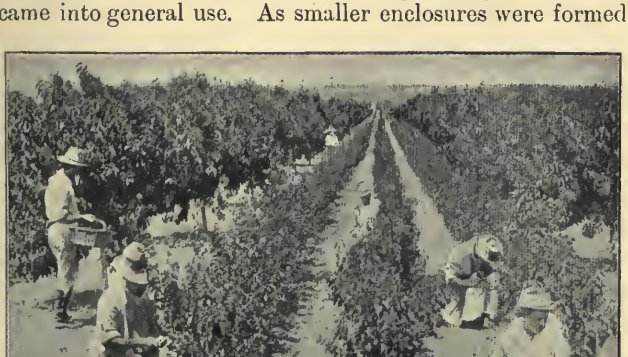
With a wide extent of the finest pasture-land, and a climate so genial that it was named by the first settlers Australia Felix, it is not surprising that Victoria soon out-

WOOL BARGES ON THE MURRAY RIVER.

stripped her neighbours in the production of wool of the highest quality. It was noticed by the first colonists that the sheep bred in Victoria grew wool of quite a different character to that produced by Tasmania or New South Wales flocks. The staple was longer, the wool was softer, and had a brighter lustre. The Port Phillip wool became the favourite with European manufacturers, and ever since it has maintained its place as the most valuable merino wool in the world.

When Victoria first became a field for colonisation, the early settlers managed their flocks on a plan somewhat similar to that followed by Abraham on the plains of Mamre. The world was before them where to choose, and they wandered over the face of the country till they found good pasture and plenty of wood and water. They then settled down and took up as large an area of land as they thought they would require. The greater portion of the colony was open forest or almost treeless plains. There were scarcely any difficulties in the way of settlement save some tribes of aborigines, who occasionally killed a few sheep, and the much more troublesome dingo, as the indigenous wild dog was called. The sheep were everywhere shepherded by day, and enclosed in hurdle yards at night. For greater security against prowling dingo or blackfellow a man slept in a watch-box close to the sheep-yard. The country was unenclosed, and one might ride from Melbourne to the boundary of the colony in every direction and not meet a fence, save round a rare cultivation paddock. While the land was held as squatting runs, as the leaseholds from the Crown were called, the practice of shepherding the sheep usually in flocks of from 1500 to 2000 in open country, and less in forest land, was universally adopted, but gradually the advantage of running sheep in paddocks became generally understood, and in places where timber was plentiful ring fences and large paddocks were formed. Some of the old squatters were strongly opposed to the practice of running sheep at large. They maintained that such a spirited animal as

the merino sheep required shepherding to keep him tame, and that once granted full liberty he would become a wild animal. Despite the opinion of these old squatters, however, the work of enclosing and subdividing the country went on rapidly, the fences being often made of logs or brushwood. As the leaseholds were transformed into freeholds, better fences were put up, and gradually wire fencing came into general use. As smaller enclosures were formed,



ORCHARD WORK IN VICTORIA.

In the Mildura irrigation colonies near the Murray River much attention is paid to fruit-growing.

wells were sunk, dams made, and banks excavated, in order to provide a sufficient supply of water for the sheep; while, later on, belts of timber were, in the open country, planted across the line of the prevailing winds. These plantations afford a welcome shelter to the stock in wet, stormy weather. Fencing in and subdividing the land and providing an ample supply of water for the stock have increased the grazing capabilities of the country greatly, in some instances the increase being fully fourfold; while the sheep, under the new management, are healthier and yield heavier fleeces.

G. A. Brown.—*Illustrated Handbook of Victoria, for the Colonial and Indian Exhibition of* 1886. Published by the Victorian Government.

"The great bulk of the sheep in Victoria never receive any food save the natural pastures of the country, and in seasons of drought great sufferings are entailed on the flocks, and occasionally the deaths are very numerous."—*Ibid.*

The First Sight of Melbourne

I was asleep when we passed between the Heads at Port Phillip, and was only conscious of the change from the long ocean roll outside to the calm of the great bay. When I went on deck we were alongside the wharf at Williamstown, with Melbourne straight before us five miles off, and the harbour reaching all the way to it. In my life I have never been more astonished. Adelaide had seemed a great thing to me, but Melbourne was a real wonder. Williamstown is the port from which vessels outward bound take their departure. The splendid docks there were choked with ships loading and unloading. Huge steamers from all parts of the world were lying round us or beside us. In the distance we saw the smoke of others. Between us and the city there seemed scarcely to be room for the vessels anchored there, from their mast-head or their stern the British flag blowing out proud and free, and welcoming us to Australia as to a second home. Steam launches, steam ferry-boats, tugs, coasting steamers were flying to and fro, leaving behind them, alas, black volumes of smoke, through which the city loomed large as life. The smoke is a misfortune. The Sydney coal, cheap as it is, and excellent for all useful purposes, is fuliginous beyond any coal I have fallen in with, and on windless mornings, like that on which we arrived, a black cloud envelops harbour and town. But it is seldom thus, and there is generally a breeze. Even the smoke itself means business, life, and energy; and along the shore for miles and miles rose the villas and plantations of the Melbourne magnates, suburban, unromantic, but all the

G. W. Wilson and Co.

MELBOURNE.

more reminding one of England, and telling of wealth and enjoyment.

J. A. FROUDE.—*Oceana.* Longmans.

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"Its population puts Melbourne into the rank of the first score of the cities of the Empire. If area were considered as the test, the city would not easily be surpassed except by London itself, for a 10 miles radius from the Post Office is required to cover it all. The city itself is a compact mass of about 1½ mile square, encircled by large parks and gardens, all the property of the people, and permanently reserved for their use. Built upon a cluster of small rolling hills, the views of Melbourne are pleasantly interrupted, and yet it is possible to obtain frequent glimpses from commanding points either of the whole or of parts of the whole. You will turn a corner and come upon a panoramic peep of streets, of sea, and of spires that takes one's breath away."—H. WILLOUGHBY. *Australian Pictures.* Religious Tract Society.

The Gold Mining Towns of Victoria

From Melbourne it is easy to journey to the two great goldfields of Victoria, Ballarat, and Sandhurst. Sandhurst is the Bendigo of old days. It has had many ups and downs; it has been deserted and has been ruined; but the result is the fine city of to-day, with its broad, tree-lined streets, its splendid buildings, and high degree of commercial activity. There is no mistake about the character of the town. Miles and miles of country before you enter it have been excavated and upturned by the alluvial digger. And there are few more desolate sights to be met with than a worked-out and deserted diggings, for often Nature refuses to lend her assistance, and does not hide the violated tract with trees or verdure. Ugly gravel heaps, staring mounds of "pipe-clay," deposits of sludge, a surface filled with holes, broken windlasses, all combine to make a hideous picture. Alluvial digging of the shallow type is a curse to the unhappy country operated upon. But alluvial mining has long had its day in and about Sandhurst, and the town lives now by deep quartz mining. You come upon the poppet-heads and the batteries every-

where, even in the beautiful reserve which is the centre of the city.

Ballarat lies 70 miles to the north-east of Melbourne. An upland plateau, with a fringe of hills all round, some of these now denuded of their timber, and glittering white, cold, and bare in the sun; the earth pitted with holes and gullies, scarified as if by some gigantic rooster, "mullock-heaps," "poppet-heads," and engine stacks everywhere. This is one's first impression of Ballarat. Goldfields are very much like one another all over the world. "Substitute pines for eucalypti," says Mr. Julian Thomas, "and I could imagine this to be California. But when one first drives from the station and sees the magnificent width of Sturt Street, with the avenues of trees planted along the centre, the public buildings, banks, and churches, you are possessed with astonishment that this is a mining town. Ballarat is indeed a great inland capital. The difference between this and Sandhurst is that at the latter place the mines obtrude themselves everywhere. One cannot go half a block but one has mullock-heaps and poppet-heads in view. In Ballarat it is all different. The mines are in the suburbs, and do not deface the town, as at Sandhurst. Embowered in trees, the homes of the people are surrounded with gardens. There is verdure and vegetation in every street."

HOWARD WILLOUGHBY.—*Australian Pictures.* Religious Tract Society.

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This volume is highly to be recommended for its numerous and excellent illustrations.

The Colony of South Australia

Generally speaking, the colony, within the limits of settlement, may be described in its physical features as consisting of hill and plain. A fine rich plain stretches eastward from the coast till it is intercepted by a succes-

sion of hills known as the Mount Lofty Range, and beyond this broken country occur other wide undulating plains called the Murray Flats, which slope down towards the Murray River. The Mount Lofty Range, as it goes northwards, merges into the Flinders Range, which gives place in turn to other ranges, altogether extending hundreds of miles up the centre of the province. This mountain range forms an extensive watershed, and numerous watercourses, more or less permanent, flow from the hills and fertilise the lower lands. For years past the coast plain has been under cultivation. For many miles you travel through a succession of farms. Here and there are farmer's homesteads, with an occasional more pretentious building, indicating the residence of one of the gentry. Dotted over the plains, too, are the towns and hamlets, townships as they are called in American parlance, in some of which may be observed the conveniences, and even the elegancies, of city life. Some portions of the mountain range are very fertile, and numerous orchards and vegetable gardens, besides ordinary farms, may be seen on the hill-sides, or nestling snugly in some of the rich valleys. The Murray Flats are rapidly being brought under cultivation. The Far North consists largely of what is known as myall or saltbush country, names given to it from the characteristic timber or shrubs which grow upon it. This country is of a lacustrine character, many of the lakes being of great extent, others forming chains of lagoons or waterholes. Almost all the lakes are salt and low-lying, Lake Eyre being over 30 feet below sea-level. West and north-west of Lake Eyre the country rises to a considerable elevation, the Musgrave and Macdonnell ranges being several thousand feet above the sea. The whole of this Far North country, lying north, east, and west of Port Augusta, is only suitable for pastoral or mineral occupation. Lying between the River Murray and the Victorian boundary is a large area known as the South-eastern District. Wide tracts of this district comprise sterile sandy land of little use even for pasturage, but here

and there are spots of great richness. These have been eagerly selected, and have proved the centres of thriving agricultural populations. This district was formerly volcanic, and the craters of extinct volcanoes, in the neighbourhood of Mount Gambier, are a feature of the district. The country round Mount Gambier is exceedingly rich. The climate also is mild and temperate, and English plants and flowers grow luxuriantly.

J. F. CONIGRAVE.—*South Australia: a Handbook for the Colonial and Indian Exhibition,* 1886.

"The country which takes up the largest portion of the district (South-eastern District), with the exception of the mallee scrub, to which it is nearly allied, is the heath. This is easily described: immense level sandy tracts, heavy and dusty in summer, and boggy in winter, supporting no grass, nor any trees but those of a stunted and worthless character, run through, here and there, with belts of short and crooked stringy bark, and in all other places covered with tangled brushwood, these are the features of the heath."—REV. J. E. TENISON WOODS. *Geological Observations in South Australia.* Longmans.

"In spring nothing can exceed the varied beauty which meets the eye on every side. There is first the *Epacris,* with its spike of campanulate white or carmine flowers; there is the *Corraea cardinalis,* something like a fuchsia tipped with yellow; there is the *Tetratheca ciliata,* a charming pink bell, and the *Dillwynia floribunda,* a tall spike of orange papilionaceous flowers, and many others, all most abundant and charmingly beautiful."—*Ibid.*

Agriculture in South Australia

A visitor to the colony in the months of October and November will, in his travels along the railways and main-roads, be impressed with the extent of waving fields of golden corn, which, in all directions, on the broad open plains, or on the undulating uplands, or nestling prettily in some quiet nook in the hill ranges, meet his eye. The agricultural year in South Australia begins immediately after the autumn months. In March or April the early rains fall, and ploughing is very general during April, May, and June. The intense heat of summer hardens the

ground so that ploughing is difficult and costly prior to the advent of the rains. Immediately, however, that the first showers have fallen, the farmer commences ploughing, and is busy with his teams from morning till night. Sowing is begun in April, May, or June, and as a rule is completed by July. The principal rains fall in June and July; in August, as the days lengthen, the crops shoot up, and in the next two months they seem to grow like magic. As the month of November approaches the crop begins to show for ear. Hay harvest is in full swing by the middle of November, the corn harvest following immediately afterwards. Hay is made in South Australia of the wheat plant, mowed just as the wheat is forming in the ear, and dried for a few days in the sun. By the beginning of December, reaping operations have fully set in, and by Christmas harvest is general throughout the colony. Wherever you go in the farming districts you may see the strippers at work, rapidly stripping the heads of the ripe corn, and hear the remarkable humming noise made by the rapid revolution of the beaters, which brush out the wheat from the growing crop.

J. F. Conigrave.—*South Australia: a Handbook for the Colonial and Indian Exhibition*, 1886.

For wine-growing see *ibid.* pp. 89-100; for sheep-farming, *ibid.* pp. 102-120.

Adelaide

Adelaide, so named after the queen of William IV., stands upon the banks of the River Torrens, a mountain stream which flows down from the Mount Lofty Range and debouches over low-lying flats in close proximity to the eastern shore of St. Vincent's Gulf, into which some of its waters ultimately find their way. As it passes through the city its waters are impounded to form an ornamental lake. The city covers an area of $5\frac{3}{4}$ square miles, including the park lands. Situated upon a wide stretching and fertile plain, commanding at many points a fine view of

ADELAIDE.

the Gulf of St. Vincent to the west, and shut in on the south and east by a magnificent amphitheatre of hills, Adelaide is justly noted for its picturesqueness and beauty. It is divided by the River Torrens into two parts, South Adelaide, which is the business part of the town, and North Adelaide, which is mainly residential, and between these two divisions there is a large area of reserved or park lands, through the centre of which runs the river. The whole city is also environed by an extensive belt of park lands.

J. F. Conigrave.—*South Australia: a Handbook for the Colonial and Indian Exhibition*, 1886.

"Landing here in the height of a scorching summer, with the blue waters of the sea lapping against a low-lying flat of land, stretching to the higher ground of the city beyond; this, dusty and parched, covered in parts with the prickly pear and other dull green vegetation peculiar to hot, dry parts, and lit up here and there with a brilliant scarlet and other bright blossom, one might imagine they had landed at some port of Northern Africa. Farther beyond the city, with its wide streets and splendid gardens, green and beautiful even beneath the rays of this scorching sun, covered with thick vegetation, a background of dark-blue hills rises into the hazy blue of the summer sky." —E. H. Canney. *The Land of the Dawning.* Remington and Co.

The Overland Telegraph Line

For pluck in public works South Australia has a character of her own. One of her great enterprises was the construction of the Overland Telegraph Line from Adelaide on the one side to Port Darwin on the other side of the Continent, to meet the cable laid from Singapore to that place, and thus to establish direct communication with Great Britain. Two years were spent in this arduous undertaking. The country was awkward; material and stores had to be transported across the desert as the work went on. For months the parties were stopped by floods; some perished from thirst, and the blacks harassed others. When at last the line was up, it was found that the white ants had destroyed the poles

in the Northern Territory, and they had to be replaced with iron columns. One contractor after another gave up in despair. The work was begun in 1870, and on August 22, 1872, the first message was sent over the 1700 miles of wire. It was feared the blacks would never let the line stand, but though they have "stuck-up" the stations occasionally and killed operators, they have never interfered with the wires. While the line was being constructed the operators gave every black who visited them the opportunity of enjoying a gratuitous electric shock. The peculiar sensation vividly affected their nerves and their imagination, and thus a wholesome awe was engendered of what they called "the white-fellow's devil." At every station there are usually two operators and four line repairers. As the adjacent station is 150 or 200 miles away, and there are no nearer neighbours, the little garrisons lead a lonely life. Whenever a breakage occurs two men start from either station between which the fault exists; each party takes, besides a supply of water, a field instrument, and at every 30 miles a "shackle" is put down and the party communicates with its own station, and so each proceeds until one or the other finds and repairs the defect. Communication being restored, the news is conveyed to the other party, and both take up their instruments and retrace their steps without having seen each other.

H. Willoughby.—*Australian Pictures.* Religious Tract Society.

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This volume, with its excellent illustrations, is recommended to the notice of teachers.

From Albany to Perth

Steaming steadily down the coast of Western Australia we at length catch sight of the headland known as Cape Vancouver, at the entrance to King George's Sound. Here the coast-line, receding rapidly, forms a magnificent

natural harbour, opening out of which, through a narrow entrance, is the beautiful land-locked bay, on the northern shore of which nestles the picturesque little town of Albany. Its well-planned streets, though yet in the most embryo condition, promise to look remarkably well when completed, for most of them have a background of rocky and well-wooded hills, which gives a very picturesque aspect to the place.

The journey from Albany to Perth is not impressive so far as speed is concerned, for in travelling a distance of 330 miles the train takes up about sixteen hours. The line of the Great Southern Railway ends at Beverley, 242 miles from Albany, where it joins the Government railway from Fremantle to Perth. The country through which we passed was more than monotonous; dense, flat wastes of forest and bush lay on either side, though the many miles of this dreary wilderness were occasionally lightened by extensive clearings, or even by patches of cultivation, betokening the presence of the enterprising settler. This magnificent country, with a line of railway to feed it, is lying idle in consequence of, in most places, the dearth of cheap labour. There are few stopping-places of any importance for some distance from Albany, most of the railway stations having sprung into existence since the Great Southern Railway was opened for traffic; and though many of them have high-sounding names, a few shanties and occasionally a "bush store" are what they generally consist of.

The Government line from Beverley to Perth, a distance of some 100 miles, is certainly the most curious specimen of railway engineering it has ever been my luck to travel over. To describe it as constructed on the switch-back principle would be to put it mildly, for when laying it no attempt whatever was made to overcome any physical difficulties the country presented, with the result that the rail runs up hill and down dale without any attention to gradients or other such trifles. Cuttings are unknown quantities, and although a high range of hills,

PERTH, WESTERN AUSTRALIA.

the Darling, had to be crossed, there was no such thing as a tunnel anywhere. This part of the journey was but a repetition of previous experiences, endless wildernesses of forest and scrub, which become intensely wearisome. Here and there one saw a station, with perhaps a few scattered houses and fields, until we lessened the distance between us and the capital, when the appearance of the country rapidly improved, the bush giving place to prosperous-looking agricultural districts. Splendid grass-land and well-laid roads then appeared, and everything round one gave indications of our approach to the centre of the civilisation of the colony. A bend in the line at last brought us in view of Perth, with its many fine buildings standing out in white relief against its background of foliage, and looking singularly oriental in the clear antipodean atmosphere, whilst the beautiful river winding through the valley at our feet, and on which this fair city stands, lent an additional charm to the scene.

It would be difficult to imagine a more pleasant or more picturesquely situated city than the capital of Western Australia, and the most casual stroll through its broad streets or along its beautiful riverside drive is sufficiently convincing proof that it has not been designated the fair city of Perth without reason. When the building of the place is completed it will vie with any other city of Australia, for at present Perth, through untoward circumstances, is somewhat behindhand. Events in Western Australia have not shaped themselves quickly or definitely as in the other colonies, where cattle-rearing, sheep-farming, or agriculture have for many years past represented huge and growing industries. Other parts of Australia owe their present vitality, in great measure, to the discovery of gold, and so it will undoubtedly be with Western Australia, and Perth, as the centre of the colony, will undoubtedly be the first to benefit by this marvellous influx of good fortune in the shape of her gold-fields; and the discovery of Coolgardie will undoubtedly, in future years, be looked on as the stepping-stone of Western Australia's era of

prosperity. As the result of the eager crowds of prospectors, gold-miners, and others on their way to the gold-fields, and who are forced to make a halt before passing Perth, on all sides is heard the hammer of the carpenter and the trowel of the bricklayer, whilst houses and stores are rising as if by magic.

J. M. PRICE.—*The Land of Gold.* Sampson Low.

By permission of Messrs. Sampson Low.

Gold in Western Australia

Rip Van Winkle could scarcely have been more astonished than is the traveller who, conversant with the fields in 1893, 1894, revisits the scene of operations to-day. Towns have risen, flourished, and passed away so quickly that even their names are only vague memories of an almost forgotten past. But a few short years ago the weary projector trudged sturdily on through the sand and scrub of the desert, with nothing certain but the heat, and dust, and thirst, towards a possible Eldorado. To-day, the traveller in the west makes that same journey in a well-appointed express train, not in search of problematical gold-fields, but to view what is perhaps the richest belt of country in the world. The hardships of camp life have given place to the comforts of a good hotel; instead of the sandy tracts there are the properly made and brilliantly lighted streets of a modern city, rising like a creation of the genii out of a waterless and barren desert; and the windlass and bucket of the prospector have given place to the latest and most elaborate scientific gold-mining machinery.

Although mining operations are being carried on at many other places in the colony—Southern Cross, Coolgardie, Kanowna, Menzies, and all that district, Murchison, Pilbarra, Kimberley—the headquarters of the industry are at Kalgoorlie. Limited in area to about 600 square miles, the East Coolgardie field is unquestionably supreme

amongst the goldfields of Australasia, and in auriferous wealth is probably richer than any equal area of country in the world. It is almost impossible to convey in words anything like an adequate idea of the magnitude of operations. Practical acquaintance is necessary, and for choice that should commence at night. Proceeding from Coolgardie, across the intervening desert, there suddenly looms up out of the surrounding darkness a brilliantly lighted patch, apparently a distant view of a large and prosperous city. Within the compass of these lights, however, is the famous Golden Mile of Western Australia, from which is annually procured, not only more gold than from all the other fields of the colony combined, but more than the output of any other State in Australia, Queensland only excepted. From one mine alone, and that by no means the largest, the Golden Horseshoe, the monthly return is 15,000 ounces. A personal visit to any of the large mines reveals the fact that here mining is more than manual labour and mechanical process. Upon it must be brought to bear some of the greatest scientific discoveries of the world. The old-time manager, whose gold was crushed from the stone by battery, has little place here. The guiding hand must know, and be able to take advantage of, the latest metallurgical processes. This is rendered necessary as much of the gold is found in the forms of tellurides and sulphides; in fact, to the prevalence of these the richness of the field is in large measure due. As may be expected under these circumstances, the cost of plant is enormous, and the working expenses abnormally heavy; but, notwithstanding that, the dividends paid by the Kalgoorlie mines from 1895 to the end of 1900 amounted to nearly £4,000,000 sterling.

The great drawbacks to development have always been wood and water. The whole district is but lightly timbered; and though, by means of tramways into better-timbered country, the wood supply is keeping fairly abreast of the demand, the total quantity available is by no means inexhaustible. In the near future we must

look to coal to provide the requisite fuel, and luckily there is every prospect that the coal industry of the colony will be able to meet the strain that, sooner or later, must be laid upon it. The water difficulty, thanks to the enterprise of the Government, will, within a little time, be practically overcome by the successful completion of the Coolgardie water scheme. The rainfall in the Darling Ranges, which is abundant and certain, is to be stored in a vast dam at Mundaring, and from there it will flow through wrought-iron pipes for a distance of some 350 miles, and finally be delivered on the eastern goldfields at the rate of something like 5,000,000 gallons of water daily.

J. S. BATTYE.—*West Australia at the Beginning of the Century. Review of Reviews for Australia.* March 1901.

For Kalgoorlie and the Golden Mile, see Miss VIVIENNE, *Travels in Western Australia.* Heinemann, ch. xvii.

"Kalgoorlie is a well-laid-out city. Bicycle-tracks are laid down on the 30-foot wide paths, electric lights are everywhere, trees have been planted in the broad streets, and by and by will afford shade in the hot days, for which Kalgoorlie is noted." — Miss VIVIENNE. *Travels in Western Australia.* Heinemann.

"Land at Kalgoorlie is daily increasing in value. An offer of £100 a foot was refused."—*Ibid.*

"It is wonderful to see the gold being smelted. To stay in the furnace-room for a minute or two, even before the furnace door was opened, was like taking a Turkish bath. I was quite content to stay on the outside when it was opened, and to see the man, dressed in an asbestos suit from head to foot, pull out with a great iron hook the red-hot pot full of gold, and pour it like golden sunshine into a mould."—*Ibid.*

Tasmania

Tasmania, formerly Van Diemen's Land, is a compact island, forming a British colony, which lies to the south of Australia in the southern ocean. It has an area of 24,600 square miles, and some fifty islets belong to it. Most of these lie between it and the southern shore of Victoria in Bass's Strait. It is a land of mountain and

flood, with picturesque scenery. The centre is a mass of hills generally covered with forest, with large lakes nearly 4000 feet above the sea; and this high land is continued to the west and north-west, while southward are other elevations. Ben Lomond in the east rises to a height of 5020 feet.

This small colony has a far greater range of climate than can be experienced throughout the Australian continent. The eastern side is dry; the western is very wet. Tin and gold miners are partially arrested in summer from want of water in the north-east. Dense forests and impracticable scrubs result in the west from the deposition of 100 or more inches of rain in the year, while other parts to the east occasionally suffer from drought. Tasmania does not escape the summer visit of an Australian hot wind. Hobart and Launceston, being near the sea, have greater equality of temperature, with rare frosts. Inland, in the settled parts, cold is severe in winter, but only for a short period. The wooded north-west shore has no cold and no excessive heat, but plenty of showers. Up in the lake country the climate rather resembles the Highlands of Scotland. On the west and southern coasts the winds are usually strong, and often tempestuous. As a retreat for Australians in summer Tasmania has strong claims. Cool and strengthening airs, magnificent forest solitudes, and secluded fern-tree vales may be enjoyed along with all the comforts of modern civilisation.

James Bonwick.—*Encyclopædia Britannica.* A. and C. Black.

By permission of Messrs. A. and C. Black.

"The island has not a large area fit for cultivation. A great part is very mountainous and dense scrubs, with heavy forests, are impediments to the farmer. The west side is too wet, stormy, and sterile for settlement. Almost all the farms lie on the line between Hobart and Launceston and between Launceston and Circular Head. The climate being cooler and moister than in most parts of Australia, the productions are of an English character."

SHEEP FARM IN TASMANIA.

First Sight of Hobart Town

The heat and drought and dust of summer begin to make Melbourne unpleasant by December. In Sydney and Adelaide it is hotter still, and in Queensland there is almost as great heat as in India. Hence there is a considerable migration about this time of year to the cool fresh air of Tasmania. Our vessel steams swiftly away from Melbourne down the dirty, sluggish Yarra-Yarra, between flat marshy banks. By sunset we are out of Port Phillip and in Bass's Strait. Next morning we pass high jagged rocky islands, rising abruptly and precipitously out of deep water; then through Banks' Strait, which seems to be a funnel for collecting the wind, for it is almost always blowing hard there from the west; and in the afternoon we glide suddenly out of the rough water into the serenest and calmest of seas, protected from the fierce westerly winds by Tasmania, the east coast of which lies a few miles off to starboard, a pretty, peaceful, shelving shore, with bold mountains rising up in the distance. Another night at sea, and we wake up at daylight as the vessel is rounding the fine, precipitous headlands of Cape Pillar and Cape Raoul, with basaltic columns like those in the cliffs of the Giant's Causeway, and is entering Storm Bay, with its wooded islands, narrow-necked peninsulas, and deep inlets running far into the country, till the eye is dazzled to discern where our course will be, and to distinguish island from coast. Two hours more, and the estuary of the Derwent is reached, broad, but, as we proceed, wholly land-locked by hilly shores, rising gently from the water's edge, and green with cultivation near their base, their summits dark with trees and half-cleared bush. Soon after the dark blue-grey wooded mass of Mount Wellington faces us, rising up 4000 feet or more; and on the sloping shores of the little bay below it lies Hobart Town, with wharves along the water's edge, and water deep enough for a man-of-war within 200 yards of the shore. Sea, river, mountain, forest, farm and city are

before the eye almost at once. It is the most beautiful spot for a city I ever saw.

J. MARTINEAU.—*Letters from Australia.* Longmans.

"All fruits which are not tropical grow at Hobart Town and in the neighbourhood to perfection. Its cherries and mulberries are the finest I ever saw. Its strawberries, raspberries, apples, and pears are at any rate equal to the best that England produces. Grapes ripen in the open air. Tasmania ought to make jam for all the world."
—ANTHONY TROLLOPE. *Victoria and Tasmania.* Ward & Lock.

ARTESIAN BORE IN QUEENSLAND.

IV. NEW ZEALAND

New Zealand

New Zealand has been richly endowed with the stores that go to build up the wealth of nations. The mountain slopes are at many places clad with forests of valuable timber, while beneath the surface there are rich mines and coal deposits that have as yet been scarcely touched. Most of the useful metals occur in greater or less abundance, and gold is to be found in formations of widely separated geological age, both in the North and South Islands, and in positions where it can be mined under conditions more favourable than those which obtain in Australia or South Africa. Mountaineers in search of pastures new are beginning to leave the well-beaten tracks in Europe, and turn their eyes and feet towards its unscaled peaks—Alpine solitudes, with their valleys, lakes, and glaciers of surpassing beauty and magnificence. The climate of New Zealand, which varies between sub-tropical and temperate, has been so often praised that further reference to it is unnecessary, and the whole possibilities held out in the way of colonisation and agriculture are almost unlimited. The natural florà of the islands is luxuriant; but it is a remarkable fact that New Zealand contains no fauna of any importance, so that one can roam through the silent tangled forests of tree-fern, creeper, and pine without any chance of treading on a snake or a scorpion, or of meeting any four-footed animal more

formidable than a rabbit or a wild hog of European pedigree.

New Zealand presents to us a fully plenished storehouse of materials in which the geologist and the physical geographer may well delight. Iceland has its active volcanoes, snowfields, and geysers; but all are more or less inaccessible, owing to the unfavourable climatic conditions in that desolate island. In the Yellowstone National Park there are splendid geysers, hot springs, and the ruins of old volcanoes, but none which has been active within historic times. In New Zealand, however, spread out before us, are abundant examples of volcanic phenomena, in all stages of development, as well as snowfields, glaciers, and evidences of the working of earthquakes and other striking geographical agencies. We can study in the North Island the old tertiary andesites and rhyolites of the Hauraki goldfield, in which the gold reefs are found, and the extinct cones and craters of the Auckland district of more recent age. From these evidences of recent volcanic action it is natural to pass on to the thermal springs, geysers, mud volcanoes, and fumaroles of modern times, and these again lead us up to the vents of Tarawera, and the huge steaming craters of Tongariro and Ruapeho, that rise majestically towards the clouds amidst their covering of perpetual snow. We find, therefore, in New Zealand, a combination of the wonders of the Yellowstone and Iceland, in a country that has many additional points of interest, not too far apart, and fairly accessible from the sea on all sides.

H. M. Cadell.—*A Visit to Mount Tarawera. Scottish Geographical Magazine*, May 1897.

By permission of H. M. Cadell, Esq., and of the Royal Scottish Geographical Society.

"The colony is, emphatically, a land of the mountain and the flood, and not only in this, but in the contour of some of its hills, some of its peaks and coast line, it shows more than a fanciful resemblance to the west of Scotland. But the New Zealand mountains are, of course,

far loftier than anything in these islands. In our islands you must expect hill and valley, sometimes mountain and ravine, pinnacle and gorge. The seas round us are not shallow, sleepy, or landlocked, but deep, wide, wind-stirred, flecked with foam, and with their blue surface more often than not lit by brilliant sunshine."—Hon. W. P. REEVES. *The Fortunate Islands.* Official.

"Thanks to its great length, the north differs much from the south. While Southland is as cool as Northern France, I have stood, in gardens to the north of Auckland, under olive trees laden with berries, with orange trees, figs and lemon trees in full bearing close at hand. Not far off a winding tidal creek was fringed with mangroves. Exotic palm trees and the cane brake grow there easily. All over the North Island, except at high altitudes, and in the more sheltered portions of the South Island, camellias and azaleas bloom in the open air. The contrast between east and west is even more sharply defined. As a rule the two coasts are divided by a broad belt of mountainous country. The rain-bringing winds blow chiefly from the north-west and south-west. It is the heavy and often warm rainfall of the west coast that is responsible for the rich luxuriance of the forest growth that nearly everywhere clothes its hillsides, valley, and the shores of its wonderful gulfs."—*Ibid.*

In the Hot Lake District of the North Island

The hot lakes district is of very considerable extent. Not a hundredth part of it or its marvels can be seen in one view. How many scores of times has one not been asked whether there is anything left to see now that the Pink and White Terraces have been overwhelmed. Whereto the answer must be that an intelligent person could spend many weeks there and come away without having seen all. How many hots springs are there? asks one questioner. I do not know. I do not think any one does know. They have never been counted: they are too many. How hot are they? asks another. They are of every degree, from, say, 60° to 212° Fahr. The chief, or, at any rate, the most noticeable, chemical elements producing effects of colour in the thermal district are sulphur, alum, and silica. To the last named we owe the frosty snow-white hue of innumerable terraces, banks, and ledges. The alum walls, or so-called caves, are more greyish. It is to the almost

rainbow tints of the sulphur pools, springs, and deposits that the springs owe their most brilliant effects. How can I describe them? It is easy to talk about red and yellow and green, but that does not give you any notion of the infinite and beautiful gradations. Yellow, yes; everything from orange to pale primrose. Red — that means rose, carmine, cardinal, blood-colour, crimson, port-wine. In the same way you may see all the greens, from the deepest emerald to the palest sea-tints. Then how can I give you even the faintest sketch of the inexhaustible variety in which the subterranean forces of fire and water manifest their strength? I can tell you that there are geysers, solfataras, fumaroles, and mud volcanoes by the score; but does that make them boil and roar, and writhe, and seethe, and hiss, and snort, and spout, and steam, and gurgle, and splutter before your eyes? In close contrast with them are often the brightest, tenderest fern and leafage. It may be truly said that the wide plateau in which the lakes stand is not always beautiful, that the ferny terraces and pumice plains are sometimes dreary when away from the water. But then there is so much water; and who can grumble at the scenery of the lakes when once you have reached their shores? Rotorua is but one of many. The visitor should insist upon being taken to Rotoiti, Rotoehu, and Rotoma. Charming as Rotorua is, lying a bright circle, a silver setting round green Mokoia, perhaps its sister lakes are more charming still. Who that has glided in a canoe across the green, placid surface of Rotoiti and has watched the vapour from some steam jet on its beach rising white against a green background of forest will forget that tranquil water? Then, when you have duly inspected the foaming geysers, miniature terraces, and boiling pools of Whakarewarewa, and the dark hell-broth, thick and slab, that bubbles and gurgles in the horrid cauldrons of Tikitere, it will be time to pursue your journey to Lake Taupo. Taupo—"the sea," as the Maoris called the great lake—is one of the finest sights in New Zealand. The air of its uplands is

peculiarly tonic and bracing. Away past its south-west corner frown the great volcanoes Ruapehu and Ngauruhoe, the steaming cone of Tongariro. The River Waikato flows into Taupo and flows out again, draining the big lake. Before the inflow it is a pretty, tree-fringed stream merely. After exit it is a fine river, and, nigh the lake, being suddenly jammed into a narrow rocky pass, it boils through the imprisoning chasm and hurls itself in one clear leap, all foam, light, and colour, into the broad, quietly-flowing expanse below. Such is the Huka Waterfall; *huka* means foam. Even finer in all except colour are, I think, the long, tumultuous rapids two or three miles farther down. I have not even mentioned the alum caves of Orakei-korako, or the natural rock fortress near Atiamuri; or the cliffs at Horohoro; or the crater, the cinders, the chasms of dark and mischievous Tarawera. I have said nothing of the Waiotapu Valley, with its long succession of pools, mud-volcanoes, and fumaroles, scientifically as interesting as anything in New Zealand.

W. P. Reeves.—*The Fortunate Islands.* Official.

The mountain scenery of the North Island is exceedingly fine. The main system is a continuation of the Southern Alps of the South Island, described pp. 149-152. West of this chain, and not in any way connected with it, rise three imposing volcanic cones, Ruapehu (9000 feet), and Tongariro, with three craters, the highest being Ngauruhoe (7500 feet). The third, "Mount Egmont, stands an almost perfect cone, its flanks curving upward from the seashore for 8300 feet. Utterly alone is Egmont, without peer or rival near, its slopes mantled with dark forest." It is considered to rival, in the beauty of its curves, the world famous Fujijama in Japan.

Mr. Froude, who visited the world-famous terraces shortly before their destruction by the explosion of Tarawera in 1886, writes: "Stretched before us we saw the White Terrace in all its strangeness; a crystal staircase, glittering and stainless, as it were of ice, spreading out like an open fan from a point above us on the hillside, and projecting at the bottom into a lake, where it was perhaps two hundred yards wide. The summit was concealed behind the volumes of steam rising out of the boiling fountain, from which the siliceous stream proceeded. . . . The Pink Terrace was formed on the same lines as the other, save that it was narrower and was flushed with

WAIROA BEFORE AND AFTER THE ERUPTION.

pale-rose colour. The crystals were even more beautiful, falling like clusters of rosy icicles, or hanging in festoons, like creepers trailing from a rail. At the foot of each cascade the water lay in pools of ultramarine."—FROUDE. *Oceana*. Longmans.

The Kauri Districts of the North Island

North New Zealand boasts of a great variety of splendid timber of which the kauri pine takes the lead. These giants of the forest attain a girth sometimes of between 40 and 50 feet, and grow up perfectly straight for 60 or 70 feet before throwing out branches. It is a magnificent timber, and if properly seasoned neither shrinks nor warps. Very few of the bush owners, however, can afford to let timber lie idle for any length of time, and therefore the majority of the kauri used is not seasoned, and shrinks very much each way. In getting out the kauri an immense, and at times reckless, destruction of young trees takes place, and for this reason the time is not far distant when the kauri pine will be a tree of the past.

The task of felling and getting the timber out is a difficult and dangerous one. The country north of Auckland where kauri abounds is usually very broken, and seldom admits of a tramway being laid down to carry the logs on. When the timber is on high ground the usual method adopted is to cut the logs into suitable lengths, move them by means of timber jacks and immense teams of bullocks to the brow of a convenient incline, and let them slide down a well-greased shoot of young kauri trees, a great number of which are thus annually destroyed. If the bush happens to be on the borders of the Kaipara, the logs are placed behind booms, until enough are collected to make a raft. If, however, it is situated some little distance from deep water, the logs are laid in the bed of an adjacent creek higher up, in which a dam is formed and the water stored. When sufficient logs are collected and sufficient water stored behind the dam, the

sluices are opened and the logs washed down to the Kaipara, where they are gathered, chained together, and towed to their destination.

There is another great industry which owes its existence to the kauri; I mean the kauri gum trade. Kauri gum is largely used in the manufacture of varnish and lacquers. When an old kauri tree dies and falls, its huge roots throw up a mound of earth, and the shape of these mounds indicate to an observing digger the direction in which the trees have fallen, although all signs of the trees themselves have entirely decayed away, perhaps thousands of years ago. As the gum generally exudes freely from the kauri and collects in the forks where the tree commences to throw out branches, by stepping 60 or 70 feet from the mound in the right direction and digging there, gum will probably be found. The mounds themselves also offer good chances, and these are generally first attacked. A gum-digger's outfit is not an expensive one. It consists of a spade, a gum spear, and piece of sacking made into a bag. The gum spear is a four-sided rod of steel, about four feet long, and pointed at one end. If the field is a new one or has been but little worked this instrument is brought into use, and with it the gum-digger probes the ground in different directions, until he strikes a piece of gum. He then digs it up, puts it in the bag, and recommences spearing. When a field has been dug over two or three times, as most of them have been now, and the big lumps have nearly all been removed, the method then adopted is to dig in the most likely places. After the gum has been dug up it has to be scraped, and this is generally done by the gum-digger before he offers it for sale. It is considered a good ten-hours' work to scrape a hundredweight of gum. When it is thoroughly scraped it is easy to see the quality. The rarest kind is quite transparent, and resembles lumps of glass; the next in order is cloudy in places, yellowish looking, and very like amber, although much more brittle. Some again is all cloudy, and the common sort is all opaque.

All the gum dug out of the gum-fields of course belonged to kauri trees of bygone ages, and is sometimes called fossil gum. From the living kauri, however, gum is constantly exuding, and forms in large lumps in the forks of the branches. To secure this it is necessary to climb the tree, but the barrel being of such huge dimensions and rising like a pillar for 60 or 70 feet, it cannot be climbed in the ordinary manner. The plan generally adopted is to tie a small weight to a long piece of strong twine or fishing line and throw the weight over the branches. The end of the thread held below is then slacked out until the line is lowered within reach, when a rope is tied to the line and hauled up over the branch and down again the other side. Climbing the rope, the gum-seeker gains a footing on the branch, and with a tomahawk hacks out the gum and lets it fall to the ground.

P. W. Barlow.—*Kaipara.* Sampson Low.

By permission of Messrs. Sampson Low.

Auckland

Let us imagine ourselves entering the harbour of Auckland from the ocean. Having passed the island of Tiri-tiri, marked by its lighthouse, we obtain, as we coast along the north or ocean side of the North Shore Peninsula, our first glimpse of the picturesque city across the low-lying land near Lake Takapuna. It reminds some travellers of the first distant sight of Constantinople and the Golden Horn, and gives the impression of a greater area than the city covers in reality. Two groups of hills, with a valley between them, are covered with houses, churches, public buildings, and gardens as far as the eye can reach. In a few minutes we lose sight of Auckland, and do not regain it till we pass round the North Head on our right hand, leaving the curious round island-volcano, Rangitoto, on our left. We pass another island, Waiheke, away upon our left, before turning round the

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AUCKLAND HARBOUR FROM MOUNT EDEN.

Head. The Bean Rock lighthouse now guides us to the channel. On the left we now have the wealthiest and most highly ornate suburb of Auckland, called Remuera. Steaming farther on, Parnell, with some lovely residences and gardens sloping to the water's edge, is passed on the left, Devonport and the big dock on the right, and then Auckland is reached. The existence of the batteries, torpedoes, and submarine mines which defend the harbour is so carefully concealed that an air of perfect peacefulness and security pervades the scene. On the Devonport side the broken-up, irregular outline of the rocky beach, resembling that of Biarritz, and the luxuriant verdure of the hills and trees, serve to heighten the picturesqueness of the brightly painted and verandah-shaded houses. Auckland, we see, is built up on groups of clay and scoria hills, intersected by valleys all trending to the sea, and, like Honolulu, is backed up by volcanic peaks, one of which, Mount Eden, is now utilised as a reservoir. Farther up the harbour, on the Auckland side, the charming residences and gardens of Ponsonby extend along the cliffs. A singular-looking island, called the Watchman, stands in mid-channel, while to the right, on high ground, stand the North Shore suburbs. The abundant sunshine, illuminating an atmosphere absolutely free from smoke and fog, reflected from the sparkling blue waters of the harbour, and from the gaily-painted houses, the number of pleasure-boats darting here and there, and the absence of all appearance of squalor and poverty, all combine to make one love Auckland at first sight.

J. Murray Moore.—*New Zealand for the Emigrant. Invalid, and Tourist.* Sampson Low.

By permission of Messrs. Sampson Low.

Wellington, also in the North Island, with a fine harbour, though the capital, is inferior to Auckland in size and population, but is growing rapidly.

The Southern or New Zealand Alps

The one feature which lends perhaps its greatest beauty to the Southern Island is the system of mountains, covered with perpetual snow, that stretches unbroken from the Southern Lakes in Otago almost to the Otira Gorge. This pass is situated on the high road between Hokitika and Christchurch, and is the principal way used when crossing from the east to the west coast. The highest point of this system is Mount Cook (or Aorangi). The comparatively slight elevation above the sea at which its actual base is situated causes this mountain to assume a grandeur unknown to many snow-capped peaks of greater altitude. The New Zealand Alps, with their broken glaciers, rocky precipices, and virgin summits, present to the climber as tempting a field for the exercise of endurance and real "grit" as can be found in older haunts.

Between the higher and lower ranges of the New Zealand Alps two groups of lakes have been formed, the one in Otago, and the other in the so-called Mackenzie country, a district which is part of the province of Canterbury. The principal lakes in Otago are Wanaka and Hawea to the north, and Wakatipu farther south. On these several towns are situated. Taking these lakes as a basis for operations, several mountain peaks are within easy distance. We may mention Earnshaw, 9165 feet high; Mount Aspiring, 9910 feet; Castor and Pollux, 8633 feet; with many others of an almost equal altitude. Still farther south are Lakes Te Anau and Manipori. Of them all Lake Wakatipu is the longest, covering in its sinuous course a length of more than 50 miles. Te Anau presents a wider expanse, besides which its western shore is intersected by large arms running up between the mountains after the manner of the fjords common to the coast of Norway. This group of lakes is approached from Dunedin

by those who wish to commence their tour from the north, and from Invercargill by those to whom the southern route is more convenient. The Canterbury lakes lie more or less near to the base of Mount Cook, Mount Darwin, and other peaks around. Amidst these ranges are to be found the celebrated Tasman and Godley glaciers.

J. Bradshaw.—*New Zealand as it is.* Sampson Low.

By permission of Messrs. Sampson Low.

"Though Aorangi has, I believe, been ascended to the topmost pinnacle of its 12,350 feet, still the peaks are many which are yet unscaled, and the valleys many which are virtually untrodden. Exploring parties still go out and find new lakes, new passes, and new waterfalls. It is but a few years since the Sutherland Falls, 2000 feet high, were first revealed to civilised man. Both our glaciers and lakes are on a grand scale. The Tasman Glacier is eighteen miles long, more than two miles across at the widest point; the Murchison Glacier is more than ten miles long; the Godley eight. The Hochstetter Fall is a curtain of broken, uneven, fantastic ice coming down 4000 feet on to the Tasman Glacier. As for the lakes, Wakatipu is fifty-four miles long, and though its surface is 1000 feet above the sea-level, its profound depth sinks below it. On the sea side of the mountains Milford Sound is 1100 deep near its innermost end. When you are in the Sounds the knowledge of the gulfs beneath your feet adds to the effect upon you of the towering mountain-heights, hanging as it were over your head. When it is, or has been, raining, and that is usually the case there—the sides of the precipices are streaked and seamed with waterfalls of every kind and size, from tiny drooping threads to thin gauze-like veils or broad roaring torrents like the mighty Bowen."—W. P. Reeves. *The Fortunate Islands.* Official.

Lake Scenery of the South Island

My Scottish blood fired with rapture at the sight of that wondrous vision across the lake. A mighty mountain range pierces the clouds, which have settled in dense fleecy folds upon the ragged peaks. The mist hangs midway between the upper heights and the steely lake below. To the left a number of sharp peaks extend barred and ridgy, and flecked with wreaths of snow, which seems to have been driven and stamped into their black rugged sides by the stormy winds which at times rave and howl with fury

down the passes. Far away down the lake, vista after vista opens up of grim snowy sentinels. What a scene of desolate grandeur! I had heard of the majesty of Wakatipu; but the reality beggared all description.

At Rat Point we turn the elbow of the lake, and get a glorious view far up its wondrous expanse. Three islands nestle on the water ahead; and beyond the eye tries to pierce the obscurity of a wild glen, filled with curling volumes of mist, that, lifting at intervals, show mighty pinnacles of rock, and fields of snow stretching into the mysterious distance. We stop to land a passenger at the mouth of the Von River, which comes tearing down through the gorges, bringing with it tons upon tons of gravel and shingle, which, in its shifting course, terraces the plain and carries ruin and desolation in its path. During the last few years the river has shifted its bed fully a mile, and in its migration it has cut away one of the finest orchards in all the lake district. At intervals, as the steamer progresses, a white gleam of silvery foam comes streaking down through the fern, and flashes over the rocks, marking the descent of some tumbling cascade from the melting snows on the heights. After heavy rains the hillsides are a chaos of hissing, roaring, leaping water. Every gully becomes a seething torrent, every rocky buttress is enveloped in seething, churning foam. Words utterly fail to describe the savage grandeur of the hills above the Greenstone River, which here comes rolling its brown waters through a deep black cleft in the mountains. The sides of the defile are wooded with a dark forest mass, in fit keeping with its surroundings. Some idea of the great altitude of the mountains here is formed from the appearance of the forest round about Kinloch. From the deck of the steamer the trees seem mere shrubs, but as you approach the shore you are astonished to find them great towering forest kings. Close by is an enormous water-wheel which works the neighbouring saw-mill. We watch the slow revolutions, the water flashing in glittering circles, and hear the clanging resonance of the saws eating through

the great logs. The lake here is over 1200 feet deep, and dips down sheer from the bank. The overhanging hills are more than 8000 feet high.

The head of the lake possesses enough objects of interest to detain the tourist for weeks. The great lake valley itself terminates in a long triangular flat, through which come tearing down the rapid waters of the Rees and Dart. The exploration of these valleys is rewarded by the discovery of waterfalls, cataracts, gorges of surpassing grandeur, and glaciers of fascinating beauty. Beyond the flat rise snowy cones and isolated pinnacles, and the eye follows peak after peak, and snowfield after snowfield, till vision loses itself amid the blinding whiteness of Mount Earnshaw.

Hon. James Inglis.—*Our New Zealand Cousins.* Sampson Low.

By permission of Messrs. Sampson Low.

Across the Plains of the South Island

Lyttelton stands at the head of a noble natural harbour. It is prettily scattered over the steep slope of the coast range of hills, which culminates in an elevation of 2000 feet. The slimy shallow, at the head of the fine mountainous natural inlet, has been dredged to a sufficient depth, even at low water, for the large steamers, up to 4000 tons, which now come to the port, as well as for the other shipping engaged in the great trade of the Canterbury district in Christchurch. Several large steamers and some smaller craft lay round us. But the bustle of the high shipping time was not yet come round, when all the cereals, the wool, the frozen sheep and bullocks of this rich agricultural and pastoral country, come tumbling in by millions in value.

A railway pierces the coast range, by means of a tunnel 2 miles in length. Christchurch, reached by this railway, is 7 miles off. Quitting the coast range, we entered a

vast plain, perfectly level to all appearance. There are perhaps as much as 4000 to 5000 square miles of this plain, extending far north and still farther south of the Christchurch latitude, with a soil mostly of the richest character, and covered with farms, and sheep and cattle pasturages. In the far distance beyond, 50 to 70 miles westwards, rose one of the interior mountain ranges, 4000 to 5000 feet in elevation, and still covered more than half down from the summit with snow. Beyond this range, and above 100 miles farther west, is the higher range which culminates in Aorangi (Mount Cook), an elevation of about 12,350 feet. Christchurch covers a most pretentious quantity of ground. Her grand wide streets, of mathematical straightness and miles in length, tell us what are the expectations of the ambitious colonists with regard to the future of the central capital of New Zealand's southern or greater island.

Fifty miles from Christchurch we began to enter upon a vast area of the plain, utterly featureless in its monotony. At times the only relief our eye could catch was some slight dividing line separating the estates or pasturages. We were thankful for the variety of the bright golden flower of the universally prevalent gorse. This plant has taken root everywhere throughout New Zealand, and is apt to be viewed as a nuisance by the colonists, in consequence of its irresistible overspread. It made, however, most excellent hedges, and the effect of these, distinctly marking out the fields, great and small, far as the eye could reach was remarkably pleasing. Another plant feature, giving also a pleasing diversity, was an old friend, the blue gum-tree. Just before reaching Timaru, 100 miles from Christchurch, the flat plain began to change into gentle undulations, which, covered with rich grass, indicated also an improvement in the soil. The snowy range had closed in upon us with less than half the distance which separated us at our starting. At and beyond Timaru we had a beautiful landscape of undulating ground, the hills covered with grass for pasturage, the valleys and

levels cultivated. We did not see any of Oamaru's great scale of farming, which already threatens to rival that of the Western United States and the Canadian North-West, where the steam plough, upon a five or ten mile square wheatfield, passes clean out of sight, except through a good telescope. The interior, but at too great a distance from Oamaru and the line of rail, affords the best illustrations of this progress. We passed, however, some large fields, finely ploughed and harrowed. These Oamaru vicinities were succeeded by a considerable area once more of the monotonous plains, followed yet again by beautiful hill and dale scenery. We were overtaken by the night for more than the last hour of our journey, during which, as we were told, we missed some of the finest scenes. But, by favour of a bright moonlight night, we still saw something, and could realise somewhat the grand view of the Otago harbour, as we passed along, high up upon the precipitous side of its northern coastline.

In point of architectural and business appearance Dunedin impressed me as standing next to Sydney and Melbourne; Dunedin, too, has a fair backbone of trading to support her. She revels in wool; she has gold, too, as well as the golden fleece, and she has golden corn and other cereals, potatoes, butter, and cheese, and the finest beef and mutton, in all but limitless quantity. Slaughtering and freezing of sheep and bullocks for exportation are upon a great scale. In all of these substantial elements of commerce she is in the heat of a close race with her northern sister of Christchurch, which with her vast background of rich, productive plains has latterly been creeping rather ahead.

W. Westgarth. — *Half a Century of Australasian Progress.* Sampson Low.

By permission of Messrs. Sampson Low.

The New Zealand Frozen-Meat Trade

In order to ensure the quicker despatch of the large steamers which carry the mutton to England, the carcasses are prepared in freezing establishments conveniently situated for the reception of sheep arriving by rail from the country, and as near as may be to the several ports which are engaged in the trade. In these establishments the greatest cleanliness is not only universal but necessary. As each carcass is removed from the slaughter-house the floor on which it was prepared is swilled with clean water, that it may be perfectly sweet for the next occupant. From the slaughter-house the carcasses are carried by men, their backs covered with clean sacking, to a well-ventilated apartment resembling a huge larder, there to remain, hanging in long rows, until they have lost all traces of animal heat. When thoroughly cool they are removed to the refrigerating chamber, in which, having been previously wrapped in canvas bags, they are subjected to a temperature of about 30°, for experience has shown that if submitted to too low a temperature at first their inner and fatty parts are not properly frozen. After the frost has once thoroughly permeated a carcass, the temperature of the chamber can be lowered to many degrees below zero, until finally the mutton becomes so hard that a heavy stone, hurled against it with the utmost strength of which a man is capable, can make no impression upon its surface. From the refrigerating chamber the carcasses are either removed to a storeroom at the works, or carried directly to the vessel which is to take them to London. On board ship they are stowed one on the top of another, in meat-rooms, which are kept at as low a temperature as the engineer in charge may deem necessary, by a separate engine provided for the purpose.

J. Bradshaw.—*New Zealand of To-Day*. Sampson Low.

By permission of Messrs. Sampson Low.

"To one who suddenly enters a freezing chamber from the outer air, the intense cold does not at once make itself apparent, and it is only after a while that its influence begins to be felt. But as a matter of fact, the cold is so real and severe, that the workmen who remove the frozen carcasses are compelled to wear thick gloves in order to protect their hands from frost-bites."—*Ibid.*

For the mode of refrigerating by means of compressed air, see *ibid.*, pp. 115, 116.

V. THE PACIFIC ISLANDS

Agriculture and Food Plants in the Pacific Islands

(*a*) The Yam, Taro, and Banana (in Fiji).

THE instincts of the Fijian are agricultural, and it may be said that he finds a use for all the vegetable products of his country, and has a name (sometimes several) for each individual plant. His knowledge of their use is seldom at fault, and they provide him a never-failing supply for all his needs. With great aptitude he selects, from the forest, portions of land best adapted for the several kinds of crops. The effects of nature on the vegetation which surrounds him are his guides to the season for digging, planting, and gathering in his crops. The people live principally on yams, *dalo* or *taro*, bananas, bread-fruit, with fish, fowls, pork, and several kinds of greens. Their drink is generally water, or the milk of the coco-nut. When tired, or on festive occasions, they use *agona* or *kava*.

The yam, *uvi*, is the staple food; they have about twenty different sorts under cultivation. Some of the varieties are very fine, mealy, and free from fibre, like a good potato. The tubers of some of the kinds do not exceed 2 or 3 lbs. in weight, but those of one or two sorts weigh as much as 100 lbs. The Fijians say that the yam thrives best in hard or rough unprepared ground. The trees having been felled, and their roots cleared out of the ground, and the grass, etc., burned off, planting commences when the *dralu* tree begins to flower, in the

month of July or August, according as the season is late or early. All hands assist in planting. The soil is thrown up into small mounds, from three to five feet apart. On each mound a small yam, or the crown of a large one is planted. Should the ground be flat, open drains are made to carry off the water, or the ground is thrown up into beds with ditches between, and the yam mounds formed in rows on the beds. The stems of the yams are supplied with canes to climb upon. The canes are generally laid horizontally, supported by forked sticks stuck in the ground, or by the tops of the mounds. The roots or tubers are ready for digging by the beginning of March: the drying of the stems indicates that the tubers are ripe. When dug the yams are stored in airy sheds erected on the fields. These sheds are constructed of bamboos set upright and the roof made waterproof by a thatching of grass. After being stored, the yams are turned over occasionally; the young stems are rubbed off those that have started growth, and all the decaying ones are removed. They are used boiled, or roasted, or steamed.

There are two kinds of *dalo*, land and water *dalo*, just as in India there is mountain and swamp rice. The land *dalo* is most commonly met with in the wettest districts. In fact, like mountain rice, it will only grow in places where the rainfall is great, and on land from which the water has neither drained nor evaporated after the forests have been cut down. To prevent too rapid evaporation, a few trees are left on the land selected for the *dalo*. To prepare the ground the trees are felled and burned, and the grass cleared from roots of grass, weeds, etc. The plants are put down in rows from 2 to 3 feet apart, and less is allowed from plant to plant. Holes about 9 inches in depth are made in the ground with a planting stick, which, before being pulled out, is well shaken to harden the sides of the hole, prevent the ground falling in, and water from passing freely through the soil. This hole catches a considerable amount of rain water as it runs off the ground, and generally retains it during a protracted

drought. Besides keeping the *dalo* moist, the depth at which it is planted prevents it throwing out suckers at the top of the tubers (corms), which it has a tendency to do where planted near the surface. The part planted is a thin piece cut from the crown of the tuber, with the leaf stalks attached, the leaves being removed to prevent exhaustion. The only care bestowed on the land *dalo* after planting is to keep down weeds, and this weeding is generally done in wet weather, lest the ground should be too suddenly exposed to the drying influences of the sun and air. The place selected for growing water *dalo* is generally the bottom of a valley, or any place where water is at command. This plant, like rice, requires a constant supply of fresh water. Not a little labour and ingenuity has been displayed by the Fijians in making aqueducts, often miles in length, over ravine and hollow, to carry a supply of fresh water to these plantations. Sometimes the hill-sides are terraced for it. Of course they are unacquainted with the use of the spirit-level, and the level must have been obtained by digging and allowing the water to follow. This would indicate the highest point to which the water would rise. In making the retaining walls for the beds and terraces on the hill-sides, a good deal of labour has been bestowed. One bed follows another in succession, the fall from a bed to the one next below it varying from 4 inches to several feet, according to the steepness of the site. The beds vary greatly in size. As in the case of yams and land *dalo* these beds, after a crop or two has been taken off them, are allowed to lie fallow for several years. The *dalo* grows best in a heavy, stiff, clay soil, and generally takes from ten to twelve months to reach maturity. The decaying of the leaves indicates that the tubers are ripe. They vary in weight from 1 to 12 lbs ; the average weight, however, is from 4 to 6 lbs. They are eaten either boiled or roasted and are starchy and very nourishing. *Dalo*, along with some sweetening matter, forms the chief ingredient in the native *vakalolo*, or puddings. The young leaves, boiled and served

like spinach, are an excellent vegetable. There are about eighteen varieties of *dalo* cultivated in Fiji. They differ from each other principally in the size and colour of the leaves and leaf-stalks. Some of the varieties are very handsome plants, deserving a place in any collection of plants for hot-house decoration. The natives interchange the tops for planting from one district to another, from a cold district to another, from a wet to a dry, and from one kind of soil to another. The Fijians know, by experience, that these changes are beneficial to the *dalo* plant, and that a larger and better crop is obtained than by constantly cultivating the same sort in the same district or kind of soil.

In selecting a piece of land the Fijians are generally correct as to the kind of land best adapted to the purpose, but as to the choice of the situation they seem to be moved by fancy. A kind of temporary dwelling is erected close to the selected land, to which they remove with their families during the season for clearing the land and planting the crop. After this is completed they return to the town, and occasional visits are made to the plantation for the purpose of weeding, etc. The common people generally assist the chief in the heavy part of his agricultural labour, and the poorer people are aided by their wives. The latter have to carry home from the fields all the yams, canes, etc. They seldom take a crop off the same piece of land for two successive years, except in well-watered districts, when a crop of land *dalo* may be found succeeding one of yams, or the reverse. One crop, however, is the rule. The land is then abandoned for an indefinite period, until its fertility is restored. When such a system of cultivation prevails a large area of country is required to supply food to a comparatively small population. In the elevated parts of the windward districts little injury is done by the unwooding of much forest land annually for plantations, an equal extent being annually abandoned. After an abundant fall of rain, so rapid is the growth, that the land thus abandoned is speedily covered by a dense

growth of trees. The native plan of digging is as follows:— The men provide themselves with a digging stick each, and by repeated blows of these make holes round a piece of ground of about 2 feet in diameter; then by using the sticks as levers this piece of soil is turned over on its side or upside down. Boys follow and break up these lumps by blows from short sticks, pulverising the soil with their hands.

Among native food plants the banana may be ranked after the yam and *dalo*. This is more especially the case in the interior of Viti Levu, where the people have not so many coco-nut trees as those who live on the coast, and in the smaller islands, where the coco-nut abounds. Even there the bananas are largely used for food, roasted when green, raw when ripe, also cooked with coco-nut milk and the juice of the sugar cane, as a *vakalolo*, or pudding. Banana plantations abound everywhere. They are planted along the sides of the road to shade the traveller from the sun, sometimes forming avenues miles in length. The fruit on those trees is *tabu*, that is, forbidden to the traveller. The *tabu* is invariably respected by the natives. Bananas are planted in rows and the trees are put down at about 8 feet apart, and the same distance is allowed between each tree. Suckers from the sides of old roots are used as plants, the leaves being cut off before planting for the reason already mentioned. The soil in the place where the young tree is to be planted is dug in a circle of about 3 feet in diameter, and to the depth of 2 feet, and well manipulated. The young trees bear in about two or three years after planting. These plantations are frequently formed on land that has yielded a crop of yams or *dalo*. The latter is sometimes planted along with bananas, whose leaves, as the natives say, shade it from the sun, or, more correctly, they shade the ground and prevent a too rapid evaporation of moisture. The leaves of the banana are often used as plates for serving food upon, as tablecloths, and also for wrapping material. When used for the latter purpose the mid-rib is cut close to the leaf,

which is passed several times through the flame of a fire to make it tough and pliable. Thus treated, the leaf does not split readily. The leaves of the *dalo* are also used for the same and similar purposes, for which they are prepared as the banana. The stems of the common banana yield a fibre scarcely inferior to Manila hemp, but it is not extracted.

J. Horne.—*A Year in Fiji.* Government Official Publication.

The scope of this book is well indicated by its sub-title: "An Inquiry into the Botanical, Agricultural, and Economical Resources of the Colony."

For the sweet potato, and other edible plants, see *ibid.*, pp. 84-92; for fruits, *ibid.* pp. 93-101; for other useful plants, pp. 102-111; for agricultural exports, pp. 171-184; for caoutchouc, pp. 195-202; for sandalwood, pp. 203-212; and for the luxuriance of the tropical forests on the windward side of the island, pp. 61-62.

Miss Gordon Cumming, in her charming volumes on Fiji, writes:—"The *taro* is of a bluish-grey colour, and both in appearance and consistency resembles mottled soap. Its leaves are like those of our own arum on a large scale, and it is of the same family. The leaves of the yam are like those of the convolvulus, as is also its habit of growth."

(*b*) The Coco-nut in Samoa

The coco-nut, of all things, loves the sunshine and free circulation of the air. Indeed, to flourish in perfection, it should stand on the outer verge of the shore, its roots striking into the sea-water, its branches or palms ever whipped and tossing in the stiff breeze of the trades. The lowlands of the beach on all these islands are more or less covered with the groves, while on the mountains and highlands no tree is found. The smaller size of the trees and the poorer yield are plainly to be noticed on lands at an elevation of from 400 to 600 feet, situated at as short a distance as 2½ and 3 miles from the shore. Standing immediately on the beach the tree inclines outward over the water, and growing inland it points by its leaning ever in the most direct way to the sea.

The habit of the coco-nut to reach out over the water

seems to be a provision of nature for its propagation and distribution. The nut falling into the sea will float for weeks in the bitterly brackish waters of these tropic seas without injury to the germinating quality. Once thrown upon the warm sands of a beach or tossed by a wave upon the reef above the surface, it soon puts forth its palm upon the smaller end, while from the round and larger end the tender roots strike into the soil or decayed coral, as the case may be. Many lagoons which have risen within living memory, and which for years remained without a sign of vegetation, are now covered with the coco-nut, although hundreds of miles from other islands.

The nuts ripen throughout the year, hanging in pendent clusters close in and around the stems of the palm branches, which spread about on all sides and reach upward from the clustered head forming the top of the tree. The nuts hanging lowest ripen first, the young nuts continually appearing above with the growth of the tree, and so the lower branches wither and dry, falling away as the younger branches push out from above. The body of the tree from the ground to the crown at the top, a distance reaching up from 30 to 60 or even 80 feet, is smooth and bare like a mere pole supporting a head of nuts and sweeping branches. The trees come into bearing, in a small way, at the sixth year on suitable soil, and are believed to reach the full limit of production at from 15 to 20 years of age. Many groves known to be 30 and 40 years of age are now bearing in undiminished abundance, and they continue to do so to a great age.

The tree and its products are devoted to many uses. The wood in the green state is very porous and spongy, and having consequently a great degree of resistance to rifle shot, in the native wars in the past it was much employed in the building of defensive works. When thoroughly seasoned, it lasts for a long time underground, and is valuable for all purposes for which posts are employed. The oil enters in many forms into the domestic uses of the natives. It forms the basis of all the liniments

and emollients in their simple but very rational pharmacopœia. It is used for anointing the body, a practice universally observed. It has the effect of keeping the skin soft and fine, protecting it from sunburn, which in these latitudes of a vertical sun, without protection, becomes very severe. It serves as well to repel mosquitoes and other small flying insects.

The nuts are one of the standard articles of diet. They are eaten in the soft but somewhat tough gelatinous state before they reach the woody condition in which they are familiar to us. In this condition they enter into the preparation of many cooked dishes. The water of the half-ripened nut forms a pleasant and wholesome drink. The whole shells, from which all the meat is removed by being left first to decay, and then by being shaken a long time half-filled with coarse sand, form the universal drinking-bottle; cut in half, they are made into bowls and drinking-cups. The fibre furnishes all the sennit, or braided twine and rope for all uses. The leaves of the great branches, which dry rapidly, are used for kindling, for torches in fishing; and a small fire made in a bowl of burned clay set in the floor of every house as a fireplace, when regularly fed with these long combustible leaves, furnishes light to the household, of a cheery and attractive kind. Again, the small ends of the long branches are tied together in couples, and, the butts being flat and heavy, they are hung across the combs of the roofs of houses, and serve admirably to hold the thatch in place against high winds. These branches are also stripped down either side and plaited into baskets; treated and plaited much in the same way, they are made into the curtains, or more properly sidings, by which all houses are enclosed and protected. Were the coco-nut tree, by some destructive blight, eliminated from Samoa at a stroke, all its export trade would be at an immediate end, and it would be difficult to see how its domestic life could adjust itself to meet the calamity.

Copra is simply the meat of the coco-nut dried in the sun, generally by being spread on mats, until the greater

part of the watery juice is evaporated. Twenty to thirty years ago, when the oil of the coco-nut began to be more largely employed in the manufacture of soaps, copra commanded in Europe, where it found its only, and still finds its principal market, very remunerative prices. The usual reaction followed, and over-production is steadily bearing prices downward.

A. W. Greely and J. H. Mulligan. — *National Geographic Magazine*, January 1898.

By permission of the National Geographic Society.

(*c*) The Bread-Fruit Tree

The tree on which the bread-fruit grows is large and umbrageous; the bark is light-coloured and rough; the trunk of the tree is sometimes 2 or 3 feet in diameter, and rises from 12 to 20 feet without a branch. The outline of the tree is remarkably beautiful, the leaves are broad, and indented somewhat like those of the fig-tree, frequently 12 or 18 inches long and rather thick, of a dark-green colour, with a surface glossy as that of the richest evergreens. The fruit is generally circular or oval, and is, on an average, 6 inches in diameter; it is covered with a roughish rind, which is marked with small squares and lozenge-shaped divisions, having each a small elevation in the centre, and is at first of a light, pea-green colour, which subsequently changes to brown, and when ripe assumes a rich yellowish tinge. It is attached to the small branches of the tree by a short, thick stalk, and hangs either singly, or in clusters of two or three together. There is nothing very attractive or pleasing in the blossom, but a fine, stately tree, clothed with dark shining leaves, and loaded with many hundreds of light-green or yellowish-coloured fruit, is one of the most splendid and beautiful objects to be met with among the rich and diversified scenery of a Tahitian landscape. Two or three of these trees are often seen growing around the rustic native house, and embowering it with their

interwoven and prolific branches. The tree is propagated by shoots from the root: it bears in about five years, and will probably continue bearing for fifty.

The bread-fruit is never eaten raw except by pigs; the natives, however, have several methods of dressing it. When travelling on a journey they often roast it in the flame or embers of a wood fire; and, peeling off the rind, eat the pulp of the fruit; this mode of dressing is called crust or shell roasting. Sometimes, when thus dressed, it is immersed in a stream of water, and when completely saturated forms a soft, sweet, spongy pulp, or sort of paste, of which the natives are extremely fond. The general and best way of dressing the bread-fruit is by baking it in an oven of heated stones. The rind is scraped off, each fruit is cut in three or four pieces, and the core carefully taken out; heated stones are then spread over the bottom of the cavity forming the oven, and covered with leaves, upon which the pieces of bread-fruit are laid; a layer of green leaves is placed over the fruit and other heated stones are laid on the top; the whole is then covered in with earth and leaves, several inches in depth. In this state the oven remains for half an hour or longer, when the earth is cleared away, the leaves are removed, and the pieces of bread-fruit taken out. The outsides are in general nicely browned, and the inner part presents a white or yellowish, cellular, pulpy substance, in appearance slightly resembling the crumb of a small wheaten loaf. Its colour, size, and structure are, however, the only resemblance it has to bread. It has but little taste, and that is frequently rather sweet; it is somewhat farinaceous, but by no means so much so as several other vegetables, and probably less so than the English potato, to which in flavour it is also inferior. It is slightly astringent, and as a vegetable it is very good, but is a very indifferent substitute for English bread. To the natives of the South Sea Islands it is the principal article of diet, and indeed may be called their staff of life. They are exceedingly

fond of it, and it is evidently adapted to their constitutions, and highly nutritive, as a very perceptible improvement is often witnessed in their appearance a few weeks after the bread-fruit season has commenced.

A mode of preserving the bread-fruit is by submitting it to a slight degree of fermentation and reducing it to a soft substance, which they call *mahi*. When the fruit is ripe a large quantity is gathered, the rind scraped off, the core taken out of it, and the whole thrown in a heap. In this state it remains until it has undergone the process of fermentation, when it is beaten into a paste. A hole is now dug in the ground, the bottom and sides of which are lined with green leaves; the *mahi* is then put into the pit, covered over with leaves and then with earth or large stones. In this state it might be preserved several months, and although rather sour and indigestible, it is generally esteemed by the natives as a good article of food during the scarce season. Previous to its being eaten it is rolled up in small portions, enclosed in bread-fruit leaves, and baked in the native ovens.

The tree on which the bread-fruit grows, besides producing three and in some cases four crops a year of so excellent an article of food, furnishes a valuable gum or resin, which exudes from the bark, when punctured, in a thick, mucilaginous fluid, which is hardened by exposure to the sun, and is very serviceable in rendering watertight the seams of canoes. The bark of the young branches is used in making several varieties of native cloth. The trunk of the tree also furnishes one of the most valuable kinds of timber which the natives possess, it being used in building their canoes and houses, and in the manufacture of their articles of furniture. It is of a rich yellow colour, and assumes from the effects of the air the appearance of mahogany.

William Ellis.—*Polynesian Researches.* Fisher, Son, and Jackson.

Some Characteristic Features of Island Life

(*a*) The Manufacture of Tapa Cloth

I shall now describe their way of making cloth, which in my opinion is the only curious manufacture they have. All their cloth is, I believe, made from the bark of trees; the finest is made of a plant which they cultivate for no other purpose. They let this plant grow till it is about 6 or 8 feet high; the stem is then about as thick as one's thumb, or thicker; after this they cut it down, and lay it a certain time in water. This makes the bark strip off easy, the outside of which is scraped off with a rough shell. After this is done it looks like long strips of ragged linen; these they lay together, by means of a fine paste made of some sort of a root, to the breadth of a yard, more or less, and in length 6, 8, or 10 yards or more, according to the use it is for. After it is thus put together, it is beat out to its proper breadth and fineness, upon a long square piece of wood, with wooden beaters, the cloth being kept wet all the time. The beaters are made of hard wood with four square sides, are about 3 or 4 inches broad and cut into grooves of different fineness; this makes the cloth look at first sight as if it was wove with thread, but I believe the principal use of the grooves is to facilitate the beating it out, in the doing of which they often beat holes in it, or one place thinner than another; but this is easily repaired by pasting on small bits, and this they do in such a manner that the cloth is not the least injured. The finest sort when bleached is very white and comes nearest to fine cotton. Thick cloth, especially fine, is made by pasting two or more thicknesses of thin cloth, made for that purpose, together. Coarse thick cloth, and ordinary thin cloth, is made of the bark of the bread-fruit trees, and I think I have been told that it is sometimes made from the bark of other trees. The making of cloth is wholly the work of the women, in which all ranks are employed. Their common colours are

red, brown, and yellow, with which they dye some pieces just as their fancy leads them.

CAPTAIN COOK.—*Voyage in the "Endeavour."*

Of the tapa cloth manufacture in the Sandwich Islands the great navigator writes :—"One would suppose, on seeing a number of their pieces, that they had borrowed their patterns from some mercer's shop, in which the most elegant productions of China and Europe are collected, besides some original patterns of their own. Their colours, indeed, except the red, are not very bright, but the regularity of the figures and stripes is truly surprising."

(*b*) Kava Drinking

The company being completely assembled, a large root of kava, brought by one of the king's servants, was produced, and a bowl which contained four or five gallons. Several persons now began to chew the root, and this bowl was made brimful of liquor. While it was preparing others were employed in making drinking cups of plantain leaves. The first cup that was filled was presented to the king, and he ordered it to be given to another person. The second was also brought to him, which he drank, and the third was offered to me. Afterwards, as each cup was filled, the man who filled it asked who was to have it. Another then named the person, and to him it was carried. As the bowl grew low the man who distributed the liquor seemed rather at a loss to whom cups of it should next be sent, and frequently consulted those who sat near him. This mode of distribution continued while any liquor remained.

The kava is a species of pepper which they cultivate for this purpose, and they esteem it a valuable article, taking great care to defend the young plants from any injury; and it is commonly planted about their houses. It seldom grows to more than a man's height, though I have seen some plants almost double that. It branches considerably, with heart-shaped leaves and jointed stalks. The root is the only part used at the Friendly Islands, which being dug up is given to the servants that attend, who breaking

it into pieces, scrape the dirt off with a shell, or bit of stick; and then each begins and chews his portion, which he spits into a piece of plantain leaf. The person who is to prepare the liquor collects all these mouthfuls, and puts them into a large wooden dish or bowl, adding as much water as will make it of a proper strength. It is then well mixed with the hands, and some loose stuff of which mats are made is thrown upon the surface, which intercepts the fibrous part, and is wrung hard, to get as much liquid out from it as possible. The manner of distributing it need not be repeated.

CAPTAIN COOK.—*A Voyage to the Pacific Ocean.* London, 1784.

(*c*) Some Domestic Arts of the Solomon Islanders

Mat-making is one of the occupations of the women, the material being the thick leaves of a species of *pandanus*. The leaves are first deprived of their thin polished epidermis by being rubbed over with the leaves of a plant which have a rough surface, giving a sensation like that caused by fine emery paper when passed over the skin. The pandanus leaves are then dried in the sun, when they become whitened and leathery, and are then sewn together into mats. These mats are not only used to lie upon, but are also worn by the women over the shoulders as a protection in wet weather. They are especially useful, as I have myself found, when sleeping out in the open in wet weather. They are sufficiently long to cover the whole length of a native, and when he is sleeping out in the bush he lies down on a couch formed from the slender trunks of areca palms ready at his hand, and covering himself completely with his mat he may sleep through a deluge of rain without being touched. The mat has a crease along the middle of its length, so that when placed over the body the rain runs off as from the roof of a house.

Coco-nut shells, pierced by a hole about the size of a

florin, are employed as drinking-vessels. The outer surface of the shell is usually coated over with a kind of red cement formed of a mixture of red ochreous earth and the resinous material obtained from the fruit of the *tita*, which is employed for caulking the seams of the canoes. The exterior of these vessels is frequently ornamented by double chevron lines of native shell-beads. Sometimes a tube of bamboo is fitted into the orifice of the vessel to form a neck, the whole being plastered over with the red cement and looking like some antique earthen jar. Drinking water is always kept at hand in a house in a number of these coco-nut shells, which, being hung up overhead, keep the water pleasantly cool, a plug of leaves being used as a stopper. The cooking vessels are circular pots of a rough clay ware, usually measuring about nine inches in depth and breadth, but sometimes more than double this size. Cleansing these vessels out between the meals is deemed an unnecessary refinement. Their cooking pots are made by the women in the following manner. A handful of the clay is first worked together in the hands into a plastic lump, and this is fashioned rudely into a kind of saucer to form the bottom of the vessel by beating the mass against a smooth flat pebble, three or four inches across, held in the left hand, with a kind of wooden trowel or beater held in the right hand. Whilst one woman is thus engaged a couple of her companions are occupied in flattening out, by means of a flat-sided stick, strips of the clay six to twelve inches in length and an inch in breadth, their length increasing as the making of the vessel progresses. One of these strips is then placed around the upper end of the saucer, and the potter welds or batters it into position, employing the same tools in a similar manner, the pebble being held inside. The cooking vessel is thus built up strip by strip, and to enable the worker to give symmetry to the upper part of the pot, a fillet of broad grass is tied around as a guide. An even edge is given to the lip by drawing along the rim a fibre from the coco-nut husk, and the interior and

neck are finished by the fingers well moistened. The time occupied in making one of the ordinary-sized pots is about three-quarters of an hour. They are kept in the shade for three or four days to become firm, and they are finally hardened in a wood fire. No glaze appears to be used. This ware compares but poorly with the finish and variety of design displayed by the glazed pottery of Fiji.

H. B. Guppy.—*The Solomon Islands and their Natives.* Swan Sonnenschein and Co.

By permission of Messrs. Swan Sonnenschein and Co.

This volume contains an exhaustive account of everything relating to the life of the Solomon Islands, on which Mr. Guppy is our chief authority.

(*d*) An Ingenious Method of Baking

A short time after we arrived, a pretty large hog was killed, which is done by repeated strokes on the head. The hair was then scraped off very dexterously with the sharp edge of pieces of split bamboo, taking the entrails out at a large oval hole cut in the belly by the same simple instrument. Before this they had prepared an oven, which is a large hole dug in the earth, filled at the bottom with stones about the size of the fist, over which a fire is made till they are red hot. They took some of these stones, wrapt up in leaves of the bread-fruit tree, and filled the hog's belly, stuffing in a quantity of leaves to prevent their falling out. The carcass was then placed on some sticks laid across the stones, in a standing posture, and covered with a great quantity of plantain leaves. After which, they dug up the earth all round, and having thus effectually closed the oven, the operation of baking required no further interference. In the meantime we walked about the country, but met with nothing remarkable. On our returning to Futtafache's house he ordered the hog that had been dressed to be produced, with several baskets of baked yams and some coco-nuts. The same person who cleaned the hog in the morning now cut it up in a very dexterous manner with a knife of split

bamboo, dividing the several parts and hitting the joints with a quickness and skill that surprised us very much.

CAPTAIN COOK.—*A Voyage to the Pacific Ocean in H.M. Ships the "Resolution" and "Discovery."*

For the same method of baking see pp. 166, 190.

Two Types of Dwelling

(*a*) Fijian Houses

The form of the houses in Fiji is so varied, that a description of a building in one of the windward islands would give a very imperfect idea of those to leeward, those of the former being much better. In one district a village looks like an assemblage of square wicker baskets; in another like so many rustic arbours; a third seems a collection of oblong hayricks with holes in the sides, while in a fourth these ricks are conical. By one tribe just enough framework is built to receive the covering for the walls and roofs, the inside of the house being an open space. Another tribe introduces long centre-posts, posts half as long to receive the wall plates, and others still shorter as quarterings to strengthen the walls; to these are added tie-beams, to resist the outward pressure of the high-pitched rafters, and along the side is a substantial gallery, in which property is stored. The walls or fences of a house are from 4 to 10 feet high, and in some cases are hidden on the outside by the thatch being extended to the ground. The walls range in thickness from a single reed to 3 feet. Those at Lau (windward) have the advantage in appearance, those at Ra (leeward) are the warmest. At Lau the walls of chiefs' houses are three reeds thick, the outer and inner rows of reeds being arrayed perpendicularly and the middle horizontally, so as to regulate the neat sennit work with which they are ornamented. At Ra a covering of grass or leaves is used, and the fastenings are vines cut from the woods; but at Lau sennit is used for this purpose, and patterns wrought with it

upon the reeds in several different colours. A man, master of several difficult patterns, is highly valued, and his work certainly produces a beautiful and often highly artistic effect. Sometimes the reeds within the grass walls are reticulated skilfully with black lines. The door-posts are so finished as to become literally reeded pillars; but some use the naturally carved stem of the palm-fern instead. Fireplaces are sunk a foot below the floor, nearly in the centre of the building, and are surrounded by a curb of hard wood. In a large house the hearth is 12 feet square, and over it is a frame supporting one or two floors, whereon pots and fuel are placed. Sometimes an elevation at one end of a dwelling serves as a divan and sleeping place.

Slight houses are run up in a short time When at Lakemba I passed a number of men who had just planted the posts of a house 20 feet long. I was away for about one and a half hours, and on my return was amazed to see the house finished, except the completing of the ridges. An ordinary house can be built in a fortnight; the largest require two or three months. Excellent timber being easily procured, houses from 60 to 90 feet long by 30 feet wide are built, with a framework which, unless burnt, will last for twenty years.

For thatching, long grass of the sugar-cane and stone palm are used. The latter are folded in rows over a reed, and sewn together, so as to be used in lengths of 4 or 6 feet, and make a very durable covering. The leaves of the sugar-cane are also folded over a reed, but this is done on the roof, and cannot be removed, as the other may, without injury. The grass or reed thatch is laid on in rather thin tiers, and fastened down by long rods, found ready for use in the mangrove forests, and from 10 to 20 feet long, and secured to the rafters by split rattans. Some very good houses are covered first with the cane leaves, and then with the grass, forming a double thatch. Sometimes the eaves are made two feet thick with ferns, and have a good effect, but when thicker

FIJIAN HOUSE.

they look heavy, and by retaining the wet soon rot. The ridge of superior buildings receives much attention. The ends of the ridge project for a yard or more beyond the thatch, having the extremities blackened, and increasing with a funnel shape, and decorated with large white shells. The rest of the ridge is finished as a large roll, and on this is fixed a thick, well-twisted grass cable; another similar cable is passed along the under side of the roll, having hung from it a row of large tassels. All foreigners are struck with the tasteful character of this work, and lament that its materials are not more durable. A more animated scene than the thatching of a house in Fiji cannot be imagined. When a sufficient quantity of material has been collected round the house, the roof of which has previously been covered with a network of reeds, from 40 to 300 men and boys assemble. The workers within pair with those outside, each tying what another lays on. When all have taken their places, and are getting warm, the calls for grass, rods, and lashings, and the answers, all coming from 200 or 300 excited voices in all keys, intermixed with stamping down the thatch and shrill cries of exultation from all quarters, make a miniature Babel.

The contents of a Fijian house are few and simple. Where part of the floor is raised, forming a dais which, by day, is the divan, and by night the bed of a chief, it is covered with mats, varying in number from 2 to 10, and spread over a thick layer of dried grass and elastic ferns, while on them are placed two or three neat wooden or bamboo pillows. Over this hangs the mosquito curtain, which is generally large enough to lay across the house, thus giving to one end of it an air of comfort. Chequered baskets, gourds, and bottles for scented oil are hung about the walls, and in a conspicuous place stands or hangs the *yagona*[1] bowl, with a strainer and cup. In various parts are suspended fans, a sunshade made of the leaf of the cabbage palm, an oil-dish of dark wood, and several food dishes of

[1] = Kava

wood or wicker-work. Along the foot of the wall rest oblong wooden bowls with four feet, or round earthen pans with none. If there is any arrowroot, it is preserved in coarse, wide-mouthed jars; and one or more glazed water vessels have a place near the hearth or bed, set in a nest of dry grass. The other domestic apparatus is found near the hearth, and comprises nets, a bone knife for cutting bread from the net, and another of foreign make for cutting up yams, etc., a concave board, 4 or 6 feet long, on which to work up the bread, and round stones for mashing the same, coarse baskets for vegetables, coco-nut and bamboo vessels for salt and fresh water, and soup dishes and a ladle made of the nut shell. On the hearth, each set on three stones, are several pots, capable of holding from a quart to five gallons. Near these are a cord for binding fuel, a skewer for trying cooked food, and, in the better houses, a wooden fork, a luxury which, probably, the Fijian enjoyed when our ancestors were wont to take hot food in their practised fingers.

T. Williams.—*Fiji and the Fijians.* Heylin.

For Samoan houses see p. 194.

(*b*) Tree-Houses in the Solomon Islands

The curse of the northern Solomon Islands is an institution known as head-hunting. The more savage tribes make collections of heads with which to adorn their houses. They go far afield for their highly-prized ornaments, and organise extensive expeditions, sweeping down on the weaker tribes and carrying off all they can seize. The southern end of the island of Ysabel is a favourite hunting ground for the more northern tribes, who come down in great force, bringing large canoes full of warriors. The more peaceful southerners make no attempt at resistance, but have built themselves strongholds into which they retire, and, if possible, defy their enemies. These places of refuge are of two kinds, tree-houses and hill fortifica-

tions. The tree-houses possess the greatest interest, and in some parts of the island are quite numerous, and are even used as ordinary places of residence in times of peace.

TREE-HOUSE, OASIRI, CENTRAL DISTRICT OF NEW GUINEA.

The people attain almost the agility of monkeys by continually climbing up and down these trees, and walking along their branches.

At the village near which we first anchored there was

but one tree-house, but it was very good of its kind. The tree in which it was built was a magnificent one, growing upon the cliff by the shore; all the lower branches were cleaned away, and its peculiar appearance made it most conspicuous amongst the surrounding palms and smaller growth. There was a cleared space round the foot of this giant, and from the branches hung a slender rattan-cane ladder. The ascent is certainly not a very enjoyable affair; the ladder seems of the very weakest, and swings about unpleasantly; the rounds, moreover, are merely bits of stick lashed on to the cane rope, and afford practically no foothold to the booted European. On reaching the top, I was surprised to find a large, well-built house, quite level, and fixed in among the branches with the greatest ingenuity. The floor is covered with mats, and scrupulously clean. It is 26 feet long by 18 wide, and the ridge pole is 10 feet from the floor. The strength and solidity of the whole is most remarkable, and, I suppose, at a pinch nearly all the inhabitants of the village might find refuge here. At either end of this house are pleasant balconies, one of which seemed literally to overhang the sea, which lay more than 100 feet beneath. The height of the house from the ground is 70 or 80 feet. Arrayed along the sides are numbers of small heaps of stones for defensive purposes. When a raid by the head-hunters is reported the people all retire to this curious fortress and, drawing up their ladder after them, can defy their enemies. If the invaders come near to try and cut down the tree—no light work, for the trunk is as hard as iron—the besieged party pelt them with stones from above, and unless the enemy were armed with rifles, I should say the tree-house is quite impregnable.

W. Coote.—*Wanderings South and East.* Sampson Low.

By permission of Messrs. Sampson Low.

Hawaii and its Lake of Fire

At 6.30 A.M. we made the island of Hawaii. The wind dropped as we approached the coast, where we could see the heavy surf dashing against the black lava cliffs, rushing up the little creeks, and throwing its spray in huge fountain-like jets high above the tall coco-nut trees far inland. We sailed along close to the shore, and by 2 P.M. were near the entrance to the bay of Hilo. It was a clear afternoon. The mountains, Mauna Kea and Mauna Loa, could be plainly seen from top to bottom, their giant crests rising nearly 14,000 feet above our heads, their tree and fern-clad slopes seamed with deep gulches or ravines, down each of which a fertilising river ran into the sea. Inside the reef the white coral shore, on which the waves seemed too lazy to break, is fringed with a belt of coco-nut palms, amongst which, as well as on the hill-sides, the little white houses are prettily dotted.

Next morning we had an early breakfast and landed in readiness for our excursion to Kilauea. The first part of our way lay along the flat ground, gay with bright scarlet Guernsey lilies, and shaded with coco-nut trees between the town and the sea. Then we struck off to the right and soon left the town behind us. At a distance from the sea Hilo looks as green as the Emerald Isle itself, but on a closer inspection the grass turns out to be coarse and dry, and many of the trees look scrubby and half dead. Except in the gulches and the deep holes between the hills, the island is covered with lava, in many places of so recent a deposit that it has not yet had time to decompose; and there is, consequently, only a thin layer of soil on its surface. This soil being however very rich, vegetation flourishes luxuriantly for a time; but as soon as the roots have penetrated to a certain depth and have come into contact with the lava, the trees wither up and perish.

After riding about 10 miles in the blazing sun we reached a forest, where the vegetation was quite tropical

though not so varied in its beauties as that of Brazil, or of the still more lovely South Sea islands. The protection from the sun afforded by the dense mass of foliage was extremely grateful, but the air of the forest was close and stifling, and at the end of 5 miles we were glad to emerge once more into the open. More than once we had a fine view of the sea, stretching away into the far distance, though it was sometimes mistaken for the bright blue sky, until the surf could be seen breaking upon the black rocks amid the encircling groves of coco-nut trees. The sun shone fiercely at intervals, and the rain came down several times in torrents. The pace was slow, the road was dull and dreary, and many were the inquiries for the Halfway House long before we reached it.

After our meal we mounted and set off for the Volcano House. The scene was one of extreme beauty, the moon was hidden by a cloud and the prospect lighted only by the red glare of the volcano. I quite enjoyed the gallop through the dark forest, though there was barely sufficient light to enable me to discern the horse immediately in front of me. When we emerged from the wood, we found ourselves at the very edge of the old crater, the bed of which, 300 or 400 feet beneath us, was surrounded by steep and in many places overhanging sides. It looked like an enormous cauldron, 4 or 5 miles in width, full of a mass of cooled pitch. In the centre was the still-glowing stream of dark-red lava, flowing slowly towards us, and in every direction were red-hot patches and flames and smoke issuing from the ground. A bit of the Black Country at night, with all the coal-heaps on fire, would give you some idea of the scene. Yet the first sensation is rather one of disappointment, as one expects greater activity on the part of the volcano; but the new crater was still to be seen, containing the lake of fire, with steep walls rising up in the midst of the sea of lava.

At 3 P.M. next day we set out, a party of eight, with two guides and three porters. First of all we descended the precipice, 300 feet in depth, forming the wall of the

old crater, but now thickly covered with vegetation. It is so steep in many places that flights of zig-zag wooden steps have been inserted in the face of the cliffs in some places in order to render the descent practicable. At the bottom we stepped straight on to the surface of cold lava, which we had seen from above last night. Even here, in every crevice where a few grains of soil had collected, delicate little ferns might be seen thrusting out their green fronds towards the light. It was the most extraordinary walk imaginable, over that vast plain of lava, twisted and distorted into every conceivable shape and form, according to the temperature it had originally attained, and the rapidity with which it had cooled; its surface, like half-molten glass, cracking and breaking beneath our feet. Sometimes we came to a patch that looked like the contents of a pot suddenly petrified in the act of boiling; sometimes the black iridescent lava had assumed the form of waves, or, more frequently, of huge masses of rope; sometimes it was piled up like a collection of organ pipes, or had gathered into mounds or cones of various dimensions. As we proceeded, the lava became hotter and hotter, and from every crack arose gaseous fumes, affecting our noses and throats in a painful manner, till at last when we had to pass to leeward of the molten stream flowing from the lake the vapours almost choked us. The lava was more glassy and transparent-looking, as if it had been fused at a higher temperature than usual, and we could see beneath it the long streaks of a stringy kind of lava, like brown spun glass, called *Pele's hair*. At last we reached the foot of the present crater and began the ascent of the outer wall. Many times the thin crust gave way beneath our guide, and he had to retire quickly from the hot, blinding, choking fumes that immediately burst forth. But we succeeded in reaching the top, and then what a sight presented itself to our astonished eyes! I could neither speak nor move at first, but could only stand and gaze at the horrible grandeur of the scene.

We were standing on the extreme edge of a precipice,

overhanging a lake of molten fire, 100 feet below us and nearly a mile across. Dashing against the cliffs on the opposite side, with a noise like the roar of a stormy ocean, waves of blood-red, fiery liquid lava hurled their billows upon an iron-bound headland, and then rushed up the face of the cliffs to toss their gory spray high in the air. The restless, heaving lake boiled and bubbled, never remaining the same for two minutes together. Its normal colour seemed to be a dull dark-red, covered with a thin grey scum, which every moment and in every part swelled and cracked, and emitted fountains, cascades, and whirlpools of yellow and red fire, while sometimes one big golden river, sometimes four or five, flowed across it. There was an island on one side of the lake, which the fiery waves seemed to attack unceasingly, with relentless fury, as if bent on hurling it from its base. On the other side was a large cavern, into which the burning mass rushed with a loud roar, breaking down in its impetuous, headlong career the gigantic stalactites that overhung the mouth of the cave, and flinging up the liquid material for the formation of fresh ones. It was all terribly grand, magnificently sublime, but no words could adequately describe such a scene. As the sun set and darkness enveloped the scene, it became more awful than ever. The violent struggles of the lava to escape from its fiery bed, and the loud and awful noises by which they were at times accompanied, suggested the idea that some imprisoned monsters were trying to release themselves from their bondage, with shrieks and groans, and cries of agony and despair, at the futility of their efforts. Sometimes there were at least seven spots on the borders of the lake where the molten lava dashed up furiously against the rocks, seven fire-fountains playing simultaneously. With the increasing darkness the colours emitted by the glowing mass became more and more wonderful, varying from the deepest jet-black to the palest grey, from darkest maroon, through cherry and scarlet, to the most delicate pink, violet, and blue; from the richest brown, through orange and yellow,

to the lightest straw-colour. And there was yet another shade, only describable by the term molten-lava colour. Even the smokes and vapours were rendered beautiful by their borrowed lights and tints, and the black peaks, pinnacles, and crags which surrounded the amphitheatre formed a splendid and appropriate background. Sometimes great pieces broke off and tumbled with a crash into the burning lake, only to be remelted and thrown up anew.

One more long last look, and then we turned our faces away from the scene that had enthralled us for so many hours. It was a toilsome journey back again, walking as we did in single file, and obeying the strict injunctions of our head guide to follow him closely, and to tread exactly in his footsteps. On the whole it was easier by day than by night to distinguish the route to be taken, as we could now see the dangers that before we could only feel, and many were the fiery crevices we stepped over or jumped across. Once I slipped and my foot sank through the thin crust. Sparks issued from the ground, and the stick on which I leant caught fire before I could fairly recover myself.

LADY BRASSEY.—*A Voyage in the "Sunbeam."* Longmans.

By permission of Lord Brassey and Messrs. Longmans.

"The coast [of the windward or north-eastern shore of Hawaii] is magnificently bold, the cliffs of black and lowering rocks are hung with creepers and ferns, and now and then relieved by a silver thread of waterfall many hundred feet in height. This rocky coast is cut up at intervals of a few miles or so by great ravines, which make travelling by land a matter of extreme difficulty."—W. COOTE. *South and East.* Sampson Low. For the island in general, see *ibid.* pp. 97-118.

For Honolulu, an oasis created by judicious irrigation on the island of Oahu, which is described as "one great cluster of craters, with lava streams and volcanic crags," and as "a pile of hot uninviting red and yellow volcanic hills," see Miss C. F. GORDON CUMMING, *Fire Fountains,* pp. 13-29. Blackwood.

"All the romance and picturesqueness has long ago been wiped out of Honolulu and the surrounding districts by the rush for the 'almighty dollar.' Now a great part of the town looks very like some mushroom town in the western part of the States. Electric trams and lights are

HONOLULU—THE SEAT OF GOVERNMENT.

everywhere, and the natives are all in European dress and hardly distinguishable from their white brothers and sisters. The town itself is situated on the island of Oahu, one of the eight Hawaiian islands, and looks very picturesque as you approach it, with the Punchbowl Mountain, an extinct volcano, rising immediately behind it; and again, behind this, Mount Tantalus, rising to a height of some 2000 feet."—D. R. HALL. *Sunshine and Surf.* A. and C. Black.

"Of course we had to drive out and see the great lion of Honolulu, that celebrated precipice, the Pali. You drive half-way across the island, which is narrow here, to get to it, the road gradually rising till you get to a sort of pass near the top of the mountains, and 1200 ft. above sea-level. Then, without any preliminary warning, the mountains, some of which are over 3000 ft. high, descend on the other side in a sheer enormous precipice, a mile in length, and as steep as the wall of a house. From here you have a fine view of the other coast of the island."—*Ibid.*

First Impressions of Tahiti

Our impression, as we first rowed to the shore, I cannot adequately describe. The sky above is of azure blue; a girdle of luxuriant and intensely green tropical vegetation, gorgeous with gaily coloured leaves and blossoms and golden-hued fruit, encompasses this delightful harbour; while corals, seaweeds, zoophytes, and fish of every possible tint and colour are seen, as in a wild garden, beneath the transparent waters on which we are floating. The surface of the water exhibited every imaginable tint, from the palest aquamarine to the brightest emerald, from the pale light blue of the turquoise to the deep dark blue of the sapphire, and was dotted here and there with patches of red, brown, and green coral rising from the mass below. On the shore there was the rich growth of tropical vegetation, shaded by palms and coco-nuts, and enlivened by the presence of native women in red, blue, and green garments, and men in motley costumes carrying fish, fowls, and bunches of coco-nuts home on poles. The harbour of Papeete is large and commodious, the view from it most exquisite, past Quarantine Island to the beautiful island of Eimeo. On landing one finds oneself in the midst of a fairy-like scene, bewildering in the brightness and variety of its

colouring. The magnolias and yellow and scarlet hibiscus overshadowing the water; the velvety turf on to which one steps from the boat; the white road running between rows of wooden houses whose little gardens are a mass of flowers; the men and women clad in the gayest robes and decked with flowers; the piles of unfamiliar fruit lying on the ground waiting to be transported to the coasting vessels in the harbour; the wide-spreading background of hills, clad in verdure to their summits, these are a few of the objects which greet the vision of the newcomer. The streets of the town are far more like avenues running through a gentleman's park timbered with tropical trees. Under the shade of the trees are built huts and houses of cane or bamboo, so small and so daintily put together that they look more like summer-houses than real dwelling-places. Close by is the Chinamen's quarter, which consists of a collection of regular Chinese-built bamboo houses, whose occupants all wore their national costume, pigtail included. The French Commandant lives in a charming residence, surrounded by gardens full of what to us are the rarest and most exquisitely scented plants. Round the outer paling is a sort of creeping hedge of stephanotis and vanilla, the mixed perfume of which I shall never forget.

In the evening of our first day at Papeete we went in our boats to see the coral reef illuminated by the rays of the setting sun. Who can describe those wonderful gardens of the deep, on which we gazed through ten and twenty fathoms of crystal water? Who can enumerate, still less give a description of the strange creatures we saw moving about and darting hither and thither amid the masses of coral forming their submarine home. There were shells of rare shape, brighter than if they had been polished by the hand of the most skilful artist; crabs of all sizes, scuttling and sidling along; sea-anemones, spreading their delicate feelers in search of prey; and many other kinds of zoophytes crawling, wriggling, and dragging their length slowly over the surface of the reef; scarlet, blue,

yellow, gold, violet, spotted, striped, and winged fish, short, long, pointed, and blunt, darting about like birds among the coral trees and plants, which looked like exquisitely coloured palms and ferns and flowers. When we reached the outer reef the sea broke far above our heads, though inside we were safe and secure.

All too soon it became twilight, and almost immediately afterwards dark. Then the bay was illuminated by the torches of the native fishermen in canoes on the reef. Each canoe contained at least three men, one of whom propelled the boat; another stood up, waving about a torch dipped in some resinous substance which threw a strong light on the water; while the third stood in the bows, armed with a spear made of a bundle of wires tied to a long pole. This he aimed with great dexterity at the fish, who were either transfixed or jammed between the prongs. The fine figures of the natives, lighted up by the flickering torches and standing out in bold relief against the dark-blue starlit sky, would have served as models for the sculptors of ancient Greece

LADY BRASSEY.—*Tahiti.* Sampson Low.

By permission of Lord Brassey and Messrs. Sampson Low.

A Walk in Tahiti

Our line of march was the valley of Tia-auru, down which a river flows into the sea by Point Venus. This is one of the principal streams of the island, and its source lies at the base of the loftiest central pinnacles, which rise to a height of about 7000 feet. The whole island is so mountainous that the only way to penetrate into the interior is to follow up the valleys. Our road at first lay through the woods which bordered each side of the river; and the glimpses of the lofty central peaks, seen as through an avenue, with here and there a waving coco-nut on one side, were extremely picturesque. The valley soon began to narrow, and the sides to grow lofty and more precipi-

tous. After having walked between three and four hours, we found the width of the ravine scarcely exceeded that of the bed of the stream. On each hand the walls were nearly vertical; yet from the soft nature of the volcanic strata, trees and rank vegetation sprang from every projecting ledge. These precipices must have been some thousand feet high; and the whole formed a mountain gorge far more magnificent than anything which I had ever before beheld. Until the mid-day sun stood vertically over the ravine, the air felt cool and damp, but now it became very sultry. Shaded by a ledge of rock, beneath a façade of columnar lava, we ate our dinner. My guides had already procured a dish of small fish and fresh-water prawns. They carried with them a small net stretched on a hoop; and where the water was deep and in eddies, they dived, and, like otters, with their eyes open followed the fish into holes and corners, and thus caught them. A little higher up the river divided itself into three little streams. . . . The two northern ones were impracticable, owing to a succession of waterfalls, which descended from the jagged summit of the highest mountain; the other to all appearance was equally inaccessible, but we managed to ascend it by a most extraordinary road. The sides of the valley were here nearly precipitous; but, as frequently happens with stratified rocks, small ledges projected, which were thickly covered by wild bananas, liliaceous plants, and other luxuriant productions of the tropics. The Tahitians, by climbing among these ledges, searching for fruit, had discovered a track by which the whole precipice could be scaled. The first ascent from the valley was very dangerous, for it was necessary to pass a steeply-inclined face of naked rock by the aid of ropes which we brought with us. . . . We then cautiously walked along one of the ledges till we came to one of the three streams. This ledge formed a flat spot, above which a beautiful cascade, some hundred feet in height, poured down its waters, and beneath, another high cascade fell into the main stream in the valley below. From this cool and shady recess we

made a circuit to avoid the overhanging waterfall. As before, we followed little projecting ledges, the danger being partly concealed by the thickness of the vegetation. In passing from one of the ledges to another there was a vertical wall of rock. One of the Tahitians placed the trunk of a tree against this, climbed up it, and then by the aid of crevices reached the summit. He fixed the ropes to a projecting point, and lowered them for our dog and our luggage, and then we clambered up ourselves. Beneath the ledge on which the dead tree was placed, the precipice must have been 500 or 600 feet deep. We continued to ascend, sometimes along ledges, and sometimes along knife-edged ridges having on each hand profound ravines. In the Cordillera I have seen mountains on a far grander scale, but for abruptness, nothing at all comparable with this. In the evening we reached a flat little spot on the banks of the same stream, which we had continued to follow, and which descends in a chain of waterfalls; here we bivouacked for the night. On each side of the ravine there were great beds of the mountain-banana, covered with ripe fruit. Many of these plants were from 20 to 25 feet high, and from 3 to 4 in circumference. By the aid of strips of bark for rope, and the stems of bamboos for rafters, and the large leaf of the banana for a thatch, the Tahitians in a few minutes built us an excellent house; and with withered leaves made a soft bed. They then proceeded to make a fire and cook our evening meal. A light was procured by rubbing a blunt-pointed stick in a groove made in another, as if with the intention of deepening it, until by friction the dust became ignited. The fire was produced in a few seconds: but to a person who does not understand the art, it requires, as I found, the greatest exertion; but at last, to my great pride, I succeeded in igniting the dust. The Tahitians having made a small fire of sticks, placed a score of stones, of about the size of cricket-balls, on the burning wood. In about ten minutes the sticks were consumed, and the stones hot. They had previously folded up in small parcels of leaves, pieces of

TAI-O-HAI—PORT OF ENTRY TO THE MARQUESAS.

beef, fish, ripe and unripe bananas, and the tops of the wild arum. These green parcels were laid between the two layers of the hot stones, and the whole then covered up with earth, so that no smoke or steam could escape. In about a quarter of an hour the whole was most deliciously cooked. The choice green parcels were now laid on a cloth of banana leaves, and with a coco-nut shell we drank the cool water of the running stream; and thus we enjoyed our rustic meal.

I could not look on the surrounding plants without admiration. On every side were forests of banana; the fruit of which, though serving for food in various ways, lay in heaps decaying on the ground. In front of us there was an extensive brake of wild sugar-cane; and the stream was shaded by the dark-green knotted stem of the ava. Close by I saw the wild arum, the roots of which, when well-baked, are good to eat, and the young leaves better than spinach. There was the wild yam, and there were, moreover, several other wild fruits and useful vegetables. The little stream, besides its cool water, produced eels and crayfish. I did indeed admire this scene, when I compared it with an uncultivated one in the temperate zones.

As the evening drew to a close I strolled beneath the gloomy shade of the bananas up the course of the stream. My walk was soon brought to a close by coming to a waterfall between 200 and 300 feet high, and again above this was another. I mention all these waterfalls in this one brook to give a general idea of the inclination of the land. From our position, almost suspended on the mountain side, there were glimpses into the depths of the neighbouring valleys; and the lofty points of the central mountains, towering up within 60° of the zenith, hid half the evening sky. Thus seated, it was a sublime spectacle to watch the shades of night gradually obscuring the last and highest pinnacles.

CHARLES DARWIN.—*Voyage of the "Beagle."* Murray.

Among the many accounts of Tahiti, one of the best is that by Miss C. F. GORDON CUMMING, *A Lady's Cruise in a French Man-of-War.* Blackwood.

Samoa

The Samoan group lies between 13°30′ and 14°20′ S. lat., and between 169° and 173° W. long. There are thirteen islands in the group, but a large proportion are little more than barren volcanic rocks. Three only are inhabited, for three alone possess the wherewithal to support a population. These three islands, which have come into such prominence within very recent years, are Savaii, with an area of 700 square miles, Upolu with 550 square miles, and Tutuila possessing but 55 square miles. On Tutuila is situated the land-locked harbour of Pago-pago. The highest peak in the islands is on Savaii, a volcanic mountain 4000 feet high, and, in common with others of this archipelago, clothed to its top with a thick growth of coco and other palms, bread-fruit, guava, and numberless specimens of tropical vegetable life. Upolu is almost entirely surrounded by those singular coral growths called barrier reefs, wonderful submarine walls or break-waters, built up to the level of the sea, and forming fine lagoons by means of which communication from point to point is facilitated in all kinds of weather. The distance varies from a few feet to three miles.

The climate of the Samoan archipelago is distinctly tropical. During a large part of the year the winds are moderate and from diverse directions, so that on the elevated plateaus near the ocean the climate is not disagreeable or unhealthy. Beginning in February, however, and extending through the entire month of March, the islands are subject to violent hurricanes, which often do immense damage to plantations and dwellings.

The food of the islanders is mainly vegetable, and bread-fruit, taro, yams, bananas, and coco-nuts are the staple articles, but the lagoons and reefs abound in fish and shell-fish, among the latter being a fine variety of shrimp, of which the natives are very fond. The cooking is done by the men, and if a woman is seen cooking it is regarded as

just cause for jeering at the men of her family. No spices or seasoning are used, but salt water is sparingly employed to give additional flavour to food. From taro and bread-fruit is made *poi*, which is extensively eaten in all the Polynesian islands, the process of manufacture being everywhere the same. The principal meal comes in the evening, when the whole family meets—men, women, and children eating together. They have no tables or other furniture, but seat themselves cross-legged on mats round about the circular house. Each person has his portion set before him on a bread-fruit leaf.

A native house resembles a gigantic beehive, 30 or 40 feet in diameter, and raised from the ground on a number of short posts placed at regular intervals. The thatching is laid with great care, and consists of the long dry leaves of the sugar-cane, which grows wild, secured in places by the picturesque branches of the coco-palm. The thatching, if well done, is rain-tight, and lasts a number of years. These great circular roofs are so constructed that they can be lifted bodily from the supports and moved anywhere. A house contains but a single room, and this apartment is by turns the common sitting-room, dining-room, and bedroom. Four or five mats make the bed, while the pillow is a piece of bamboo raised from the ground on short legs. The fireplace is a circular hole several feet in diameter by 6 or 8 inches deep, and the fuel commonly employed is dried coco-nut shells, which give neither smell nor smoke. Cooking, however, is not carried on at these fireplaces, but, save in the worst of weather, is always performed at some distance from the dwelling-house.

COMMANDER H. WEBSTER.—*National Geographic Magazine*, June 1899.

By permission of the National Geographic Society.

APIA, ON UPOLU.

Cruising in the Friendly Islands

Just under the red of sunrise on the starboard bow, silhouetted against a pale yellow-green sky, stand, as it were right out of the ocean, the feathery tops of coco-nut trees; and nearer, puff, puff, puff, one after another, stretching almost a mile along the horizon, like shells fired from a line of forts and exploding in the water, leap, twenty feet into the water, little heaps of white spray. These are the waves breaking over a line of coral rocks and up through submarine caves in the rocks. Soon the low land rises in the air. We enter a wide bay; its port arm is formed by the long coast-line of Tongatabu, and to starboard is a string of many islands of all sizes, from mountainous Eua, down to a tiny thing looking in the distance like an old-fashioned four-decker in full sail, with tall coco-nut for masts. Land lies ahead of us, but so low that it is visible only in spots. A sharp-cut distant line, the edge of the unseen coral that underlies the whole island and creeps far out to sea, divides the purple from a pale-green, broad expanse, which stretches ahead of us nearly to the horizon. There, on the starboard bow, the view is bounded by a chain of circular islands which stand up out of the blue sea, a darker green, glittering like a chain of huge emeralds in a broad band of sapphire. The intense paleness of the green colour in the bay is caused by the shallowness of the water. The masses of underlying coral are only 2 to 4 feet beneath the surface. The sea around our steamer looks a deeper purple from the contrast. As we near the green water the captain climbs into the foretop and sits there guiding the steamer along the swift tide past the reefs, through the blue, narrow passage, with pale-green water rushing and tumbling on either side. "Port!" Then we wheel to starboard, the steamer answering her helm beautifully, and darting away from the green water. Not too much swing, or we shall be on the opposite reef,

whose jagged surface would tear and rip up the stoutest ship's bottom in a jiffy. It is a relief when the passage widens and we head for Mount Zion. This is a bold, abrupt rising ground, in old time occupied by the historical great round fort. Now it is peacefully crowned by the large unsightly church, which gives it its Bible name. Below the church, around the edge of the beautiful bay, nestling among coco-nut trees, stands white Nukualofa, the capital of the kingdom of Tonga.

Tongatabu is a well-watered island, and even in the winter there is plenty of rain. Broad roads, shaded by coco-nut, banana, orange, and all kinds of tropical foliage lead everywhere out into the country. Being simply unmetalled tracks on rich loam, many of them are almost impassable for carts or carriages. Even on horseback it is difficult to penetrate far inland, more especially in the rainy season, unless with a guide. There is a great sameness in the scenery, an endless profusion of rich tropical trees and plants, and only three or four tiny streams, no mountains, and no rivers. Being of coral formation it is mostly flat, with a few low hills 40 to 80 feet high, except to the south-east, where the land rises to 200 feet. An earthquake wave 60 feet high would submerge nearly the whole island.

. . . . . .

Vavau Sound is a good many miles long, and is studded with circular islands. Until near enough to distinguish the coco fronds that crown the heights, these islands remind one of Scotch scenery. Standing sheer up out of the deep blue water, mountain peaks of some submerged range, they are one mass of trees and plants to the steep edges of their cliffs; extending in lines two or three deep for miles to starboard they, with the mainland jutting far out on the port side, make Vavau Sound completely land-locked. Halfway up the lock we pass a headland, from the top of which is a good view of the sound, with its numerous islands stretching in one direction almost to the horizon, and of the *licoo*, or weather side of Vavau. After pass-

ing this, the high land about 8 miles up the sound closes in on both sides. At Sandy Point a narrow channel, in width two cables' length from land to land, of that width only one cable's length in deep water, leads into a circular lagoon. This is the harbour of Neiafu. A gay scene is the wharf, where to see us land are assembled all the *habitués* of the place; dark Solomon islanders, Fijians with enormous heads of hair, beside whom the Tongans look quite pale; Loyalty islanders, Tongan girls, and half-castes, in bright-coloured shawls; a chief's young son in white cloth coat and trousers, his air and well-cut, straight features singling him out from the others; women with hair on top, and others with imitation pads of coco-nut fibre sticking far out at the backs of their heads, unconsciously in the height of various European fashions, a cigarette stuck over one ear, and a lump of tobacco over the other. Our native passengers push through this crowd, shouldering their mats, baskets of yams and coco-nuts, rolls of tapa cloth, and wet strips of fibre ready to be beaten out with a stone hammer into tapa cloth, heaps of provisions and pigs—they always carry their pigs with them when travelling. The winches rattle noisily; more timber for houses and churches and wood in short lengths for orange-boxes are landed; English-bred cows and calves released from the ship's slings are quieted with bunches of bananas, which they attack greedily; our white passengers walk in and out of the crowd, staring at everything and everybody; all these make a confused mass on the wharf and portend great changes. The traveller of twenty years hence will look in vain for landmarks of the old civilisation of the Tongans. The heaps of timber on the wharf warn us that the elegant native grass-hut, through the thick walls of which the health-giving cooled air permeates freely, making it well-ventilated but rain-proof, is condemned as damp, and will soon disappear before the more durable, horrid, European square box-like wooden house with galvanised iron roof. European clothes are

taking the place of tapa cloth and coco-nut oil, and European diseases are following.

The whole country is a mass of the orange-trees, trees for which Vavau is so famous. Tons of oranges could be picked up off the ground. A marvellously pretty sight is the glittering yellow fruit, dropped from the trees and strewn on the green grass of broad avenues extending in every direction. Dotted here and there, in soft brown relief among the brilliant-coloured orange, tall, feathery-topped coco-nut, stumpy, long-leafed banana, dark-green spreading bread-fruit, and brown-leafed pandanus, on a carpet of grass to the very doors, are the brown huts of the natives.

E. Reeves.—*Brown Men and Women.* Swan Sonnenschein and Co.

By permission of Messrs. Swan Sonnenschein and Co.

For a good description of a walk across one of the smaller islands, see *ibid.* pp. 84-86; for the celebrated caves of Kopa, in Vavau Sound, *ibid.* pp. 99, 100.

A Glimpse of Fiji

I have just come in from such a scramble. Certainly those hills of Ovalau are most tantalising. From the sea they do look so attractive, and not particularly difficult to ascend; but when it comes to the attempt, you find that even in the rare instances where the semblance of a foot-path exists, it takes a very good scrambler to follow it over great boulders of rock, or up almost perpendicular banks of soapy mud. Should you attempt to leave the path you find it almost impossible to force a passage through the dense underwood; and even the tracks, which from the sea look like grass, turn out to be tall reeds, reaching far above your head, and matted together with strong vines, which totally prevent your advance, and large spiders' webs, which cling to your face and hair. Still, it is worth a considerable exertion, for the reward of at length reaching some point whence you can look down

on the lovely sea and all the far-away isles. This island is itself quite beautiful, though by no means a desirable one on which to establish a capital, as it consists entirely of very steep hills, rising to a height of about 3000 feet, crowned with great crags and rent by deep gorges densely wooded. The only available building land is a narrow strip on the edge of the sea; and though, of course, the lower spurs of the hills may gradually be dotted with villas, there is no possibility of extending the town except by extensive terracing.

. . . . . .

In one respect we are greatly disappointed in this place, there are scarcely any flowers. This strikes us all the more as we have come here direct from Australia, where we left the whole country literally aflame with blossom. The ferns, however, are exceedingly lovely. Innumerable species grow in richest profusion in every damp ravine, and great tufts of bird's-nest and other ferns cling to the mossy boughs of the grey old trees. Every here and there you come on a rocky stream or shady pool, round which they cluster in such luxuriance and variety that it makes you long to transport the whole fairy-like dell to some place where all fern lovers might revel in its beauty. And this is only the undergrowth; for the cool shade overhead is produced by the interwoven fronds of great tree-ferns, their exquisite crowns of green supported by a slender stem from 20 to 30 feet high, up which twine delicate creepers of all sorts, which steal in and out among the great fronds and so weave a canopy of exquisite beauty. Loveliest of all are the delicate climbing-ferns, the tender leaves of which, some richly fringed with seed, hang in mid-air on long hair-like trails, or else, drooping in festoons, climb from tree to tree, forming a perfect network of loveliness.

I ought to mention that though there are no flowers within reach there are several flowering trees with unattainable and happily not very tempting blossoms. They

FIJIAN CANOE UNDER SAIL.

are all alike remarkable for having a most insignificant calyx, and being almost entirely composed of a great bunch of silky stamens, which fall in showers on the ground below. The most attractive of these is the Malay apple, which bears tufts of crimson blossom, especially attractive to certain lovely scarlet and green parrots with purple heads, and which in due season bears a very juicy though insipid crimson or white fruit.

C. F. Gordon-Cumming.—*At Home in Fiji.* Blackwood.

"To state that the scenic beauties of the archipelago are charming conveys no adequate conception to the mind. Beauty of the most sublime grandeur is here to be seen; on the hills and mountain faces, in the narrow glens and gorges, along the windings of the rivers, in the rapid foaming streams, by the silent lakes and marshes, and on the widespread plains and valleys—there the eager eye beholds the magnificence of nature, in the tints and shades of verdure and the richly-coloured foliage of the giants of the forest and the creeping vines and leaves; while the ocean, with its beauties, 'mid the submarine structures, and mighty foaming billows, as they crash against the faces of the ponderous Barrier Reef, impresses the spectator as amazingly he gazes on the surface of the water, over a scene of majestic beauty, wild and terrible at times. In the different countries through which I have wandered I have seen nothing to surpass the natural loveliness of the coral-girt isles of Viti."—J. P. Thomson.—*Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia*, vol. ix. 1893-94.

A most exquisite description of the colouring of the Pacific Ocean off the Fiji group and of the wonders of a coral reef is given by Miss Gordon-Cumming, *At Home in Fiji*, vol. i. pp. 63-71 (89).

Ascent of Mount Tanna in the New Hebrides

Our road led across a strip of beach, mainly composed of volcanic sand, into a thicket of cottonwood, and, gently rising, brought us through a belt of tropical forest about a mile in width. Here we saw for the first time the New Hebrides banyan-tree. However frequently afterwards we met with this giant of the forest all through the archipelago, I could never cease gazing in wonder at the

enormous size of its trunk and masses of aerial roots. The whole aspect of this tree is wonderful. All kinds of ferns and orchids thrive on its bark and among its limbs. Leaving this forest, an abrupt rise of about 50 feet, evidently a volcanic upheaval, brought us into sandy country again, where nothing but arrow-grass, cotton-wood, and pandanus would flourish. On emerging from this we entered an absolutely barren sand-flat. An irregularly shaped hollow lake on our right reflected the cone of the mountain rising steeply from the opposite shore. We looked awestruck at the sight before us. In every direction were signs of former eruptions and volcanic devastation. Having reached the edge of the lake, we evidently stood in the middle of an ancient crater. The almost incessant roar from the mouth of the giant above warned us that we were approaching dangerous ground. The ascent commenced. For the first few hundred paces little hillocks with tolerably level crests were taken advantage of; but the difficulties of the ascent became greater at almost every step. The angle of incline was never less than 40°, and in many places much steeper. Here and there we encountered great masses of scoriæ. We steered for these, wading ankle deep in the loose, burning hot sand, for occasionally they afforded better foothold, if only for a few yards. To walk straight upwards soon became impossible, and after every few minutes of excessive toil we were obliged to rest on one of these rocks, whose blistered, glassy surface afforded but small comfort to our weary limbs. All this time eruptions were taking place at short intervals, and often the ground trembled beneath our feet with their violence. The brink was reached after a terrible climb. Just at that moment, and before I could catch a glimpse of the abyss, another terrific explosion took place, seemingly right underneath me. I made a rush back, but was in an instant enveloped in a dense vapour shutting everything from sight. I could detect no sulphur, but the smell was rather like the steam arising from freshly

slaked lime. The cloud rose rapidly and soon I could see the natives and some of our friends. They beckoned me to join them, and waved their hats to warn me not to approach the edge. The place they occupied was a splendid position to survey the grandeur of the spectacle. Dense clouds of vapour arose with scarcely any intermission, and but rarely could the whole extent of the crater be seen. We all gazed awestruck at the fiery cauldron below. As far as we could judge, the circumference of the crater edge measured from between $2\frac{1}{2}$ to 3 miles, but there was what might be termed a saddle, which divided the cauldron into two unequal halves. The larger and more active half was right beneath us, and the smaller basin formed the eastern boundary. On our right, more than 300 feet sheer below us, was a lake of liquid fire, frothing and seething. Every few minutes before an eruption took place the surface of this lake would smoothen like a mirror. Then by degrees the whole face of it would assume a spherical shape until the pent-up gases below burst the gigantic bubble with irresistible force. From this fire-lake little or no solid matter was ejected, but great clouds of steam followed each bursting bubble, shrouding for a time the whole side of the mountain. Grouped round this fire-lake, but seemingly at a much greater depth, were five funnel-shaped pits. Three of these were on our side, the remaining two on the other side of the dividing spur or saddle. The size of the pits at their mouths varied between 40 and 120 feet in diameter. The lesser ones emitted, unceasingly, cascades of red-hot lava in jets and columns ever varying in height. The larger two were slower and more deliberate in their action; but it was from these that we witnessed the most tremendous discharges of lava and scoriæ, accompanied by deafening roars. A slight idea of the force may be conceived when, taking the depth of these pits from our level to their mouths at 400 feet, the height to which the ejected masses of scoriæ rose was at times from 400 to 600 feet above our heads. And, bear in mind, this was

the Tanna fire mountain at its moments of comparative quiescence. Only at such time man dares to approach.

J. W. Lindt.—*Transactions of the Royal Geographical Society of Australia, Victorian Branch.* March 1891.

This should be compared with the account of the ascent of Kilauea p. 180.

Scenery of the Solomon Islands

Few visitors to these regions could fail to have been impressed with the grandeur of the south-east portion of the island of Guadalcanar. Viewed from the south, a few miles from the shore, its lofty mountains rise up one behind the other, their summits lost in the clouds. The island has a length of 80 miles, and an average breadth of about 25 miles; whilst towards its eastern portion it rises in lofty mountain masses, which attain in Mount Lammas an elevation of 8005 feet above the sea. A sombre forest-growth clothes its more elevated eastern portion. In the western half there lies an extensive prairie district covered with high grass, and dotted here and there in its hollows with patches of forest. On the south side the precipitous mountain slopes are only separated from the sea-border by a narrow fringe of lowland, and in consequence the streams are but mountain torrents. On the north side a low undulating tract descends gradually to the coast from the base of the elevated region in the interior, and here large streams or rivers, navigable for several miles, discharge their waters into the sea.

H. B. Guppy.—*The Solomon Islands, their Geology, General Features, and Suitability for Colonisation.* Swan Sonnenschein and Co.

By permission of Messrs. Swan Sonnenschein and Co.

Of the difficulty of penetrating the dense forest of the Solomon Islands, Mr. Guppy gives an amusing and graphic account in his larger volume, *The Solomon Islands and their Natives*, pp. 2, 3.

New Caledonia

New Caledonia is an irregular-shaped island some 200 miles long and only about 30 miles wide, with a range of hills running down the whole length. It is evidently the top of a submerged mountain chain, which now only shows the former summits lifted above the level of the sea. The whole is surrounded by a barrier reef of coral, at an average distance of 1 to 3 miles from the shore; but here and there are gaps in the limestone barrier which permit ships to enter. These openings in the coral are usually opposite places where fresh-water streams run down into the sea from the mountains; for the fresh water kills the coral polyp, and so the barrier is not broken, but simply not formed at those points. The steamer entered by one of these openings in the reef and was soon alongside the pier of Noumea.

Soon after our arrival we went ashore to walk round the straggling, muddy town, and then took a drive into the country. The scenery is pretty, and though there are a few mangroves on the beach, the general character of the vegetation was rather semi-tropical than truly tropical. In fact the forest seemed to be somewhat transitional between the vegetation of Australia and the jungle of Fiji which we saw later on. There was a kind of gum-tree and also of ironwood, with other things that reminded us of Australia, mixed up with a luxuriant undergrowth, but still not the profusion of creepers and parasites which are characteristic of truly tropical vegetation. It is noteworthy that both the people and the plants seem to be somewhat transitional in their character between the Australian and Papuan types of man and nature.

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"The usual wooded mountains of the South Seas rise behind the town of Noumea to a few thousand feet, and a kind of cypress or pine

grows to a great height everywhere on the hillsides. The town of Noumea is very French, with its tall houses and magazines and depots. In a fine place, planted with coco-nuts and glorious flambeaux, is the kiosque for a band, the finest in the southern hemisphere. The musicians are drawn from the convict prison."—ANON. *Parts of the Pacific.* Sampson Low.

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