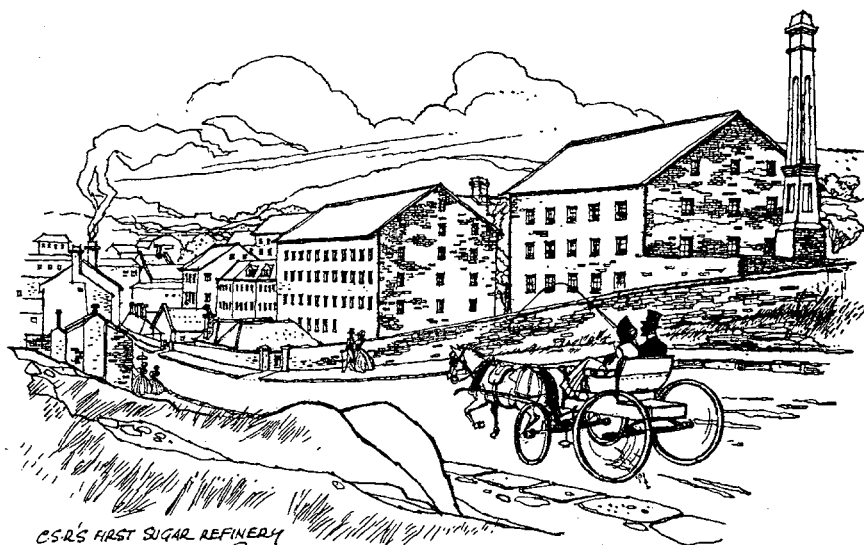




CSR'S FIRST SUGAR REFINERY
—THE BRISBANE WORKS, Paramatta Rd. Sydney.

CHAPTER 2

The Historical Background

ALAN BIRCH & J. F. BLAXLAND

This is a brief history of the Colonial Sugar Refining Company for the first sixty-odd years of its existence. It deals also with the early history of the sugar industries in Australia, Fiji and New Zealand for, although C.S.R. is only a part of these industries, their growth and the growth of the company are closely related. The last forty years are not dealt with because many developments of this period are covered in other chapters. Much has been omitted which those who know the company would have liked to see recorded. To suit the limited scope of this book, the authors have had to confine their attention mainly to major trends.

Most of this historical sketch is based on research and more extensive writing by Dr Alan Birch of the Department of Economic History in the University of Sydney. Mr B. B. Levick, who recently retired as the company's senior librarian, collected and sorted masses of records and publications for reference and also checked many details. Dr Birch and Mr J. F. Blaxland of the company's staff collaborated in writing the chapter.

September 1955

DURING the fifteenth century the Venetians, who were leaders in the sugar and spice trade of the Mediterranean, established a pattern of trading and manufacture of sugar which survives to the present day. They bought crude raw sugar, made in the cane fields of Egypt, Sicily, southern Spain and other warmer regions of the Mediterranean, and refined it at Venice, close to their European markets. Throughout the world raw sugar is still the sugar of international commerce. It is an intermediate product, made in the semi-tropical and tropical regions where the cane plant flourishes and transported to the population centres in the temperate zones for refining to a form suitable for consumption.

Australia, even from the early days, had not been solely a penal settlement. It had attracted private business enterprise from Britain. The census of 1836 showed that the colony of New South Wales, which then covered the full length of the eastern coast of Australia from Wilson's Promontory to Cape York, had a population of 77,096 people and over 3,000,000 sheep. Sydney was a flourishing commercial centre, and the foundations of the country's wealth were already laid. During the late 1830s the colony experienced a mild boom. Much English capital was poured into pastoral ventures. To Francis Kemble, London company promoter, and William Knox Child, Deputy Lieutenant of the County of Kent, it looked a likely place for a sugar refinery, and in 1839 the Australian Sugar Company was formed in London. Lured by Kemble's grandiose predictions of a profit of £40,000 a year, Child sold his estate and put his capital into the venture. Steam engines, boilers, plant and machinery to the value of £20,000 were purchased with Child's money and shipped to Sydney to equip a sugar refinery, according to the company's prospectus, "on the banks of the Cook's River . . . in the village of Canterbury, within five miles and a half from Sydney". But before the refinery commenced operations there was a crippling trade slump, and disagreements among the principals led to the dissolution of the company.

A new company, the Australasian Sugar Company, was formed to take over the assets of the Australian Sugar Company. In the terms of its deed of settlement of 31 March 1842, it was "to carry on the Trade or Business of purchasing and refining raw sugar, the sale of Sugar whether raw or refined by the company, the sale of Molasses, or the distillation of such molasses into spirits, the manufacture of Animal Charcoal, Ivory Black, Soda, Sal ammoniac, Black Ink and such other business connected with the general objects of the company as the Directors shall think fit".

The capital of the new company was £23,000 sterling in £50 shares.

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Kemble and Child reconciled their differences and persuaded several Sydney gentlemen and merchants to head an imposing list of more than sixty shareholders.

In September 1842 the manufacture of sugar was at last begun, with raw sugar imported from the Philippines. Towards the end of the year the Australasian Sugar Company advertised in the Sydney newspapers that it was "now in operation and will be enabled to supply the whole of the Australian Colonies with refined sugar at the following prices:

Fine loaves or Titlers ...	5d.	per pound
Lump	4½d.	" "
Crushed Lump ...	£43	" ton
Fine Pieces	£26	" "
Molasses	£13	" " ."

In 1843 Edward Knox (no relation to William Knox Child), a young man twenty-four years of age, born and educated in Denmark and only three years resident in the colony, took over the management of the struggling sugar company. He remained as manager until 1846 and as a director until 1854, when disagreements again arose between the partners and the Australasian Sugar Company was in its turn dissolved.

A new company, the Colonial Sugar Refining Company, was then formed on 1 January 1855. It was a partnership of unlimited liability with a capital of £150,000.

At first there were only ten shareholders, five of whom were directors of the company. The first directors were William Fanning, Walter Lamb, William Walker, Edwin Tooth and Edward Knox. Shareholders included J. H. Challis, Daniel Cooper, Archibald Walker and James Robey, who had made himself valuable to the previous company through his technical knowledge and skill. The company was supported by the most important banking and mercantile interests in Sydney at that time. Edward Knox was also chairman of the Commercial Banking Company, established in 1834. Walter Lamb was the son of an English naval captain who had settled in Sydney after the Napoleonic wars to establish a merchant house. William Walker, also a merchant, was associated with the Bank of New South Wales and Edwin Tooth was a brewer.

During the half-century before the establishment of refineries in Sydney low quality "ration sugars", imported from Java, Mauritius and the Philippines, provided the colony's staple sweeteners. Commercial production of raw sugar for the local refineries did not

commence in Australia until the late 1860s. But as early as 1817 canes, said to have been introduced from Tahiti by Thomas Alison Scott, had been planted in the Sydney Botanic Gardens. Scott was appointed by the Government in 1823 to take over the growing of sugar cane at the penal settlement of Port Macquarie, and in 1827 succeeded in making some crude sugar. He was dismissed by Governor Darling in 1828, but continued to advocate the development of cane-growing in New South Wales. Scott claimed to have supplied many planters with advice and with cane for planting when the industry made a second start on the northern rivers of New South Wales and in Queensland. Captain Louis Hope, the first commercially successful plantation owner in Australia, obtained some of his cane cuttings from Scott, who was later granted a small pension in official recognition of his pioneering work. He was given a grant of land at Point Clare, near Gosford in New South Wales, and died there in 1881. The village of Tascott, near Gosford, perpetuates his name.

Scott and others had shown the way but it was the dislocation of the cotton industry in the southern states of America, caused by the Civil War, which provided the first incentive for the cultivation of crops in the tropical areas of the north-eastern Australian coast and in the Fiji Islands. Cotton proved unsuccessful in both Queensland and Fiji and many of the pioneering planters turned to the cultivation of sugar cane. They were encouraged in Queensland by the Sugar and Coffee Regulations of 1864, by which the Government made available selected lands at a nominal rental, with right to purchase, to any persons or companies undertaking the growth of either sugar cane or coffee on an extensive scale.

Throughout the world at that time, and still largely today, cane was grown by coloured labourers working on plantations, and this was the system naturally adopted by the pioneers. In Australia and Fiji most of them started by using South Sea Islanders to clear their land and to cultivate and harvest their crops. These labourers were not slaves, such as those then employed in the cane fields of Puerto Rico and Cuba. They worked for their keep and a small wage, the terms of their employment, working conditions and repatriation being regulated by Acts of the Queensland and Imperial Governments.

The recruitment of South Sea Islanders by "black-birders" has been described by Noel Deerr in his *History of Sugar* as "conducted with a callousness and brutality equalling anything that happened in the course of the African slave trade". Despite nominal government supervision, there were also undoubted abuses on the plantations but most of the Australian planters seem to have treated their labourers

humanely, considering the harsher standards of those times. Deerr, an authority on the history of labour conditions in sugar production, states "once landed in Queensland it does not appear that the labourers were ill-treated". H. T. Easterby, in his historical review of the Queensland sugar industry, states "on the whole they were well treated".

In Australia the pastoral industry was the first to use indentured labour. In 1839 there were over a thousand indentured Indians in the country, all of whom were engaged by pastoralists. The first Kanakas, introduced into Australia during the 1840s, were used as shepherds. In the early 1860s larger numbers of Kanakas were used, originally by Robert Towns to work on cotton plantations and later, when cotton failed, to work in the cane fields. Chinese coolies were used in the mining industry from the early 1850s and were imported by the South Australian Government to build the railway from Darwin to Pine Creek even as late as 1883-89.

In 1842, when the first refinery commenced operations in Sydney, the colony of New South Wales was still being administered by a governor. Citizens of Sydney were petitioning the home authorities for some measure of self-government for the colony and settlers at Port Phillip were agitating for separation from New South Wales. The country around Moreton Bay convict settlement, then part of the northern district of New South Wales, had only the year before been thrown open for settlement at twelve shillings per acre. In 1863, when Captain Louis Hope first commenced growing cane on a commercial scale on his plantation at Ormiston near Brisbane, slavery was still in force in the Dutch colonies, in Puerto Rico and in Cuba, while in America its future was still being decided by the Civil War. In New Zealand the Maori wars were to continue for another eight years. Despite the large increase in total Australian population following the gold rushes, the census of 1861 had shown that the population of Queensland, separated from New South Wales in 1859, was only 34,000.

The early planters who followed Hope in northern New South Wales and in Queensland lacked experience, capital and knowledge of tropical agriculture and of the technology of sugar milling. Their field practices and mills in those days were similar to those of a much earlier period in the West Indies.

It was not until the early eighties, at the time of the Sudan War, and twenty years after Hope and the early planters pioneered the coast of Queensland, that the Colonial Sugar Refining Company entered the field of raw sugar production in both Queensland and Fiji. The company and its predecessors had been in the sugar refining business for some forty years and in raw sugar milling in northern

New South Wales for twelve years when it embarked upon this major and decisive expansion of its activities.

The Period of Edward Knox

Born in Denmark in 1819, Edward Knox was to grow up a determined and ambitious man, gifted with extraordinary commercial ability. His father was George Knox, son of a Scottish glazier who had married the sister of Arthur Howden, a hackle-master whom the Danish Government had persuaded to leave his employment in the linen industry in Edinburgh to ply his trade in Denmark. George Knox became a merchant, settled in the seaport city of Elsinore, but he died when Edward Knox was eleven years old, leaving his English wife in comparatively poor circumstances. Edward determined to become a merchant like his father, and it was necessary for his mother to borrow money from her brother, James Mullens of London, to send the boy to Lübeck in Germany for a thorough grounding in the ways of the commercial world.

At the age of sixteen, equipped with a knowledge of English, Danish, French and German, Edward Knox was given a job as a junior clerk in his uncle's merchant house in London. The firm of Perkins, Schlusser and Mullens had an extensive business in the Baltic trade. It was a good training ground for a young man who was to make his mark as a merchant; but apparently Edward was a fiery and spirited youth and after several years he and his uncle quarrelled violently over his mother's business affairs. He was dismissed. "Whatever his talents may be," his uncle wrote, "and I am ready to admit his are of a high order, they will no doubt enable him in time to make his fortune if he can only make up his mind to be satisfied with being a junior clerk for the present and not expect to jump from junior clerk to partner."

But Edward Knox could not wait for this seemingly remote prospect. He had been thinking for some time of emigrating to Australia in order to make a fortune like Captain John Macarthur. Somehow he raised a modest amount of capital to take up some land there and to buy a few hundred sheep, and took passage, travelling steerage, in the barque *Sophia*, arriving at Port Jackson on 26 February 1840. His mother had written to him, when she learned of his bold plan, "Everybody is willing to make allowance for the sanguine hopes of an active, enterprising youth, eager to make his way quickly in the world for his mother's and sister's sake but certainly too sensible to persevere and lose his best years in tending sheep and remain an exile." She even

likened him to Robinson Crusoe! Knox soon decided for himself that he was not cut out for the pastoral life. After a brief period at Bayly Park, a pastoral property at St Mary's near Sydney, he obtained a position as accountant of a real estate firm, the Australian Auction Company.

His advancement from then on was rapid. In May 1843 he became manager of the auction company. In August 1843 he was appointed manager of the Australasian Sugar Company at a salary of £250 a year and "more when times mended". In the following year he was appointed by the Chief Justice an official assignee to administer under the Insolvents Act the property of Sydney merchants who had suffered in the slump of the 1840s. In 1845 he was appointed a director of the Commercial Banking Company of Sydney, which had been formed eleven years earlier. In 1847, at the age of twenty-eight, he became managing director of the banking company and was largely responsible for the reorganization of the bank when it was re-incorporated with a capital of £120,000.

During his twenties and early thirties Knox applied himself with exceptional vigour to the task of establishing his reputation and his fortune. He held a number of executive posts at the same time and continued to buy and sell real estate. He was thirty-five when the Colonial Sugar Refining Company was formed in 1855 and had already established himself as a leading personality in the business life of Sydney. From his fifteen years in the colony he had amassed a considerable personal fortune, most of which was invested in the new sugar company. A daguerreotype portrait from this period shows him as handsome and determined but, despite a suggestion of abundant self-confidence in the portrait, he was, according to the testimony of his fellow merchants, "a perfect man of business and a highly agreeable person".

On his own admission Knox was "only a theorist in sugar boiling" but he was to bring his acute commercial sense and his flair for organization to the new Colonial Sugar Refining Company. It was a case of the time and the man being right. During the 1850s the colony's population increased rapidly in size and in wealth and the local market for refined sugar expanded proportionately. But raw sugar markets fluctuated violently, making sugar refining a hazardous business. With sources of supply far away and transport unreliable it was necessary to hold considerable reserves; but a large stock of raw sugar at the refinery followed by a tumbling of prices would bring calamity. Competition from merchants who imported sugar was intense. The risks were great but the rewards for success could also be great.

SOUTH PACIFIC ENTERPRISE

The first *Statement of Affairs* of the company dated 30 June 1855 was typical of companies relying heavily on trade credit and correspondingly vulnerable:

LIABILITIES			ASSETS		
	£	s. d.		£	s. d.
<i>Capital</i>	150,000	0 0	<i>Plant, Machinery & Land</i>	121,464	8 11
<i>Bills Payable & Import A/c</i>	119,610	13 8	<i>Stock on Hand</i>	87,892	17 6
<i>Sundry Creditors</i>	8,914	2 2	<i>Cash, Bills Receivable & Sundry Debtors</i>	19,999	15 8
<i>Profit & Loss</i>	16,123	1 10	<i>Raw Sugar Imports</i>	53,570	9 6
			<i>Sundry Stocks</i>	5,405	7 7
			<i>Consignments</i>	6,314	18 6
	<u>£294,647 17 8</u>			<u>£294,647 17 8</u>	

Business for the first year was brisk, and in the following year of 1856 a dividend of 50 per cent was declared.

Prospects were so encouraging that in June 1857 the shareholders, "being of the opinion that the growing demand for refined sugar in the Australian Colonies . . . calls for the establishment of a sugar refinery and distillery on a large scale" in Melbourne, decided on the formation of an associated company, the Victoria Sugar Company. Half of the £150,000 capital was subscribed by C.S.R. shareholders and the other half by Melbourne merchants. Edward Knox was appointed superintendent and chairman of the Victorian company and personally arranged for a refinery to be built at Sandridge, now Port Melbourne.

Having established what appeared to be two flourishing sugar companies, Knox decided that he had made the fortune which as a young man he had set out to seek. He sold his home and some of his shares in the Colonial Sugar Refining Company and, late in 1857, embarked for Europe, leaving his property in the care of Grafton Ross, the company's new manager. He had hardly set sail when the crash came. There was a world-wide fall in the price of raw sugar, coinciding with a depression in Australia. The company was caught with a large stock of expensive raw sugars on its hands, and imports of sugar at ever-lower prices flooded the market. Knox was bombarded with letters telling him he was ruined.

Before he could return to Sydney, another blow was struck at the company, which appeared certain to founder. The manager of the

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sugar house, one of the shareholders, James Robey, planned a rival establishment on the north shore of Sydney Harbour. When this was discovered he was dismissed and he then threatened to dissolve the company. The Sydney directors were ready to throw in their hand. Estimated losses were £120,000; Robey, their most experienced production colleague, had gone and they were faced with legal action. Dissolution would have ruined Knox. He persuaded some English shareholders to make a loan to the company and hurried back to Sydney, where he succeeded in preventing the Robey equity suit.

From the day of his return Knox threw his great energies and abilities into the task of restoring the fortunes of the sugar company. He was faced with ruin and he had been bitterly criticized for paying such a large dividend in 1856. His fortune and his reputation were in jeopardy. Before he left for England Knox had sold nearly £20,000 of C.S.R. stock, on which he had guaranteed to double any deficiencies in the company's dividend below 20 per cent for the next five years. The purchaser wanted to release him from this bond, but it is indicative of his character that he insisted on keeping to his undertaking, even though he had great difficulty in honouring it. It is also an indication of his principles that he had appointed as main banker for C.S.R. the Bank of New South Wales, rather than the Commercial Banking Company of which he was Chairman.

It was ironical that this man, who had determined to build his own fortunes on firm and lasting foundations, should have been forced to choose for his field an industry which was overwhelmingly influenced by outside circumstances. Raw sugar prices were beyond his control. Even so, it was still possible to achieve some degree of understanding of the market, even with all its vagaries. Knox came to develop an almost instinctive anticipation of the sudden booms and depressions in the raw sugar markets of the world.

During the second half of last century, as populations grew and standards of living rose, sugar passed rapidly from a luxury food to a normal item of diet in the more advanced countries of the world. Over the same period the beet sugar industry, founded in France during the Napoleonic wars, was developed on the continent of Europe by subsidy and millions of tons of bounty-fed beet sugar were dumped on the markets of the world. Sales below cost of production of huge quantities of such sugar created great instability in raw cane sugar prices.

Throughout the sixties Knox struggled to keep the company's head above water, to pay off its debts and to put aside reserves to redeem debentures issued after the crisis in 1857-1858. Cut-throat competition from imports was an additional menace to stability. In Knox's own

words, the company's profits could "be reduced by £70,000 per annum at one blow from the importing merchants".

A partial answer to the problem of the fluctuations of the international market in raw sugar was to grow one's own supplies. From the establishment of the first plantations in 1863, there had been a mild boom in cane-growing and raw sugar manufacture in northern New South Wales and in Queensland. In 1868 Knox decided to enter this field and in 1870 he put his second son, Edward William Knox, in charge of the project. Several mills were established on the northern rivers of New South Wales and during the 1870s young E. W. Knox, who had started in the company's business as a clerk at the age of seventeen, learnt in the hard school of experience the principles of raw sugar manufacture and the wider principles underlying the management of men and large industrial organizations.

Edward Knox's venture into milling was to have great influence on the development of the raw sugar industry in Australia and on the development of C.S.R. itself. It will be dealt with more fully in the section on the period of E. W. Knox which follows. Full credit is due to Edward Knox, however, for initiating the move, as his directors acknowledged in 1877 on his temporary retirement as chairman: "To his guidance must be attributed much of the success that has attended the operations of the Company, particularly in originating and bringing into successful existence the mills on the Clarence River".

The company prospered and expanded during the seventies. By 1875 the reserves, meticulously conserved by Knox and his associate Grafton Ross, exceeded £200,000. The new mills in northern New South Wales were successful and accounted for more than half of the company's earnings. Several small ships were bought to bring molasses and raw sugar from these new mills to the company's distillery and refinery in Sydney. A new refinery was commenced in 1875 at Pyrmont on the shores of Johnston's Bay in Sydney Harbour. It began operations in 1878 and was capable of producing weekly over 400 tons of refined sugar, about one-twelfth of its present capacity.

In 1880 Edward Knox, then sixty years of age, handed over the day-to-day management of the company to E. W. Knox. Shortly after his appointment as manager of the Australasian Sugar Company some thirty-seven years earlier, he had married Martha Rutledge, the daughter of a pastoralist. She bore him four sons and he was well pleased with them. "My boys", he wrote to a friend in 1875, "are all, I am happy to say, steady young fellows and will, I hope, someway or other leave their mark behind them." George, the eldest, became a member of the legal profession in England; the second son, Edward

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William Knox, carried forward the enterprise that his father had commenced; T. F. Knox played an influential role as managing director of Dalgety and Company Limited and Adrian, the youngest, became Chief Justice of Australia and, like his father, received a knighthood for his public services.

Although in 1856 he was a member of the Legislative Council in New South Wales, Edward Knox kept aloof from the rough and tumble of politics. He was deeply interested in public affairs, however, and had been a founder member in 1851 of the Sydney Chamber of Commerce and of the Royal Exchange, and a director of the Sydney Railway Company. In 1856 he was appointed a member of a committee of advice to the Australian Agricultural Company. After his retirement from executive management of the Colonial Sugar Refining Company he continued on the boards of both C.S.R. and the Commercial Banking Company of Sydney. He had helped to build these two great Australian organizations and most of his considerable personal fortune was invested in them. His later years were occupied also in helping the Prince Alfred Hospital and the Carrington Convalescent Hospital; he had always been concerned, as one of his fellow merchants said of him, in doing "good by stealth in religious and charitable matters". He lived an honoured and useful life for twenty years after his retirement from the active control of C.S.R. and was knighted in 1897, some years before his death in 1901 at the age of 81.

The slump of 1857-1858 was a turning point in the life of Edward Knox and also marked, far more than the formal incorporation in 1855, the beginning of the Colonial Sugar Refining Company as an enterprise with a positive character and policy. The Knox who returned to Sydney to rehabilitate C.S.R. and his own finances and reputation was no longer the personally ambitious, fortune-seeking young man of his earlier days. From then on he was to devote his life to building a great industrial and commercial organization, a purpose which he achieved by unceasing work and a constantly pursued policy of conserving in the business as much of its earnings as he could persuade the shareholders to forgo.

After the harsh lesson of 1857-1858, profit for the shareholders and himself was almost a subordinate objective. He determined to build on rock foundations, not by eliminating risks—that was impossible—but by meeting and overcoming them and by making his base of operations financially impregnable.

As the years progressed, pressure for more dividends from the increasing body of shareholders was only one of the many obstacles to be overcome in his task. The dividend policy he pursued was un-

usually careful and conservative. Sugar was an uncertain business. Never again was there to be a repetition of the 50 per cent dividend of the over-confident days of 1856. From some guarded statements by Edward Knox himself and from more explicit statements by his son, E. W. Knox, who succeeded him, we know that the amount of the dividend never exceeded 5 per cent of the cost of assets, and the assets continually increased through prudent internal re-investment.

The policy of saving and re-investment was to be followed by Edward Knox's son. Its fruits were not wholly reaped by shareholders during the lifetime of Edward Knox and it remained for future generations to enjoy the full benefits of his policy of frugality and ploughing back of earnings. The early shareholders' enforced renunciation of rewards was eventually to provide the essential foundation of capital for great development in the raw sugar industries of Australia and Fiji, and for the establishment of sugar refining industries elsewhere on the Australian continent and in New Zealand. In our own times similar policies were indirectly to make possible the launching of new chemical and building materials industries in Australia.

The Clarence River Venture

Crude forms of sugar have been made for over two thousand years in India and southern China, and the old methods of manufacture are still continued in many Asian village communities. Separate stalks of sugar cane are fed singly between wooden rollers which are turned by hand or by a beast following a monotonous circular path around the primitive crushing machine. The juice expressed by the rollers is collected and boiled in open pots over wood fires until concentrated, when it is poured into cooling vessels where sugar crystals form in the syrup. The mixture of crystals and syrup is then poured into moulds and sets solid as it cools.

The pioneers who first attempted to make raw sugar in Australia used equipment hardly more advanced than these village manufactures. In 1867 there were six mills in Queensland and between them they produced only 168 tons of raw sugar. In 1868 nine mills were operating in northern New South Wales, with a total combined output of 60 tons.

Edward Knox watched these developments with interest. Assured and adequate supplies of raw sugar at an economic and stable price is an ideal towards which every sugar refiner strives. Raw sugar production was a field in which he had no experience, so Melmoth Hall, a West Indian planter of sixteen years' experience, was engaged

SCULPTURE GALLERY,

DOWLING STREET, WOOLLOOMOOLOO.

MR. W. G. NICHOLL, begs to announce to the admirers of art and the Public in general, that his gallery is now open for exhibition, between 10 A.M., and dusk.

Admission on Thursdays 2s. 6d.

Other days, 1s.

Catalogues 6d.

When the admission is 2s. 6d. the Catalogues will be given away.

Tickets may be had at Messrs. Woolcott and Clarke's, Printsellers, George-street, and at the door. 3652

JAMES. W. WAUGH

BEGS to intimate that, having taken those premises,

No. 14; Hunter-street,

he has this day commenced business as a

BOOKSELLER and STATIONER,

When he hopes that, from his experience of the trade, both in Edinburgh and the Colony, he may command a share of public favour.

Orders from the interior (accompanied by a remittance or reference in town) punctually attended to.

Country Storekeepers supplied on liberal terms.

17th November, 1851.

3633

COMPANY'S SUGAR.

ON SALE, by the Australasian Sugar Company, at their stores,

No. 427, George-street,

No. 1 pieces, of superior quality, at £25 per ton, specially packed for the use of parties proceeding to the Diggings, in strong canvass bags containing 70 lbs. sugar each.

A. ASHDOWN,

Manager.

Sydney, 18th November, 1851.

3681

GOLD DUST.

THE undersigned is a cash purchaser at the highest market rates.

R. CAMPBELL,

Circular Quay.

Sydney, 21st August, 1851.

2098

GOLD.

THE undersigned are Purchasers of Gold Dust at the highest price.

R. CAMPBELL, SEN., & CO.

Bligh Street.

3587

WRITING DESKS.—Russia leather Ne Plus Ultra, rosewood and mahogany, plain and brass strapped ditto.

HENRY PARKES, Hunter-street

COWVAN'S STROPS.—A small parcel of these celebrated and unequalled Razo strops, just opened.

HENRY PARKES, Hunter-street.

rops, pepper, rice, starch, blue, soda, Liverpool salt, saltpetre, rock salt, &c., "Tobacco," negrohead and colonial; soap and candles, Belmont sperm, &c.; carbonate soda; woolpacks, 10 lbs. & three-bushel bags, &c., &c.

SAMUEL D. GORDON.

3, Bridge-street, Sydney.

2906

FOR SALE!!! At the Albion Wharf, (foot of Market-street.)

Hardwood, at 8s. per 100 feet, delivered in any part of the city

Moreton and Wide Bay pine, in logs and boards

Cedar, in log and boards

Shingles, laths, and fencing stuff

Packing and wine cases

Soap and candle boxes

The splendid cargo of Kauri pine, ex Lavina

COALS—Newcastle, by the ton or cargo

Maitland, 18s. per ton, delivered.

November 13.

3611

TO WINE GROWERS.

THE Undersigned are prepared to enter into arrangements with parties desirous of obtaining Vinedressers, Wine Coopers, &c., from Germany, and would undertake to procure, engage, and have conveyed hither, skilled labourers of the above description, free of all expense to the employers.

Immediate application is requested to

1321

KIRCHNER AND CO.

PRISE OF FLOUR, AT GARSED AND MORKILL'S STORES:—

BATHURST.

Fine Flour..... 33s. } per cwt.

Seconds..... 31s. }

TURON,

Opposite the Post Office,

Fine Flour..... 44s. } per cwt.

Seconds..... 40s. }

TURON,

Between the Flat and Lower Crossing Place.

Fine Flour..... 48s. } per cwt.

Seconds..... 44s. }

NEWTOWN, OPHIR.

Fine Flour..... 46s. } per cwt.

Seconds..... 41s. }

From sound Australian and Van Diemen's Land Wheat, ground in Sydney. 32

The highest market price given for Gold on the Turon in any quantity; and at H. DIXON'S, Tobacco Warehouse, No. 494, George-street, Sydney.

BOHEMIAN GLASS.—Vases of rich and various patterns, toilet bottles, jewel stands, decanters, lustres, baskets, pomatum pots, &c.

HENRY PARKES, Hunter-street.

PARASOL FURNITURE.—Ivory and Bone Hooks, plain and fancy sticks, handles, rings, &c.

HENRY PARKES, Hunter-street.

Extract from front page of old Sydney newspaper.
An advertisement by the Australasian Sugar Company appears about mid-way in the left hand column.



NOTICE TO SUGAR PLANTERS.

IN RESPONSE TO NUMEROUS APPLICATIONS MADE TO THIS COMPANY TO ERECT SUGAR MILLS on the Northern Rivers of this colony, the DIRECTORS OF THE COLONIAL SUGAR REFINING COMPANY, DESIRE TO NOTIFY, that on being assured that a sufficient area of land has been planted, to warrant the required outlay, they will be prepared to

ESTABLISH CENTRAL SUGAR MILLS,
in the principal sugar growing districts.

Communications addressed to the undersigned, on the subject of the AREA ALREADY UNDER CANE that can be relied upon, and the price at which growers will be willing to deliver the same at mills centrally situated, are invited by the Board.

J. GRAFTON ROSS,
Manager Colonial Sugar Refining Company,
24, Bridge-street, Sydney 2nd July, 1868.

The advertisement above appeared in the *Clarence and Richmond Examiner* of 14 July 1868. Central sugar mills are large mills supplied with cane by nearby farmers in a district, as distinct from mills which grow cane on their own plantations. *Public Library of N.S.W.*



The Northern Rivers districts of New South Wales were isolated, undeveloped areas when C.S.R. erected its first mills in 1869. It was necessary for the company to issue its own currency. *Reduced-scale reproduction from plate in possession of C.S.R.*

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in 1868 and sent to inspect the new cane-growing districts in northern New South Wales. His mission was to seek areas suitable for the establishment of mills and to assess the supply of cane which might be forthcoming from growers. His reports led the company to take a decisive step. It decided to adopt the central mill system, by which independent growers supply their cane to a large, centrally-situated mill. An advertisement in the *Clarence and Richmond Examiner* announced:

NOTICE TO SUGAR PLANTERS

IN RESPONSE TO NUMEROUS APPLICATIONS MADE TO THIS COMPANY TO ERECT SUGAR MILLS on the Northern Rivers of this colony, the DIRECTORS OF THE COLONIAL SUGAR REFINING COMPANY DESIRE TO NOTIFY that on being assured that a sufficient area of land has been planted to warrant the required outlay, they will be prepared to

ESTABLISH CENTRAL SUGAR MILLS

in the principal sugar growing districts.

Communications, addressed to the undersigned, on the subject of the AREA ALREADY UNDER CANE that can be relied upon, and the price at which growers will be willing to deliver the same at mills centrally situated, are invited by the Board.

J. GRAFTON ROSS

Manager Colonial Sugar Refining Company,
24, Bridge-street, Sydney, 2nd July, 1868.

In August 1869 Edward Knox advised his shareholders that no mills were being erected on the Macleay and Clarence Rivers. These no mills—Darkwater on the Macleay, Southgate and Chatsworth on the Clarence—commenced crushing cane purchased from local farmers in 1870. The Macleay district soon proved too frosty for cane-growing and its mill was transferred to the Clarence in 1873. Edward Knox himself spent the first season at Darkwater and gained first-hand experience of the difficulties attending the establishment of a new industry.

Edward Knox's adoption of the independent farming and central mill system was a daring step. Whether he had any precedents in mind is not known. The system soon proved a most successful one which materially affected the company's subsequent fortunes. The new C.S.R. mills, with their up-to-date machinery and techniques of manufacture, were large-scale factories quite unlike the small plantation

mills of the times. In course of time Australia and Fiji turned completely away from the plantation-cum-mill system of raw sugar production then developing, and followed the system of small farms with a central mill introduced to the South Pacific by Edward Knox on the Clarence River.

Looking back on his career, Edward Knox wrote to a friend, "I can only expect to leave a kind of smeary, sugary track behind me. Even this will satisfy if those who have been associated with me in launching first the refining and, subsequently, the sugar-growing industry [of N.S.W.] have reason to think that my life has not altogether been wasted." Actually Knox launched neither industry. The credit for launching the sugar refining industry must be given to Francis Kemble and William Knox Child, who promoted the Australian Sugar Company in London in 1839. But if Knox did not actually launch the refining industry he certainly must be given full credit for establishing it firmly. Similarly, the credit for launching the raw sugar industry must go to pioneers like Scott. But, again, it is to Edward Knox, more than any other, that credit must be given for laying the foundations and fixing the pattern on which the raw sugar industries of the South Pacific were subsequently developed.

In 1870 young E. W. Knox, aged only twenty-three, was sent to the Clarence as superintendent of mills. As he admitted many years later, "All that could be said in my favour on taking up this work was that no one in the service knew more, or much less, than I did about making sugar, and my feelings for the first year were those of a motherless foal turned out to pick up a living in the cold, hard world."

There were many difficulties to overcome. The Clarence was an isolated, undeveloped district. It was necessary to build houses and to establish a retail store to provide for the workmen's needs. The company had even to issue its own currency notes. The machinery was in "an unfinished state". There were accidents. Like Knox, the men were new to their work. The first season was very wet and the cane supply to the mills was unsatisfactory. The first shipment of sugar, made in a solid form technically referred to as "concrete", was found on arrival in Sydney to have lost its solid form and to have "deliquesced and drained excessively". Knox was very pessimistic and reported to his father, "The venture is an exceedingly risky one and the question whether we will make large profits or none at all depends in a great measure on circumstances over which we have no control." In the event of a flood the "prospects of even paying interest and working expenses . . . would be very doubtful".

From his reports, however, it is apparent that young Knox was

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soon able to master the problems arising from the establishment of the infant industry. He had a lively intelligence, ability and outstanding determination. He introduced many important improvements in the management of the mills and in the agriculture of the farmers who supplied them. He concentrated on persuading the farmers to cultivate sweet canes, on reducing running expenses and on raising the efficiency of the processes by which raw sugar was extracted from the juice of the crushed cane.

In the second season the mills were the chief source of the company's profits. It was a real achievement and E. W. Knox was no longer pessimistic. "I must now confess", he reported, "that there seems to be every probability of the manufacture of sugar becoming permanently established in New South Wales, and of our ultimately reaping some reward for the capital which we have spent in developing this industry."

During his ten-year term on the Clarence River Knox gained first-hand experience of milling and cane-growing which was to prove of great service when, during the 1880s, C.S.R. expanded to Queensland and to Fiji. He also saw other experienced raw sugar millers in the Caribbean, where he was sent in 1876 "with a view to enabling him to compare the results on the Clarence River with those of the West Indian Islands". On his return in 1877, Knox made a detailed survey of the Tweed and Richmond Rivers, where farmers, impressed by the prosperity of those growing for the company on the Clarence, were petitioning the company to build further central mills.

E. W. Knox had taken up his position as general manager when crushing commenced in 1880 at Condong Mill on the Tweed. The next year Broadwater Mill started on the Richmond. Broadwater was described by Despeissis in 1891, in an article in the *Agricultural Gazette of New South Wales*, as "by far the most important sugar factory, not only in this Colony but in the whole of Australasia". It was able to crush 900 tons of sugar cane in a day, compared with 2 or 3 tons a day at many of the smaller mills. This one mill made as much raw sugar in a month as all the mills in New South Wales and Queensland made in 1868. In the slumps of the 1880s and 1890s the small, inefficient mills were not able to weather the economic storm. From a total of 102 mills in New South Wales in 1885 the number fell to 33 in 1890. By 1912 only the three C.S.R. mills, Harwood, Broadwater and Condong, survived. (Of the Clarence River mills, Southgate had been transferred to Queensland and Chatsworth merged in 1888 with Harwood, which started crushing in 1874 and is the oldest mill in Australia.) Edward Knox's choice of the system of small farms and large central factories had proved a wise one.

Expansion Under E. W. Knox

The Colonial Sugar Refining Company had been established for twenty-five years when E. W. Knox took over from Grafton Ross as general manager in 1880. Knox was then thirty-three and had been in the company's service since he was seventeen. He had received an early commercial training in the Sydney office and a thorough training in management and the practice of raw sugar manufacture on the Clarence River. He had also learnt the importance of good agriculture and had gained considerable skill in encouraging farmers to follow the best methods.

Although Edward Knox, as chairman, was still holding the purse strings, young Knox was able to draw upon the accumulated reserve funds which his father had built up over the previous quarter-century. He also inherited, fortunately for the company, his father's commercial ability and determination. He was very conscious of his father's example, in both character and achievement. He remembered vividly the enforced economy in the Knox household on the family's return from England in 1858 but the memory of past difficulties did not deter him from launching out into a number of bold and ambitious new ventures. During the first five years of his general managership C.S.R. established seven large new sugar mills in New South Wales, Queensland and Fiji, and built a sugar refinery in New Zealand: achievements which even on the scale of today's industrial development would be considered impressive.

E. W. Knox was born and educated in Australia. His grandparents were Scottish and English, his father was born in Denmark and his mother in Northern Ireland. The result of this "composite nationality" he described on one occasion in these words: "When I might have been expected to show that I inherited from my Ulster ancestors 'the ornament of a meek and quiet spirit' I probably played the part of a pragmatical Scot. When the occasion seemed to call for Scotch economy I might be a free spending Englishman (I admit that this was not often the case) and, similarly, an argumentative Australian in circumstances when someone else would show a disposition to take a course involving the least discussion or trouble."

Certainly Knox, as a young and somewhat impetuous and autocratic general manager, showed no obvious signs of meekness. He surrounded himself with able lieutenants, who supported him with the greatest loyalty in his venturesous plans, but he was not disposed to let his officers assume they were his equals when it came to a decision. He was, in the words of a later general manager, "the leader and pusher-on".

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The magnitude of the administrative effort required and the tempo of expansion are hard to visualize. "Everything went like an express train," E. W. Knox remarked, "even the increase of the indebtedness of the company for the new ventures." In five brief years the mills on the Clarence River were merged in one big mill at Harwood, and Broadwater on the Richmond and Condong on the Tweed started operating. New areas were opened up in Queensland and three big new mills with their transport systems and cane plantations were established: in 1883 Homebush Mill, in the Mackay district, and Victoria Mill, on the Herbert River, began crushing, and two years later Goondi Mill, on the Johnstone River near Innisfail, commenced. The associated Victoria Sugar Company in Melbourne, established by Edward Knox in 1857, was a financial partner in the Queensland ventures but the burden of planning, building and organization fell on C.S.R.

In Fiji, also, three mills were established during the first five years of E. W. Knox's general managership. Two of these, Nausori Mill, on the Rewa River near Suva, and a small ancillary mill, Viria, which operated for only ten years, were purely C.S.R. ventures. Rarawai Mill was built by the company in 1885 as a joint venture with the New Zealand Sugar Company, in which C.S.R. and the associated Victoria Sugar Company had a controlling interest.

Chelsea Refinery in Auckland, New Zealand, which commenced refining in 1884, was built by C.S.R. as agents for the part-owned New Zealand Sugar Company. In this instance, also, planning, building and organization fell to the Colonial Sugar Refining Company, which acted as a board of management for the New Zealand company until its amalgamation with C.S.R. in 1888.

The difficulties which E. W. Knox, as general manager, and Edward Knox, as chairman, had to overcome in launching C.S.R. on these expansions are briefly described in the following sections.

To Queensland

The company's entry into Queensland, according to a speaker in the Queensland Parliament in 1881, was "on a scale never contemplated in the North before". To permit the company to acquire land, the Queensland Parliament passed the Colonial Sugar Refining Company's Act of 1881, and C.S.R. undertook to spend £200,000 within five years on the clearing and cultivation of land and the erection of buildings and plant for the manufacture of sugar.

A contemporary description of the Victoria Estate in 1886 gives a

good impression of the revolution which the company's arrival brought about in the Queensland sugar industry. As the ridges were cleared of jungle, the "Fowlers' powerful steam ploughs" turned up the virgin soil with ploughshares and cultivators dragged on steel cables backwards and forwards through the root-entangled earth. There were "scores of ploughmen with their teams" and hundreds of labourers of many nationalities. Seventeen miles of railway line and four locomotives were used to haul the cane to the mill, which was lit by novel incandescent electric arc lights imported direct from the Paris exhibition.

C.S.R. spent £240,000 on Victoria Mill and its transport system and cane plantation, but the board was told in 1885 that "the work was still unsatisfactory and small owing principally to difficulties with machinery, want of steam and laziness of men". When a gold strike occurred on the Johnstone River, the Chinese workers left the mill to seek a quicker fortune. Despite the directors' express instructions that "the closest inspection by the Government officers into the condition and health of their labour shall at all times be courted on all the Company's Estates", the doctors could do little to stop the spread of beri-beri and dysentery among the Kanakas, Javanese, Singhalese, Chinese and Japanese workers. Labour problems harassed the company to such an extent that, in the early nineties, it considered taking a mere £93,000 offered for Victoria Mill by a group of farmers anxious to set up a co-operative mill with government aid.

This undoubtedly was a period of crisis, for the company was being harried by other problems besides that of labour. The Queensland Government proposed a discriminatory taxation scheme for C.S.R. and also levied heavy duties on the machinery for the new mills. In an outburst of frustration and exasperation the chairman, Edward Knox, told shareholders in 1890 that these circumstances would, "when the history of the Company's experience comes to be written, furnish an instructive lesson for those who would venture upon the establishment of any manufacturing enterprise in that Colony".

In New South Wales some of the early plantation owners employed Kanakas and in Queensland they relied almost entirely on coloured labour. Nowhere in the world, except in C.S.R. mill areas in the semi-tropical districts of New South Wales, was cane farming work done by white men. The Queensland pioneers, most of them recent immigrants from temperate European countries, accepted almost without question the belief that white men could not undertake hard manual labour under the tropical sun. Despite their successful establishment of a community of independent white farmers in New South

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Wales, the Colonial Sugar Refining Company in Queensland accepted this belief for a decade.

From the start of operations at Victoria Mill in 1883, the company had been buying cane from farmers in the district as well as getting its supplies from its own plantations. This was reported to have been "the first case of farmers growing cane for a mill in the North". In 1884 the proprietors of Habana Estate at Mackay divided a portion of their plantation into farm-sized blocks for renting to farmers. In 1891 C.S.R. subdivided part of the arable land of Homebush Estate in the Mackay district and leased small blocks to farmers with option of purchase "as a possible partial solution to the labour difficulty".

This experiment proved promising and in the following year the chairman announced that it was intended "gradually, as chances occur, to part with the greater portion of the arable land in this way". By April 1893, 5,514 acres of plantation had been divided and leased or sold and already the board was "convinced that this is the system which . . . as in New South Wales will give the most satisfactory results".

Gradually most of the Queensland industry followed the example, by then long-established, of New South Wales, where, according to a Queensland parliamentarian speaking in 1881, the C.S.R. central mills with their surrounding small farms had "elevated [the Clarence River district] out of bankruptcy to affluence". An observer of the Queensland industry could report, in a sugar journal in 1896, "The epoch of small mills and large areas of semi-cultivated land is passing away. The small mills are now very few and far between. . . . Instead of these we now boast some of the largest and most complete factories in the world; in our sugar districts are grouped around these mills the homesteads of settlers who have taken up cane culture. The change is a striking one. . . . White men working for themselves and using the best labour-saving implements are displacing coloured workers rapidly. The large estates are rapidly becoming peopled with small farmers."

This development of working small farms opened the way for the abolition of the plantation system and with it the abolition of coloured labour. There is no doubt that the Kanaka system was always more or less disliked by the young democracies of the Australian colonies, and the developing labour unions, for the protection of their own members, opposed coloured immigration. Under the influence of economic and technological change, the employment of Kanakas in the sugar fields began to decline as the only or dominant system. As has been acknowledged by others, the policy of the Colonial Sugar Refining Company, the largest plantation owner in the north before it subdivided its estates, with much the largest mills, and the producer

in 1890 of one-third of all raw sugar produced in Australia, had a powerful effect and hastened the day when coloured labour would no longer be used.

A parallel movement, originating and developing mainly in the Mackay district where Habana had subdivided its estates, also hastened the change to a white labour basis. This was the idea of co-operative central mills which S. W. Griffith, the Queensland Premier, supported to implement his own programme of removing the Kanakas from the cane fields. As early as 1885, cane growers in the Mackay district petitioned the Government to erect a central mill for the purpose of encouraging independent white farmers. Two large mills, North Eton and Racecourse, were built with the help of a £50,000 government grant and commenced operating in 1888. Griffith expected that these mills would be entirely supplied with cane grown by white men but this proved impracticable at the time.

It is a common Australian myth that the greedy and inhuman planters employed vast numbers of Kanaka "slaves" on their plantations until, at the turn of the century, a newly-federated Australia, in the face of bitter opposition from the avaricious sugar interests, put down this discreditable exploitation of human beings.

The facts are different. While in New South Wales some planters employed Kanakas, from the very beginning C.S.R., according to a correspondent in the *Sugar Journal and Tropical Cultivator* of December 1893, had "not a single coloured man employed on any of their rivers". Edward Knox told his shareholders that white men could do the work in New South Wales. "We will face the destruction of the industry," he said in 1896, "rather than take part in the introduction of coloured labourers from India or elsewhere." In Queensland C.S.R. employed Kanakas for little more than 10 years, from the early 1880s until it split up its estates in the early nineties. A few islanders remained in the company's employ at its cane nurseries, however, until early in this century.

As early as 1885 the Queensland Government had passed an act which provided that immigration of Kanakas should cease in 1890. But by the time that date arrived even S. W. Griffith was convinced, after a report by a Royal Commission, that the immediate elimination of Kanaka labourers would result in the extinction of much of the Queensland sugar industry. The cessation provisions of the 1885 act were repealed in 1892 but by that time the trend towards white labour and away from Kanaka labour was already manifest. The Kanakas had made a great contribution to the pioneering development of the north by carrying out the arduous work of clearing the tropical jungle.



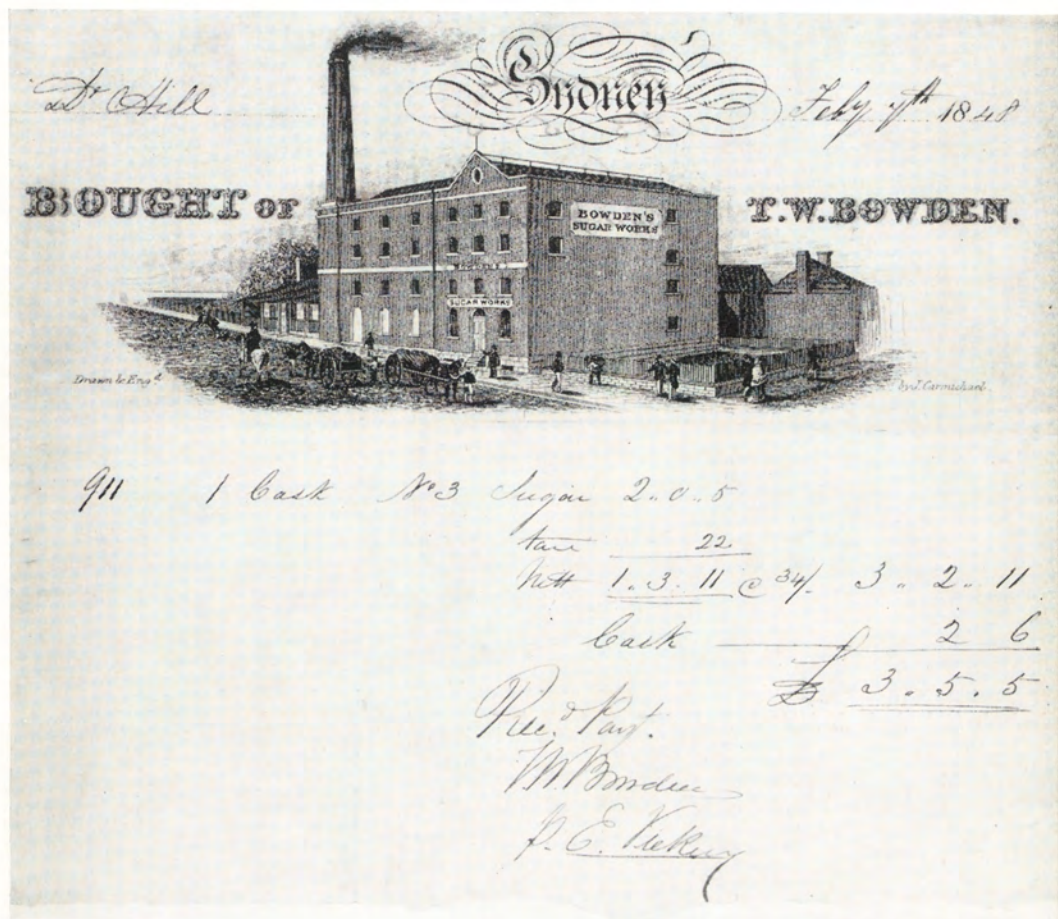
Edward and Martha Knox, from portraits painted in Sydney in 1854 and 1855 by Marshall Claxton. Highly idealized. Both portraits now in Christiansborg, Denmark. *Reproduced from recent photographs taken by John Knox, Ministry of Foreign Affairs, Copenhagen, Denmark.*



Settlers meeting immigrants at Port Jackson during the 1840s, shortly after Edward Knox arrived in the colony. Imaginative rendering of Government House and Fort Macquarie in background. *From a lithograph in the possession of the Sydney University Union.*

The Canterbury sugar works near Sydney, a photograph taken in recent times. This refinery, the first in Australia, was built in 1841 by the Australian Sugar Company, and taken over by the Australasian Sugar Company in 1842.



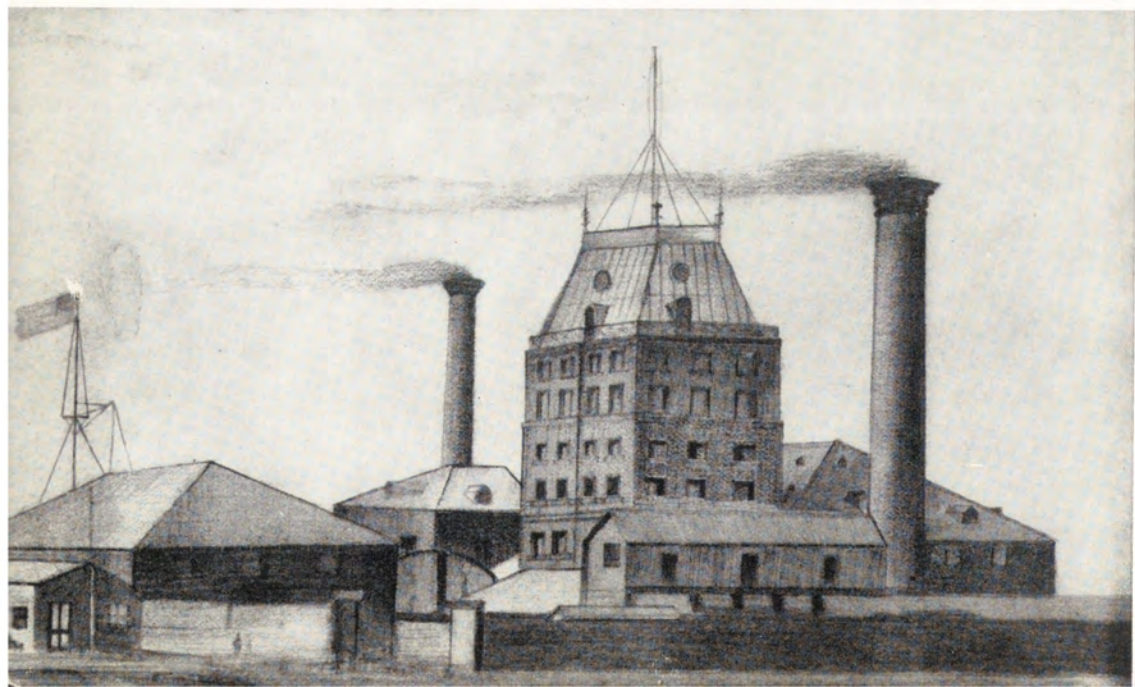


Bowden's sugar works, situated on the corner of Pitt and Liverpool Streets, Sydney, competed with the Australasian Sugar Company's Canterbury refinery during the 1840s. Reproduced from old billhead dated 7 February 1848—Mitchell Library.



The seal of the Victoria Sugar Company, which was formed in 1857 by the partners of the C.S.R. Company and a number of Melbourne merchants. Edward Knox was Chairman of Directors. It was amalgamated with the C.S.R. Company in 1887.

The Victoria Sugar Company's refinery at Sandridge, Melbourne, about 1872. When this refinery was burnt down in 1875, the Victoria Sugar Company bought Joshua Bros.' refinery at Yarraville, which had started up the year before. *From old charcoal drawing in possession of C.S.R.*





Pyrmont refinery and employees in 1878 shortly after operations commenced.

A price card of 1886 showing Pyrmont refinery.

PYRMONT REFINERY, SYDNEY.



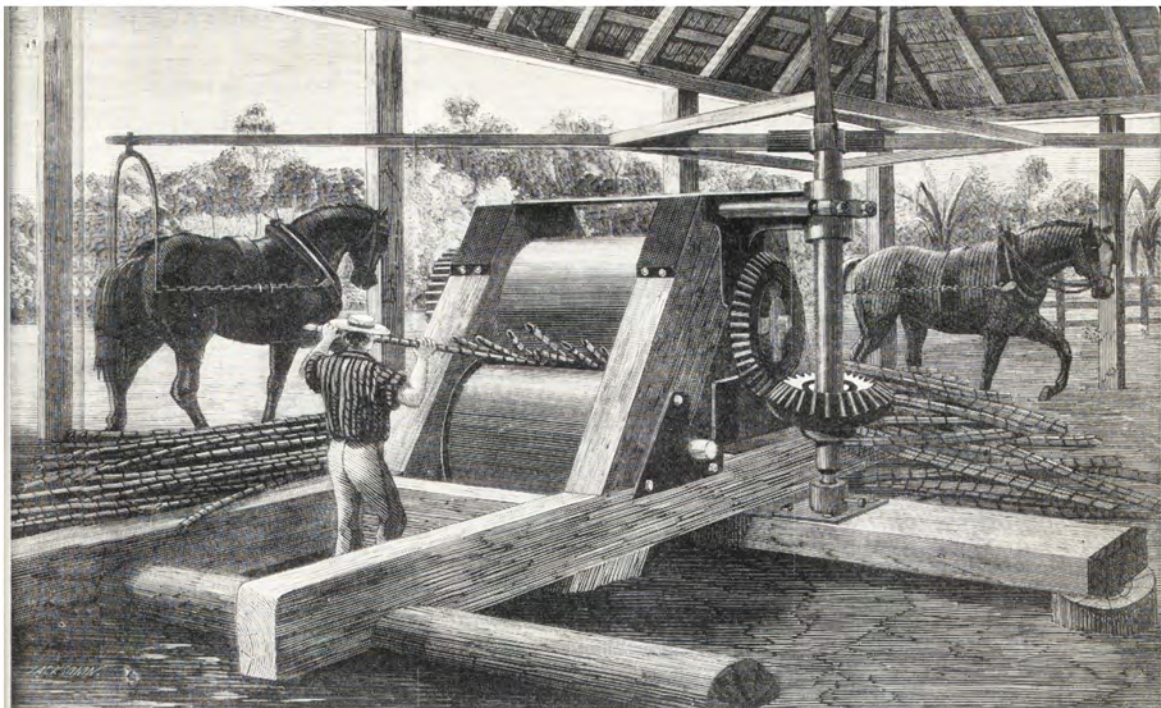
Colonial Sugar Refining Company.

THE ILLUSTRATED SYDNEY NEWS.



THOMAS SCOTT, ESQ.

Thomas Alison Scott is often referred to as the "Founder of the Australian Sugar Industry". He is said to have brought Tahitian sugar canes to New South Wales in 1817, and in 1827 made some tons of raw sugar at the Port Macquarie penal settlement. When commercial cane growing and raw sugar production commenced in northern N.S.W. and southern Queensland in the early 1860s many of the early planters obtained canes and advice from Scott. *Portrait reproduced from "Illustrated Sydney News" of 18 February 1869—Mitchell Library.*



An early cane crushing mill on the Hastings River, northern New South Wales. From *"Illustrated Sydney News"*, September 1868—Mitchell Library.



Brewer and Joske's sugar mill and plantation, Suva, Fiji, 1875. From the *"Illustrated New Zealand Herald"*, February 1875—Parliamentary Library, Wellington, N.Z.

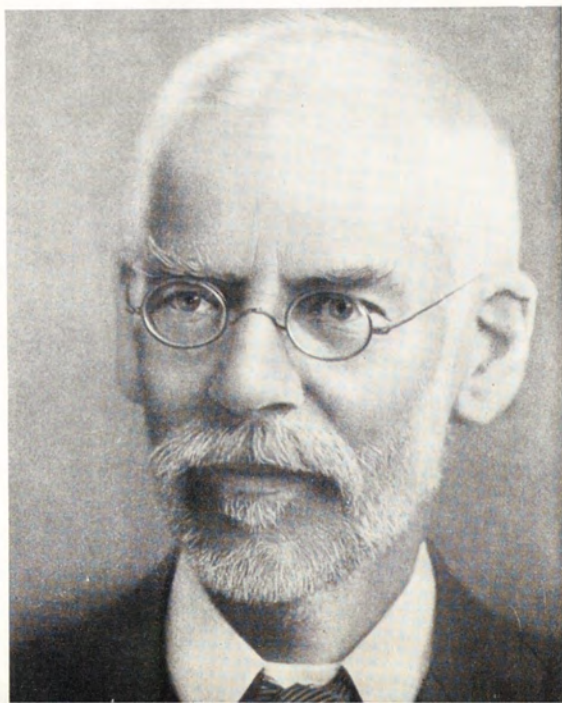
E. W. Knox in his twenties, when he was superintendent of the Clarence River Mills.



Dr Gustav Kottmann, a German beet sugar chemist, engaged in 1883.



T. U. Walton, a Scottish sugar refinery chemist, engaged in 1881.





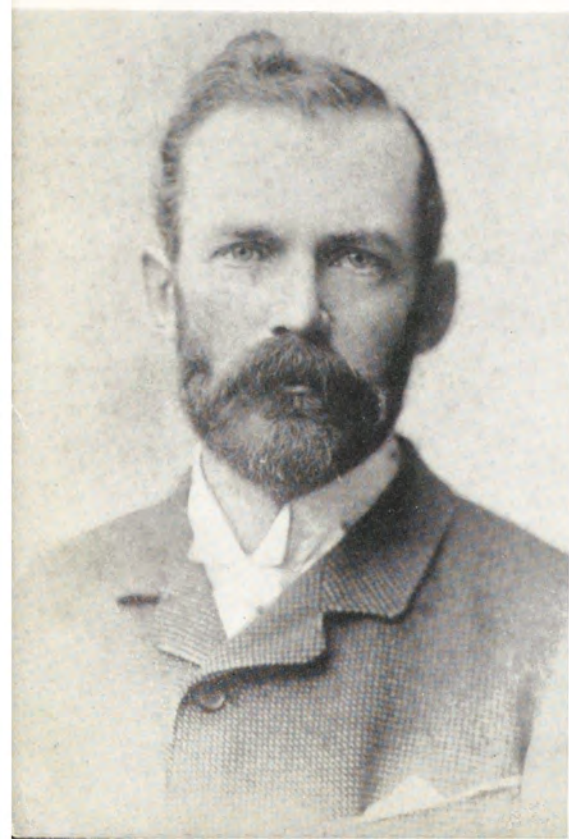
Victoria Mill, in 1883, when it commenced operating. The company's new mills in the 1880s were far larger than the small plantation mills then common in Australia and Fiji.

Seedling canes at the C.S.R. Co.'s Hambledon Mill, 1902. Trials of various canes were carried out at C.S.R. mills from 1886, and in 1891 experimental canes were successfully raised from seed (as distinct from cuttings).





Sir Edward Knox addressing employees
at the Pymont Refinery picnic, 1894.
Refinery manager James Muir, at right.



H. E. Kater, Chairman of the Board,
1901-1920.



W. H. Rothe, General Manager, 1920-1923.



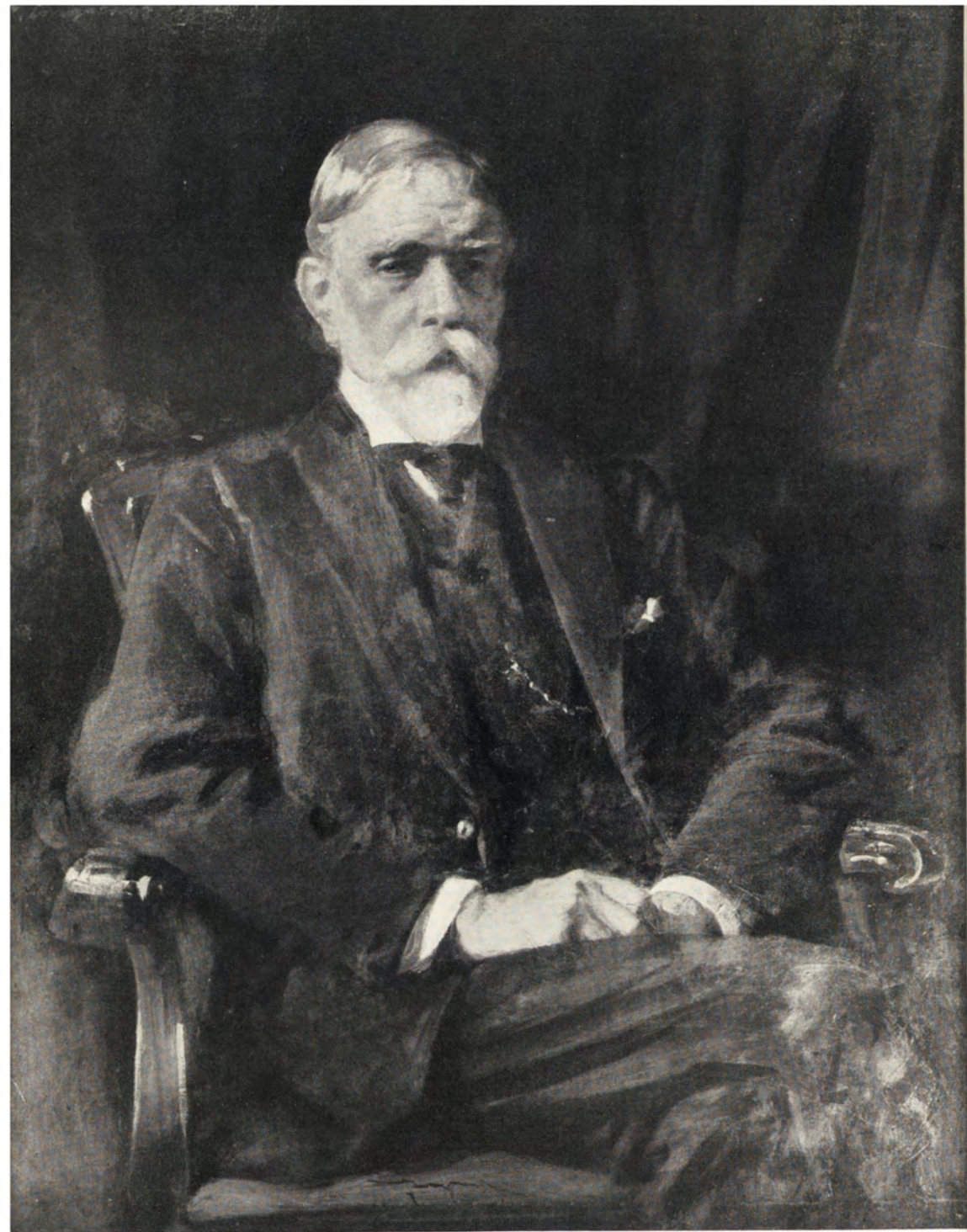
H. V. Dixon, General Manager, 1923-1928.



P. H. Goldfinch, General Manager, 1928-1943.



C. W. Rothe, General Manager, 1943-1951.



E. W. Knox in his old age. *From a painting in the Union Club, Sydney.*

and getting the land under cultivation. By the turn of the century the jungle was under control and the industry was established. Much of it was already operating on a white labour basis, though many of the small farmers who took over the subdivided plantations used one or two Kanakas to help them. While considerations of conscience and humanity played an important part in the extinction of the Kanaka system and while the decisions of the new Federal Parliament hastened the change and ameliorated the consequences, the main reason for the decline in coloured labour was economic. Hoe culture was giving way to plough culture and the white man was proving a more productive worker, even in the tropics.

To Fiji

"Sugar will be produced in Fiji sooner or later which will come into competition with ours;" E. W. Knox wrote in 1879 when he was superintendent of the Clarence River mills, "it is a question whether it will not be better for us to take a share in the development of the industry and the profits that will be realized."

Knox had only just taken up his post as general manager when one of his New South Wales mill managers returned from Fiji, where he had been sent to look for a suitable site for a mill and to investigate offers of local planters to supply cane. This officer reported that he had obtained contracts from planters to supply over 70,000 tons of cane to a mill during the 1882 season. The company's board decided to order "the machinery at once for a factory equal to working that quantity".

Knox's organizing ability and his experience on the Clarence were of great value in the new venture. The *Sydney Morning Herald* reported:

The Colonial Sugar Refining Company has entered upon an undertaking of great magnitude, for the purpose of developing the sugar-growing resources of the Fiji Islands. Their scene of operations is on the Rewa River, about twelve miles from the ocean, where a considerable area has been planted with young cane during the past few months. Before long there will be a small colony of Europeans and natives in the employ of the company. . . . The steamer *Fiona* leaves Sydney immediately with twenty mechanics and about sixty labourers, to commence the work of erecting a large sugar mill on the banks of the Rewa. The steamer is loaded with plant and stores, including materials for the construction of houses, piles for wharves, and a pile-driving machine; also a steam launch for towing lighters etc. . . .

The new mill was Nausori, near Suva, and the *Fiona* was the company's ocean vessel.

It was decided not to depend entirely on "purchasing and crushing the farmers' cane in the same way as they do on the Clarence and Tweed Rivers" but to grow a proportion of cane for the mill on company estates in Fiji. "On the whole, I am well satisfied with our prospects;" Knox reported after a visit of inspection in 1881, "unless the cane from some causes should prove very inferior . . . we should have no reason to be disappointed with the result of our venture."

Results were not, at first, to prove as satisfactory as Knox optimistically hoped. Nausori is a very wet part of Fiji and the cane was not as sweet as in New South Wales. The Rewa River flooded and damaged the growing cane, and then dried up in the summer heat so that the punts bringing the harvested cane to the mill stuck in the mud. The coloured labourers succumbed to European illnesses. But, despite these disappointing results, it was decided to set up another mill on the "dry" side of the main island. In 1883 Knox, on another visit to Fiji, reported that "the planting of the cane nurseries and the erection of labour houses etc., which had been commenced, was being pushed on . . . suitable sites for the mill and the surrounding buildings have been selected . . . the plan of the mill is being prepared and will be sent to England at once."

The Rarawai mill was built in a remote area across the mountain backbone where "the only reliable means of sending a letter to the Rewa is by a special messenger, at a cost of £1, a week being necessary for the trip". But it was accessible by ship and Knox eventually thought it to be "decidedly the best and most conveniently arranged of all our factories". The new mill commenced crushing in 1886.

The early troubles and difficulties in Fiji were gradually overcome and the two mills proved a worth-while investment. In 1891 it was proposed to move Victoria Mill from Queensland, where the company was experiencing difficulties with labour, and re-erect it at Lambasa on the other major island of the Fiji group, Vanua Levu. When it was decided to retain the mill in Queensland and to split up the plantations into farms, new machinery for the Lambasa mill was ordered from Glasgow. The new mill began operations in 1894.

A few years later, in 1899, the company announced that it proposed to lease a tract of 8,000 to 10,000 acres from the native Fijian owners and to build a further mill at Lautoka which would be "the greatest in the southern hemisphere". This mill began operations in 1903.

Penang, the fifth mill to be operated in Fiji by C.S.R., was bought in 1926. It had been established by a planter, Dr Chalmers, about

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1878, just before the company had come to Fiji. It was one of the few small mills to survive the slump of 1884, which affected the Fijian sugar industry as drastically as that of Australia.

As had been the case in Queensland, the early pioneers used coloured labour for field work on their cotton and sugar plantations in Fiji. Local Fijians and imported Polynesian workers gradually gave way to Indians after the British Government in 1877 authorized the shipping of indentured Indian labourers to the new colony. "Under the plan adopted, volunteer migrants were recruited by agents in India, and in due course signed a contract to serve in Fiji for a period of five years on any plantation to which they should be assigned, the cost of their introduction being paid by the plantation owner. At the expiration of the stipulated term the migrants were free to work where and for whom they pleased; and after five more years, of free labour, they and their families were entitled to a passage back to India if they chose to return."

C.S.R. was from the early days the largest employer of Indian immigrants, but it was not responsible for the system, nor was it peculiar to Fiji. It had been in operation for more than forty years in other British colonies before it was introduced to Fiji by Sir Arthur Gordon (later Lord Stanmore) who had been previously governor of Mauritius where Indian migration had commenced in 1834. Soon after his arrival in Fiji in 1875 Gordon recommended Indian migration to Fiji. He saw in the planters' demands for labour a danger to the stability of the indigenous Fijians' social system. "I utterly objected to the measures by which they wanted to force the native population, who were almost all owners of land themselves, to come and work on estates . . . and I proposed the Indian immigration. It was enormously opposed by the planters at the time. . ." (Evidence to Committee on Emigration from India to the Crown Colonies and Protectorates, 1909-10). In order to put his proposals into effect Gordon sent his agent-general for immigration to India in 1877, and as a result of his negotiations the first migrant ship arrived in May 1879. The next year, 1880, C.S.R. bought its first land in Fiji, on the Rewa River, and commenced clearing with Pacific Islanders. E. W. Knox welcomed government arrangements to bring more Indians to Fiji because they provided an opportunity to "have nothing more to do with Polynesians. . . the trade is, to say the least of it, a disagreeable one, and I should certainly prefer to leave it alone." Thus in Fiji, as in Queensland, the company at first accepted the existing social structure of the sugar industry as it found it, but to Fiji also it brought new attitudes and new techniques which were gradually to bring about changes of great significance.

In 1908 the chairman told shareholders, "We are continuing the policy of leasing portions of the land hitherto cultivated by ourselves to officers who have been for some time in our employ, and we hope thus to dispose of a considerable area in the next few months. It is manifest to us that the land and labour are in this way worked to a greater advantage and, although we have some loss of profit, the business is put on a sounder and more enduring basis."

In 1916 emigration of Indian labourers to Fiji was terminated and in 1920 all existing indentures were cancelled. There were acute labour shortages and industrial troubles, followed by a sudden and disastrous slump in sugar prices. The company and the independent planters were not able to work their estates. E. W. Knox was by that time in his seventies and apparently viewed the position of the industry in Fiji with deep pessimism. While he undoubtedly gave approval—reports suggest somewhat grudgingly—it was left to the initiative of younger men in the company's service to introduce, in Professor Shephard's words, the "bold experiment" of small farm growing of cane by Indian tenant farmers.

The small-farm system, introduced in 1924, ultimately proved successful. A new generation of C.S.R. men had brought into being in Fiji agricultural communities similar to those E. W. Knox had helped to establish in New South Wales in the 1870s and in Queensland in the nineties.

Applied Science

In 1884 a great slump hit the sugar markets of the world. Raw sugar prices per ton fell from £21 sterling in 1882 to £13 sterling in 1885 and continued to fall gradually. Knox expected a profit of £200,000 for 1884, but the actual result was a deficit of £100,000. Payment of dividend ceased for 18 months and Knox was faced with the possibility of the destruction of the organization his father and he had built.

A modern historian has suggested that it is adversity rather than prosperity which stimulates achievement and that progress and development occur as responses to difficult situations. Edward Knox had responded with sustained vitality to the situation of 1857 and his son responded with equal vigour to the challenge of 1884. The father's response was primarily financial and commercial; the son was now to add a technological response of great importance.

The elder Knox applied his trading and financial abilities to the conservation and increase of the company's capital resources. He bought his

raw sugar on the markets of the world and savings were measured by him primarily in terms of money. E. W. Knox manufactured raw sugar and he came to think of conservation of resources in terms of the sucrose in the cane, which was costly either to produce on one's own plantations or to buy from farmers.

This attitude of thought was to bring about great changes in the raw sugar industries of Australia and Fiji where much of the sugar in the cane was being lost during the process of manufacture. It was also to bring about great increases in the company's fortunes for, in the end, the value of the sugar saved in manufacture and later marketed was expressed in the account books in impressive financial terms.

There were a number of reasons why the company survived the 1884 slump and the prolonged period of depression which followed, but three factors were of vital importance. The policies of Edward Knox had placed at its command considerable resources of capital. The company's mills were of an economic size. In addition, from the mid-seventies onwards, the Knoxes were among the first cane sugar manufacturers in the world to seek to apply the science of chemistry to the company's factory processes. These three factors—adequate capital, large-scale production and applied technical and scientific skills—combined with the genius for management possessed by the Knoxes were responsible for the survival of C.S.R. when other sugar manufacturers with limited funds, small mills, and comparatively inefficient methods of manufacture were ruined.

When the Colonial Sugar Refining Company started to make raw sugar in New South Wales it was "absolutely without experience" in this new field. Sugar refining, its main business, was at that time more an art than a science. "There was no book on sugar analysis in the English language" and progress in the new venture depended on Knox's ability to master by trial and error the technicalities of milling and the mysteries of agriculture. But E. W. Knox was not a man to wander aimlessly round the periphery of a problem. He quickly came to realize that the success of sugar milling depended primarily on two things—an assured supply of cane rich in sugar and the extraction of the maximum amount of sugar from that cane.

The company kept abreast of developments abroad. Knox returned from his visit to the West Indies in 1877 with knowledge of the latest developments in milling technology. He introduced double sets of rollers in the company's New South Wales mills and obtained a much higher extraction of sugar from the cane. In 1873 Sir Daniel Cooper,

one of the original partners of the company, wrote from London to Edward Knox:

I hope by the aid of Professor Smith that you will work the polariscope, and with the help of the other chemist inform yourself as to the component parts of the juice and syrup, so that you may know exactly what enemies you have to contend with. If you once know this I feel certain your work will be greatly facilitated and success will be sooner attained.

About 1879 the company "was led by the great attention then being paid to chemical research in connection with the beet sugar industry [in Europe] to commence such investigations into our mode of work". As Knox said in 1890: "We did not know clearly what we wanted nor did the man we engaged, so the first start was not a success; but it showed us we were on the right track, and we accordingly engaged in Scotland a refinery chemist and a year later two beet-sugar chemists in Germany, and began the systematic check on our working. Of these gentlemen the former is now our head chemist (Thomas Utrick Walton, B.Sc., F.I.C., F.C.S.) and one of the latter our inspecting chemist (Gustav Kottmann, Ph.D.), and it is to the patience and industry of these two gentlemen that much of the success we have achieved is due."

Little is recorded of the work of the company's first chemist, but Walton, the Scot engaged in 1881, and Kottmann, the German engaged in 1883, set to work and evolved methods of sampling cane and methods of analysis of cane and intermediate products. Walton's instructions were "to find out if the waste fibre contained sugar, and if so how much. . . . At this time double-crushing was considered to be the last word in cane sugar manufacture, and mill managers confidently stated that all sugar was taken out of the cane—the usual test being to suck a piece of megass." Walton's assistants found some 7 per cent of sugar in the megass but the mill managers accused them of talking nonsense. "If they find sugar it is there," Walton retorted, "the polariscope cannot lie."

In 1884 Knox wrote to the mills, "The great fall in the value of sugar which has taken place this year has forced upon our attention in a very unpleasant way the necessity of improving our work and reducing our expenditure to the greatest possible extent, and I wish now to direct the attention of our managers to some details of the work in which savings of some importance can be effected." He then went on to say that the company had decided to "commence a system of chemical book-keeping in regard to the work of the mills".

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Although far-reaching in its consequences, the system was simple in broad concept. It involved measuring, by chemical analysis, the amount of sucrose in the cane as it entered the mill; the sucrose in the juice and syrups at various stages of the process; and the amounts of sucrose leaving the mill—as raw sugar, retained in the cane fibres, in an unrecoverable form in the residual syrup known as molasses, and in other ways. By comparing input of sucrose with output, losses during processing could be determined. The records of continuous analyses provided data from which could be compiled, in terms of sucrose, periodic profit and loss accounts and balance sheets.

This system, started in 1882, was put into full effect at the mills during the 1885 season. It is difficult to know whether this was the first full and formal method of measuring the chemical work on the sucrose entering the cane mills of the world but it seems likely that it was. Certainly it was a great advance which gave C.S.R. a long-sustained advantage in Australia and Fiji.

In 1886 Knox visited Europe and inspected beet-sugar factories in Germany. This experience strengthened his conviction that the lines on which he had been working for several years were sound. Part of the reason for the slump in sugar was the technical efficiency of the German chemists, which had allowed them to increase output and to lower their costs. Knox reported to the Board: "The extraordinary success achieved is almost entirely due to the union of science and practical skill which is manifest in every detail . . . We cannot do better than follow the example of our German competitors in making chemical research their main standby in all their operations."

One result of his observations was that the chemists were given more responsibility in the control of manufacture. Knox was firm but tactful in advising his managers of this new policy. "I therefore wish", he wrote, "that to the chemical staff be entrusted the oversight and, to a certain extent, the control of the manufacture from the rollers to the packing of the sugar. The Managers will, as hitherto, have the regulation of the work entirely in their own hands . . . but they will be expected to give effect to any reasonable requests of the chemists and be guided by their advice in all questions relating to the treatment of the juice, sugar and syrups. . . . It will, of course, be necessary to arrange that there shall not be any divided authority. . . ."

Kottmann between 1885 and 1888 devised a formula to assess from the weight and analysis of the cane the amount of sugar a mill should obtain from it. This formula, conceived in terms of "an unconquered margin to stimulate efforts towards further improvement", was known

as P.O.C.S. (Pure Obtainable Cane Sugar) and, together with an associated Co-efficient of Work formula for the mills, formed a most important additional element in the control exercised by C.S.R. chemists over the mill manufacturing processes. These formulae also allowed the efficiency of mills to be measured and compared, irrespective of the different qualities and varieties of the sugar cane which they were handling.

Because it stimulated the growing of canes rich in sugar the P.O.C.S. formula was to become of even greater importance in its long-term effects when payment to the farmers was established on a basis of the recoverable sugar content of their cane. With sweet canes many costs are reduced: cultivation costs per ton of sugar in the field, harvesting costs per ton of sugar, cost of transporting to the mill the sugar in the cane, and cost of crushing the cane. Moreover there is less cane fibre to retain residual quantities of sugar. Some of these advantages are not great individually but, in total, they are significant.

The importance to the mills of full crops of clean sweet cane had been early recognized by Edward Knox. Before any of the company's New South Wales mills were built he instructed Melmoth Hall to carry out experiments to find the best time to harvest cane. Hall showed that "richness of cane in saccharine matter" depended not only on the age of cane but also on the period of the year at which it was cut. "The plan originally contemplated by the Sugar Company", he wrote in 1874, "was to pay for the cane on a scale proportionate to the quality of the juice. . . . Those were the terms offered to the farmers by myself, on behalf of the Company, in 1868. But the plan was found impracticable" because the technical method of measuring the sugar content proved unreliable. But C.S.R. did not forget the idea and in 1899, armed with the P.O.C.S. formula, introduced the concept of paying for cane on its sugar content. It was adopted by some other mills in due course, and by the whole Australian raw sugar industry from about 1916 onwards.

In 1890 E. W. Knox gave an address to the Australasian Society for the Advancement of Science. His paper, reprinted as Appendix 5, shows the quality and progressiveness of his thinking. In it Knox describes the function of the chemist in the company's organization, deals in some detail with the scientific methods used and explains the way in which observations are recorded and translated for use by the managers in improving methods, minimizing waste, and increasing profits. He deals frankly with the problems which arose when the scientists were introduced into mills and refineries and speaks warmly of the advantages which accrued by "having, in a large service

like ours, men trained in the knowledge that their work is useless unless it is carried out with patient thoroughness accompanied by uncompromising truth-telling".

This address of E. W. Knox reveals the thinking of a man who set a pattern of organization which, in many essential respects, still operates after 65 years of growth and development. In reprinting it in the *Proceedings of the Royal Australian Chemical Institute* for May 1954, the editor comments: "We venture to think that few readers would guess without assistance that this modern scientific lecture was delivered by a non-scientist in January 1890!"

In 1910 E. W. Knox stated: "The chemical check . . . applied since 1882 under very competent control has brought about marked savings, and the consequent lowering of our cost of production has aided us greatly in surmounting the many difficulties and the two serious crises in the sugar market we have had to face within that time. And thus strengthened, we are ready to meet competition from any quarter with untroubled minds."

Over the years C.S.R. chemists and engineers have made a number of major contributions to the advancement of sugar technology which have been applied in its own factories and have gradually come into widespread use. The sum of the further savings effected over the years is great. In the early years of the present century an overseas expert in fuels and boiler efficiencies was engaged. For many years a heat balance, comparable to the earlier sugar balance, has been regularly used in the company's factories.

The man who played a leading part in training and guiding those who were to apply and refine the scientific methods was Thomas Utrick Walton, Chief Chemist from March 1881 until he died aged sixty-four in 1917. He was something of a confidant of Knox and without him it is doubtful if the full advantage would have been derived from Knox's basic drive and from Kottmann's imagination and great technical competence.

Walton was a man of ability and character, possessed of a keen intellect and ardour for truth. These qualities he impressed upon his pupils, for the training of the young chemists became one of his particular cares. He was responsible for the chemical system in the refineries and for ensuring that the chemical sections of all the factories were well staffed. He concentrated on building up a technical staff strong in character and tradition as well as strong technically. He was friendly and kind by nature, a born teacher, and his young chemists looked to him for guidance and advice in many matters. The staff he "fathered" and taught constituted a unique cadre in the South Pacific

until similarly trained staffs were built up in more recent times by other companies.

* * *

Attention to the standard of agricultural practice and the sweetness of cane had been important considerations with E. W. Knox from his first experiences on the Clarence River and progress in these directions was linked intimately with scientific progress in the factories. In his review of the 1872 season's work, he reported: "The conviction is forced upon me that there is no loss by good farming, and that money spent in improvements such as manuring, draining etc., is well laid out and will in due time give a handsome return." On his suggestion it was decided in 1873 to give prizes up to £50 each (a substantial bonus in those days), to an annual total of at least £1,000, to farmers on the Clarence whose cane "bears evidence of the most efficient and careful cultivation".

Some years later, in 1880, he commented on the Clarence River farmlands that "even with the best cultivation a continual cropping without any adequate return of plant food to the soil must gradually result in its impoverishment . . . and in the end what has been taken from the soil must be returned to it". Knox either stimulated Kottmann to work on this problem or welcomed his native interest. In addition to the P.O.C.S. formula and chemical book-keeping in the mills, Kottmann devised and supervised field experimental work. In advocating trials with a few clumps of cane in nurseries, he suggested that "these trials take the place of scouts in warfare who are sent where it would be impossible or impracticable to employ larger bodies of troops".

His scouts reconnoitred many new fields, some of them extremely profitable. In 1885, in the first agricultural circular signed by him and sent to the Nausori mill in Fiji, Kottmann gave directions for trials to be made with superphosphate and sulphate of ammonia. Soil analysis was started in 1886 and in the same year he wrote: "It is a matter of greatest importance that we should increase our knowledge in regard to the varieties of cane which are the most profitable to cultivate and the conditions under which they grow best, both as to quality and quantity." The result was the establishment of a small cane nursery at Harwood Mill in 1886, and a small area was also set aside at each of the mills for experimental work. Green manuring with cowpeas and vetches was started in 1888.

All this original and near-original work by Knox, Walton and Kottmann represented a remarkable achievement in the context of the times. It was the more remarkable for the speed, precision and

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decisiveness with which it was conceived, worked out and put into full practical effect. This was made possible by the early realization that an advisory service must be provided to transform the results of research into practical application by the farmers, and that service was available in the close contact between the mill field staff and the farmers, between whom there has always been close co-operation. Although spectacular advances were being made in other fields in the rest of the world there was little comparable scientific research and application being carried out in the young, undeveloped and remote Antipodes. About this time Java was starting to establish in cane fields and mills her standards of technology which later became famous, but the early efforts in Java and by C.S.R. were quite independent of each other.

In 1889 Knox sent Kottmann to Mauritius and Java to study the cultivation of cane. Kottmann's observations and recommendations as a result of this trip gave a further impetus to C.S.R. agricultural research in the succeeding years, although nothing new in factory techniques seems to have developed out of these visits. He was a keen observer and a meticulous recorder and, even though he had some trouble at times with the niceties of the English language, he could make his meaning clear. The rough terrain in Mauritius, he reported, did not "allow of much display of the fertilizing steel drawn by quadrupeds or steam".

The world's first industry-based sugar experiment stations were those of Louisiana and Java, started in 1885 and 1886. Deliberate seedling raising had commenced in Java and the British West Indies in 1889-90 after the discovery that the cane plant produced fertile seed. From this stimulus, the company started cane-breeding in 1890. In 1893, in co-operation with the New South Wales Department of Agriculture, successful work commenced on the control of gumming disease, a severe threat which forced the closure of several small mills not owned by C.S.R.

Noel Deerr did not know of the Colonial Sugar Refining Company's record in the sphere of factory and field technology (which has not been given full public documentation), but we can put it in perspective by quoting from his *History of Sugar*, where he gives instances of contemporary developments in other countries: "The first organized work was that begun in 1880 by Bonâme in Guadeloupe, who also in 1893 organized the Station Agronomique in Mauritius. Harrison began work in Barbados in 1884 and in 1890 moved to Demerara, where he conducted a notable series of manorial experiments besides giving the sugar industry its first successful seedling canes. The sugar

experiment station at Audubon Park, New Orleans, was founded in 1885 under the direction of W. C. Stubbs, and that of the Hawaiian Sugar Planters' Association in 1897 under Maxwell, who also initiated experimental work in Queensland in 1900. . . . The Java Stations . . . began work in 1886 and 1887."

Noel Deerr's reference to Maxwell's work in Queensland in 1900 recognizes the establishment of the Queensland Bureau of Experiment Stations, but we have shown that C.S.R. was far ahead of the rest of the Australian sugar industry in applying scientific methods to its work in factory and field. In the factory it was also probably far ahead of cane sugar industries in the rest of the world, with the possible exception of Java.

It is worth noting the similarity in time and nature between the company's work and what was happening in Java. Quoting again from Deerr: "Of the period 1896-1912 Mr H. C. Prinsen Geerligs, one of the most distinguished of the many Dutch technicians who have benefited not only Java but the whole sugar world, has written with pardonable pride:

Java was struck by two calamities, which brought the sugar industry to the verge of ruin. The enormous beet-sugar production caused the price of sugar to go down considerably in 1882-4, so that it fell eventually below net cost price. At the same time a mysterious disease . . . attacked the cane plantations and did great harm. . . . The sugar manufacturers, oppressed by two evils, did not lose courage; they put considerable capital into their industry and invoked the aid of science to help them improve their cultivation and manufacturing methods. Three experimental stations were founded, for the purpose of combating the serch disease, which have done good work outside their original scope and which have given useful information as regards planting and manufacturing methods, chemical analysis and control, and even now as regards mechanical installation of factories. Capital was provided by the Dutch capitalists and invested in the calamity-stricken area, science was practically applied and the estates were managed in an economical, rational and energetic manner. The praiseworthy combination of energy, science and capital not only saved the Java sugar industry from utter ruin but also placed it among the foremost sugar producing countries, so that for years Java has been an example to other countries, who recognize it to be expedient to carry on the sugar industry in a scientific manner. . . ."

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The C.S.R. story over this period has many points of fairly close correspondence; it seems that Java pioneered in some fields and C.S.R. led the way in others.

The Growth of Refining

The old Canterbury refinery, built by the Australian Sugar Company and operated by the Australasian Sugar Company from 1842 to 1855, was not taken over by C.S.R. It was too far out of town. Two other refineries had been built in Sydney during the 1840s by independent entrepreneurs. C.S.R. bought one, the "Brisbane House" in Parramatta Road, to commence its operations and the other, Bowden's works in Liverpool Street, a year later "in case of accident to the Brisbane Refinery". Production for the first year was, according to board minutes, "324 tons of Loaf, 2,087 tons of Crystals and Snowdrop, 1,503 tons Pieces, 1,155 tons Molasses". In those early days the company also bought Robey's refinery on the north shore of Sydney Harbour. The cost of "putting down opposition" loaded the company with debt for many years and burdened it with several unproductive properties.

In 1857 the partners of the Colonial Sugar Refining Company, as previously mentioned, decided upon the formation of an associated company in Victoria. Edward Knox visited Melbourne to choose a site for a refinery and to persuade a number of Melbourne merchants to join in the new venture. The Victoria Sugar Company was formed under deed of settlement dated 1 June 1857 and a refinery was built at Sandridge, now Port Melbourne. The new company suffered, as did its sister company in Sydney, from the slumps which followed.

In 1874 a large refinery at Yarraville, built by the firm of Joshua Bros. "of London and Melbourne", seriously competed with the Victoria Sugar Company's Sandridge refinery. The next year the Sandridge refinery was burnt down. Edward Knox hurried to Melbourne and bought Joshua Bros.' refinery on behalf of the Victoria Sugar Company, thus achieving elimination of competition and continuity of production in one coup. The company also acquired, besides a brand new refinery, another valuable asset—James Muir, an engineer, who had built refineries in Scotland and England and who had come out to build the refinery for Joshua Bros. Muir subsequently built for C.S.R. the Pyrmont and Chelsea refineries and Broadwater Mill on the Richmond River in New South Wales, at the time the biggest mill in Australia.

The Victoria Sugar Company, half-owned by C.S.R. shareholders, was a financial partner of the Colonial Sugar Refining Company in the

expansion of the early eighties. It helped to provide a share of the new capital needed to build mills in Queensland and in Fiji and a refinery in New Zealand. From 1882 onwards the Victoria company experienced considerable financial difficulties and the idea of full formal amalgamation was discussed. In 1887 the arrangement was carried through and E. W. Knox became general manager of a still bigger company, this time on a footing of limited liability. The old Colonial Sugar Refining Company of Edward Knox had become the Colonial Sugar Refining Company Limited of modern times.

The next year a further consolidation was effected. In 1883 C.S.R. and the Victoria Sugar Company had decided to form the New Zealand Sugar Company with one-third representation for local New Zealand interests. Edward Knox, then chairman of C.S.R., had visited New Zealand in 1881 and purchased land for a refinery, and James Muir was already proceeding with its erection before the New Zealand Sugar Company was formed. The New Zealand investors later found it difficult to raise sufficient funds to finance expansion into Fiji and in 1888 the Colonial Sugar Refining Company Limited absorbed the New Zealand company.

C.S.R. now had three large modern refineries at work. The old Brisbane House had been closed down and a new refinery at Pyrmont in Sydney had commenced operations in 1878. The 1880s were a boom period in the Australian cities despite the slump of raw sugar prices which brought ruin to many in the cane districts. By the end of the eighties it was necessary to enlarge the capacity of the Pyrmont, Yarraville and Chelsea refineries. It was decided also to extend refining operations to South Australia and Queensland; operations commenced in 1891 at the company's Glanville refinery in Adelaide and in 1893 at the New Farm refinery in Brisbane.

In Queensland there were several attempts to establish refineries in cane districts. In 1870 Messrs Tooth and Cran, owners of the Yengarie sugar mill in the Maryborough district, built a plant to refine limed cane juice purchased from farmers. The plant was closed down some years later when Robert Cran moved to the Bundaberg district, where he took a leading part in the establishment of the Millaquin refinery in 1882. Bingera Mill, also at Bundaberg, operated a small refining plant for about three years from 1889 but ceased refining to concentrate on milling.

In Victoria a number of refineries were built at various times but only one survives today. Various beet-sugar projects have also been started but all eventually failed. Joshua Bros.' refinery at Yarraville, built in 1874 and bought by the Victoria Sugar Company in 1875,

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has already been mentioned. The Rosstown Sugar Company was formed in 1881, but from the scanty available references it does not appear to have had a long or prosperous career. In 1886 a small refinery was established in Melbourne by the Poolman family. It operated until 1907 when it and another small Poolman refinery in Sydney were bought by C.S.R. In 1891 a group of wholesale merchants started a refinery in Melbourne, operating as the Australasian Sugar Refining Company (not to be confused with Sydney's Australasian Sugar Company of 1842-54). In 1894 Edward Knox, the chairman, told shareholders of C.S.R. that "when the population of Melbourne began to diminish, and the prevailing depression made itself acutely felt, the impolicy of maintaining two large refineries, under separate management and administration, where one establishment was capable of supplying the entire demand for refined sugar, forced itself upon the attention of the two companies". Negotiations for amalgamation commenced and resulted in C.S.R. purchasing the business for £104,000, thus "doing away with a competition that has proved troublesome and unprofitable to both companies".

Under Knox and Walton the chemists were cutting down losses and minimizing waste in the refineries as they were in the mills. Competitors found themselves in a difficult situation. The main processes of sugar refining have been established for a long time but modifications of plant and technique can produce improvements and economies which, though separately small in themselves, have a very considerable cumulative effect. The story of the slow, unspectacular achieving of progressive increments in refining productivity is not simple to tell and, in its complexity, has to be written by the expert for the expert. The end result for the company was reflected in E. W. Knox's confidence, which he proved to be well founded, that he could undersell any competitor. In fact his prices were lower than those of the much larger and long-established London refiners.

Politics and Opinions

After the purchase of the Poolman refineries in Sydney and Melbourne in 1907, C.S.R. shared the Australian refined sugar market with only the Millaquin refinery in Bundaberg, but this situation involved continual watchfulness and appropriate adjustment of prices to keep out large imports. At that time Australia had little secondary industry and the refineries of C.S.R. stood out as impressively large factories on the skylines of the capital cities. The company was the biggest industrial organization in the Commonwealth. There was,

however, little appreciation of the reasons for its success; of the constructive part it had played in shaping an industry; of its intensive use, ahead of its time, of modern scientific and mass production methods; of its enlightened policies in respect of growers and employees. E. W. Knox and his board were prepared to make explanations, of the cold and distant kind, but were disdainful of publicity.

Bigness and success, as usual in our democracies, attracted the attention of a certain type of politician. When, in 1910, Chairman H. E. Kater told shareholders "the substitution of shareholders' capital for borrowed money . . . and the chemical check" were "the real reasons for the success of our company", he found it necessary to add "not, as some would have you believe, the acquisition of money by wrongdoing and robbery, but only by careful and laborious application over a long period of fundamental rules so often neglected by manufacturers". Referring to an outburst of parliamentary criticism he said, "We have not thought it necessary to make any reply . . . refining is called a monopoly which deserves to be crushed, though every distributor is free to draw his supplies from Hong Kong, Java or elsewhere . . . white sugars are not imported to any extent because we undersell our friends in the East, and we intend to continue to do so."

"Monopoly" was not an exact description when applied to the company's refined sugar business because, as E. W. Knox stressed, anyone could, and some did, import refined sugar without hindrance; but that did not prevent the term being used. Knox regarded those who hurled it into controversy in a spirit of opprobrium much as a dignified old gentleman might regard name-calling, naughty little boys. Those who cried "monopoly" most were, however, not entertaining themselves—they were playing the very serious game of politics.

The windmill-giant of the "C.S.R. monopoly" has provided good tilting for the Don Quixotes of Australian politics for more than half a century. William Morris Hughes in later days enjoyed admitting to E. W. Knox that, when he was badly in need of some additional income in the early 1900s, he could always depend on the Sydney *Daily Telegraph* of those days to pay him well for, as he himself put it, a few "pithy paragraphs" on the iniquities of C.S.R. But E. W. Knox's sense of humour was not his strongest point, and he felt bewildered when it was suggested that Australia needed rescuing from the company.

Described by a contemporary as a man of "unswerving rectitude", he hardly suspected, once an explanation had been given in the public report to shareholders, that his motives could be questioned, except by knaves or fools. When the company became a subject of political

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contention about 1905 he was sincerely distressed. Its record afforded only deep satisfaction, for prosperity to him, as to the ancient Israelites, was the outcome of virtue: "He that gathereth by labour shall have increase."

Knox regarded reinvestment of carefully conserved earnings in modern and efficient refineries as wholly praiseworthy. He could not understand that the company's emergence as virtually the only refiner of sugar in Australia and New Zealand should be regarded as in any way undesirable or sinister. True, it had partly achieved its position by buying or amalgamating with competing refineries but their owners were not inadequately compensated. Most had been paid in C.S.R. shares and had done quite well in their deals with the larger company.

It was obvious, Knox considered, that excess competition in sugar refining could benefit neither competitors nor consumers. Two small refineries could not produce as cheaply as a single large one. The bigger unit of production could take advantage of efficient, large-scale processes and specialized scientific skills. He could see no sense in several refineries competing for the same limited local market; it was not economic. His refined sugar remained cheap to the public by any standards of comparison, and continuously open to import competition. To Knox this was the complete answer to all criticism.

"What the Company most wants is to be left alone, so long as its actions are in conformity with the law," he told the 1912 Royal Commission, which had been set up primarily to uncover the suspected villainies of the "giant C.S.R. octopus". The Commissioners rejected proposals for reviving competition in refining because they considered it would reduce efficiency. "We do not hesitate to express our admiration of the economic efficiency which characterizes every branch of its business which has come under our notice" they reported of C.S.R., although Knox's attitude towards the Commission was not calculated to elicit testimonials. One Commissioner (the only one experienced in the industry, a grower and director of a co-operative mill), in a lengthy separate report which dealt with many other matters, commended the company in these terms:

It occupies a commanding position in the industry, secured by steadily pursuing for a long course of years a policy which has won for it the confidence and good will of practically the whole of those with whom it has had business dealings. There is nothing to indicate that any of the Company's transactions have been in the slightest degree of a predatory character . . . that the Company earns large profits, both within and without the Commonwealth,

appears to be entirely due to its volume of business, the command of adequate capital, the complete utilization of by-products, thorough organization, able administration, and high efficiency in every department.

Perhaps it was such reports, or possibly the sense of responsibility which often comes with experience and high office, which tended to modify the views which William Morris Hughes had expressed in the years before the Commission. Perhaps E. W. Knox also came to modify his own stubborn views regarding his completely independent but responsible position. The march of political events and the war of 1914-18 brought the two fiery personalities together in a common cause. One day in 1915 W. M. Hughes, Prime Minister of Australia, and E. W. Knox, General Manager of the Colonial Sugar Refining Company, met together and between them drafted the principles of an agreement by which C.S.R. undertook to refine domestic requirements on behalf of the Commonwealth. This agreement was destined to form the foundation of one of the important institutions of the Australian sugar industry.

In their report the Commissioners of 1912 remarked:

While the wide divergences of opinion [about public policy towards the sugar industry] are often the result of mere ignorance of essential data, they are still more frequently the result of failure to outgrow ideas, opinions, or policies which belong to the limited outlook of pre-Federal times.

Many factors operated to distort public opinion. Much of the popular lore regarding the Australian sugar industry had its origins in the colourful pioneering days in Queensland. The tropical north appeared a wild and lawless frontier to the comfortable citizens of Sydney and Melbourne. Queensland was imagined to be another West Indies, with Kanakas instead of Negroes, and rich "sugar barons"—a term imported from the West Indian slave days and never applicable in Australia. Most of the planters of those early days were pioneer farmers employing a few Kanakas in their fields and themselves working their own crude mills. But they were often portrayed as rich and powerful, sitting on their verandahs sipping cool minted drinks while their slaves toiled in the cane fields under the cruel tropical sun.

Despite the importance of this early period as the origin of the industry and its interest as the source of colourful myth, it was of little significance in its effects on the subsequent character of the industry. The pioneering phase lasted a brief twenty years, from 1863 to 1883,

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and most of the small farmer-planters were ruined by the sugar slumps of the following years. Those early planters were not soft men. It took courage and enterprise to leave the settled areas, move to some wild and lonely tropical valley and there clear the jungle and cultivate crops. Their task required labour but they were not followed into their uncomfortable new places by their fellow-countrymen seeking employment. Being men of their times, they solved their problem by the methods of their times. They followed the example of others and used Pacific Islanders. Their agriculture and their technology were inefficient by the standards of later periods, but they opened up the north-east coast of the Australian continent, winning only meagre rewards, little recognition, and some calumny. Poor markets and lack of capital forced most of them from the industry over seventy years ago but some of the antipathy aroused by their use of coloured labour has lasted long in the southern states.

The slump of the eighties provided a stimulus for the adoption of new attitudes and techniques. Reforms took place in every part of the industry—in cane agriculture, in farming methods, in land use and ownership, in milling technology, in mill size and ownership, in labour relations, and in the relations between growers and millers. As the old-time planters were replaced, the Queensland industry was rebuilt on new foundations of social stability and technical efficiency.

The influence and example of C.S.R. in bringing about these changes was considerable and in several important directions decisive. From the time it moved to Queensland in the early 1880s it was by far the biggest miller and largest owner of cane lands; in terms of production it dominated the industry. It had gained experience and recognition on the Clarence River and brought to Queensland, besides large mills and advanced milling and agricultural techniques, a number of customs and forms of agreement which in New South Wales had proved satisfactory in regulating the relations between farmers and the mills to which they sold their cane.

As C.S.R. grew in importance as the main refiner in Australia it also became the main buyer for the product of the Queensland mills. The price it paid for raw sugar was determined by the state of the world's raw sugar markets and was designed to hold the price of Australian refined sugar slightly below that of the imported product. But the company's position as a guaranteed buyer gave the industry an assured outlet for its product and introduced an important element of stability. It was an effective form of organized marketing. At the turn of the century total Australian production of raw sugar was 112,000 tons of which 40 per cent was made at C.S.R. mills in Queens-

land and New South Wales. This contrasts with 86,000 tons made in 1954 at one C.S.R. mill in Queensland and a total Australian production in that year of 1,300,000 tons.

One of the earliest steps taken by the first Australian Government after Federation was to introduce legislation to accelerate the conversion of the industry to an entirely white labour basis. An excise duty of £3 per ton was levied on all raw sugar produced, with a rebate of £2 per ton for sugar produced exclusively with white labour. Excise and rebate legislation was continued until 1913, by which time the few remaining Kanakas in Queensland had been repatriated to their island homes. From the excise the Federal treasury had a net benefit, after rebates, amounting to £2,692,329, and the industry was burdened with yet another myth. As the majority report of the 1931 Sugar Inquiry Committee stated, ". . . this rebate was termed a 'bounty' (*vide Sugar Bounty Act, 1902*) but the word 'bounty' was plainly a misnomer, which has resulted in an extraordinary amount of misunderstanding of the true position ever since." The excise and rebate legislation did, however, have the effect of hastening the complete establishment of the industry on a white labour basis. Australia became the first country in the world where cane sugar was produced entirely by white men.

When, as a wartime measure, the overall control of the industry passed to the Commonwealth and Queensland Governments in 1915, the Queensland act setting out the basis of payment to farmers for their cane embodied, under the title C.C.S. (Commercial Cane Sugar), the P.O.C.S. formula evolved by Kottmann to determine the sugar content of cane. A considerable amount of other legislation also came into being to give effect to the new form of state supervision of the industry. Several statutory bodies were set up within the industry and the rationalized and legalistic machinery under which the industry now functions is complex and intricate. It works on the whole with smoothness and efficiency because of a number of effective internal incentives and because the legislative enactments relating to the industry have substantially given *de jure* recognition to a number of sound *de facto* institutions, customs and practices evolved by the industry itself.

The very complexity of the system of control and administration of the sugar industry has added yet another difficulty to the problem of communication between the industry and the Australian public. Such a combination of large-scale private industry, co-operative ownership, small farm agriculture and government participation is a rare and unfamiliar phenomenon. The difficulty of obtaining wide

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understanding of its nature and efficiency is complicated by its geographical and political remoteness from the bulk of the Australian community. Unlike, for instance, the Australian fine wool industry which is spread widely throughout Australia, the cane-growing communities are confined to a narrow coastal belt in the north-east of the continent. The wool industry is familiar to most Australians, it is easy to understand and its tremendous importance has helped to bring understanding. It is only in comparatively recent times that the sugar industry has approached any similar degree of recognition. The war against Japan helped to emphasize the strategic importance of the ports, communications and settlements which the industry had been responsible for creating.

While the public has only in recent years appreciated the role of the industry, its importance was stressed as long ago as 1912 by the Royal Commission of that year:

The problem of the Sugar Industry today is not, save in subordinate respects, a problem of industry, of wealth, or of production; it is primarily and essentially a problem of settlement and defence. No nation can afford to regard lightly the development of its industries, the progress of its wealth, or the economic efficiency of its productive machinery. But, important as these things undoubtedly are, they rank, as regards the Sugar Industry, on an inferior plane. The Commonwealth today is brought face to face with one of the gravest problems which has ever taxed the ingenuity of statesmanship—that of the settlement of tropical and semi-tropical areas by a white population living under standard conditions of life. And intimately associated with this problem is the question of national defence. If the ideal of a White Australia is to become an enduring actuality, some means must be discovered of establishing industries within the tropical regions. So long as these regions are unoccupied, they are an invitation to invasion, as well as a source of strategic weakness. Granted so much, it follows that the supreme justification for the protection of the Sugar Industry is the part that the industry has contributed, and will, as we hope, continue to contribute to the problems of the settlement and defence of the northern portion of the Australian continent. The recognition of the nature of this supreme justification is the first condition of a sound public policy in relation to the Sugar Industry. Relatively to it, all other issues are of minor importance.

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One hundred years ago the Colonial Sugar Refining Company commenced as a partnership of a few merchants. For sixty of those hundred years its history, which we have briefly traced, is largely the story of two men—Edward and E. W. Knox. Both were able, determined individualists and their times allowed full scope for their abilities. As Professor H. J. Habakkuk has recently remarked, "Conditions before the first World War favoured the rise to control of men of exceptionally great ambition, thrust and initiative . . . less confined by the pressures of public opinion or the regulations of government than either before or since . . . such men were the pace-makers of economic progress in the nineteenth century."

EDITOR'S NOTE

This historical sketch ends about the time of the first world war. There are some gaps between that period and the remainder of the book which deals mainly with developments of the last decade or so and with the company as it is today. This treatment was adopted partly because time and space were limited and partly because of the desirability in this book of placing on record, for the first time, an account of major trends in the company's early history which still influence the present in a marked fashion. It would have been easy to enlarge the historical chapter to book length and I had to persuade its authors to limit its scope or this might have happened.

This chapter has emphasized the role of the two Knoxes and rightly so, for, as Charles Wilson has commented in his history of Unilever, "the principal reasons why some firms survive, prosper and expand while others dwindle, perish or sell out must be sought in the personalities of the men who manage them. . . In the history of business, as in other kinds of history, biography is a powerful element."

It has not been possible to mention individually many of those who worked with E. W. Knox to build the company from the eighties onwards. There were the men to whom Knox gave the title General Inspectors and who administered the main divisions of the company—refining in Australia and New Zealand, milling in Australia and milling in Fiji. There were the senior refinery and mill managers and engineers who were responsible for the construction and management of new factories of a size and complexity new to the South Pacific. In addition to the chemists whose contribution has been mentioned in some detail, there were the administrators and business men whose authority rested on wider commercial and social grounds and who, in the nature of things, held a status superior to the technologists.

Although the final decisions in important matters were made by E. W. Knox, he did not surround himself with "yes men". He chose for his assistants men capable of independent thought and judgment. By the time E. W. Knox moved to the board as chairman and managing director in 1920 the circumstances were favourable for the gradual evolution of a system of management which did

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not depend unduly on the dominating character and authority of one man and which would be more suited to the growth of the company under increasingly complex business and social conditions.

From an early stage, E. W. Knox depended a good deal on his financial assistant, W. H. Rothe, who had been recruited from the Commercial Banking Company of Sydney and succeeded Knox as general manager in 1920. Although W. H. Rothe took over the title Knox had held for forty years he was subject to Knox's close oversight and he could not, in the circumstances, take over his full authority. When W. H. Rothe was succeeded in turn by H. V. Dixon and P. H. Goldfinch, two men who had also worked closely with Knox, they also were more subject to the board and to the influence of expert advice.

When E. W. Knox retired in 1933, only four months before his death, the company still retained much of the outward appearance of the monolithic structure he had created. But beneath the surface many changes had taken place. The most important of these were concerned with the process of policy-making which became more of a deliberative one to which many contributed. This is described by Dr R. W. Harman in the chapter on "Men and Organization". It is sometimes defined as the group method of management and its development in C.S.R. runs parallel with similar growth in other corporations.