The Story of Richmond.

The story begins in 1886 when the development of alternating current made it possible to transmit electrical energy over considerable distances, so that it was no longer necessary to have the dynamo within a few hundred yards of the consumer. With the City Council planning to enter the electricity supply business in a big way, Melbourne itself seemed hardly a healthy place for a private electricity firm to expand and so the Australian Electrical Company Limited, which had operated for some years in Russell Place, sallied forth into the bucolic surroundings of Green Street, Richmond, to build its new power station.

Keen Competition

On one side (where the Richmond Brewery now stands) were extensive Chinese gardens stretching to Church Street. Across the railway line, Law Somner's nurseries covered the area now devoted to making tomato soup. To the south, then as now, the ever flowing Yarra provided unlimited water for the steam engines - in times of flood, far too much.

The new power station was a single story building, and it began operations in 1890 with an Elwell-Parker alternator operating at 2,000 volts, 97 cycles and driven by a Robey 200 h.p. compound engine. There were also some Thomson-Houston direct current arc lighting machines. The company was now called the New Australian Electric Lighting Company.

The following year the A.U. Alcock Electric Light and Motive Power Company moved its generating station out of the city to Burnley Street, Richmond, and for some years the two companies were in active competition for customers in the city area.

Public Lighting Paid

The New Australian supplied the southern part of Richmond and part of Prahran and South Melbourne. In those days public lighting was the backbone of the business, and a contract for street lighting became the basis of a virtual franchise over the area concerned.

Neither the New Australian Company nor Alcock's could finance their growing business and in 1899 they both sold their undertakings to the Brush Electrical Company of London, pending the flotation of a combined company, the Electric Light and Traction Company of Australia, which took over in 1901.

Renovations Begin

Under the new company, Richmond in 1901 underwent the first of its many reconstructions. The height of the walls of the engine room was increased to allow the installation of two Brush Universal 500kW. sets during the next two years. During 1903, the boilers of the New Australian Company were transferred from the north to the south side of the engine room, in 1905 larger coal bunkers were put in, and in 1907 the first turbo-alternator was ordered, necessitating more alterations. The roof was raised again, and the old boiler house became workshops.

In 1908 the company was re-named the Melbourne Electric Supply Company. In 1909 new switchgear was required, a new economiser was finished in 1910 and the building extensions were completed. But, by this time, the boiler house was ready for re-modelling

This constant renovation resulted from a continual increase in the number of consumers and an ever-growing demand for electrical energy. In 1913 more land was acquired, and the engine room was extended to the eastward. A new chimney 150 feet high was completed. It was Richmond's third, the former chimneys being demolished.

Anxieties of War

The Melbourne Electric Supply Co. had a particularly anxious time during the first world war. It was impossible to purchase plant abroad without a priority, and demand always seemed ahead of the station's capacity. Maintenance was rushed through during holidays and in the early hours of the morning when the demand was at a minimum.

March, 1919, saw the second big chimney completed rising to 185 feet, and the earlier chimney was made taller to match. The office building had been enlarged in three stages, the last in 1922. Surrounding it were stores, switchyards, laboratories, garages, and all the paraphernalia of a great power station.

Relief of the power shortage was now in sight. Frequency changers were installed to allow current to be drawn from the new Railways power house at Newport via Jolimont and during the 1920's more and more current began to flow from Yallourn.

Richmond's peak load was reached in the winter of 1924 when it touched 29,900 kW. Then it began to fall as the load was transferred to the Commission's supply. Generation at Richmond ceased on 4th September, 1927.

New Management Again

The equipment was dismantled in preparation for the new 15,000kW turbo-alternator which the Electricity Commission, as prospective owners, wished to put in as a peak-load station. In May, 1929, tests with birquettes instead of coal and coke were successful and the old Babcock and Wilcox boilers are still raising the steam for the 15,000kW. set with Yallourn-made fuel.

When the S.E.C. formally took over Richmond in 1930 Richmond's busiest days were over. It was no longer Melbourne's electrical heart. Most of the turbine room was used as a workshop, and its cream-tiled sign facing the railway was covered over with tin, lest anyone should be reminded of the old company's pride in it.

Faced with a State - wide shortage of electricity after World War 11, the Commission's engineers scoured the world for generating equipment. Then they looked at every building, at every power station - both town and country - to see where they could squeeze in an extra generator. Richmond's old turbine room-cum-workshop could not be overlooked. It was already linked with our State-wide grid, and the Yarra, as always, was flowing past with millions of gallons of cool water for the condensers of a steam plant.

Had there been no urgency, the Commission might have preferred to confine development to the type of station which used locally produced fuel - either raw brown coal or briquettes - but the premium was on speed and so our engineers were told to grab everything they could lay their hands on provided that it would do the job.

The Swiss had the Answer

In 1949, when Mr. E. Bate (then Chief Engineer) was in Europe buying briquetting machinery he heard that a gap had occurred in the production schedule of the famous Swiss firm of Brown Boveri, making it possible to secure a complete plant within two years, with the prospect of its being in full operation by the end of 1951. British firms could not promise delivery for several years.

Moreover, it was no ordinary plant. Lacking coal supplies, the Swiss are pre-eminent in the use of other kinds of fuel and Brown Boveri had developed an oil-fired boiler of greater efficiency than any other in the world. Known as the Velox, it uses an exhaust gas turbine to drive a multi-stage compressor which delivers a blast of air to the combustion chamber. Economy is taken so seriously that the electric motor which starts the turbines spinning is driven by the turbine when the boiler is nearer its full load and is used to generate electricity for the feed pumps.

Through Gas Turbine to Efficiency

The plant offered at a cost of about £1½ million consisted of two of these Velox boilers, each delivering 75 tons of steam per hour at a temperature of 850 deg. F. and 600 p.s.i. to a three cylinder turbine coupled to an alternator producing 32,000 to 38,000 kW of power. Its cost of operation as a complete plant, based on 1949 prices of fuel oil, was less per kilowatt-hour than any of the Commission's installations except Yallourn, and the total installed cost per kilowatt was reasonably low, though to untrained eyes £3¼ million looks like a lot of money.

But the Brown Boveri plant had other advantages beside availability and efficiency. It was compact, and needed comparatively light and simple foundations. Burning oil, it would not aggravate Victoria's chronic shortage of solid fuel. It had all the latest electrically controlled valves and automatic safeguards. Air blast, not oil, quenched the arcs in the circuit breakers and a photo electric cell detected smoke in the chimney - an indication of incomplete combustion. The main control panel was a miniature diagram of the whole plant, a masterpiece of clarity in industrial design which enabled 50,000 h.p. to be accurately controlled with no more effort than tuning a wireless set.

But its most striking advantage was that it could start from cold in a few minutes and in an emergency be generating its full power within half an hour - an ideal feature for a peak-load plant and one which would ensure its usefulness for years after the present emergency has passed.

English Transformer

Specifications were airmailed back to Australia and the Commission decided the turbine was ideal for the purpose. Then began at top speed (and at top level) the long negotiations to obtain an import licence in Australia and an export permit in Switzerland - not made easier by the fact that Brown Boveri had already exceeded their quota. The necessary sterling credit was the toughest proposition of all, because the Swiss franc is an even harder currency than the United States dollar.

From England was ordered a 47,500 kVA Haokbridge transformer, one of the biggest ever ordered by the Commission, to step up the 11,000 volt output of the new plant to the standard 22,000 volts of the Commission's distribution system.

Attempting the Impossible

The proposal presented the Commission civil engineers with an almost impossible problem. In effect, they were asked to reconstruct the turbine room and boiler house, removing walls, needling up roofs and digging 44 feet below ground level to put in circulation water conduits and the foundation of the new generator bed - all without interrupting the precious 15,000 kilowatts that were flowing from the existing generator.

What made the task so difficult was that previous facelifts and alterations had reduced the structural stability of the building. When the main turbine room had been doubled in height in 1901, the original foundations had not been strengthened. The location of the boiler house had been shifted around several times and the basement was riddled with cable conduits, storm water drains, ash hoppers, air flues for cooling frequency changers and underground circulating water systems. Some of the tunnels had never been used.

There were many exciting moments. Perhaps the most critical operation was maintenance of a flow of a million gallons of cooling water per hour to the condenser of the existing plant while constructing the ducts for the new water circulating system.

Another difficulty is that towards the south and east, building is being done on reclaimed land, and the black river mud mixed with cinders and ash is as poor in bearing capacity as it is rich in electrical history.

If the Commission could have shut down the station for a few months the job would have been comparatively simple. As the Assistant Civil Design Engineer (Mr. L. C. Profitt) remarked when old plans failed to agree with contemporary photographs or when the remains or some forgotten construction was brought to light, "This place has had so many major operations, you'd think it had cheirurgophilia!"

Immediate Contribution

But in spite of all the difficulties and delays - engineering and otherwise - the work has been pushed ahead. Fuel oil is being delivered by special road tankers to the main half-million gallon storage tank.

The importance of this immediate contribution to Melbourne's electricity supply will be clear to those who remember that the 1923 requirements of the whole metropolitan area totalled only 50,000kW, and even today Richmond alone will be able to look after several suburbs.

Then Richmond will have Victoria's most powerful generating set - that is, until the new 50,000 kW generators at Yallourn come into service.

Few would describe Richmond as an architectural masterpiece or even a thing of beauty, but not every pioneer power station could look forward to such a useful rejuvenated old age.
