1. RAILWAYS AND SOCIETY

Railways in History

Industrialism

Railways provided the foundation stone for the *Industrial Revolution* which swept Europe and North America in the nineteenth century. Through railway construction, European people experienced rapid technological advancement, unified themselves into strong nations and broke down the barriers of time, distance and delay. Many scholars argue that the introduction of railways was the single most powerful initiator of economic *takeoffs* which allowed European societies (and later North America and Japan) to provide their people with improved living standards[1]/.

Railways built their own industrial base, absorbing vast quantities of capital, men and natural resources to forge rails, build locomotives and rolling stock, and keep their equipment maintained in vast workshops. As railways expanded to new frontiers, they generated local industrial capacity. In Australian colonies, railway workshops at Eveleigh in Sydney, Newport in Melbourne and Islington in Adelaide, provided the initial impetus for industrialisation, including the capacity to build locomotives and carriages. Railways were also pioneers of industrial synergy [2]/. They greatly increased the effect of other inventions such as the Wheatstone telegraph, electric traction and micro-electronics.

The wealth and power generated by the Industrial Revolution enabled European nations in turn to expand their influence around the globe. Eventually this expansion encompassed the people living in the mainland and islands now known as Papua New Guinea. This is the story of that process, initiated by the invention of steam locomotives operating on iron (and subsequently steel) rails and expanding through the capital, industrial might and technological expertise of railway engineers to the most remote outposts of colonial empires.

Time and Discipline

Through their requirement for punctuality and discipline, railways led the social transform-ation from rural to industrial society. They scheduled the arrival and departure of trains according to strict timetables, thereby disciplining the citizens of industrial societies to time[3]/. The discipline of the railway pervaded the whole society. To travel by train, members of the public had to queue for tickets, present the correct tickets to officials, follow company rules and above all, to become a servant to *railway time*. At village, town and city alike, the railway guided the daily habits of citizens. Natural time, the pattern of activities dictated by the sun's progress through the heavens and the peasant's age-old rhythm of life no longer sufficed. The train did not wait and those who did not adjust to the new discipline were left behind.

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[1] /   Rostow, WW, *The process of economic growth,* Cambridge, 1960. p. 302

[2] /   Faith, N, *Locomotion: the railway revolution*, London, BBC Books, 1993, p. 141.

[3] /   *Ibid*., p. 20; Richards, J and MacKenzie, JM, *The railway station: a social history,* Oxford University Press, 1988, p. 94.

Moreover, railways standardised time. In the pre-railway age, towns prided themselves in keeping their own times, a few minutes different from a neighbour a few miles away. This would not do the railways, who required a precise, standard time to schedule their operations. In England, Grenwich Mean Time, colloquially known as *Railway Time*, was established in the 1840s to solve the problem[4]. Other countries followed suit and International Standard Time emerged in 1884.

The Railway as Social Exchange

In providing new opportunities for people to travel, railways helped break down old cultural divisions and expand social exchange for ordinary people. The railway station emerged as the place where people met and mingled, the starting and arrival point for journeys to work, the country, the city and the wider world. The station was a gateway through which individuals could expand their network of social exchange beyond their town and village to the wider world. In industrial society, railway stations became:

> cathedrals of the new humanity [which were] the meeting points of nations, the centre where all converges, the nucleus of the huge stars whose iron rays stretch out to the ends of the earth[5].

Railways brought diverse communities and regions together. In this process, they helped to diminish regional differences and, at the same time, they advanced the process of urbanisation by breaking down the distinction between town and country.

Suburban railways and street tramways enabled mass transportation to come into existence for the first time in history[6]. Walking distance no longer set the limits to urban growth and city growth followed railway lines into the hinterland. Mass transport made mass suburbia possible. In Australia, railways shaped settlement patterns and helped create the world's most urbanised nation. Vast metropolis' developed around the opportunities offered by cheap mass transport which funnelled people and goods into a central place. Cultural activities and mass media emerged to shape a sense of national identity.

Institutional Development

Through railways, the first modern business corporations were born. Railway organisation required the effective organisation of multi-disciplined work units covering many thousands of employees on a national basis. At first, they were organised along military lines as armies were the only other organisations of such size spread over so broad a canvas[7]. The early railway organisations imposed tight discipline, long hours, strict hierarchy and military-style regulations. In Germany in particular, respect for authority and strict observance of the rules dominated railway operations. This discipline brought with it an efficiency and safety record which characterised the German ethos[8].

However, railways soon became the pioneers of modern management techniques, particularly in North America and England where private companies operated the enterprises. Railway companies were the first corporations run by professional managers

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[4] / *Ibid.,* p. 94-5.

[5] / Gautier, T, in Jean Dethier (ed), *All Stations,* London 1981, p. 6.

[6] / Mumford, L, *The city in history,* London, Secker, 1961, p. 429.

[7] / Richards and MacKenzie, *op. cit.,* p. 62.

[8] / *Ibid.,* p. 99.

who did not necessarily control the company's shares[9]. They established new organisation patterns with clear functions between departments and they forged new cultures of customer service.

This institutional base built by railways was a fundamental step toward modern international market economies. At the dawn of the railway age, European economies were in the process of evolving from the city state with some specialisation into capital markets with secure property rights over time and complex governance structures. For the first time, the problems faced by traditional institutions in achieving secure, low-cost market transactions were overcome[10]. With the railway age, new institutions developed to facilitate measurement (quality control) and enforcement of contracts. These institutions safeguard property rights and provide certainty in transactions. In contrast, non-industrial economies found that transaction costs increased sharply and the productivity of the traditional groups had difficulty competing with the specialist commercial institutions of industrial societies[11].

Railways not only created the first large-scale economic organisations which operated over vast distances, but also introduced innovative solutions for regularised, low-cost transactions. Travel was procured by the purchase of tickets covering journeys for clearly specified prices; goods were shipped according to publicly advertised charging rates. Other means of transport were pushed aside by the certainty, convenience and price advantage of railway transactions.

In Australia, where the state was seen as a benevolent provider of railway services (Chapter 3), the need to distance railway management from political interference for sound commercial operation resulted in the railways founding the model for the modern state corporation[12].

Railway administrations, bound by excessive regulation, later became ossified and failed to move with the times through the mid-20th century. Nevertheless, the technical expertise, discipline and work ethic of the railway culture was an important factor influencing the adventurers and colonialists who extended the influence of industrial powers to Africa, Asia and the Pacific in the 19th and early 20th centuries.

Nationalism and Imperialism

Industrial expansion and the rise of nationalism in Europe generated imperial rivalry for new spheres of influence in the Americas, Africa, Asia and the far off Pacific. Nineteenth century imperialism was profoundly influenced by railways. Railways created colonies like Kenya and enabled small groups of foreigners, like the British in India, to rule large subject populations[13]. The Russian Czar built the Trans-Siberian Railway to open up Siberia and colonise it with millions of Russians.

The impact of railways was viewed with ambivalence by the colonised. On the one hand, local leaders saw railways as symbols of modernity and power; on the other, they were part

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[9] /   Faith, *op. cit.,* p. 62-3.

[10] /   North, DC, "Institutions", *Journal of Economic Perspectives*. Vol. 5:1, 1991, p. 101.

[11] /   *Ibid.,* p. 99.

[12] /   McKillop, RF, "Railways in Australian history: a preliminary reconnaissance. Part 3: building institutions." *ARHS Bulletin*, No. 558, April 1984, p. 92.

[13] /   Faith, *op. cit.,* p. 96.

of an alien culture who treated them as inferior people. Moreover, railway stations and carriages were designed to segregate the colonial masters from their indigenous subjects[14]. Strict segregation was seen as fundamental to the strength of imperial rule and reinforced the sense of inferiority imposed on the indigenous people.

Imperialists sought to modernise their colonies through the work discipline and institutions of industrial societies. In this process, the "backwardness" of the old societies would give way to new cultures in their own image. Significantly, it was in Japan which enthusiastically adopted railways without becoming subject to imperial powers, that this modernisation was most effectively achieved.

When Captain Perry arrived in Japan in 1853, the country had never seen a wheeled vehicle and there was no tradition of industrial discipline. Unpunctuality was accepted as a Japanese cultural trait[15]. Within twenty years, the Japanese were building railways to modernise the country. Through its railways, Japan established a strong industrial base and, from this, an international reputation for its disciplined industrial work force. Japan is now a major industrial nation where *railway time* is paramount. In to-day's Japan, split-second timing to change trains on Tokyo's complex network is a common theme of popular crime fiction.

Foreign Intrusion in PNG

Europeans began to arrive in the New Guinea islands from 1794. Industrial expansion and imperial rivalry in far off Europe made it inevitable that foreign intrusion would intensify over the following century. Traders, missionaries and adventurers arrived from Britain, France, Germany and Australia to promote their various interests.

Statesman in Europe were primarily concerned with the strategic and diplomatic advantages of the acquisition of colonial possession might bring: economic benefits were of secondary importance[16]. The spur to British colonial expansion in the Pacific Islands came from Australian settlers who sought British domination of the region. German ambitions were driven by expansionist business opinion and national pride back in Europe.

English missionaries first began working on Woodlark Island from 1847. English Methodist missionaries established a station in the Duke of York Islands in 1875, French Catholic missionaries arrived in 1882 and German Catholic missionaries commenced their work in mainland New Guinea in 1886. Australian traders had established bases by 1875 and the German trading firm JC Godeffroy and Sohn expanded its operations into the Bismark Archipelago from a base in the Duke of York Islands the following year. The stations enabled Godeffroy's successor, *Deutsche Handels-und Plantagen Gesellschaft* (DH&PG), to recruit labourers for German plantations in Samoa. Competition from Queensland recruiters was deeply resented by DH&PG, who urged annexation of New Guinea by Germany to monopolise access to labour [17].

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[14] /   Faith, N, *Locomotion: the railway revolution*, London, BBC Books, 1993, p. 139.

[15] /   Faith, *op. cit.,* p. 29.

[16] /   McKillop, RF, and Firth, SG, "Foreign intrusion: the first fifty years", D Denoon & C Snowden (eds), *A time to plant and a time to uproot: a history of agriculture in Papua New Guinea*, Port Moresby, Institute PNG Studies, nd, p. 85.

[17] /   *Ibid.,* p. 88.

In 1884 Bismarck decided to make Germany a colonial power, prompted by a claim that the Reich would incur little expense if the territories were administered by chartered companies modelled on the East India companies of the 17th and 18th century. Germany proclaimed north-eastern New Guinea as a protectorate on 3 November, 1884. Britain responded to pressures from Australian colonies with a similar claim over south-eastern New Guinea two days later.

Britain and Germany agreed on the partition of New Guinea by April, 1885, when a charter was granted to the *Neuguinea Kompagnie* (NGK) to administer German New Guinea (GNG). Initially the company established its main station at Finschaffen on the mainland (*Kaiser Wilhelmsland*), but conditions were unsatisfactory for European settlement and the hopes of many settlers succumbed to early mortality.

German New Guinea was expanded to include Buka, Bougainville, Choisel and the Shortland Islands in 1886. Isabel and Ontong Java were added in 1889. In 1899 New Guinea became an imperial German colony which covered the Carolines, Marianas and Palau, but Isabel, Choisel, the Shortlands and Ontong Java were transferred to the British Solomon Islands.

Pre-colonial PNG Society

Traditional PNG societies were based on local exchange within the village. Families relied on agriculture, supplemented by hunting, gathering and fishing activities, to meet their subsistence needs. Territory and institutions were generally confined to small localised areas, although some extensive trading patterns were estab-lished, particularly on the southern (Papuan) coast.

Land provides clan members with a sense of identity and security, while serving as a store of wealth for past, present and future generations. Customary law and order was maintained by each clan. Clan members come together to defend their territory against threats from outside groups. Endemic warfare was a feature in many areas, particularly in the Highlands.

Politics and decision-making in Melanesian society revolved around *big men* (rarely women) who acquire their position through economic largess to clan members. While women were primarily responsible for growing food and generating surpluses, men dominated decisions on the allocation of resources. The emphasis was on the distribution of wealth, not its acquisition and transfer to future generations. Leadership is constantly under challenge from emerging *big men*, a situation which can lead to considerable instability.

Pre-colonial Transport

Tribal and language boundaries restricted social interaction and exchange to small social groups. There were few goods to transport and travel was restricted to nearby villages. Most land transport was handled by the New Guinea beast of burden - women. Journeys were made by foot, with the men walking ahead carrying weapons to guard against surprise attacks. The women laboured behind with heavy loads.

Only in selected coastal areas, notably on the Papua coast, were wider patterns of trade established. Water transport required canoes which varied greatly in their manner of construction. Some of these canoes were very large, and it was in their manufacture, always by men, that the first organisation of land transport emerged. Large trees, up to 30 metres tall and 4 metres in girth, were cut in the forest and transported to the coast. Often whole clan groups were required to pull the log. Saplings were cut and placed as rollers under the log, and vines were used to pull it to the shore where the log was carved into a canoe.

Railways in PNG History

Papua New Guinea (PNG) is a land of rugged terrain, broad rivers, swamps and jungles which are not inviting to the railway engineer. Nevertheless, as the following chapters amply demonstrate, many small railways were constructed in PNG over the years. On the one hand, these railways represent the efforts of pioneers and innovators to gain access to resources and improve their quality of life; on the other, they symbolise the fleeting and insubstantial impact of industrial civilisations on the forces of nature in the tropics.

As the case studies demonstrate, imperial power was reduced to impotence in the remote tropical outposts of Papua and New Guinea. Here, the steel rails which conquered Europe and the American prairie did not march forward with vision and boldness to modernise the country. Instead, numerous short lines marked the hopes of an individual or a company to master an unknown environment. Only rarely did the whistle of a locomotive announce that the frontier was being tackled with confidence: in most cases trucks pushed by local labourers or pulled by animal power sufficed to demonstrate the continued struggle of man over nature. It was very much the "end of the line" where few resources of the industrial metropolitan powers penetrated and local impacts were minor.

Chapters 2 and 3 trace the policies and performance of German and Australian colonialists building and operating railways in New Guinea and Papua. Chapter 4 traces the efforts of the Australian administration in the Mandated Territory of New Guinea to build on the base German infrastructure and the decision to bypass a railway in favour of air transport to open up the Bulolo goldfields in the 1930s. The chapters examine the impact of railways and their associated commercial ventures on the economy and on the lives of Papua New Guineans.

The power and conflict of industrial society was to be thrust upon Papua New Guinea in the turmoil of the Pacific War from 1942 to 1945. Railways were to play only a minor role in PNG during this conflict, though their important function behind the war machines of the combatants is often overlooked. Chapter 5 examines the war years from a railway perspective.

The post-war era was initially dominated by the motor vehicle and the aeroplane rather than the railway. The limited railway operations in PNG during this period, are examined in chapters 6 and 7.

Chapter 8 draws together the conclusions of preceding chapters into an economic history of PNG. It looks at the role of railways in establishing the infrastructure and building the institutions of modern commerce and highlights the implications of the historical failure to establish this base in Papua New Guinea.

The threads of this experience, including today's international railway revival, are brought together in a final chapter which examines the potential future roles for railways in Papua New Guinea.

The account represents the product of 25 years research by the authors. Yet the record is by no means complete. The ravages of war, tropical mould and carelessness maintaining and storing records have made the task of tracking the fortunes of various railway ventures, many of them in remote locations, a difficult one. A listing of the 150 railways identified by the authors is presented in Appendix 1, including known details of the gauge, length, purpose and mode of operation.