Building Japan's First Railways:
How Western and Japanese Cultures Interacted while Conducting Technology Transfer in the 19th Century

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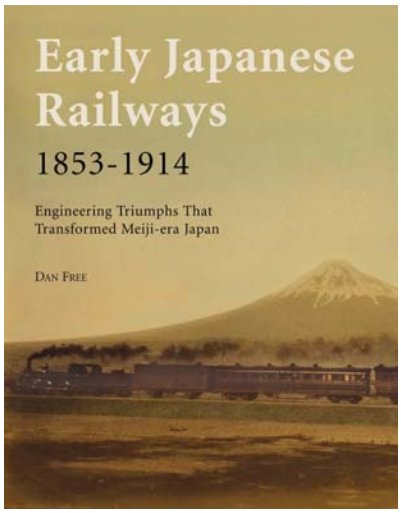

Brief History of Transportation before the Introduction of Railroads

Travel in Japan changed little for the millennium stretching from the 8th Century to the 19th Century when Japan made the decision to modernize. In the 8th Century, Buddhist monks, most notably the legendary monk Gyoki, instituted Japan's first notable public works program, developing a system of communication with new roads, canals, and bridges to enable public access to the great temples of the day. In that century as well, the first system of post stations and inns (restricted to the use of only government officials) were established, being staged approximately 30 *ri* (about 75 miles)[1] apart. Transportation technology was little improved over the course of centuries intervening between the age of the engineer-monk Gyoki and the 19th Century. The distance between stages had been reduced to anywhere from four to ten miles, but as road building and road maintenance were the responsibility of the village or locale through which they ran, there was a great variance in traveling conditions throughout the realm. Travel was either on foot or horseback, by ox-cart (for nobility) or palanquin, a type of sedan chair known in Japanese as *kagō* or *koshi*, depending on its configuration. The average load for a packhorse was 250 – 350 pounds. Under the best conditions, a traveler could travel 25 miles in a day; usually, however, the average was around 18. This continued to be the average rate of travel up until the 1870s. Rivers formed a natural highway network for travel along so much of their length as was navigable, but interposed barriers to travel routes that crossed their courses. At some rivers, it took travelers up to half a day simply to accomplish a crossing. Because some rivers, such as the Ōigawa, formed domain boundaries, boats of any kind were forbidden on them as a defensive measure, necessitating detours of many miles in a route to a point where they could be forded. (The well-to-do would hire *kataguruma*, coolies stripped to a *fundoshi*, to carry them on their backs across at this point.) Many rivers were unbridged simply because bridging strong enough to withstand the severe seasonal flooding so prevalent among Japanese rivers could not be devised. Even on the major roads, there were frequent gates, meant to keep

[1] One *ri* equals 2.44 miles

the peasants of one fief from traveling freely to the next. Due to the fact that Japan is an archipelago, there was naturally a great emphasis in coastal shipping, but because of shipping restrictions, the largest ships (the *Sengokubune*) were by law limited to a burthen of 1,000 *koku* (a unit of measure defined as the amount of rice necessary to feed one person for one year: approximately 5 bushels), although by the first half of the 19th century the law was not as strictly enforced and some ships of larger burthen had come into service.

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[After the arrival of the first Portuguese in Japan in 1543, a] brisk but intermittent trade gradually developed as quickly as ships of the day could sail. Within three years, the first Portuguese vessel had come to Kyushu (remarkably fast contact given the rate of change and travel in those ages). By 1549, Francis Xavier had established a mission in Kyūshū and the Portuguese were attempting to be the first Western nation to forge regularized trade relations with Japan. The first cannon were purchased and brought ashore two years later. The Portuguese found one of the bays at the base of a long cape in western Kyushu to have a natural harbor well suited for a port, and requested permission of the local *daimyō* [high nobleman] to anchor there, which was agreeable. The locals had named the small fishing village situated at the anchorage "Long Cape" (*Naga-saki* in Japanese). By 1571, the first *regular* trade ships from Portugal anchored in its waters and Nagasaki was on its way to becoming a trade center. The local *daimyō* were quick to send their best swordsmiths to learn gunsmithing from the Portuguese and to establish manufactories at the local arsenals that each domain was required to maintain as a part of its national defense obligations. Firearms proliferated rapidly from that small foothold in Kyūshū, and within years the use of firearms had spread throughout the realm. Henceforth, the transfer of Western technology to Japan would become a notable aspect of Japan's interaction with Western civilization: small initially, but accelerating at an amazing pace during the Meiji period.

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It was decreed illegal for any Japanese to own a ship with more than a single mast or exceeding fifty tons displacement, effectively an outright ban on ownership of ocean-going vessels. As restrictions against Western influence mounted, those local Japanese in Kyūshū who had converted to Christianity bore some of the burden and became resentful. In 1637 an ill-fated Christian revolt, the Shimabara Rebellion, broke out near Nagasaki, aided in part by the Portuguese. The locals again resorted to Portuguese firearms, long since banished under the *Katanagari* [a ban on swords and firearms], which further convinced the new regime that foreign influence and technology were a threat. As a result, in 1639 the Portuguese (along with their meddlesome missionaries and gunrunners) were outright barred from entry anywhere in Japan. The remaining Dutch East India Company, which kept strictly to business and did not import religion, fared better, but was no longer allowed freely to occupy sites in the Nagasaki environs. Starting around 1641, the number of Dutch ships were curtailed and severely controlled, only being allowed to anchor in port at certain periods, not allowed to come and go freely, and

all Dutch trading entrepôts, factories, and residences were required to be moved and thereafter confined to a small island just off shore in Nagasaki harbor called the *Deshima* that was ordered to be enlarged artificially to the size of about one hectare. Housing, warehouses, and other necessary buildings for the conduct of trade were built there, the entire island surrounded by a high fence, and a bridge was built that connected it to the town proper, with a guard post manned by the local police and gates that were barred year-round. The Dutch traders were not allowed to leave the island, except the *Opperhoofd* ("chief", lit. *Overhead*) of the trading post who was required to make a yearly report to the Shōgun in Edo called a *Fusetsu-sho*, and was allowed to leave the Deshima for this purpose. Otherwise the Dutch might as well have been politely treated hostages. No Japanese men were allowed on the island unless they were employees of the company. No Japanese women were allowed at all, unless they were courtesans. The trade ships were allowed to arrive in summer, usually July, and were required to turn over their sails, arms, and ammunition to the local authorities to prevent any adventurism during their stay. Any Dutch ships in port were required to leave by no later than the end of September; even delay caused by the worst of sailing weather being unacceptable. As the time approached, their sails, arms and ammunition would be returned, the ships would be refitted, provisioned, and loaded with a year's accumulation of stock in trade, and when all was well, set sail.

There must have been a very lonely and desolate feeling on the tiny islet each October, when the last Dutch ships had left and the *Opperhoofd* and the ten or twenty Dutch resident employees who remained in isolation set about preparing for winter and the return of Dutch ships the next summer. But the pattern had been set. Like a larger Deshima whose last ships had sailed, for the next two hundred years Japan settled into a period of profound isolation.

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…Dutch trading ships in strictly regulated quotas continued to come and go from the Nagasaki *Deshima*. Trade and trade ships had improved in the interceding 200 years, the age of the clipper ship was dawning, and Europe, particularly Great Britain, was becoming increasingly hungry for markets for the new mass produced products resulting from its recent industrialization. By contrast, little had changed in Japan. At the most restrictive point in 1715, the number of Dutch ships allowed to enter Japan – *the trading capacity of the entire Western World* – was limited to 2 ships per year. Even ships from neighboring China had been limited to 25 ships a year by 1736. Holland, China, and Korea (which was permitted to trade only with the island of Tsushima midway between the two countries) were the *only* countries with which Japan had any contact whatsoever, let alone formalized trade arrangements. Knowledge of western technology was slowly trickling into the country by means of whatever books or sages were brought by the annual Dutch East India Company ships that were allowed to drop anchor at the Deshima, and by means of the annual *Fusetsu-sho*, that the *Opperhoofd* from Nagasaki was required to make annually to the Shōgun in Edō. The report covered not only *Deshima* trade matters, but gradually developed into an annual briefing on world affairs occurring beyond Japan's shores, as digested by the *Opperhoofd*. Official policy towards

contact with the West vacillated with glacial speed: a series of earlier edicts banning western learning and dissemination of western texts and teachings was relaxed in 1720 by the Shōgun Tokugawa Yoshimune, but 1839 marked another crack-down, which came to be known as the "Imprisonment of the Companions of Barbarian Studies."

[By the 1820s] the issue of taking on food, fresh water, and firewood or coal was of the highest importance to [Western] trade ships and trading nations, as ship stores would have been depleted after long trans-oceanic voyages which could take months, but temporary stops in Japan, even for re-supply purposes only, were forbidden. The ability to use Japan as a re-supply stop was not vitally important to European traders, for whom Japan was simply the last port of call at which to collect commodities before they turned and set sail back for home, but it was very critical to America, because of course it would be the first accessible re-supply point for the famous China Clippers or other slower Yankee ships after a long Pacific crossing (on a voyage that could take up to ten months from New York or Boston). Since California had yet to become a U.S. possession and re-supply point, the young republic's interest in being able to use Japan as a re-supply point was all the more acute.

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Introduction of the First Train to Japan

All too soon for the Japanese, a squadron of four "Black Ships" of the US Navy appeared on the horizon; side-wheel paddle steamer warships dispatched in the waning days of Millard Fillmore's presidency under the command of Commodore Matthew Calbraith Perry. Perry's frigates appeared off the coast of Shimoda, Izu province, on the southern tip of the eponymous peninsula, southwest of the Shōgunal capital of Edō [present day Tokyo], on July 8, 1853 on full battle alert. Perry delivered a message from the United States government asking for the establishment of trade relations. His squadron stayed only long enough to receive assurances that his message would be delivered to competent authorities, and Perry advised the Japanese that he would set sail to China in order to give the government adequate time to consider its reply and would return the next year to have it.

One month after Perry had left his first calling card, ships under the command of E. V. Putyatin of the Imperial Russian Navy dropped anchor off Nagasaki on August 2, 1853 bearing gifts as an enticement, among which was a small alcohol fired model of a railway steam locomotive and train about the size of a large toy. Putyatin is said to have run this model train on the deck of his flagship, the *Pallada*. It was seen by Tanaka Hisashige from the Kyūshū town of Kurume. Tanaka, who would go on to form one of the companies that evolved into the present-day Toshiba, eagerly set about making an imitation, which was completed shortly thereafter. This was the first operating model steam locomotive built in Japan. It may still be seen in the Saga museum, and gives some idea how the Putyatin model must have appeared.

When Perry reappeared in February 1854 to receive his demanded reply, his squadron of Black Ships had increased to seven – a fact not lost on the Japanese. This

time Perry did not return to the Izu peninsula, but chose an anchorage in closer proximity to the capital: the Uraga Straits region of the Miura peninsula, uncomfortably close to Edō at a place he called "Mississippi Bay", a name which for many years stuck with and was used by the foreign residents destined to settle there. Along with him, Perry had brought gifts from the Republic to the Shōgun. Among those gifts was a 610mm (two foot) gauge fully functional model of a 4-4-0 Norris locomotive, a tender, passenger car, and one mile of circular track, which his crew set up on the beach at Mississippi Bay, to demonstrate to the Shōgunal representatives, among whom was Kayama Yezaemon, (described in Perry's report as the "Governor of Uraga") and "Prince Hiyashi" (*Hayashi Daigakonokami,* an official who would have been the equivalent of a modern-day Minister of Education)[2]. Judging from the gauge, and scaling proportionally, this locomotive was perhaps a one-quarter scale model, of a size large enough to have hauled 3 or perhaps 4 adults behind it on its train, about the size of amusement park railways for small children one finds today in city parks or at small fairs.

It is difficult to say with any certainty how aware the Japanese were of railway technology at the time of Perry's visit. The Dutch *Opperhoofd* Joseph Henry Levyssohn had mentioned a French plan to build a portage railway across the Panama isthmus to the Shōgun in his 1846 *Fusetsu-sho*. (The French builders defaulted in 1848, but the scheme was taken up by Americans in 1850 and the railway was completed in 1855.) The 1844 Dutch book *Eerste Grondbeginselen der Naturkunde* (First Principles of Natural Science), which contained passages treating on steam locomotives, is thought to be the first book on the subject of railways to enter Japan, and by 1854 had been translated into Japanese under the title: *Enzei Kiki Jutsu (A Description of Notable Machines of the West).*

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First Railways used for Commerce

There is little historic record of railway activities for the next ten years in Japanese history but by 1865 enough rails, flanged wheels, and railway hardware had been imported that Japan's first railway that accomplished a commercial purpose was in operation. This was a short mining railway that was constructed to move coal from the

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[2] Perry, as a Presidential Envoy, had been quite insistent that he interact and conduct negotiations with a member of the government at the highest level, and found Prince Hayashi acceptable largely because his title was translated "Prince", which in Japan did not necessarily carry the same status that the title did in the monarchies of the West. The title of Prince was an awarded, not inherited, title, used in government as a high honor. The mere title of prince (as opposed to an Imperial *Prince of the Blood*) was a not as high a title as it was in Europe. In keeping with the nuanced show-of-status diplomacy that often governed traditional East Asian diplomacy of the times, the *Bakufu* quite naturally wanted to send as *low* an official to deal with Perry as it could possibly get away with; to bolster the perception that the foreign barbarians were of such inconsequential status as to merit the time and consideration of only a minor functionary. On this score, perhaps the *Bakufu* got the better of Perry without his even realizing it. One wonders if he would have insisted on negotiating with yet a higher official or a *Prince of the Blood* if he had understood that the *Bakufu* had merely sent its Minister of Education on what from the *Bakufu's* point of view could have been characterized merely as a fact-finding mission by its Minister of Education to gather intelligence about Western ways and technology.

mines of newly discovered coal deposits at a locale known as Kayanuma in Hokkaidō to a navigable transshipment point. The venture came to be known as the Kayanuma Tankō Tetsudō 茅沼炭坑鉄道 (*tankō* means coal mine and *tetsudō*, literally "iron way," means railway). Little is known of the line or its workings, save for the fact that it was worked on a "horse and gravity" principle, in the time-honored tradition of the first coal mine rail lines around Newcastle 200 years before.

Nagasaki in 1865 was quite a different town than it had been ten years before. Foreigners were no longer Dutch and Chinese only and were no longer confined to the Deshima. A newly arrived Scottish trader by the name of Thomas Blake Glover founded the firm T. B. Glover and Co., which is said to have imported from Great Britain a small 762mm (2' 6") gauge steam locomotive and to have demonstrated it on a test track along the Nagasaki Bund (as the waterfronts in Far Eastern treaty ports were becoming known) between Lot numbers 1 and 10 in the foreign resident's quarters in hopes of inspiring "railway fever" to Glover's profit among the Japanese. Some authorities question this, but if the reports are to be believed, this was the first locomotive in Japan that was not a model and was capable of actual commercial activity, despite the fact that there is no confirmation that it ever performed *revenue earning service*. Again, very little is known about this demonstration railway, but fittingly the first fully-functional locomotive in Japan was named the *Iron Duke* and, if reports are to be believed, then the Iron Duke inaugurated the Railway Age to Japan, a symbolism perhaps not lost on Glover. There is brief mention of this event in *The Railway News of London*, July 22, 1865, "A railway, with locomotive engine and tender, is in operation on the Bund at Nagasaki, and excites a great deal of attention among the Japanese, who come from far and near to see it." Thomas Glover's house still stands in what is now a park in Nagasaki and is in fact the oldest western style residence in Japan, but what became of the *Iron Duke* is not known.

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The newly installed head of the British legation, Sir Harry Smith Parkes, landed in Nagasaki in 1865… By the time Parkes was appointed the United Kingdom's Minister to Japan in 1865, he was self-assured, worldly wise, and could be quite obdurate. And while undoubtedly he could be quite tactful and charming when it served his purposes, likewise he could bully, intimidate, and be a martinet when it behooved him. The story is told that despite the fact that he was by one year [French Minister Léon] Roches' junior in terms of diplomatic standing, he succeeded on one occasion in forcing his way in to a private meeting between Roches and the Shōgun himself on grounds of equal treatment for Her Britannic Majesty's Minister. Another example is found in the December 29, 1873 issue of the New York Times, where it was reported that at one State Dinner in the presence of the Emperor, Parkes, who then held senior status among Tōkyō Ministers, rose to give a toast to the Emperor "accompanied by a neat little speech," but when it came time for the American Minister's toast, Parkes literally shushed him at mid-point of the first sentence and told him to sit down; shouting him down with the abrupt words "No more." Parkes' objection? The American Minister's grave offense lay in the formula used in his toast, which had wished "Prosperity, happiness and progress to the Sovereign and People of Japan" and, according to Sir Harry, mentioning the People of Japan in the same

breath as the Emperor was "superfluous" and out of order as unduly political. As John Black, the man responsible for introduction of modern journalism to Japan and editor of one of its first English language newspapers put it, "The Japanese officials who were brought into communications with them [foreign ministers], complained sadly of the brusque manner in which they were frequently treated by the plain-speaking strangers. Especially was this the case with regard to Sir Harry Parkes, on whose absolute outbursts of wrath and excited action, they are never tired of dilating."

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Politics and the Development of Early Rail Lines

In late 1866, the American Legation was confidentially advised that the Shōgunate had resolved to build a railway from Kyōto to Edō, along an inland route. This would have run through tea growing districts, then a major source of Japanese foreign trade revenue, and also would have avoided coastal areas prone to foreign bombardment (as had occurred at Shimonoseki) and colonial occupation of the line. The Tokugawa scheme reported in a later official dispatch to the US State Department also called for a northern extension to the silk districts, probably those in the Takasaki/Maebashi vicinity, which also would have a secondary purpose of linking close-by Nikko, where the ancestral tombs of notable Tokugawa Shōguns were found and rich copper deposits could be exploited, with Edō. This would have formed a great central trunk line through Japan, connecting Edō and the north with the populous Kansai plain on which Kyōto and Ōsaka are located, and thus have joined the two capitals of the Shōgun and the Emperor. According to US diplomatic correspondence, the Tokugawa railway proposal had progressed at least to the point where a preliminary "though hasty" route survey had been made, and young Tokugawa functionaries had been sent to Europe to study railway building and earn engineering degrees, with more expected to do the same in the United States.

Unfortunately for the Tokugawa Shōgunate at this time, both the financial and political situation were highly uncertain, and the Tokugawa railway proposal was postponed indefinitely. Foreign ministers at the head of their respective legations did the best they could to assess the likely outcome of the political unrest.

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By this time, the US Minister was Robert Van Valkenburgh, a New Yorker who had served in the US Congress, and who along with Roches, also tended to sympathize with the *Bakufu* [Shogunal Government]. Shortly after Roche [had made a railway] proposal, and a competing proposal by one Carle L. Westwood, an American named Anton L. C. Portman met with *Bakufu* officials and made yet a third proposal to build a line from Edō to Yokohama in the form of a *concession* (i.e. the line would not have been built for the Japanese government, but was to have been financed with American capital and to have remained American-owned under the control of its American owners). Portman, a naturalized American who had been born in Holland, had been attached to the Perry expedition as a mere clerk, but when the attempts to communicate with the

Japanese using Chinese proved to be such a shambles that the Japanese refused to negotiate in that language, Dutch was hurriedly substituted[3], and Portman, who spoke Dutch, proved invaluable and was pressed into service. (Congress later resolved to increase his pay to three times the original sum in view of his contribution to the success of the Perry Expedition.) By 1867, he had risen to become the Secretary, what today would be the Deputy Chief of Mission; second in command of the US Legation in Japan. When he learned of the Tokugawa project to build a railway from Edō to Kyōto in 1866 he saw an opportunity. During the course of 1867, he devoted increasing portions of his time to obtaining for American interests the right to participate in the first railway building. He undoubtedly pointed out that Americans had an enviable record of railway building and were well along in the process of building the World's first transcontinental railroad and likely reminded the *Bakufu* that the French and the English had been awarded contracts for building all the major public works projects then underway and that it was unfair to exclude Americans from such undertakings. He inquired of his counterparts in the *Bakufu* why there was no provision in the new Tokugawa railway project for a branch to Yokohama, Japan's most important port, less than two dozen miles away from Edō. His counterparts at the Ministry for Foreign Affairs replied that due to the increasing anti-foreign *sonno jōi* ["Revere the Emperor, Expel the Foreigners"] political sentiment then prevailing in Japan, it was felt that allowing anyone other than Japanese to build the railway would have aroused contrary public opinion to an unmanageable level. Portman then skillfully proposed to build only a branch railway of the Tokugawa grand trunk line: a section between Edō and Yokohama, astutely pointing out that the Yokohama line did not even have to be physically connected to the Tokugawa Grand Trunk Line, and that the building by Americans of a short line of railway could only serve to underscore the importance and nationalistic character of the achievement of the projected Grand Trunk Line. He succeeded where others had failed in concluding negotiations with the *Bakufu* for a railway concession in part due to timing. By late 1867, relations with anti-Tokugawa *daimyō* had turned so sour that there was little political disadvantage in risking arousing them on smaller subsidiary issues. The *Bakufu* felt that while, given the impending struggle it could foresee, it could ill-afford to budget domestic funds for its projected grand trunk line, there was little reason why foreign money couldn't be put to use on the smaller Yokohama line, which at least would be helpful in the logistical support and supplying of troops and materiel likely to be needed to be sent from Edō. Accordingly, Portman was granted a concession to build the line from Edō to Yokohama by the Foreign Minister; an official then honored with the title of Ogasawara Iki no Kami, on January 16th, 1868 (December 23rd of the preceding year by the Japanese lunar calendar) in what was to be one of the last major foreign policy actions of the Shōgunate. In a later diplomatic dispatch, it was said that the two men, who had grown over the course of their years of interaction to be long-standing friends, had an understanding to keep the existence of the grant confidential for as long as feasible, so as not to cause further problems for the *Bakufu* in difficult times or to arouse the sensibilities of the British or French Ministers.

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[3] Dutch was the one European language that was understood and spoken among some Japanese of the day in any useful number, due to 200 years of Dutch trade at Nagasaki. As such, it was used as the language for official diplomatic communiqués between Japan and Western powers up to the end of the Tokugawa Shōgunate.

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During the time Portman was conducting his negotiations, the domains of Chōshū and Satsuma had continued their [*sonno joi*] remonstrances: an abortive punitive expedition against the so-called "Southern *Daimyō*" by the Shōgunate in 1866 had only served to underscore the military ineffectiveness of the *bakufu* government. The struggling and inept fourteenth Shōgun, Tokugawa Iemochi, died during the course of that expedition at age 20, and his death was used as a face-saving measure to cease pursuit until his successor Tokugawa Keiki (more commonly known in the West as Tokugawa Yoshinobu) was installed. Taking advantage of this, sensing the weakness of the *Bakufu* armies, seizing on the relative inexperience of the new Shōgun, and exploiting the potential for transitional difficulties they hoped would be a natural result in the Tokugawa administrative structure and in its chain of command, the Chōshū-Satsuma Alliance grew and the year 1867 saw it increasing pressure on the Shōgun to step aside. As the stage had been set for a final Chōshū-Satsuma/Tokugawa rivalry, so too was it set for a Anglo-French-American diplomatic rivalry for *entrée* and influence, with Roches whole-heartedly embracing the Tokugawa régime, the Americans trying to remain aloof, but preferring the known quantity of the Tokugawa régime to the unknown and avowedly anti-foreign *sonno jōi* hotheads of the so-called "Imperial Cause" which was the label preferred by the Chōshū-Satsuma Alliance, and the British becoming increasingly sympathetic to the Emperor (as an institution of real political power) and his Chōshū-Satsuma backers.

The year 1868 was the watershed. Armed conflict began only a few days after Ogasawara Iki no Kami had issued the railway grant to Portman and the spectre of civil war raised its head. The *Bakufu* moved to dislodge Chōshū-Satsuma troops surrounding the Emperor in Kyōto. At the four-day Battle of Fushimi (now a suburb of Kyōto) that began January 27th, the Chōshū-Satsuma Imperial forces eventually carried the day and the new Shōgun's forces retreated to Ōsaka. After further adverse developments, the Shōgun withdrew to Edō on a steamer. Subsequent defeats and political machinations resulted in further setbacks for Yoshinobu. By that time, Yoshinobu had shown the first signs of potential for being an astute and skillful leader, but circumstances were such that he didn't have enough time in which to develop those abilities. By July 1868 Yoshinobu, the fifteenth and final Tokugawa Shōgun, surrendered Edō castle and with it his capital city, and went into seclusion (as would a monk intent on renouncing all worldly connection) at a temple first in Ueno, then one of the northern neighborhoods of Edō, from which he removed later to a Tokugawa estate in Mito and finally to another in the vicinity of Shizuoka, both towns with strong Tokugawa associations.

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Rail Development and The Meiji Restoration

Once faced with the hard reality of governing, the Chōshū-Satsuma *clique* quickly realized that the foreigners could not be expelled, as the more radical elements of the faction had desired and it gradually became more pro-reform and pro-Western (at least

insofar as adopting technology to strengthen the realm was concerned); progressive ministers emerged as most influential and elected to set the country upon a radical course of rapid modernization. The decision that the Tokugawa Shōgunate had made to build a lighthouse system to aid in shipping and navigation was ratified.[4] In 1869 the old edicts outlawing ocean-going ships would be rescinded. That same year, another significant act of the Meiji government in respect of industrial development occurred with the erection of the first telegraph line in the realm. In a radical change of course from the policies of the preceding 200 years, the Imperial Government unabashedly began retaining Western advisors to help modernize the nation. It has been observed that technological change is a political process, and while this certainly is often the case, in Meiji Japan, the inverse could be argued: political change was a technological process. By the time the realm had absorbed needed Western technology, it had become acclimated enough to Westerners that the political agenda of the Chōshū-Satsuma oligarchy had been changed to the point that complete expulsion of foreigners was no longer a goal.

Initially, Japanese of all political stripes could agree that the planned naval base and a navy were an absolute necessity to defend the homeland against foreign aggression or intervention, so the essence of the Yokosuka agreement with the French was re-affirmed by the new government. In an effort to avoid reliance too much on any one power, which could too easily lead to dependence (and in those times in Asia, dependence was never far removed from annexation and colonization), the new government exercised a delicate balancing act, retaining different nations to accomplish different areas of reform and to be used as models to approximate, while the new régime strove not to become too reliant on any one power. The Tokugawa régime had asked the French to assist in modernization of the army, which they did up to their defeat in the Franco-Prussian War, when the Germans replaced them as a model. The régime leaned on British advisors for the navy, while the Dutch were retained for civil engineering projects involving land reclamation and river and harbor improvements. Later, the German legal system was emulated and the American educational and agricultural systems were studied; all according to areas where, in the conventional wisdom of the time, the particular country chosen as a model had demonstrated notable success.

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Once peace had been restored, Portman tested the waters by writing a letter under date of January 5, 1869 to Ogasawara Iki no Kami in Hakodate where he had gone (possibly to avoid capture, imprisonment, or worse) with the Tokugawa bitter-enders who were attempting to establish a Tokugawa government-in-exile. In that letter, Portman sought his blessing in commencing the project in earnest. Portman received a favorable reply, although having been stripped of his official titles, Ogasawara signed his letter under date of February 9, 1869 by his actual name, Oi Yosuke[5]. Portman, then in ill

[4] Article III of the Convention of Edō with the Western Powers called for the establishment of Treaty Ports and "lights" in conjunction with those ports, so there was a treaty obligation to fulfill in establishing a lighthouse system.

[5] Oi Yosuke was also known by the name of Ogasawara Nagamichi. He had been the daimyō of Kokura, in northern Kyūshū.

health, gathered up his grant signed by Ogasawara from the Legation's files, and called upon the Ministry of Foreign Affairs where he met with the new Minister of Foreign Affairs, Sawa Nobuyoshi, whom he addressed by the title of *Highashi Kuze Chiujio*, to discuss its implementation sometime between February 9 and March 11, 1869. The meeting evidently did not go as well as Portman would have hoped.

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The new US Minister, Charles Egbert De Long, arrived on October 30, took charge of the US Legation on November 1st, and presented his credentials to the Emperor ten days later. De Long was what we would today call an *arriviste* who had been born in Duchess County New York, in the farmlands north of New York City. By the time of his appointment in 1869, he had moved to the West, lured by the California Gold Rush -- working initially as a miner then later in other menial capacities, educated himself in law by self-study, practiced his newfound profession in various Nevada and California towns, joined the Republican Party and served one term as a legislator in the California State Assembly. Along the way, he had married, and at the time of his appointment, found himself living with his family in the Nevada boomtown of Treasure City (destined to become a ghost town by 1880 when the silver discovered there had been mined out). De Long was a Wild West frontier type in the truest sense; a self-educated lawyer and one-term phenomenon who had bootstrapped his way to mediocre notoriety through his Republican political connections and had utterly no previous diplomatic experience. By 1868, he had lost a series of elections and was burdened with the taint of "un-electability." His appointment as Minister to Japan was said to have been purely a political move by the administration of President Ulysses S. Grant after the first candidate had withdrawn from consideration. That candidate was Chauncey M. DePew, who declined the appointment in order to take a position as Counsel for the New York Central Railroad, and would eventually serve as its President. De Long's nomination was reportedly a political exile for past ineptitude cloaked as a reward, to remove him from the US political scene in a quiet and dignified manner.

De Long lost no time plunging headlong into his duties and sent long dispatches to Secretary of State Hamilton Fish in Washington. Among the topics discussed: his pay was inadequate; security at the Legation was inadequate; the furniture at the Legation was inadequate; the Legation's US flag was old and tattered, he had had to pay for a flag pole outside his residence out of his own funds and at 30 feet, it was shorter than that of other Legations and could not be seen from Yokohama harbor; as a mere *Minister Resident* he was junior in rank and title to the British and French *Ministers Plenipotential and Envoys Extraordinary,* to which rank he deserved a promotion: "I frankly submit to your Excellency, with most profound respect, that I feel the indignity of my position daily, when brought into contact with the Representatives of the other Great Powers, and even of the people accompanying them…" He promptly embroiled himself in the hue and cry surrounding reports of suppression of the practice of Christianity by native Japanese in Nagasaki, the likes of which would bring sheaves of letters in the direst of prose from missionaries with excessive time on their hands and which his predecessor Van Valkenburgh once characterized as "almost invariably exaggerated." In so doing, De

Long effectively ignored a basic lesson in diplomacy from the first days of Dutch – Portuguese rivalry in Japan that was by then 300 years old. But while De Long expected much of Hamilton Fish and the State Department in Washington, he pointedly cautioned his superiors not to expect much *of him*. In a dispatch to Hamilton Fish, he wrote, "I trust that your Excellency will remember that I am young and inexperienced in the fields of diplomacy…"

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It cannot be determined from the record transmitted in the two US Diplomatic dispatches dealing on the subject of the Portman grant whether Sawa Nobuyoshi [the new Japanese government's Minister of Foreign Affairs] was aware of the Portman grant before that meeting. We do know, from a letter he wrote to Sawa on March 11th, that Portman showed him the original grant and furnished him with a copy of it on the day following their meeting. About a week later, Portman received a reply signed by three of Sawa's assistants, setting forth for the first time in writing, the new government's objection to the grant. The grounds stated were simply that the new Government had already been considering construction of a railroad and intended to build it "with the united Strength of our own people," pointing out that the grant had been given "before the change of Government took place" and raising the spectre of the new Government repudiating the grant.

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Unknown to the US Legation, the Japanese had good reason not to reply to Portman's … communication[s]. … Apart from the weariness of replying to Portman's by now monotonous entreaties, the Japanese Government had apparently never taken its own assertions as to the technological and engineering capabilities of the Japanese people seriously, or if it did, it had very quickly disabused itself of it's illusions, and had concluded that it wanted railways *now* and with the assistance of foreign technical advisors; and was willing to suffer the consequences of any negative domestic public opinion or opposition. Unfortunately for the small staff of two at the US Embassy, the new Government decided that, despite the fact that the Portman grant matter had apparently not been conclusively laid to rest, they preferred the British.

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The energetic Parkes at last had his chance, and undoubtedly if he had by then gleaned through intelligence any inkling of the Portman grant, his bulldog instincts took over. He was given his opportunity to make a case for railway building using *British interests* on December 7, 1869 (November 5th under the traditional Japanese lunar calendar – Japan had yet to adopt the Gregorian calendar) when he was invited by his ever-more-interested hosts to the residence of Prince Sanjo Sanetomi, Minister of the Right and acting Premier, to meet with government heads, among whom were Ōkuma, Itō, and as well as the Finance Minister Date, the Minister of Foreign Affairs Sawa

Nobuyoshi, and Vice Premier Iwakura Tomomi. They would discuss the possibility of introducing railways…

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Parkes' arguments and proposals were made against a backdrop of action by his Japanese counterparts. Well in advance of the December meeting with Parkes, probably sometime late in 1868 (and again apparently unbeknownst to the US Legation), the officials responsible for such undertakings had done some investigation themselves, had contacted [a Scottish engineer employed in Japan to build its lighthouses,] Henry Brunton, and had asked him to advise as to the feasibility of introducing rail service to Japan. It should have come as no surprise to them that Brunton's curt reply, set down in his memoirs, was to the effect that,

> "I had formed an opinion, which I repeatedly expressed with great emphasis, that the immediate and pressing need of the country was not so much an elaborate and costly railway system as the formation of good roads. Besides the main thoroughfares between Tokio and Kioto, themselves merely crude mud traveling ways, almost impassible in wet weather, the only tracks by which journeying could be accomplished or merchandise conveyed overland were narrow footpaths forming the dividing ridges between the irrigated fields. It was only by pack horses, walking in single file, that the products of one part of the empire could be transported to other parts… It appeared to me that the energies of the country would be more suitably expended on making good public roads… Common roads are not so much the supplements of railways as railways are of common roads… To begin with railways before there are roads is generally to begin at the wrong end."

Undoubtedly, this seemed a well-reasoned opinion from strictly an engineering standpoint for a modestly-sized densely-populated country like Japan (nonetheless ignoring thirty-five years' of accumulated experience of the "American model" of railway development, demonstrating quite to the contrary that by penetrating vast tracts of wilderness first by railroads, economic development and "good public roads" would follow). In fact, Brunton's was a complaint still made by foreign engineers as late as the 1890s in respect of Japanese land transport infrastructure development. However, there were more than mere engineering practicalities to be considered from the perspective of those at the helm of the Japanese government. Those men quite correctly saw the matter also as being one of national prestige and of "credibility as a progressive country" in the eyes of the Western powers and properly reckoned that much more prestige and international respect could be leveraged by building railways than building a system of roads could ever have accomplished. To have used what limited funds the Japanese government could afford to budget – *Western technology and warships did not come cheaply to an agricultural nation just emerging from a feudal economy* – for the purpose of building new roads and thereupon to have marshaled those roads in evidence of Japan's progress to the West would have risked inviting a collective and patronizing reply from the world community somewhat to the effect of "Hasn't Japan *always* had

roads?" However, to have built a railroad system was irrefutable evidence of palpable *modernization*. Patronizing replies and the attitude from which they sprang were precisely what Japan most needed to avoid in 1868-69. One fairly winces in sympathy for Brunton's Japanese employers, who did some cajoling of their own and convinced him that railways it would be. Brunton relented and took up the issue.

In due course, the headstrong Mr. Brunton produced his report in March of 1869 (on the subject of railways *not* roads), which concluded, "In order to get the general public to recognize the usefulness of the railway, the route must be carefully selected. The distance must be short, the construction project must not be difficult, yet it must yield a reasonable profit. Moreover, there must be a great possibility that the fledgling railway line will sometime be linked to the nation's trunk line. The ideal site meeting all these indispensable conditions would be an area linking Tōkyō, the nation's political center, and Yokohama, the newly opened port city. Also, the railway service should be placed under the direct management of the Government." Brunton pointed out that the terrain between Tōkyō and Yokohama presented no great engineering difficulties, as it was essentially alluvial plain and the route would follow the coast of the Tōkyō Bay, and estimated the cost to be approximately £1,000,000; about $5,000,000 at the exchange rates prevailing at that time. The seeds of discord had been planted. British interests would compete for the same route that was subject of the Portman Grant.

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From this point forward, Sawa, who had been present at the December 7th meeting with Parkes, and who knew of Portman's persistent correspondence, had to walk a fine line between diplomacy and dissemblance. It was henceforth in his interest to delay any meaningful resolution of the Portman grant short of outright abandonment by the US Legation and to keep undisclosed the agreements reached with Parkes for as long as possible in hopes that the Americans would become discouraged with those delays and eventually go away. In De Long, he had the perfect counterpart for his diplomatic game of delay.

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De Long's initial reply of February [to another of Sawa's attempts to escape the railway grant] bears a note of astonishment "at its tenor" and, with a lawyer's eye to dates, De Long noted that despite his letter of resignation in November 1867, the Shogun had continued to transact the governmental business of Japan up to and including the date of the conclusion of the Battle of Fushimi, *after the date of the Portman grant,* and observed that the letter *in the name of the Emperor* formally notifying the diplomatic community of the Emperor's assumption of sovereignty didn't occur until the tenth day of the first month of the lunar new year that followed the Battle of Fushimi (i.e. in early February 1868) and that up to that date "all acts of the former or Tycoon's [Shogun's] Government are considered legal and binding." This was probably the better argument as between the two sides. Within only weeks of the Shōgun's tender of resignation in the fall of 1867 and the Imperial Court's assumption of the reins of government, it came to

the realization that it was ill equipped to do so, and had instructed Tokugawa Keiki to remain in place and to act in a *pro tempore* capacity. By the 20th of November, Van Valkenburgh had received confirmation of that fact from Ogasawara Iki no Kami. To make matters worse for the new government's position, the Imperial rescript accepting the Tokugawa resignation was ambiguous enough that it could have plausibly been susceptible to an interpretation that the Shogun was to continue as the Government until a grand council of state could be convoked. The government had also allowed Ogasawara to communicate the fact that, "Orders were then issued by the Mikado that until the Daimios should come up to Kioto, on which further orders would be issued, The Taikun [Shogun] should attend to business as heretofore," which he did in writing to Parkes on December 4th, 1867. Finally the State Department had received intelligence from Paris confirming that the Japanese Minister had likewise confirmed to the French that the Tokugawa régime was to remain in place pending further developments. In point of fact, the foreign powers continued to treat the Shōgunate as the *de facto* government of Japan and had dealt with it as such up to the Battle of Fushimi, without any protest from the Imperial Court in Kyōto. This was not, after all, the first time that Yoshinobu had used the act of resignation as a political gambit. Earlier, when he was serving as Regent for the Shōgun Iemochi, he had also resigned that office *in writing* as a power-play and had been asked by the Emperor to reconsider and had in fact subsequently resumed his duties. The foreign governments dealing with Japan knew only too well that they were conducting their foreign relations with a country where feudal intrigues were still very much a way of business. Further confusion was caused by the Imperial Court's contradictory decrees, the fact that active resistance had at the time been on-going (today that resistance is largely played-down as a "bloodless revolution" but at the time, when thousands of partisans were known to have been killed in the struggle, it appeared to be anything but), and by the inherent ambiguity the power-sharing arrangement between Emperor and Shōgun *by it's very nature*. In short, if there was any question as to the validity of the Portman Grant, that confusion was largely the fault of the Japanese Government and not of the US Legation. The legal position of the new government's assertion concerning Ogasawara's lack of authority would probably have been the losing one had the matter been submitted to international arbitration. Given the fluidity with which the Imperial Court at times acceded to or acquiesced in the Shōgun's exercise of Japanese sovereignty, it is perhaps more likely than not that the outcome of international arbitration reasonably could have held that the Imperial Court was stopped from contesting the authority of the *Bakufu* to have issued the Portman Grant in the name of and as the legitimate Government of Japan.

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In the end, the Wild West *parvenu* was simply out-maneuvered by Sawa and was bested by Parkes. The brash frontier country lawyer was simply no match for two seasoned diplomats. The result was probably inevitable absent US resolve to make an international incident out of the affair. Even the New York Times correspondent could see the realities of British influence. He had reported as early as January 1869 that, "Sir Harry Parkes, … leading man with the new Government, … holds all the trump cards in the diplomatic game just now; and the French are next. I fear the American

representative does not wield as strong an influence with the present Government as he did with the Tycoon." Parkes had backed the winning horse, and had stolen a march on the Americans. Roches had backed the losing horse and had gone home. Van Valkenburgh had proven to be a thorn in the side of the Imperial Cause with his pro-Tokugawa sympathies and the *Stonewall* affair and De Long had been a thorn in their side with his officious intermeddling in the Nagasaki Christianity affair, but an ineffective one. Moreover both Van Valkenburgh and Portman were in poor health and probably lacked Parkes' zeal. By September of 1870, the relationship between De Long and Portman had become so acrimonious due to other issues between the two men that De Long had dispatched the resident US Marshal to Portman's residence to remove papers and files under force of arms and had engineered Portman's removal from the Diplomatic Service. (In assessing blame, one commentator felt no need to explain beyond making the piquant observation that Portman was a gentleman known to have served quite creditably under three US Ministers to Japan without complaint, while De Long quarreled with almost every one with whom he had dealings.) One could hardly have expected successful results under such circumstances, and quite naturally, the American efforts withered on the vine. Portman, forced to resign his post as a result of De Long's machinations, undoubtedly lost interest in further pursuit of the grant, left Japan, and perished in the sinking of the Compagnie Générale Transatlantique's ocean liner *Ville du Havre* in 1873.

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Opposition to a Tokyo-Kobe Rail Line

Funds [to build the railway] were thereafter forthcoming but not without problems. When the fact of the foreign borrowing became known…, a great deal of popular opposition ensued. Hotels, innkeepers, porters, rickshaw runners, livery stables, and stagecoach[6] drivers alike all along the Tokaidō (the main Tōkyō – Kyōtō road) seized upon this in furtherance of their protests against the Tōkyō-Kobe railway scheme generally, as they saw their livelihoods being rendered obsolete. The concept of the Government floating a loan on foreign money markets was unheard of in Japan and highly controversial on grounds that any default would be grounds for armed intervention on the part of the creditor power, which could only further weaken Japan's already weak position as an independent nation among the ever increasing number of lands being annexed and colonized on the Asian mainland. Accordingly, the military minds at the Ministry of War, who previously had objected only on general grounds that scarce government funds were better spent on defense, now raised serious opposition on grounds that if the railway was a failure, it could jeopardize the safety of the realm. Writing in English in 1904, Kashima Shosuke, a young Japanese student of railway economics at Keiogijuku University (as Keio University was then known), described it in the following manner, "The story is full of many quarrels and caramities. [*sic*] Most of the people as well as the governmental officers thought that such action as to borrow money in the name of the government from the foreign nation is a kind of political crime [i.e., was treasonous]." However, the government stood firm on the matter, eventually the hue and cry of outrage subsided, the papers for the Oriental Bank loan were signed and proceeds were obtained. Greatly to its credit, and favorably reflecting on its

[6] The licensing of stage coach lines began around 1870.

subsequent financial management, during the remaining course of the Meiji reign, the Japanese government vowed never again to resort to foreign borrowing to finance government-projected railway lines, and for the most part kept to its vow: future development of the *state-owned* railway system would be primarily financed domestically.

Internal Politics and Building the Railway

In March of 1870, the Ministry of Civil Affairs and Finance was split in two, with the Ministry of Civil Affairs retaining authority over the project. The new-formed Ministry promptly set about recruiting and appointing officials for the new railway. Things went more smoothly for the Government with the arrival of two foreign staff members who would prove to be of incalculable value to what would eventually come to be known in English as the Imperial Japanese Government Railways. Close to home, the first was found in William W. Cargill, the manager of the local Oriental Bank branch office in Yokohama, who agreed to become the first Director of Railways and Telegraphs. He was both courteous and competent, and was said to have been the only *yatoi* (a shorthand term the Japanese called the foreign technical staff: more properly *o-yatoi-gaikōkujin* which roughly translates as "Official Government Foreign Employee") hired by the Japanese government ever officially to have been described as "indispensable." With a salary of ¥2,000 (elsewhere reported at $2,000 per annum and still elsewhere at £2,000 per annum), he was said to have been the highest paid of all the *yatoi* (whatever the currency) and was one of two *yatoi* whose annual pay was reportedly higher than the Prime Minister's. One of Cargill's first recommendations was the establishment of a Japanese national to serve under him as the Government's Chief Commissioner of Railways.

The *yatoi* employed building railways were British subjects. Those employed in the railway service were 19 in number in 1870, were at 60 by the end of 1871, 82 in 1872, 101 by the next year, and reached a maximum of 120 in 1877, according to sources. But they had dwindled down to 16 by June 30, 1884. This was due to the Japanese policy of replacing foreign engineers, surveyors, and skilled professionals with Japanese counterparts as quickly as they returned from study abroad, were trained by *yatoi* on the job, or had gained enough field experience to be confident and competent. The high price of *yatoi* salaries was an obvious factor for their demise. For example, Richard Trevithick (grandson and namesake of Richard Trevithick who built the world's first operating steam locomotive) worked as a *yatoi* for the government railways and was paid ¥675 a month and his brother Francis who joined him was paid ¥475. Later, the pace of replacing *yatoi* would accelerate even more – as quickly as graduates could be graduated from the newly-established *Kōbudaigakkō*; the Tōkyō Engineering College, later to become the Engineering Department of Tōkyō University, Japan's most prestigious university. In the first days of 1870 however, all manner of foreign staff were required and were sought, down to the level of engine driver. The UK and its colonies were scoured for suitable talent.

From Australia came the second highly valued *yatoi*; a 29 year old British railway engineer named Edmund Morel who was willing to relocate. Lay had found him working

there for the railway engineer Edwin Clarke (or Clark) and hired him to be the new undertaking's Chief Engineer. Parkes had endorsed him and the Government and The Oriental Bank had acceded to or ratified the arrangement after Lay's departure from the scene. Morel was a young man of fragile health with pulmonary problems. He had enrolled in King's College School in London, but never took a degree, largely as a result of his health-related absences and probably went to New Zealand and Australia to escape the poor air quality of London at a time when coal was burned on the hearth of every home. Nevertheless, in Morel, the Japanese found a tireless worker and willing teacher, and his memory is revered still in railway circles in Japan. Sources vary between the months of February, March, or April, depending on whether they refer to the date by the Japanese lunar calendar or Western Gregorian calendar, but Morel was hired in one of those months, arrived sometime in April, by the Western calendar, and lost no time in commencing a survey of the line on April 25, 1870 (or March 25th, under the Japanese calendar).

For Morel, there were many tasks requiring attention. "Coolies" had to be taught how to make cuttings or embankments in conformity with the necessary line profile. Graders had to be shown the proper way to prepare a roadbed, with its necessary drainage slopes and ditches. The Japanese track gangs had to be taught the basics of track laying, alignment, and ballasting, not to mention how to curve rails without kinks and build turnouts and crossings. On days when inclement weather had stopped work, Morel would take the Japanese workers into his own home and lecture them on engineering and surveying. The rails on the Shimbashi line and the earliest railways in Japan were the typical British bullhead (double-headed) rail, weighing 60 lbs. to the yard (quite a creditable weight for the time given the train weights envisioned) in 8 yard lengths, set in proper chairs, on cypress wood sleepers or crossties, but by the turn of the century, American style flat-bottom rails spiked directly to the crossties were in universal use. Initially, it had been proposed to import cast iron crossties from the UK for the line on the theory that wooden ties wouldn't withstand the climate. This would have entailed a significant expense; just one example of the needlessly inflated costs of the line that came to be laid at the feet of the British consultants by later critics. Morel protested that there was no shortage of cheap timber in Japan and prevailed in saving his hosts not only the cost of the sleepers themselves, but also import duties and shipping costs.

Foreign Workers and Building the Railway

Apparently, all along the new line there were scenes of more than average confusion, as English engineers and surveyors, Japanese laborers, and Japanese bureaucrats, all of who could be stubborn when it suited, learned how to make a go of it together *as a team*. Cross-cultural barriers may have been crossed a bit too far at times, toes were perhaps stepped on at times, language problems undoubtedly caused frustrations, and sensibilities may have been tried. As it was feared that reactionary elements in the country might stir the populace into violence against the *yatoi* workers in reaction to perceived foreign encroachments, it was initially ordered that each locality through which the line was being built would be responsible for providing body guards for each foreign worker, at a ratio of four bodyguards for each *yatoi.* But still work

muddled on, with Morel not only proving himself to be a tireless worker, but one who seemed to get along exceedingly well with the Japanese and who won their respect and admiration, in part because he never tired of teaching his Japanese assistants the hows-and-whys of a task and zealously advocated training them for the day when Japan would be self-sufficient as a rail building nation. As one contemporary writer put it, "Many difficulties that at first seemed great, vanished altogether as the native workmen and the engineer came to understand each other: many mistakes occurred, but a remarkably good feeling always existed between the native and foreign officials." But despite good feelings and Morel's best doings, things were apparently chaotic and disorganized to the point of considerable waste: Inoue himself remarked that the British engineers rejected rough-hewn wooden sleepers if they were not properly square and simply threw them away[7] and required stonemasons to finish all sides of stone block when only the sides being mortared were truly necessary: evidence of undue attention to appearances at a time when it was common knowledge that funds were short and that concerns over appearances should take a back-seat to concerns over economy. As many of the higher-paid British *yatoi* were diplomaed engineers and their Japanese hosts had no formal education in the field, it was often not feasible to stand down the British on technical disagreements or in the making of judgment calls as to necessity, and so considerable *gilding of the lily* crept in to the entire undertaking. Moreover, some unthinkable blunders by today's construction standards were made. Brunton comments, "The construction of this line… was… attended by a series of the most unfortunate mischances and mistakes. Buildings were erected, pulled down and re-erected in other places: numerous diversions were made; bridges were strengthened after completion; rails were twisted in every conceivable form and laid in such a way that it seemed impossible for a train to run over them." Brunton, in his usual jingoist and condescending way, points the finger at Cargill for "supinely ikado[ing] the interference of the native officials with their operations" and the "self-willed, self-satisfied, and over-bearing" nature of the Japanese. (For their part, the Japanese could have used almost exactly the same words in their descriptions of Brunton, Parkes, and Lay.) Brunton's antipathy for the undertaking is perhaps a reaction to the fact that Morel, a relative novice who had no formal degree, had been selected for the post of Chief Engineer, when Brunton had many years of railway service to his credit. Brunton was first and foremost a railway man, both by degree and by training, after all. One would almost be disposed to discount Brunton's account as so much "I told you so" self-indulgence were it not for the fact that, in its essentials, it has been confirmed by other sources.

In an article in one of the engineering journals of the day, it is noted that while the roadbed had been built to a width to allow for double-tracking of the line in the future, the initial line was laid right down the center, which meant the entire existing trackage had to be taken up and moved to one side of the roadbed when the decision was made to

[7] At the height of the Union Pacific Railroad's cash crisis during building of the US Transcontinental Railroad, cross-ties not far removed from rough logs, with only the necessary faces finished, were used in order to save the cost of milling them into uniform and square beams. Similarly ingenious measures would have been appropriate given the tight financial condition of Japan, which was then what we would today characterize as a Third World country, but such departures from British engineering orthodoxy would have been anathema to the average British engineer.

double-track; this undoubtedly the most unthinkable blunder of all, and probably evidences official interference on the part of short-sighted Japanese functionaries who opted for neat appearances over common-sense engineering reason. No engineer of any worth would have permitted such a blatant misstep. The article also notes that the trackage in the yards was arranged so poorly at Yokohama and Tōkyō that they were essentially taken up, redesigned, and re-laid. Even allowing for some self-congratulating jingoistic commentary, and discounting accordingly, the clear message is that all was not well on the Shimbashi line. Lay [a British advisor] himself must have had some misgivings as to Morel's abilities, as he had written to the Government, before the parting of ways, that "his [Morel's] technical skills may prove not adequate for the task."

Edmund Gregory Holtham was another British engineer who was hired and shipped out to Japan among the second wave of "new hires." As such he arrived too late to become involved in the building of the Shimbashi line, but on arrival in Yokohama in 1873 he was immediately struck by the poor workmanship evident in the line, and records that fact prominently it in his memoirs. Holtham wrote,

> "This little piece of railway of eighteen miles, the first constructed in the country, was a model almost of what things should not be, from the rotting wooden drains to the ambitious terminal stations, that always suggested by their arrangement the idea that they had been cast, from some region under heaven, with a pitchfork into the places where they were now visible."

Perhaps this is fitting of the first railway in Japan; Holtham's description bears an uncanny and remarkable parallel to Japan's creation myth, for according to the most ancient Japanese beliefs, the Japanese archipelago itself was created in a similar fashion. The Kojiki (the "Records of Ancient Matters"), an 8th century Japanese text meant to record its earliest history, recounts that the god and goddess Izanagi and Izanami (who are to the Japanese as Adam and Eve are to Christendom) were given a jeweled spear by the deities of the heavens, who commanded them to create the earth and bade them go. While they stood on the Floating Bridge of Heaven, which lay between the heavens and earth, they saw that the world had not yet condensed and was still a sea of primeval ooze. Perplexed, Inazagi suggested they test the waters with the spear, and when he drew the spear back out from the brine, the droplets that fell helter-skelter off its jeweled tip immediately coagulated into the first of the islands that are now Japan as they randomly hit the sea. Had Holtham been more conversant with Japanese cultural history, he would have perhaps seen the ancient parallel to his own assessment with deeper appreciation, and perhaps would have attributed the pitchfork work to the hand of Izanagi.

One contemporary writer gives us a further insight into some of the reasons for disorganization, specifically the tasks that were laid before the first engineers in training the Japanese laborers who were often opposed to abandoning their traditional construction methods in favor of what the British saw as more efficient Western techniques. At a time when the steam-shovel excavator was only a few years old as an invention in the West, there were precious few to be found in Europe or American, let alone Japan, where there were none. Excavation had to be done by hand, and the

Japanese "coolies" initially refused to use wheelbarrows to haul away the spoil, insisting instead on using two baskets slung on each end of a bamboo shoulder pole in the time honored Japanese way of doing the job. Another story is told that the first proud Japanese surveyors, taken for training from the better educated samurai class, initially refused to remove the two swords always carried by samurai as a badge of class distinction, despite the fact that the steel of the sword blades interfered with the survey instruments and caused faulty readings. (The carrying of swords by the samurai class had not yet been outlawed.) Time had to be taken out from the project to negotiate a compromise whereby the samurai would temporarily put aside their swords when using the instruments, and take them back up on resumption of other duties.

The evident lack of concern as to the proper laying out of railway facilities continued in a lackadaisical manner. Yards and turnout patterns were poorly laid out, with turnouts placed in a manner to impede smooth running. Even by 1894, when the desire for increased speeds should have resulted in more concern being paid to track alignment in stations, *yatoi* IJGR employee, Francis Trevithick, noted "if the line through the stations was constructed for through running, and devoid of curves on approaching the facing points, a speed of 35 miles per hour could be maintained without any difficulty… the points and signal arrangements are of the most primitive methods, and are a good many years behind the Railway Age."

Completing the Shimbashi Line

Another Englishman, R. Vicars Boyle, C.S.I., who had considerable prior experience building railways in India, took Morel's place [after Morel's death], and work plodded on. In the event, it took *two and one half years* to build the 18-mile stretch of single-track railway. At the end of construction, the initial million pound loan (which initially had been assumed to be sufficient to build the larger portion of the entire projected network from Tōkyō all the way to Ōsaka and Kobe) had been almost entirely exhausted. Granted, approximately two thirds of it had been diverted by the government to pay other pressing needs of modernization, but of the £300,000 actually allotted to rail building, all that was accomplished (at a time when a top quality British-built locomotive could be purchased new for about £1,500) was the Shimbashi line and a *fraction* of preliminary works on the Ōsaka to Kobe section that had been chosen as the next phase (and the *entire* Kobe-Ōsaka section was only some twenty miles in length).

Despite the various obstacles, it is still difficult to justify why Morel, Boyle, their crews, and the Railway Bureau were as slow as they were building a *single track* line of railway only 18 miles long on the flatland of an alluvial plain, with no tunnels, in an area where there was no shortage of cheap labor from a populous workforce, with only one bridge worthy of mention, and where any urban demolition necessary would have almost entirely consisted of smallish wooden houses or other wooden structures that were easily torn down. Moreover, one reads no-where of any serious shipping delay that disrupted the supply line of equipment and materials being shipped out from the UK. Of course, track laying work is accomplished at a far quicker rate of progress than the civil engineering works that precede it, which are undoubtedly one of the prime suspects for the delay, since one has to assume that if the roadbed and bridges – the civil engineering

works – had been ready, the entire trackage, including station yards and sidings, could *easily* have been laid in a month, including proper ballasting.

By way of comparison, when the Central Pacific Railroad broke ground for the western portion of the US Transcontinental Railroad on January 8, 1863, it did so largely with new crews of workers unaccustomed to railway building who had to learn railway construction techniques and who used the same tools and technologies as were used in Japan. Bridges on both lines were to be made of wood. Furthermore, the Central Pacific was not managed by seasoned professional railroad executives, but by a group of Sacramento shopkeepers, assisted by a small group of professional engineers, not too different from the administrative structure that existed in Japan. Similar to the Shimbashi line, the Central Pacific was building a single-track railway, but through much more rugged terrain. The two lines were not that much different in respect of equipment and materials acquisition and shipping costs. All rails, locomotives, rolling stock, and many tools and specialized supplies for the Central Pacific had to be shipped from the Eastern US (there were no railway equipment factories *per se* then in California and only one foundry of any note) either around South America and Cape Horn which took months, or to Panama and off-loaded to cross the isthmus by rail or mule team, then back aboard ship for transit on to California… a supply situation similar to the one facing the builders of the Shimbashi line. Later, after the first Chinese work crews had been hired in 1865, the Central Pacific faced the same linguistic and cultural challenges that the British engineers faced in Japan. In fact, except in matters of terrain, the relative initial situations of the two undertakings were notably similar. Nevertheless, the Central Pacific had completed all its surveys, made its gradings, fills and cuts, built its bridging, finished its roadbed, laid its first rail (Oct. 26, 1863), and reached Roseville, California, where the foothills end and the Sierra Nevada mountains begin, (126 ft. in elevation above their start point) by February 29, 1864. The distance of the line to Roseville was 18 miles, exactly the length of the Shimbashi line. It took the Central Pacific Railroad only thirteen months (over more difficult terrain as a start-up enterprise with new crews and inexperienced management) to build the exact same length of line that would take 2 ½ years to build along the shores of Tōkyō Bay: less than half the time. In fact, by 2 ½ years after groundbreaking, the Central Pacific had succeeded in opening 43 miles of operating railway line through *mountain* terrain to Clipper Gap, California, elevation 1766 feet, a full one-quarter of the way to the line's summit, up the steeper face of the Sierra Nevada mountain range; ample proof of what could have been accomplished by motivated contemporaries with the same basic tools. In fact, when its construction crews were fine-tuned to the peak of their performance in 1869, the Chinese track crews of the Central Pacific laid over ten miles of track (admittedly on pre-readied roadbed) on the mere whim of a bet in *less than twelve hours*.

Even assuming the fact that the English built railways initially to a higher standard of engineering permanency than their backwoods American cousins, e.g. proper iron bridges in place of the rickety wooden trestles one sees in photos of the Wild West (which in the case of the Shimbashi line simply wasn't done; as all the bridging was of wood) or true brick station houses in place of slap-dash shacks put up overnight on the prairie, etc., one still can't account for the clearly excessive amount of time required for

construction of a mere wisp of a railway only 18 miles in length. One searches about for an apology, but all that seems plausible is the fact that the government didn't prosecute the right-of-way acquisition phase as competently as it should have[8], was not as organized or decisive as it should have been, unduly interfered with its *yatoi* in matters where it lacked proper engineering judgment, or that the British engineers and Japanese work crews simply dithered. One *yatoi's* subsequent recollection recalls, "[T]he difficulties artificially created by landowners, and by that section of the Japanese public which secretly viewed the introduction of foreign inventions with disfavour, notwithstanding the progress already made, tended perceptibly to thwart and delay completion of the undertaking." That construction had started before the government had created the Kobushō and Railway Bureau obviously didn't help matters. Still, it would be difficult to imagine, as friendly as Itō, Inoue, and Yamao were, that Inoue and Yamao weren't fairly current with matters from their friend Itō by the time he turned direction over to them. While there may have been a "lurch high up" in the administrative machinery, it is difficult to assign to this one event the fact that it took *two and one half years* to build what, by standards of both engineering difficulty and distance, was an insignificant line. The untoward delay was probably caused by a confluence of all these factors.

As construction neared completion, one final, crowning obstacle had presented itself. The last segment of line between Shinagawa and Shimbashi was delayed by the military, which was being reactionary and would not allow tracks to be built on lands reserved for military use that stood between Shinagawa and the Tōkyō terminus. One faction of the Army had actually tried by force to prevent surveying for the projected line. The military was decidedly anti-foreign at this time, and viewed railways as merely an instrumentality that would facilitate invasion by a foreign army with a colonial agenda. Thus, almost from inception, railway building in Japan faced organized and virulent opposition from the Army.

As an expedient, Ōkuma brokered a compromise whereby the line between these points was re-routed onto a two mile long causeway, which had to be quickly designed of stone pitching protected on the bay-ward side by small pilings and built on the tidal mudflats of Tōkyō Bay to avoid the military grounds altogether. This delayed opening of the entire length of line another five months until October. Of course, as a result, the fishermen who lived along the shore in that area complained bitterly that the causeway blocked their access to fishing waters, but they were easier to contend with than the Army. The causeway was breached and bridged at intervals, permitting access to Tōkyō Bay. An unfortunate result of this compromise causeway was the fact that the line was thereafter often prone to wash-outs during the typhoon season when the waters of Tōkyō

[8] At this time, private ownership of land, as we know it in the modern sense and as was recognized by the first *Chiken* (certificates of land ownership) given out by the new Government starting in January 1871, didn't even exist, and thus couldn't have given rise to any need of speedier condemnation procedures due to relatively weak eminent domain laws, as has been remarked was the case with later railway building. Land was still feudally held (generally as *State lands*) at the time of building the Shimbashi line, although certain land, particularly in Tōkyō, was classified as *bukeji* (samurai land) and *choji* (townsmen's land).

Bay were driven over the causeway in successive waves, carrying away ballast, dislocating track, and frequently causing traffic delays.

At long last, October 14, 1872 (given as September 12 under the Japanese calendar) was chosen as the official opening date for the entire line. The day was declared to be a general holiday for all government offices. The Emperor himself graciously agreed to officiate, and arrived at Shimbashi Station in his new Western style State Coach, drawn by a team of four matched horses. According to John Black this would be the first recorded public appearance of a Japanese Emperor in the modern age (although the Emperor had in fact publicly reviewed troop manœuvres two years previously and earlier that very summer); commoners customarily had never been allowed to see the Emperors prior to that time.

William Elliot Griffis, one of the professors at what would later be called the Imperial University of Tokio (Tōkyō University) described the significance of the event in rather florid prose,

> "The 14th of October was a day of matchless autumnal beauty and ineffable influence. The sun rose cloudlessly on the Sunrise Land. Fuji blushed at dawn out of the roseate deeps of space, and on stainless blue printed its white magnificence all day long, and in the mystic twilight sunk in floods of golden splendor, resting at night with its head among the stars. On that auspicious day, the Mikado, princes of the blood, court nobles, the "flowery nobility" of ex-daimios, and guests, representing the literature, science, art, and arms of Japan, in flowing picturesque costume; the foreign Diplomatic Corps, in tight cloth smeared with gold; the embassadors of Liu Kiu[9], the Ainō chiefs, and officials in modern dress, made the procession, that, underneath arches of camellias, azaleas, and chrysanthemums, moved into the stone-built depot, and, before twenty thousand spectators, stepped into the train. It was a sublime moment, when, before that august array of rank and fame, and myriads of his subjects, the one hundred and twenty-third representative of the imperial line declared the road open. The young emperor beheld with deep emotion the presence of so many human beings. As the train moved, the weird strains of the national hymn of Japan, first heard before the Roman empire fell or Charlemagne ruled, were played. Empires had risen, flourished, and passed away since those sounds were first attuned. To-day Japan, fresh and vigorous, with new blood in her heart, was taking an upward step in life. May the Almighty Disposer grant the island empire strength, national unity, and noble purpose while the world stands!
>
> These were my thoughts as the smoke puffed and the wheels revolved. Past flower-decked stations, the train moved on. When at Kanagawa, puffs of smoke and tongues of flame leaped from the fleet of the foreign war-ships as their broadsides thundered the congratulations of Christendom to New Japan. But all

[9] i.e. from the King of the Ryukyu Islands, as the Okinawan Islands, not yet fully under Japanese sovereignty, were then known.

> ceremony, pageant, and loyal hosannas paled before the sublime significance of the act of the ikado, when four of his subjects, in the plain garb of merchants, stood in the presence of majesty, and read an address of congratulation to which the emperor replied. The merchant face to face with the ikado? The lowest social class before traditional divinity? It was a political miracle. I saw in that scene a moral grandeur that measured itself against centuries of feudalism. What were war's victories, or the pomp of courts, compared with that moment when Japanese social progress and national regeneration touched high-water mark?

At Yokohama, the Emperor also received congratulations from Count Alexandro Fea, the Italian Minister on behalf of the diplomatic community. The address on behalf of the Japanese merchants that broke centuries of Confucian tradition was given by Hara Sensaburō. Apparently, this was also the first time the Emperor had ever been addressed by a *commoner*, let alone a merchant. (Under the traditional Confucian value system that Japan had gradually adopted from China, merchants were viewed as one of the lowest social classes.) While seeming quaint today, for its time, it truly was *momentous*. The new railway was not only revolutionizing land transport in Japan; it had deliberately been chosen as a vehicle to revolutionize social order – where only five years before the average citizen was little more than a medieval serf, henceforth he would take a more active role in the polity of the realm. The Emperor also addressed some special words of thanks to Itō and Ōkuma for their endeavors which by today's standards seem equally quaint: "We express Our great satisfaction for the undeviating obedience to Our will for the introduction of railways, and the overcoming of all opposition and difficulties, and the consequent completion of the work We witness to-day." The Emperor's public appearance in *naoshi,* full traditional court dress, occurred one more time: the next month when he was invited to inspect one of the new Russian ironclads that had arrived in Yokohama harbor. After that appearance, on all future public occasions, the Emperor wore Western style clothing, usually a full dress military uniform.

It is known that the lead driver of that nine car inaugural *omeshi ressha* (Imperial Train) was Thomas Hart, who arrived at the platform of Yokohama station about fifteen minutes earlier than scheduled arrival time… such was his excitement… at which time last minute preparations were still underway, to the embarrassment of all, and for which driver Hart received a severe reprimand. His fireman that day was Hattori Tokizo, who had gone over-budget the night before in preparation for the event and bought a new velvet pair of *tabi*, the thong-toed socks worn with Japanese sandals, so as to look his best that opening day. Contemporary reports indicate that the train was double-headed by two engines, Nos. 2 & 5, a pair of the Sharp-Stewart locomotives, which had gained the reputation of being the best engines out of the ten[10]. One of the Japanese participants on the scene is said to have taken such pity on one of the poor locomotives which he mistook to be huffing and sweating under the exertions of having pulled its train that he dowsed it with a bucket of water to cool it down, only to receive his own chastisement.

[10] In fact, out of the original 5 locomotive types purchased, the only specimens subsequently re-ordered were the Sharp-Stewarts.

From this occasion one of the most thread-bare and apocryphal of anecdotes about early railways in Japan seems to have arisen: that quite a number of the participants, on taking their first train ride that day, seem to have unthinkingly equated the passenger carriages with traditional palanquins (*kagō)* in which one rode without shoes, which were carried by the porters or sometimes placed on the roof or in a storage compartment during the trip according to proper Japanese custom. Many of the Japanese accordingly removed their footgear before entraining as a conditioned response, leaving all manner of shoe, slipper, and sandal on the platform of Shimbashi when the train departed, only to arrive at Yokohama discalced. Such was said to be the extent of the problem that in the earliest days, the railway assigned station staffers to supervise boarding and insure that sandals and *geta* were not left behind. That such a phenomenon existed is not to be doubted, but surely the problem had arisen and been noted well before the day of the official opening.

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The initial fare for a one-way trip the entire length of the line was 37 *sen* 5 *rin* for Lower Class, 75 *sen* for Middle Class, and 1 *yen* 12 *sen* 5 *rin* for Upper Class.[11] Class names were later changed to First, Second, and Third. Prof. Ericson points out that the third class fare was slightly higher than the fare of the small steamboats that plied the waters from Yokohama and Tōkyō, while Second Class fare was about 13 *sen* more than the usual fare of a rickshaw ride between the two cities. At that time, a third class fare of 37 *sen* 5 *rin* would have bought enough rice to feed a man for 4 ½ weeks, with a little change to spare. From this perspective, it can be seen that only the relatively well off could afford to travel by train.

At the time of planning, it was assumed that the working classes could not afford to avail themselves of rail travel. Yet, despite the relatively high third class fare, it was quickly learned that many of the riders were from the less fortunate classes, and in such numbers that 26 of the second class cars were quickly retro-fitted to carry more passengers per carriage and re-designated 3rd class. If the contemporary woodblock prints of the day are to be believed, windows were hurriedly cut into the side of some of the boxcars and wood plank seating installed to convert them to third class carriages as well. None of the passenger cars had any lavatories, as might befit an 18 mile long line where stations with public lavatories were spaced apart at an average distance of only 3 miles. These planning assumptions ran afoul of the new patrons to such a degree that within a year of the official opening, a new regulation had been promulgated imposing a *very* costly ¥10 fine on anyone guilty of urinating from the windows or end platforms of the passenger carriages, prompting much joking at the time among the ribald as to whether mere flatulence would result in a fine of five yen. Like it or not, the fledgling railway was destined to be one of the front-line bringers of "modernization," as then defined, to the less fortunate classes of Japan. Not just in the matter of footwear and lavatories did the railway effect radical social changes. The "wickets" (as the ticketing gates were called) to the train platform were closed ten minutes before the scheduled departure time

[11] At that time, the *Yen* was subdivided into one hundred *Sen, a Sen into ten Rin, a Rin into 10 Mō* or *Mon*, a *Mon* into 10 *Shu*, and 1 *Shu* into 10 *Kotsu*, although the monetary units below the *Mō* were used only in calculations, as there were no coins below that level.

of all trains in those earliest days, prompting the introduction of a modern concept of time and time management to classes that were of a pre-industrial mindset that measured time in increments no smaller than two-hour units before *timetables* obliged them to adapt and adopt. Indeed, a railway train or station were likely to be the *only* place that an average Japanese commoner (with the exception of those who lived in treaty ports) of that period would have encountered a foreigner, and as such, they took on a certain *cachet* as a place where one might profit from the exposure to gain worldly knowledge and experience. The public nature of the new conveyance was also not lost upon the populace. One source has recorded the social phenomenon that more educated gentlemen would, in early Meiji times, often use the captive audience of a railway carriage as an audience for making political speeches, while railway officials instructing the offender to stop would sometimes find themselves being lectured on the newly-appreciated principle of *freedom of speech.*

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Osaka-Kobe Rail Construction

December 1873 saw authorization to begin construction of the next segment of railway; a line starting at Kobe, the new deep water treaty port 20 miles west of Ōsaka along the coast of the Ōsaka Bay, running to Ōsaka, the second largest city in the realm. The initial surveys for this line were started in July 1870, and as tasks were completed on the Shimbashi line and personnel could be spared, they were sent by steamer along the coast to the new port of Kobe. By the close of 1871 the survey for the line had been staked out. As with the first line, matters had not gone well in the Kobe – Ōsaka region, and Inoue thought things could be managed better close at hand and petitioned the government in early 1874 to move the main offices of the Railway Bureau to the Ōsaka – Kobe area, in order to be closer to construction. There was more to be done in Kobe than in Tōkyō. The management of daily operations of the Shimbashi line could have been handled more easily from a remote location than actual construction could have, so from a practical viewpoint his proposal made a considerable amount of sense. Unexpectedly, his petition was denied by Yamao Yozo, with whom friction had been developing, and this request set the two men on such a collision course that Inoue resigned in July of 1873. Itō eventually mended the rift, and Inoue resumed his office in January of 1874. As part of the rapprochement, Inoue's relocation request was granted, and the seat of the Railway Bureau was thereupon temporarily moved to Kobe.

There were some of the first real construction obstacles to be faced in the projected 20 ¼ mile segment from Kobe to Ōsaka, first to be built of the Kobe-Kyōto route. The first serious bridging (necessitating use of the first iron bridges) and the first "tunneling" of a sort was encountered on this section. Being volcanic in nature, the principal geographic feature of the Japanese islands is a central mountainous range, to quite high elevations at some points, with plains along the coasts. It is said that only some 17% of Japan is non-mountainous. The mountains of Honshū, the main island on which Tōkyō, Ōsaka, and Kyōto are located, run almost the entire length of the island in a backbone formation along its longitudinal centerline. A corollary to this is the fact that many rivers in Japan transform themselves from small streams of modest width in dry months to raging torrents hundreds of feet wide during the winter melt-off and rainy

months, as the steep courses of the rivers descending from high altitudes along steep mountain slopes give rise to water flowing at swift speeds. Consequently, rivers often overflowed what were their normal channels the rest of the year, resulting in frequent devastating floods. Because of this, bridging had to be undertaken with greater caution and much sturdier bridges had to be constructed than ever would have been the case with the tamer rivers found in Great Britain or the eastern seaboard of the United States. Streams that could have been crossed easily by a small span of 50 feet during most of the year had to be built many times longer to allow for the wide raging torrents. Additionally, because of its underlying geology and volcanic nature, Japan was highly earthquake prone, and bridges had to be designed with this in mind at a time when seismology was only in its infancy. As a result, brick and mortar bridges with long arch spans were generally considered too brittle and were only rarely used. Wrought iron (later steel) bridges came to be preferred as they were sturdier than wood and more flexible than brick and mortar. The initial care that went into the design of the bridges along this and future railway lines would soon return dividends to the country. Indeed, it would soon be seen that the bridges the railways had built would often be the *only* bridges to withstand severe flooding, the native wooden bridges being washed out, leaving the railway bridges the only ones standing for miles around. The general populace of the time often pressed them into service for relief efforts and general road traffic until the floodwaters had calmed enough to use ferries and rebuilding roadway bridges could be commenced.

The Shimbashi line zero milepost surveyor, John Diak, was made the Resident Engineer of the new line. As it basically followed the coastline, mountains were not a problem, but several rivers were, and these were the chief obstacles. To add interest to the undertaking, it was not uncommon to find that rivers of the day were *above* the level of the surrounding countryside; fantastic as this may seem. As the mountain-sourced currents were strong, the streams had a higher capacity to carry large amounts of silt; accordingly as they reached flatter land and their currents slowed the suspended silt settled, and silting occurred at a quicker rate. As the rivers silted, they became much more prone to flooding due to their increasingly shallow riverbeds. Because large scale dredging was beyond the technical capabilities of the Japanese prior to the arrival of Western dredging technology, they coped with the problem by expedient of building levees to contain the rivers. Because of this, the level of many rivers in Japan actually rose over time. The silting and levee-building cycle had continued for centuries, so that by the time the first of Morel's engineers arrived in 1870, some of the river courses were as much as 40 feet above the level of the surrounding countryside. Three such rivers were encountered along the Kobe-Ōsaka section, and it was seen as a better course to tunnel under them than to bridge over them.

After the final survey, acquisition of right of way, and staking of the line, usually the first works put underway are tunnels, bridging, and excessively long cuttings or embankments, as these are the works likely to take the longest time to complete, and so it was to be for the Kobe-Ōsaka section, which was probably a bit unfortunate, as this came during the time of the inordinate disorganization seen on the Shimbashi line. Some of the disorganization evidently spilled over, for when Holtham arrived at Kobe, he was

disgusted to see that of the three tunnels; one had been built wide enough for a double line, while two had been built only wide enough for a single line, yet another example of the waste and poor planning that occurred in the starting days of railway building.

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Opening the Osaka-Kobe Line, and The Emperor's Exciting Ride

Most of the shop and maintenance buildings were located in Kobe, and were chiefly built of corrugated iron to save cost and time. In 1875, a wagon building works supplemental to the one also constructed at Shimbashi was completed and brought "on line" in Kobe so that the rolling stock of passenger and freight cars could be built in Japan without having to import rolling stock from the UK, as had been done initially. Walter McKenzie Smith was the first Works Superintendent. Steel parts such as wheels, axles, and buffing and draw gear were still imported from England, as Japan had no steel mills yet. But the Japanese have a long history of carpentry and skilled joinery and soon were turning out a very good product, even by the exacting standards of the British commentators of the day. Holtham, who was a frequent visitor to Kobe at this time, recalls how this was the time when many of the old castles of the local *daimyō* had been ordered torn down by government decree. He goes on to recount that the Kobe works "turned some seasoned timbers from pulled down feudal castles into railway carriages." In both the Kobe and Shimbashi carshops, the underframe timbers of both passenger and goods cars were usually *keyaki* (Japanese Elm) while the floors, sides, and roof were made of *hinoki* (similar to red pine). Initially hinoki, kiou, or matsu (pine) was used for the crossties of the railway, but by 1907 kuri, similar to chestnut, was in almost universal use according to the Nippon Railway's Superintendent of Way that year, S. Sugiura. On the Hokkaidō Tanko Tetsudō, the Chief Engineer Ōmura Takuichi reported that chestnut, oak, elm, spruce and yatitamo (similar to elm) were used by his line that same year. As creosote was not at that time manufactured in Japan, and as the cost of importing it was prohibitive, due to its highly flammable nature rendering it a shipping hazard, ties on the initial lines were not treated until domestic creosote production came into being. Progress in attaining self-sufficiency in car building was such that as early as 1885, a British diplomatic report mentions that Japan was producing her own rolling stock and largely was no longer importing it from England, only being dependent on foreign builders for locomotives. In fact, the shops at Shimbashi and Kobe met not only the needs of the government railways, but built all the rolling stock for such soon-to-be formed early private lines as the Nippon Tetsudō, Ryomo Tetsudō, and Kōbu Tetsudō.

[Building continued and the line to Kyoto was prepared for an official opening ceremony set for February 5th, 1877.]

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Holtham takes the story up on the morning of that ceremony:

"The [Kyōto station] offices were fitted up as withdrawing and reception rooms, and a sort of stage was built out in front of the station, carpeted and hung round

with tapestry, with a gorgeous throne all proper. All the approaches were decorated, stands for spectators arranged, and curious devices set up, such as gigantic lanterns, dwarf Fujisans[12], ships, engines, etc., with Venetian masts, strings of lanterns and flags, and so on, and the same at both Ōsaka and Kobe. The saloon carriage upon which the energies of the locomotive superintendent and the carriage department had been concentrated for six months past, was secretly run up to Kiyoto by night, as a thing "that mote not be prophaned of common eyes" and No. 20 engine[13] was painted and silvered up until she looked almost quite too beautiful, and the driver and stoker, even in their Sunday coats, were by no means congruous; so they were hidden in a grove of evergreen cunningly attached to the cab…I had to run down to Kobe, where I secured the last hat there was in the place, so as to make a fitting appearance at the impending solemnity. We had been warned that nothing less than dress coats and white chokers, with the regulation chimney-pot hats, would qualify us to stand over against the foreign representatives upon the platforms at Kiyoto, Ōsaka, and Kobe, subject to the gaze of thousands, while addresses were being presented and prayers recited. Of course some priests were mixed up in the matter, as indeed has been the case elsewhere than in Japan on occasion of railway festivities within my knowledge… The morning, though bitterly cold until the sun was well up, turned out bright and glorious, and we soon warmed up as the Imperial train started away from Kiyoto, amid great firing of guns and shouts from the populace. We engineers had a compartment next the engine, with a friendly reporter and a pack of cards. At Ōsaka, a stoppage, and grave solemnities, firing of cannon, addresses, general enthusiasm, etc.: then en route for Kobe, where more solemnities were perpetrated … Then there was a grand scramble for lunch, laid out in a room thirty feet by twenty, for five hundred people, one hungry engineer, who had been up since half past five that morning, getting a French roll and a bottle of beer for his share. The word soon passed that the Mikado had had enough of it… [apparently having been forewarned that a certain overly-zealous Kobe foreign consul had prepared a written harangue in an attempt to corner the Emperor *à la Parkes* which Meiji naturally desired to avoid and circumvented by announcing an early departure]… and… at last… we started back, making the best of our way to Kiyoto without a stoppage. We arrived there safely, notwithstanding that we were turned through a siding at one station, instead of going by the direct [main] line, insomuch that after charging the points at a rate of thirty-five miles an hour, we were not quite sure if we were all right for a few seconds; and afterwards were desolated by the barely averted destruction of our Traffic Manager's [Walter Page Smith's] head against one of his own signal boxes at Ōsaka, which would have spoilt all the fun we derived from hearing the ambitious consul's private address to the Mikado, read by our friend the reporter,

[12] This time, instead of a tree being used, the Imperial Household Agency cleverly disguised a large unsightly piece of manufacturing machinery sitting at the station, using it as the frame over which their replica of Mt. Fuji was built.

[13] One of the newly arrived "second wave" of imports; originally a Kitson 0-6-0 engine for freight, it that had been converted quite adeptly to a beautifully proportioned 4-4-0 passenger engine at Kobe shops; surely one of the rarest events in the history of locomotive rebuilding: a lowly freight engine rebuilt as an express passenger locomotive.

who was the sole recipient of the document. However, we did the forty-seven miles in an hour and thirty-five minutes; say a rate of thirty-five miles an hour all through, which was quite fast enough for our narrow gauge; and his Imperial Majesty was good enough to cut short the final ceremony at Kiyoto, so that we were free at half-past four or thereabouts. The prettiest feature of the whole affair, to my mind, was the conduct of the country people all along the route. Wherever suitable ground could be found outside the fence, about on a level with the rails, spaces had been marked off to be occupied by the school children from the various villages of the district; some of these spaces extended alongside the line for half a mile together. Each school was in [the] charge of its teachers and the mayors and principal inhabitants of the villages, and as the Imperial train approached and passed the bands of eager girls or wondering-eyed boys bowed their heads and rose again,[14] changing the bright field of expectant faces into an expanse of black polls, and then breaking out again with the flush of accomplished ceremony as the little ones clapped their hands and gazed after the vanishing train. The successive movement of the different corps of children had an effect like the passing of a summer cloud across a ripening cornfield. [Then back to Ōsaka later that evening for another celebratory banquet and, as there was no train back to Kyōto, taking the last train to Kobe after the banquet to put up at Headquarters] …and somebody lost his boots on the way. It was for a time supposed that he had put them on the step [i.e., the running board of the passenger car] to be [picked up by his servant (undoubtedly booked in a lower class compartment) and] cleaned, [en route, so as to have clean boots] before he should get up in the morning, on entering the carriage; but at last there were found in the next compartment. And so finally we all got to bed and ended this eventful day."

The incident of "charging the points at a rate of thirty-five miles an hour" is remarkable. Holtham is implicitly relating that the Meiji Emperor was a passenger aboard a train that came close to an accident. One of the points or switches at Ōsaka station had been improperly set, the train was routed through a siding that required reduced speed instead of along the mainline through the station too suddenly for the driver to react. The train lurched violently at a speed far too excessive for the swerves of a sudden "S curve", and Page Smith, who as traffic manager was responsible for train movements, had on impulse very improvidently popped his head out of the train carriage window to see what was amiss, narrowly averting being hit by a passing signalman's cabin as the train sped by.

Every time Queen Victoria traveled by train, all "points" or "switches" along the route were routinely padlocked in the proper direction as a security precaution and a decoy "pilot train" ran before the actual Royal Train to prevent just such occurrences. In America, switches were routinely "spiked" (i.e. nailed in place with railroad spikes to prevent accidental or intentional misrouting) along routes of Presidential train travel. Here is evidence that such practices had yet to be introduced in Japan. It's amazing that

[14] Between the opening of the Shimbashi line and the opening of this line, the practice of kneeling before the Emperor had been replaced with that of bowing as part of Meiji modernization efforts. At the opening of the Shimbashi line, Wirgmann noted that the crowds along the line *kneeled*.

out of the entire British operating staff on hand, all railway men, that *not one* had thought it necessary to adopt the routine practice of his native land and that no one had seen fit to take a similar precaution. One presumes that more adequate practices were adopted for the benefit of the Japanese monarch from that day forward. That Holtham was more concerned with his Traffic Manager's head than this serious security breach and operational failure evidences either embarrassment or the blithe manner in which Japanese railroading of the day was conducted, if not more. Almost certainly, Page Smith's head would have found itself charged for negligent criminal conduct before an Ōsaka consular court instead of "…against a signal box", and Parkes would have had a very regrettable diplomatic incident indeed on his hands given the stature of the personages involved had the train derailed with serious injury or loss of life.