Science Across the Pacific: American-Japanese Scientific and Cultural Contacts in the Late Nineteenth Century*

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Introduction: the Age of Steam and Electricity

The nineteenth century witnessed a remarkable dissemination of science and technology in the Western world and, from the point of view of history of science and technology, may very well be considered the age of steam and electricity. It was in the nineteenth century that the steam engine, already invented and utilized in the eighteenth century, came fully to exhibit its power in promoting the industrial revolution. It was also in this century that newly invented locomotives and steamships revolutionized means of transportation and spurred oceanic navigation. Thus steam replaced the labor of man and beast and the power of water and wind, served to step up the production of mining and manufacturing, drew distant areas together, and accelerated economic circulation and cultural exchange.

Moreover the cuttings and tunnels required for railway construction revealed a great deal of geological information and furnished new knowledge of the past (particularly of fossils), which led in part to the theory of evolution itself.

The discovery of the electric battery by Alessandro VOLTA in 1799 gave, for the first time, a continuous current of electricity. It facilitated the discoveries of electrolysis, the electric arc, the electro-magnet, the induction coil, the dynamo, and the electric motor. The invention of the electric telegraph and telephone followed. A new era of electricity was thus opened. Effective means of communication by electricity, of transportation by steam and later by electricity, were developed with great rapidity. The consequences were particularly remarkable in America, where both need and effectiveness were so great in developing that vast country's lightly populated land.

After settling the Mexican War and securing California as its territory, America's commercial as well as religious interests extended directly across the Pacific to the Far East. Since Japan lay on the line from San Francisco to Shanghai, the requirement of navigation by steam made it imperative to establish coaling stations somewhere in or near Japan. Thus the second paragraph of Chapter I

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