

Title	An observation on the foundation of Hitachi Seisakusho : prehistory of the Hitachi Trust
Sub Title	
Author	吉田, 正樹(Yoshida, Masaki)
Publisher	
Publication year	1977
Jtitle	Keio business review Vol.14, (1977.) ,p.97- 119
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260481-19770000-03920031

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AN OBSERVATION ON THE FOUNDATION OF HITACHI SEISAKUSHO

— prehistory of the Hitachi trust —

by

Masaki Yoshida

Foreword

This essay takes for its subject the process of foundation of the Hitachi Seisakusho Co., Ltd., which corresponds to the prehistory of the so-called Hitachi trust. The major matter of analysis is the evolution of its managerial strategy, factory administration and organization system for the period when it was a business-establishment (or division) of the Kuhara Kōgyōsho (Mining) Co., in other words, before it became an independent joint-stock company.

Today Hitachi is towering as a representative giant enterprise of Japan. This position has been born through continual competition with the *zaibatsu*-linked companies of the same industrial field (for example, Tokyo Shibaura Electric with Mitsui clique, Mitsubishi Electric with Mitsubishi, Fuji Electric with Furukawa and so forth) and such competition was the history of organizing an industrial trust of its own.

The competition with *zaibatsu* capital worked effects on management in various ways. For instance, since Hitachi had no main banks or other financial organs to back up it, capital had to be sought independently and from financiers of many lines. Similarly selling through influential trading firms (e.g., Tokyo Shibaura by Mitsui Bussan, Mitsubishi Electric by Mitsubishi Shōji) was impossible, which drove Hitachi to take a peculiar policy for sales expansion. In addition, the competition was also with the world's biggest heavy-electric-machinery capital (General Electric—Tokyo Shibaura, Westinghouse—Mitsubishi, Siemens—Fuji) which afflicted on Hitachi a sense of fear about technology and stimulated independent technical development. In any way, the record of such competition and management is what we must study in the light of Hitachi's whole history.

This essay has an intention, beside such a theme about Hitachi, to contribute something to the investigation of actual pictures of heavy industries in their growth period from the end-Meiji to Taishō era (about 1910 to 1920) which has been left untouched even today, and to consider a typical example of evolution of an independent company from some sector of a mining or manufacturing enterprise, not a few cases for that period. To speak of the latter theme, business-historical explanation of the foundation of joint-stock companies, which is intended here, is very scarce. We can mention a viewpoint that takes the

origin of such companies as a produce of multi-line enterprising in mining and so on, but detailed investigation of its processes has not been conducted. It cannot be said perfect to grasp it as separation of business or birth of new firms born from the strategy of parent companies. It is necessary to analyze the processes of growth and independence.

In this sense I endeavored to clarify the performances of Namihei Kodaira, has founder, as an enterpriser and the evolution of management in Hitachi as a key to answer the problem of business development. Yet my aim was greatly hampered by the condition of material. Major documents and literature used were the *Hitachi Kōjō 50-nen Shi* (Fifty-Year History of Hitachi Factory), *Hitachi Seisakusho Shi* (History of Hitachi), *Hitachi Seisakusho Nempu* (Annals of Hitachi), *Hitachi Kōzan Shi* (History of Hitachi Mine), *Nihon Kōgyō KK 50-nen Shi* (Fifty-Year History of Nihon Mining Co.), *Hitachi Rōdōundō Shi* (History of Labor Movement of Hitachi) and published memories of Chikara Kurata, Naosaburo Takao and others. And I utilized original manuscripts written for the above-said history of Hitachi Factory as well as many records of accounting.

I. The Birth of Hitachi Seisakusho

The growth of Hitachi Seisakusho¹⁾ dates back to a repair plant for electric machines used for mining work which belonged to Hitachi Mine of the Kuhara Mining Co. The exact year of the set-up of this workshop—then a tiny hut with an area of 130 sq. meters and 5 workers—is unknown, but we can find it in the Engineering Section of the Mine already by the beginning of Meiji 41st.

This late-Meiji era was the age when electric power began to be utilized as motive power widely in Japan's industry. Also for mining the use was active for exploitation, transport and refining of ores, and in Hitachi Mine it was positively introduced by Fusanosuke Kuhara, the proprietor, and Kodaira of the Engineering Section. Soon auxiliary functions of frequent repair and maintenance of motors and other machines due to violent consumption became necessary. The origin of Hitachi Works was thus for subsidiary purposes and, say, spontaneous. It was never an important part of management for which managers should contemplate long-run plans. It is said Kuhara himself had not even once intended enterprising of electric-machine manufacture.

Several conditions were necessary to embark in the business of machine manufacture in a repair workshop, a common being to all mines. First, there had to be technical ability, if of primary level. Secondly, more important was

1) The name Hitachi Seisakusho came into use since its promotion to the status of business-establishment (*jigyōsho*) of Kuhara Mining in December 28, 1911. For a year or so after the construction of manufacture plant, November 1910, it was called Shibanaï Works after its place name but not recognized as a business-establishment.

existence of men willing to undertake production as well as capitalists to provide necessary funds.

It was Namihei Kodaira, the then head of Engineering Section of Hitachi Mine, that promoted the enterprising of this manufacture. He had moved to Hitachi Mine from the Tokyo Electric Light Co. in response to Kuhara's request and was displaying ability in the mechanization of mine pit work. Primarily he was attempting to found a concern of electric-machine production by Kuhara's capital and undertook the Section from a long-run viewpoint of cultivating domestic technology.²⁾ Yet machines for mining were quickly used up, and since especially in Hitachi Mine, which was in a growth epoch at that time, operation of machines was wild (for example, damages of motors by over-heating were not a matter to care), cases of new procurement instead of repair were not few. This experience rendered it possible to cultivate capability of manufacture in a short time. A motor of 5 HP accomplished in March 1910 was the first product on the own design, drawing and procurement of parts by Hitachi's engineers.

However, this motor was nothing else but a type very common in power already at that time, and the success in this first work was not such that drew wide attention. Technological study and experiment of higher levels were impossible in a tiny plant as narrow as 130 sq. meters. A special plant was necessary but difficulties lay in the secure of funds and excellent engineers. In addition, Kuhara, on whom Kodaira wished to rely, did not at all show willingness to manufacture of electric machinery, though he was very earnest in mining. So Kodaira had to go through hardship in persuading him to pay money for plant construction.

On the assent of Kuhara to build a manufacture plant on a condition to perform both repair and manufacture,³⁾ Kodaira accomplished the construction of main plan by November 1910 and then gradually promoted expansion through the next year, until finally a factory of 9,500 sq. meters was built up including office and warehouse.

At the same time Kodaira endeavored to employ necessary engineers and succeeded in obtaining many graduates of the engineering and electric faculties of universities and technical colleges. It is said most of them came to such a post of tiny, local factory in sympathy with Kodaira's idea of domestic produc-

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- 2) Kodaira enjoyed friendship of Kuhara in Kosaka Mine and later on, when Kuhara entered business of Hitachi Mine, resigned Tokyo Electric Light and after 1906 made efforts in the modernization of Hitachi Mine as the head of Engineering Section. His ambition is described in detail in his biography and the company's history. His ability as an enterpriser was shown also in the business of carbide production and the establishment of electric power companies.
 - 3) According to a writer, Kodaira got Kuhara's sanction to this expenditure under the pretext of expanding the repair plant and actually constructed a manufacture plant (*Hitachi Seisakusho Shi*, p. 14). Yet in view of the personal talks between them, Kuhara's final assent is probable.

tion of electric machinery.⁴⁾ In these days it was a rare case that engineer bachelors of as many as ten persons were gathered, and supposedly Kodaira owed much to these endowed people in his success in the self-dependent cultivation of technology. On another hand plant workers were also increased counting 150 persons at the time of plant construction, and 33 managerial personnel and 360 workers by July 1911,⁵⁾ to hold the shape of a manufacture factory, if of a small scale. And in April 1910 a training house was attached for practical education of casting, lathing, electric work and so on.⁶⁾

Thus necessary plant, managerial personnel, and workers were provided to begin actual production of motor and kindered goods. But the results were continual failures due to wrong design, imperfect knowledge on products and unskilled workers. Even Hitachi Mine itself, the sole user, was putting no trust in them.

Accordingly often designer engineers themselves spent long time in the plant observing workers' operation. In such joint working of engineers and workers in the same place we can see the birth of the most primary stage of factory management. The origin of the weighty role of engineers in the later-day administrative form of Hitachi Seisakusho may be found at this period. For instance, the job-allocation table (*banwari-hyō*), once used, was a device by Kodaira, that is, a job-order paper describing workers' names and jobs allocated for each day.⁷⁾

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- 4) The absorption of able men had been started prior to the plant construction. By 1912 Kodaira had in his staff nearly ten engineer graduates of Tokyo Imperial University, and that at good pay, which should tell his strong position in Kuhara Mining. At that time even big firms were barely able to get one graduate or so from Imperial Universities. Among such bachelors who entered Hitachi at the period of foundation we can find Naosaburo Takao (later vice-president) in 1909, Kumeo Baba (later director) in 1910, Toshiichi Otani (of literary course, managerial staff) in 1911, Masaichi Akita, Sadaichi Morishima and Ryoji Ikeda (all later directors), Daigoro Yasukawa (later president of Yasukawa Electric) in 1912, among technical college graduates Saburo Musumi (later director) in 1909, Minoru Fukumoto (later director) in 1910, Kamejiro Takeuchi (later (vice-president) in 1911, and Chikara Kurata (later president) in 1912. It is said most of these men received instruction from Kodaira as trainees while in school and gathered there after graduation being charmed by his personality and grand aim. His active invitation was extended also over managerial personnel.
 - 5) *Rōdōundō Shi*, p. 8. The form of employment for university and college graduates was "main-office employee" while hire and discharge of workers were conducted by the level of each business division. As regards the wage levels Hitachi Mine held large competence of decision.
 - 6) The first-term students of this house were trainee employees of factory, but after the completion of a boarding house in the next year invitation was gradually extended regardless of residence.
 - 7) From manuscript papers and material used to write *Hitachi Kōjō 50-nen Shi*, now preserved in the Kodaira Memorial House of Hitachi Factory. Hereafter will be abridged as The Note.

As regards the calculation system before the separation from Hitachi Mine (to be explained later), many points are not clear, yet the following are known about repair work. An account was provided to transfer expenses for parts and out-order of fabrication excluding labor costs of the repair plant, to the mining and refining sections. Yet the aim of setting up a costing system at that time was not repair but manufacture of finished goods. Orders received, however, were not so numerous at first, and due to many failures and over-again work duplication of materials and parts used for the same work process was not rare. So accounting of real expenses expended was very complicated and difficult a task.⁸⁾ Earnest study of costing was conducted including examination by Kodaira himself and other engineers, and conceivably what strongly fostered the enforcement of costing system was the success in outward selling of May 1911 for the first time since the plant construction.

Although after the accomplishment of plant the products were increased to include motors—the principal one—, transformers and generators and the capacity was improved step by step through failures, they still remained to be of small power and low voltage, with Hitachi Mine being the sole customer. So it was an epoch-making event that supply of twenty 2 KVA transformers to the Ibaragi Electric Power Co. was achieved. Supposedly this sale made a factor that required a change of mind to those who were opposed to the enterprising of outer sale, because Kuhara himself was still holding strong objection and Hitachi Mining had approved manufacture work in its repair plant on humble appraisal that it would use the products if practically usable.

Kuhara's evaluation on this affair is not certain, yet some reasons are thinkable for the fact that the plant was still left to be attached to the Engineering Section of Hitachi Mine despite its actual production in an area of 9,500 sq. meters. First of all, Kuhara was indifferent to such sober business as electric-machine manufacture in contrast to his particular concern on gay business such as mining.⁹⁾ In addition, Hitachi Mine itself was taking a policy that foreign-made goods should be used for big-type equipment of high power and voltage. This was a popular thought in the end-Meiji era, which was making it difficult to find customers who dared to buy home-made goods.¹⁰⁾ It was all the more reasonable that Kuhara did not think that an obscure, urban factory would be successful.

However, in December 1911, one year after construction, Kuhara acknowledged the plant as a factory to be exclusively engaged in manufacture, separated it from Hitachi Mine, and promoted it to the status of business-establishment

8) *Kodaira Namihei no Jigyō to Hito*, Hitachi Seisakusho, p. 244.

9) It is said Kuhara was inactive in manufacture business even after the separation of Hitachi Works. (M. Udagawa, "Nissan Zaibatsu Seiritsu Zenshi," *Keiei Shirin*, vol. 9, No. 4, 1972, p. 86.)

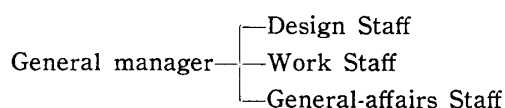
10) *Nihon Denki Kōgyō Shi*, p. 21.

of Kuhara Mining.¹¹⁾ A notice dated January 1, 1912 was sent to Kodaira stating "Hitachi Seisakusho (Works) shall be placed in Hitachi-mura, Taga-gun, Hitachi-no-Kuni, to carry on business about manufacture of electric and other machinery." Thus the Works was given the same position with Hitachi Mine in the Kuhara Mining Co., and the relations among the three were as follows.

Hitachi Mine shall give all orders of electric machines for its use to Hitachi Works.¹²⁾ Hitachi Works shall gain profits by outer sale, yet necessary funds for management shall be borrowed from Kuhara Mining on interest.¹³⁾ For this aim the Works shall make a budget for every half-year, and receipts and expenses for every month be reported to the main office of Kuhara Mining. These points exhibit deep color of particularity attendant to the birth of Hitachi Seisakusho, but it must be said a rare case in those days that a divisional establishment with independent accounting was born,¹⁴⁾ which strongly affected its management as will be seen later.

Kodaira, resigning the post of head of Engineering Section of Hitachi Mine, took office as the general manager (*shuji*) of Hitachi Works and embarked in its administration, laying down a position system comprising design, work and general-affairs staff (in charge of selling). In this year of 1912 full-scale production was started, yet defective products were not few in betrayal to the concession given by the Mine to place all of its orders on the Works. So the result was such that a strong wish to stop production was presented from the side of the former. Distrust against the ability of Works grew even to a situation that the Mine ordered motors for a year's use to America, one-sided breach of agreement.¹⁵⁾ The Works was barely able to sustain operation by transferring those orders canceled by Hitachi Mine to other mines Kuhara newly bought.

Figure 1.



The actual state of outer sales at that time is hardly ascertainable, yet it is unthinkable that orders received, both from Hitachi Mine and outside, counted large numbers because a motor of 275 HP manufactured in August 1912 was

11) By the organization of Kuhara Mining at that time, under Governor (Kuhara)—General Manager (Takeda) there were placed Main Office, two offices of Tokyo and Osaka, two mines of Hitachi and Higashiyama, and two factories of Tsukudajima Seisakusho and Hitachi Seisakusho. *Nihon Kōgyō KK 50-nen Shi*, p. 178.

12) *Nihon Denki-kōgyō Shi*, p. 704.

13) N. Takao, *Hitachi to Sono Hitobito*, p. 433.

14) Pay and bonus for managerial personnel of Hitachi Works were paid from Hitachi Mine. (*Nihon Denki-kōgyō Shi*, p. 794).

15) *Nihon Denki-kōgyō Shi*, p. 704.

named No. 1 product.

Since such poor business continued for a while it was difficult to borrow money for expansion from Kuhara's Main Office as had been promised, and so equipment for production was still hand-operation or hand-fabrication machines.¹⁶⁾ As for machine tools alone high-priced foreign ones were used but this was due to the low technical level of Japan's manufacturing in those days.

Partially by reason of such a slow pace of mechanization, a policy of utilizing rich manpower was taken, for which labor management was regarded as essential since early days. The management in Hitachi Works was based on the rules of Hitachi Mine even after the separation, and especially the determination of wage levels, as well as welfare provisions, was reserved in the hand of the Mine. The level in the Works was somewhat higher than in the Mine.¹⁷⁾ While the Engineering Section of the Mine adopted a wage system mainly based on "piece-work" (contract work) and "regular work with extra,"¹⁸⁾ in the Works the system was "piece work on until price" (for direct workers) and "regular work with no extra" (for indirect workers). Save this minor difference, in principle the rules of miner employment of Kuhara Mining were followed in the Works for labor management. Workers were called *Kōin*. General workers were divided into *tekkō* (iron worker), *denkō* (electric worker) and *kirokukō* (recording worker), and titled workers involved *shokugashira* (job master) and *kogashira* (job sub-master), for each of them maximum and minimum wages being defined in detail. The master and sub-master corresponded with the miner master and minor sub-master of the Mine. They acted as the supervisor of workshop work and combined the role of representative contractor of piece work.¹⁹⁾

On the other hand, by becoming a manufacture-specialized factory substantial progresses were seen in costing. It was since this period of early Taishō that expenses for materials and labor were counted up as "direct costs" and other expenses were grouped into "plant-allocation" and "general-affairs-allocation" costs, treating these as product costs.²⁰⁾ Of course accomplishment of costing procedure is one thing and its smooth use is another. Since the beginning,

16) Before World War I, even by 1914, the total motive power for machines was only 160 HP. ((The Note).

17) Although the level was a little higher than in the Engineering Section of the Mine, it must be taken into account that the level in the latter itself was lower than in other mining companies. To add a word, wage differentials among managerial employees were large, and in 1912 graduates from college went into a dispute demanding betterment of pay.

18) Even after the separation of the Works the Engineering Section retained appreciable capability of repair and manufacture. So the jobs mentioned here were common to both the Works and Mine.

19) Later on to the titled worker were added *hissei* (writer) in 1914 and *kumigashira* (group-master) in 1916. The jobs of general workers were re-divided into lathing electric, casting, finishing, wooden work, recording and so on.

20) Kodaira paid much attention to accounting procedures, and not only instructed managerial personnel to study but also he himself looked over English literature.

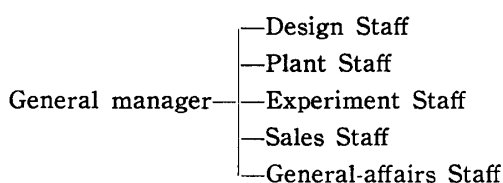
recording of plant work was managed by the recording workers, but due to their inexperience, and more basically unskillfulness in technology, calculation was complicated. So a simpler method of multiplying crude measure and random value was used for convenience's sake, and it was strongly asserted to employ it in place of the said toilsome calculation of plant-allocation and general-affairs-allocation.²¹⁾

Yet inflow-orders were still small till 1914. An order of two 200 HP motors and that of three 700 KW transformers beared "lively atmosphere." Under such a situation it was not strange that costing procedures did not become fixed. The formation of Hitachi's administration, so rapid and deserved to be called radical in a sense, had to wait the boom during World War I when the sales ran in full scale.

II. Business Management during World War I

The War, breaking out in July 1914, brought about an overall recession to Japan's economy for a while but was only short-lived. In August Hitachi Works conducted an organizational reform. Previous work staff (*sagyō gakari*) was renamed plant staff (*kōjō gakari*) and new posts of chief and vice-chief of plant staff were laid down to fortify control within plant. The sales staff was separated from the general-affairs staff to become independent business. Furthermore experiment staff was newly set up to be in charge of inspection on capacity and troubles of products, partially to help selling. The implication of this post, however, was rather demonstration to outside, at least at the beginning.²²⁾

Figure 2.



Under such organization, business was carried on during the War, but the management of factory was gradually transformed in accompany with increasing inflow-orders. Kodaira put importance to factory management as the pillar of self-dependence and posited engineers to managerial and selling posts from a viewpoint that even these men should not be indifferent to such tasks. It was an expression of such a management idea that, when a post responsible for estimation was laid within the sales staff, men of the design staff were transferred

21) N. Takao, *op. cit.*, p. 436.

22) N. Takao, the then chief of plant staff, combined the chief of this post, but no special house or equipment was provided, with an oscillograph being the only one.

to it in order to secure speediness and exactness in receiving orders.²³⁾

Again in order to obtain more orders from outside, it was natural that improvement of technical level, which had been content with manufacture of small machines of low power and voltage, had to be contemplated. Since at this period of creation it was impossible to accept technological information by cooperation with foreign firms, such improvements were mostly of allopathy nature. Drawing of plans was performed by means of sketching at generating stations, occasional break-up of foreign products or, when these were impossible, designing after specifications and plans of them.²⁴⁾

Yet for such an unknown maker of a single factory and on an unfavorable locational condition, it was not easy a task to develop outside markets. Insofar as we can see in documents, sales increased year after year up to 1915 but only slightly. To infer from a graph of productivity improvement inserted in the *Kōjō 50-nen Shi* and²⁵⁾ and that of output in the *Hitachi Seisakusho Shi*²⁶⁾ (old ed.), the amount of sales may have been less than 1 million yen a year, probably 600–700 thousand yen (150 thousand 1911).²⁷⁾ Workers increased to 550 persons by 1914, yet hardly deserving to say a big factory.

However, in 1914 a good chance arrived that importation of big-type products of high power or voltage from Europe and America was obstructed by war, and in place of its subrogate production by home makers came to be wanted. By this opportunity Hitachi endeavored to obtain orders, and meanwhile an event arose which made its name widely public. It was that Hitachi dared to accept an order of a waterwheel of large capacity of 10,000 HP and succeeded its manufacture. Since the waterwheel was of the most fresh and big type, which the Tone Electric Power Co. placed order to a German company but became unable to import, and its manufacture was considered difficult by the technical level of domestic firms, no other makers wished to receive. But Kodaira resolved to accept it, apparently thoughtless acceptance, in order to enliven business and to raise the name of Hitachi. Until this time the waterwheels Hitachi had manufactured were of at most 100 HP for spiral-system and 1,240 HP for pelton-system, the order meant a big bet for both Tone Electric and Hitachi. In the end Kodaira's policy of gathering able men bore fruit and, on unique devices, the product passed the examination by the Ministry of Communication (Teishin-shō) in July 1915.

23) *Hitachi Seisakusho Shi*, p. 46. That is, development of Kodaira's idea of combined functioning of selling and production.

24) Even journals bought at night-stalls were utilized for reference (The Note).

25) P. 88. *Hitachi Kōjō 50-nen Shi*, p. 88.

26) *Hitachi Seisakusho Shi*, p. 119.

27) By the *Nihon Kōgyō KK Shi* the movement of Hitachi's sales since 1912 (beginning of Taishō) was:

1912	¥ 533,675	1916	¥1,630,592
1913	651,110	1917	3,578,228
1914	683,390	1918	4,701,442
1915	895,240		

For this success Hitachi Works was publicly praised and its high technical level was appreciated as a matter of congratulation of Japan's machinery industry. The name Hitachi became well-known for the first time.

After this event inflow-orders increased rapidly and the factory showed a brisk scene ever unseen. Since this year it became possible to count profits as a business-establishment of Kuhara Mining, growing to a factory of 1,500 workers. Such expansion of output and employment, however, inevitably invited difficulties of management. Increases in expenses were one of them, and efforts of cost-down were directed to many aspects including institution of costing and other accounting procedures.

Cost-down relates firstly with the treatment of materials and parts costs. Hitachi endeavored at self-supply of them on the principle of self-production.²⁸⁾ This policy facilitated it to secure stable supply of cheap materials and parts, though not without other managerial problems. The matter of self-production was extended over silicon steel, casting stuff, electric wire and isolation varnish which were in supply-shortage due to stopped import or increased demand. Since delay of procurement of these goods often caused much confusion on operation, self-production was contemplated instead of outward order-placement and purchase, while on another hand making efforts of cultivating new stuff and avoiding wasteful use.

As the first step of such self-supply, trial manufacture of electric wire using copper from adjacent Hitachi Mine was conducted by a few men specialized in it and made success in 1917. Research for production was advanced to isolation stuff, meters and so on. Especially as to electric wire large investment was made from the accumulated profits of the Works in 1918 on Kodaira's decision,²⁹⁾ and its production became paying.³⁰⁾ Outer selling was promoted on a "special account."

Although it was not all the items of self-production that was sold outward, yet the success of wire resulted from the advantageous relation between Hitachi Mine and Works, both under Kuhara's command. Primarily Kuhara Mining itself had held a plan of embarking in fabrication of copper, as in Furukawa and Sumitomo Mines, but this was abandoned because of too much sober color as an enterprise. So Kuhara raised no objection against Hitachi's production. As a matter of result this may be said a great error of Kuhara's as an enterpriser because in the depression time after 1920 Kuhara Mining, with no business of copper fabrication, greatly suffered from drastic falls of copper price.

Turning back to Hitachi, along with such efforts of cost-down by self-supply,

28) Hitachi disliked outward order and adopted self-production, partially for the sake of value control. This policy was continued till early Shōwa. As the general technical level of casting was very low, major companies made research in own techniques, and Hitachi also conducted casting in its own plant excepting some special cases.

29) *Hitachi Seisakusho Shi I*, p. 29.

30) *Hitachi Kōjō 50-nen Shi*, p. 95.

much deliberation was made on costing procedures and estimation method. An essential point here was the treatment of direct costs and at this period the basic principle of later days was formed.

First, as to expenses relevant to labor, system of job-slip was effectively utilized on past experiences. The job-slip, formerly for "job allocation," by this time came to combine the nature of contract-price designation and that of work order, whose preparation was a complicated procedure. According to extant documents,³¹⁾ this procedure was to begin with warehouse-out-slip, which the workshop-counter (*keisankata*) of the plant staff issued according to a parts-table attached to the plan delivered from the design staff, in order to require supply of materials and parts from warehouse. Along with this warehouse-out-slip, parts-slip was transferred to the work-manager (*kōjikata*) of the plant staff in charge of workshops of casting, finishing, electric work, etc. respectively. This work-manager, who was to investigate the sorts of necessary jobs as one of his duties, chose such jobs from the parts-slip received, issued job-slips to allocate job names, which, with contract price inserted, were delivered to the group-master (*kumigashira*), and then each worker received his job. The pay for indirect workers such as warehouse-man was on a daily-pay system and, similarly with direct workers, the job-slip of each worker, with the date and hour of work written, was returned to the counter, by which pay was calculated at each month-end. It seems that in this case of indirect workers the hours written were irrelevant to pay. As for piece workers a method of total-amount contract was applied, but the way of wage calculation, including distribution of contract, is not clear.

Next, the warehouse-out-slip, delivered to the work-manager together with the job-slip, was brought to the warehouse-man, who belonged to the general-affairs staff, and in exchange for it materials or parts were given. By this step the warehouse-man wrote cost prices on the slip to use for the calculation of materials costs. The design staff was provided with a materials-budget table. Supposedly this table was checked with actual expenses. In fact Hitachi Works brought into practice the comparison between budget and actual values during the War and used it for estimation. Its costing table had two columns of budget and actual, both for materials costs and labor costs.³²⁾ To the materials costs another table of item breakdown was attached, alike provided with budget and actual.

Such a calculation system was utilized for estimation on contracts, especially

31) *The Note and Hitachi Kōjō 50-en Shi.*

32) This costing table had four vertically-arranged columns of casting, finishing, electric work and total, and on each column four items of materials cost, labor cost, plant cost and total were to be written. Again this table had a profit-loss calculation column to record expenses and sales in plant, with budget and actual for all items.

as the base of pricing and discount sale as well as for cost-down.³³⁾ Here what draws our notice is that cost control was undertaken by the whole organization of factory and consistently. For instance, the said costing system could be effectual only by being connected with designing from the outset. Thus in the Rule of Designing of Hitachi Works of 1916, not only formulas of plan and items to be described were laid down but also calculation of costs with defined contents was required.³⁴⁾ Again as the final step, the various costs collected by the workshop-counter were consolidated by an accounter directly subordinate to the chief of factory, and monthly total was reported to the chief. This material served as the basic data of "statistical book of accounts" and used for the profit-loss table to be presented to the Main Office of Kuhara Mining every month.³⁵⁾

A characteristic point of Hitachi's calculation system developed during the wartime lies not only in the systematization but also in the fact that its function was not confined to costing but utilized for the grasp of overall management of factory.

To consider the evolution of managerial control of Hitachi Works, which was remarkable compared with Mitsubishi Electric, we must understand the character of the system of business-establishment standing on independent accounting employed in Kuhara Mining. Of great significance was the capital-lending system, that is, each establishment applied for borrowing to Kuhara's Main Office semiannually, against which ways of use had to be explained and a report of receipts and expenditures be presented.

Thus with the lay-down of groundwork as a business-establishment, Hitachi's performances began to be inserted on the financial statement of Kuhara, side by side with mining business, since the 2nd-half term of 1917. By the by, what was the state of production activities of the Works? Owing to the stopped import and subrogate production for it, success was noticeable in the manufacture of big-type goods, including some Japan's first products. However, since designing was conducted by simple groping—such as books and journals, model sketch, break-up of foreign products and so on with some own devices being added—there were not a few products of doubtful performance in the backscene of e.g., the above-mentioned success in 10,000 HP waterwheel. It cannot be denied that the business expansion owed to good fortune by the stop of import. Cases of obstacle and breakage of products were countless, for whose relief often Kodaira had to submit an informal resignation.³⁶⁾

33) Calculation of sale price was: direct cost (materials cost + labor cost) + indirect cost (plant-allocation + general-affairs-allocation) = product cost; by multiplying this product cost by a profit rate, sale price was determined. The plant-allocation was calculated by multiplying wages by a rate, and the general-affairs-allocation by multiplying wages, materials and plant-allocation by a certain rate.

34) *The Note*.

35) *Ibid.*

36) *Hitachi Seisakusho Shi* I, pp. 31-34.

And for such received orders with a strict delivery day laborious all-night work had to be continued, yet resulting in greatly prolonged schedules. This was because many half-finished goods were disorderly scattered in a small plant causing difficulty of operation, and out-ordered materials, parts or fabrication were not supplied as expected resulting in stoppage of processing and assembling,³⁷⁾ in short, variance of operation in the whole factory. Apparently schedules of manufacture were greatly and wholly affected by the supply of materials and parts. This phenomenon was most numerous seen in about 1917 when the inflow of orders was most brisk. Delayed delivery might possibly result in decay of social confidence, but a greater fear for the executives at that time was that an idle state of work would give a hotbed to labor dispute and riotous move in the end.³⁸⁾ The reason for the said self-production of parts and so on lay in such confusion in production. Yet the framework of self-production was impossible to build at once and to extend over all goods. So the stagnation of operation arose throughout the wartime boom period. There was always a scene that one post was very while another was idle waiting for parts. For this reason once lay-off of workers took place. Of course this was merely a temporary measure with increasing inflow-orders in the background, and employees were rather on an expanding trend, showing 1,492 persons in 1916 and 2,962 in 1917.

It is impossible to say, however, that such confusion derived solely from the side of parts and materials supply which was lying outside Hitachi's control. The factory itself was involving a cause for discrepancy of operation. In such assembly work on a stage of chanced control, and in such a tiny plant, idleness was always easy to occur due to stagnation, that is, unequal flow of work as a whole. With the rapid growth of received-orders and delay of materials-parts supply being combined, it was rather natural that idleness appeared and lasted for some length of time. And production of varietiful products with different time for work and preciseness—such as generator, transformer and motor—in the same plant embraced a possibility of fall of efficiency and variance of operation volume.

As a policy to meet these matters Hitachi Works expanded its main body of plant and constructed auxiliary plants in order to deal with increasing inflow-orders and to advance smooth operation, that is, a new plant for meter instrument in 1916, a new plant for transformer in 1917, transfer of waterwheel, pump and the like to Kameido plant in 1918,³⁹⁾ and a new plant for switch board. Thus,

37) *Ibid*, p. 20.

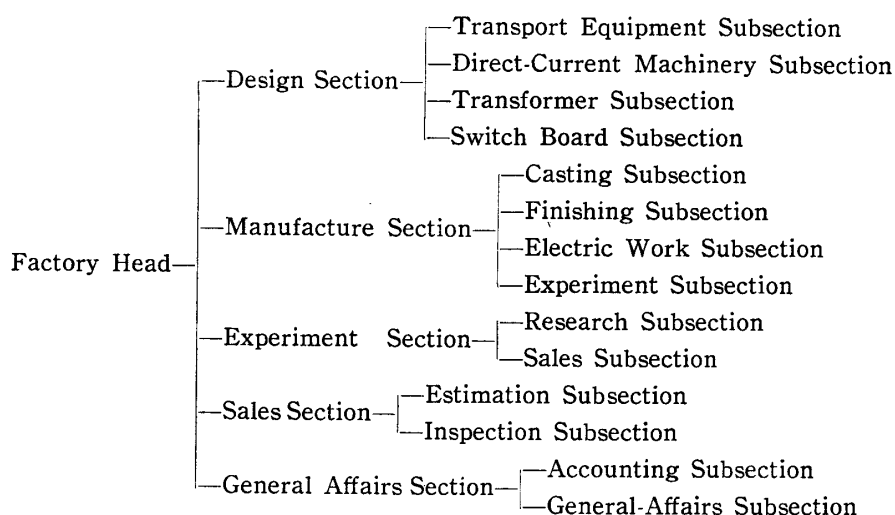
38) *Ibid*, p. 20.

39) By Kodaira's strong wish, Tsukudajima Machinery Works, (Kikai Seisakusho), Tokyo, with Kameido plant as its main body under Kuhara's command was transferred to Hitachi Works in October 1918. It was engaged in manufacture of general machinery, on four divisions of staff and a wage level a little different from Hitachi.

the framework of product-specialized plants was accomplished, if broadly.

An important reform was put on its organization in February 1918 in accord with the expanded plant capacity. Previous general manager (*shuji*) was renamed Factory Head (*kōjōchō*) and a position system of section and subsection was laid down for the first time. The Design Section had subsections by the sorts of products, and the Manufacture Section held subsections by the kinds of operation. The enlargement of the Sales Section was to tell the growth of Hitachi, side by side with that of plant. In particular the Estimation Section became a body comprising some ten persons to take charge of estimation for the whole work. The activities of order-receiving had already been extended from local to nation-wide, and from 1916 through 1918 Hitachi obtained orders from Yahata Steel, Sumitomo Mining, Nihon Nitrogen, some electric power concerns and government bodies.⁴⁰⁾

Figure 3. (as of Feb. 1, 1918)



III. From Business-Establishment to Joint-Stock Company

(I) Postwar business strategy and factory administration

In October 1918 an organizational reform was introduced again. The head-quarter of Hitachi was removed to Tokyo, combining selling activities. By this, the previous organization, which gathered all managerial functions into a plant of Prefecture Ibaragi, was greatly transformed. The plant of Hitachi was now named the Hitachi Factory of Hitachi Seisakusho. In this month Kodaira placed the Kameido plant of Tsukudajima Machinery Work under his control, receiving from Kuhara. And his residence was removed to Tokyo in order to command overall management, while keeping the position of Factory Head at Hitachi. At

40) Resident business men had been dispatched to Tokyo and Osaka since before this reform.

that time Shibaura Seisakusho (later Tokyo Shibaura Electric) was holding overwhelmingly strong competitive power among domestic makers of electric machinery, and also Mitsubishi Electric, then belonging to Mitsubishi Ship-building, was advancing into the market in cooperation with Mitsubishi Shōji.⁴¹⁾ In addition, cautious mind against possible recession after war-end became deep also in this industry, from which Hitachi was not allowed to be free.⁴²⁾

The expansion of plant of Hitachi Works came to a finish by 1919 and the emphasis of management was oriented to the fortification of selling business. In this year business offices were opened in five major cities of the country, purporting expansion of sales route together with Tokyo Main Office.

A longer distance between factory and sales division presents a problem about cooperation between the two. That Kodaira managed both Tokyo office and factory helped to maintain unification of production and selling. It may be said that his assertion of office-plant coordination was realized by the rule that estimation for orders received by all offices was conducted in Tokyo.

And Kodaira was always taking a view that "the base of sales business lies in costing," and the trunk members of factory were conscious of the importance of the principle that "undertaking based on calculation brings about established selling." So efforts of cost-down and waste-avoidance were earnestly pursued so that even discount selling might not result in loss.⁴³⁾

However, the factory management after the War set forth a new problem, how to increase the intensity of manpower use. As a way of promoting efficiency, production by specified forms had been adopted since 1918,⁴⁴⁾ but this was confined to some products, e.g., induction motor. What is noteworthy from the viewpoint of efficiency promotion and postwar management was the formation of process control to grasp operation progresses within plant.

In the reorganization of March 1919, although the existing position system was wholly maintained, a new Process Subsection was added to the Manufacture Section, the only change worthy to mention. Yet this was the beginning of process control to view the flow of goods in plant, as against costing to grasp the flow of expenses which had been already executed. It meant completion of the series of moves of plant and worker expansion carried out during a short period through the War. The remote origin of process control may be traced back to the painful

41) At that time direct selling by makers themselves was rare. Trading business was entrusted to big trading firms, for example, Shibaura Seisakusho-Mitsui Bussan, Mitsubishi Electric-Mitsubishi Shōji, and Meidensha-Moriya Shōkai.

42) There were many reasons for the advance to Tokyo. Later on Kodaira told that he took command of selling in order to cover a slender state after the death of an Otani who was then in charge of it. But he was busy in Tokyo for capital raising also.

43) However, competitors looked Hitachi's business as appreciably forcible. It was only Hitachi that had not fallen to redink settlement through several recession times before World War II.

44) *Hitachi Kōjō 50-nen Shi*, p. 261.

experiences of delay and disharmony of work during the War. It is conceivable that the postwar temporary decline of work afforded a scope to enter the solution of these problems, and also the eight-hour labor law enforced since November of this year is not to be overlooked. Nevertheless the adoption of process control was never an abrupt idea. For, should the production system by product-specialized plants, born as a solution of work confusion during the war, have not existed as the ground, process control would not be possible to function well.

What are now known to us as the contents of process control at that time are merely that "progress card" was used and that this was effectual in grasping advances of operation.⁴⁵⁾ But by understanding the composite members of the Process Subsection something more will be known.⁴⁶⁾ The cost-counter and work-manager, who had been placed in each Subsection of the Manufacture Section till the reform of March 1919, were united into "research-men" and became the core of the Process Subsection. Since the cost-counter had been engaged in costing at work posts, including wages, and the work-manager in the sorting of jobs to be allocated to workers by way of job-slip, these men's experiences were well utilized for the formulation of the steps of process control. Accordingly the duty of the Process Subsection was defined to be studying of necessary hours for work and costing.

The Process Subsection was directly subordinate to the Factory Head. Since a part of the Estimation Subsection was transferred to the Sales Section of Tokyo and the rest to this Process Subsection when the Estimation Subsection disappeared from organization, the Process Subsection was responsible for budgeting and partially for estimation.⁴⁷⁾ This task, however, was not to decide estimates for ordered goods by themselves but to pick up the product costs of kindred goods and send them to Tokyo to help estimation. Thus the function of the Process Subsection covered a wide scope and hence may be said an undifferentiated state. Yet the rule of process-control steps was so complete as was used by Mitsubishi Electric for reference in creating its rule.⁴⁸⁾

Such efficiency improvement and cost-down provided a solid base for discount sale and contributed to the growth of sale, together with completion of sales sector. N. Takao, Factory Head next to Kodaira, highly appreciated the role of process control saying "The basic cause for successful selling was the enforcement of costing to make profit and loss clear, and it was also for this aim that the Process Subsection was set up for precise study of hours needed for production," though he himself had not been engaged in the sales sector.⁴⁹⁾

45) This progress card was useful for the disposal of self-made and half-finished goods at the surrection from the fire of November 1919.

46) The following are extracts from the Note.

47) Three years later this duty was transferred to the Costing Subsection separated from the Process Subsection, to consolidate the latter's function.

48) Mitsubishi Electric, *Kengyō Kaiko*, p. 331.

49) *Hitachi Seisakusho Shi* I, pp. 185-6.

The competence given to the Sales Section to make additions to prices on its own accord in case of sharp fluctuation of general prices,⁵⁰⁾ especially of materials, was fruitful only by the backing of factory management to clarify profit and loss. That the meetings held for exchange of views between factory and sales sector soon turned to those to exchange of information about technical knowledge and customers attests to the fact that the systems of estimation and expedient pricing were favorably functioning.

The profits of Hitachi for the eight years of foundation can be expressed by a word of growth, thought not so remarkable in terms of as absolute value,⁵¹⁾ in view of its position of a business-establishment and the limited market of the industry, manufacture of heavy electric machinery. The period was that of stable sales and increasing profits, though figures are available for after 1916 only.

The sharp increase in profits for the 2nd-half of 1918 derived from the annex of Tsukudajima Machinery Works, yet reflects a trend fundamentally similar with Shibaura Seisakusho, a settlement most greatly affected by the War. Since generally product delivery, hence sales, lagged behind order by half a year, it is supposable that inlow-orders began to decline already in this business term, which accords better with the history of the factory. As the result of expansion the Works had a space of building of 23,000 sq. meters, and its name and rapid growth became well known in the world of electric-machinery makers.

Table 1. Profit and Loss Statement of Shibaura Seisakusho (in thousand yen)

	1915 2nd-H	1916 1st-H	1916 2nd-H	1917 1st-H	1917 2nd-H	1918 1st-H	1918 2nd-H	1919 1st-H	1919 2nd-H	1920 1st-H	1920 2nd-H
Receipts	2,469	3,226	6,107	8,780	11,934	15,458	17,401	18,772	15,183	17,310	18,304
Expenditures	2,322	2,854	5,189	7,237	9,968	12,752	14,193	15,826	13,147	15,267	16,350
Profits	174	372	918	1,543	1,966	2,706	3,208	2,946	2,036	2,043	1,954

(Extract from Business Report for 1923.)

It is said by this year demand recovered favorably in this industry, yet the age was not one of wartime boom when orders poured in, and import of foreign products began to restore its prewar position. Especially big-type products were profitable but huge capital was needed for production. So circumstances were not easy for Hitachi to sustain production.

(II) Problems around incorporation to joint-stock company

World War I affected the industry to improve technology and to swell its scale, but it worked also as a factor to attract many enterprisers. After the

50) *Ibid.*, p. 47. In 1918 a price-list was accomplished, which enabled sales offices to conduct estimation except for special design.

51) See Table 4 later shown. Our next paragraph III-2 refers to Hitachi's performances, but basic data for this period must wait further study.

foundation of Yasukawa Electric Machinery of 1915 there was a pause in new entry, but in 1917 Takaoka Seisakusho, Tokyo Electric Machinery and an electric machinery plant of Toba Shipbuilding (later Shinkō Elect. Machi.) were established and Meidensha was reformed to joint-stock company with a capital amount of 2 million yen. In 1918 there was the foundation of Tōyō Electric Machinery, Nisshin Manufacturing and other several firms, and Koana Seisakusho and Okumuragumi became joint-stock companies. In 1919 Osaka Transformer and Yachio Electric Machinery were born, and in the next 1920 Shibaura Seisakusho, the biggest at that time, increased its capital from 100 million yen to 200 million, and the Furukawa *zaibatsu* commenced a project of joint enterprise with Siemens. In the next 1921 the electric-machinery plant of Mitsubishi Shipbuilding became an independent company. Along with such foundation of new companies, reformation to joint-stock company and modernization of business were conducted by all existing companies. Especially Shibaura Seisakusho, the biggest rival of Hitachi, attempted to reinforce its position by entrusting selling to Mitsui Bussan, and by receiving technical aid from General Motors. The form of joint-stock company was taken by, not to speak of Shibaura, even by the new-born Osaka Transformer.⁵²⁾

So it was not strange as the selection of business form that, on such a current of expansion, Hitachi Works, conducting independent activities, transformed itself to joint-stock company in February 1920. However, because this meant separation from Kuhara Mining, it is conceivable that Hitachi's financial strategy was involved at the same time.

By the way, this separation from Kuhara Mining has been explained as the result of subjective selection by both the histories of Hitachi and Kuhara.⁵³⁾ Should this be understood as a link of chain of Kuhara's business or as a product of far-reaching program of Kodaira's? Probably both standpoints were combined, and it must not be forgotten that a problem concerning maintenance of business was related.

Let's observe the situations around the separation first from the side of Hitachi. This reform has been summarily described as follows. "Hitachi Works, having established its groundwork through the wartime boom, grew smoothly being little affected by the postwar recession and owing to the growth period of

52) In 1919-20 establishment of joint-stock company invited a speculative boom. Although we cannot say in this industry nothing was born from it, the motive of company foundation may have been in the active demand and appreciable self-confidence in home production.

53) Hitachi says, "Being dealt with a hard blow, which seemed to make resurrection almost impossible, and faced with fatal damage internally and recession externally, our company performed daring and pathetic independence as the Hitachi Co., Ltd. in February 1920." Kuhara says "Thus the business of manufacture has become too big as a division of our company and to have substance to be independent on the aspect of management, and so the Hitachi Co. started."

the industry, was completely separated from Hitachi Mining to be a joint-stock company."⁵⁴⁾ That Hitachi was able to take opportunity of the wartime boom and continue growth through the postwar recession cannot be fully understood without paying attention to the evolution of management and also to its successful strategy of product diversification and self-supply of materials and parts. And in October 1918 it was given by Kuhara Mining the management of Tsukudajima Works and built up a structure combining two axes of general industrial and electric machinery. This was a policy superior in quality to Shibaura Seisakusho. Also the buy-up of Sakado plant again from Kuhara in 1921 was based on its strategy toward a big enterprise. Naturally enormous capital was required to support such a policy, and in addition the necessity of long time for big-type goods, nearly one year for the longest, did not allow easy path of financing. For the manufacture of some tens of electric locomotives ordered by the National Railways Kodaira asked for credit to the First Bank in 1918 and 1918. And a motive to advance its headquarter to Tokyo was this aspect of financing.⁵⁵⁾

On another hand, what was the state of business in Kuhara Mining, the parent company? Already by January 1918 difficulties were arising in finance. F. Kuhara had invested a large amount of funds in shipbuilding and iron manufacture almost at the same time in 1917, which was, according to his partner Gisuke Ayukawa, loose multiplication of business. Ayukawa parted from Kuhara for the cause of financial hardship and resigned from the position of director of Kuhara Mining as early as in 1918. And, as Ayukawa feared it, shipbuilding was compelled to contraction and iron manufacture was abandoned. Notwithstanding this, Kuhara set up a trading firm, which had been his desire ever since young age, in July 1918. This was the Kuhara Trading (Shōji) Co., which was said a plan simply following the tide of the time, and its easy-going speculative business ate up money resources. Again the drastic drop of copper price dealt a hard blow on mining with no division of fabrication, and so by mid-1919 consolidation and contraction of Kuhara's enterprises were looked inevitable in the business circles.

It is said Kodaira respected Kuhara's activities on many aspects but often felt antipathy or fear against his vainglory mental character. It seems that herein lay the reason why Kodaira did not give assent to the last on the transfer of the competence of outer sale of Hitachi Works which was asked for by Kuhara Trading.⁵⁶⁾ And Kodaira must have seen fully the decay of confidence on Kuhara himself and his business among the financial and industrial quarters.⁵⁷⁾ It is natural that Kodaira made his best to maintain the confidence on Hitachi, including future ways of finance. And his self-confidence on independent

54) M. Udagawa, *op. cit.*, p. 90.

55) *Hitachi Ridōundō Shi*, p. 20.

56) This problem was discussed again when Kuhara Trading fell into a difficult position but Kodaira still refused it.

57) *Hitachi Seisakusho Shi* I, p. 46.

management apart from Kuhara Mining may have been strong because of favorable past performances. Accordingly it is not unthinkable that he required separation and reorganization to joint-stock company to Kuhara.

However, it was the destruction by fire of Hitachi Works in November 1919, when the postwar recession was nearly got over, that changed independence to an actual problem at one stroke. In the midnight of 14th of this month by an accidental fire, breaking out from a wood room for experiment attached to the plant for big-type products, almost all plant buildings were burnt down, by which even stoppage of work was rumoured. The loss amounted to more than 890 thousand yen including the main plant, wire plant and warehouse. To add indirect losses, it was said to surpass 1 million yen. In addition, finished and half-finished products for received orders were almost all destroyed.⁵⁸⁾

Suspension of manufacture work was considered but Kodaira held self-confidence on reconstruction. He said "I thought we should rather stop business but I am fully self-confident in the future. So after deep consideration I have decided to reconstruct as fast as possible and continue our work." He mentioned further "I think this factory has come through too smooth a way.... We must take opportunity of this fire to grow larger."⁵⁹⁾ Thus far from being pessimistic, he stated not only hope of resurrection but also ambition toward further growth by the chance of fire. Of course these words were spoken to men of circles of Hitachi, nothing to suggest will of separation from Kuhara and advance to joint-stock company, yet it is conceivable that after this November the final will-decision began to be boiled down between Kuhara's Main Office and Hitachi Works. Though on my simple conjecture, in the above word "deep consideration" supposedly independence was hinted.

Now, as regards the one million yen necessary for resurrection, it is impossible decisively to say Kuhara Mining was lacking in the capability of raising it. But its profits from mining were appreciably decreasing by this time (Table 2). And finance from financial organs was not easy due to failures in the related business. Kuhara's personal funds are thinkable but these seem to have been unavailable in view of his cool attitude to electric-machinery manufacture.

Table 2. Performances of Mining of Kuhara Mining Co. (in thousand yen)

	1916 1st-H	1916 2nd-H	1917 1st-H	1917 2nd-H	1918 1st-H	1919 2nd-H	1920 1st-H	1920 2nd-H	1921 1st-H
Receipts from mine products	16, 866	20, 438	38, 992	36, 764	23, 130	21, 943	17, 794	17, 794	16, 617
Expenses for mine operation	10, 670	13, 720	29, 826	31, 076	17, 508	16, 254	16, 022	13, 701	16, 438

(Source: Profit and Loss Statement for 1923.)

58) *Ibid.*, p. 39.

59) *Ibid.*, p. 40.

In any way, resources had to be raised without relying on Kuhara for reconstruction and independence. A possible way is internal reserves of Hitachi.⁶⁰⁾ However, confirmation of this availability is not easy. First, to observe the profit and loss statement of Kuhara Mining, the item "operation expenses for works" seems to represent those of Hitachi Works. Then the problem is its receipts, for which two figures are available. The one is "Movement of Sales of Hitachi Works" inserted on page 380 of the *Nihon Kōgyō KK 50-nen Shi* and "Movement of Sales of Tsukudajima Works (Table 3). By these two sources Hitachi's performances were wholly in red-ink, which makes the said conjecture impossible. Next, provided the receipts from manufacturing products (separated from mine products) in the profit and loss statement of Kuhara Mining represent the sales of Hitachi Works and Kameido Works, the profits are as shown in Table 4. Although the reliability of this table is somewhat inferior to the table

Table 3. Sales of Tsukudajima Works

(in thousand yen)

1912	259	1915	556	1918	2,132
1913	287	1916	912		
1914	276	1917	947		

(Source: *Nihon Kōgyō K.K. 50-nen Shi*)

Table 4. Performances of Hitachi Seisakusho

(in thousand yen)

	1916 2nd-H	1917 1st-H	1917 2nd-H	1918 1st-H	1918 2nd-H	1919 1st-H	1919 2nd-H
Receipts from mfg. products	2,146	2,639	3,778	4,206	5,064	6,625	5,064
Expenses for works operation	1,847	2,324	3,422	3,722	4,362	6,045	5,192
Profits	299	310	356	383	702	580	413

(Note: The receipts and expenses are considered to include Kameido plant which became the Kameido Factory of Hitachi since 1918. Source: prepared by the profit and loss statement of Kuhara Mining.)

in the history of *Nihon Kōgyō KK* because the breakdown of products is not shown,⁶¹⁾ it may not be unnatural to regard the mine products as the sales related to mining and the manufacturing products as those of works. Doubts lie rather in the movement of Hitachi's sales described in the history of *Nihon Kōgyō* and

60) Iyao Izawa, *Hitachi Ichigō no Shūnen*, p. 279.

61) This "receipts from manufacturing products" intractable. We re-read it as the sales of Hitachi Works for the following reasons. This item had been inserted in the profit and loss statement of Kuhara Mining until the separation of Hitachi and thereafter blank. There is provided a column "receipts from sales of mine products," Kuhara's principal business, whose figures are enormous. And in correspondence to these items there are "operation expenses for mine" and "for works," whose values are acceptable. By the figures in the history of *Nihon Kōgyō* the performance are wholly in red-ink and hence internal reserves are quite unsupposable.

the profits in Table 4 accord with Kodaira's word "smooth" development." They are also plausible by comparing with Shibaura Seisakusho. Yet we cannot infer their disposal due to the organization system laid down by Kuhara.

However, in the account of debts in the financial statement for the 1st business term of the Hitachi, Ltd. (Dec. 1919 to April 1920) no item to correspond to long-term borrowing can be seen. In the section of outlay in the profit and loss statement 253,359 yen is reckoned as expenditure for resurrection from fire, and 179,849 yen under the name of redemption of fire damage of fixed assets. Thus for the sake of resurrection 433,208 yen was expended in this 1st term.⁶²⁾ Thus part of reconstruction funds was covered by operation profits. The rest is supposed to have been disposed by means of paid-in capital or as unpaid account. Of course, if accumulation of profits had been possible under the position of business-establishment, they may have been used.⁶³⁾ Anyhow, no borrowings from banks or other organs were made because these were difficult.

Additionally I should like to consider a point that, while Hitachi became an independent joint-stock company in February 1920, formally the start of its operation is dated retroactively on December 1, 1919. Supposedly this was for convenience's sake because the date of financial settlement of Kuhara Mining was the end of November, but, to speak inversely, doubts remain why it was impossible to wait the next settlement data, May 1920. In April 1920, two months after independence, Hitachi published a quite abnormal financial statement for five months, showing its smooth operation despite the task of resurrection. I imagine that this derived from its intention to make the independence public as fast as possible and to boast of its successful performances in order to restore social confidence. Anyhow, it is not too much to say that the fire gave Kodaira a decisive turn in his activities as an entrepreneur.⁶⁴⁾

62) The plant reconstruction expenditure was fully redeemed by the 2nd-half 1921 term.

63) The possibility of accumulation is supposable because the money for the wire-plant construction was not provided by Kuhara.

64) Taking opportunity of this resurrection time Kodaira ordered solution of a labor dispute which was harboring then. He won in his oppressive attitude to discharge all leaders of struggle including some leaders of Yūaikai (the then powerful union in Japan). He avowed that the life or death of Hitachi depended on the work of reconstruction, and thus ingeniously turned employees' eyes from dispute to restoration. The causes of this dispute lay in the wage level lower than general one as well as the control on wages being put by Hitachi Mine. In August 1919 workers of Kameido plant, where the wage level was a little different from Hitachi Works, held dissatisfaction against wages and asked for a special increase of pay. The flame leaped at once to the recording workers of Hitachi Factory for the same demand and further extended to general workers' demand for pay and contract-price increase. At first the Factory was inclined to accept these demands but was unable to disregard the view of Hitachi Mine, which made the struggle more fierce, partially due to the intrusion of the Yūaikai.

At the Finish

In February 1920 Hitachi Works became a joint-stock company with capital of 10 million yen, independent of Kuhara Mining. Relations between the two, however, were still maintained. On the last day of November 1919 Kuhara transferred part of its assets to Hitachi and obtained shares of the latter. Accordingly it dispatched directors and auditors. Of total 250,000 shares (25 yen a share) Kuhara took 184,000 shares by contributing real assets, and as the top stockholder sent Yataro Kaku, Benkichi Tanabe and Saburo Rokkaku as directors (three of total five members) of Hitachi and requested selection of Tetsusaburo Hori and Ken'ichi Shimokawabe for auditors (all of two). Among all the directors and auditors only Kodaira and Takao had been directly engaged in the manufacture work Hitachi, and since all Kuhara's men, except Rokkaku, were of important position in Kuhara, thereafter management was apportioned to Kodaira responsible for Tokyo main office, Takao for Hitachi Factory and Musumi for Kameido Factory.

This separation from Kuhara protected Hitachi from direct effects of the hard position of Kuhara Mining and the failure of Kuhara Trading which occurred in 1920 by a huge deficit. For its managerial policy buy-up of plants and new opening of business offices further advanced, maintaining its yearly dividend rate at 8 to 10 percent. So Kuhara Mining gained profits as a stockholder yet its holding did not suffice to cover the whole worth of the assets transferred to Hitachi at the period of business-establishment. The large sum reckoned as "Hitachi account" in the assets of Kuhara Mining tells that the business transfer of February 1920 was an agreement obviously more advantageous to Hitachi. Later on Kuhara drew away the dispatched executives for the reconstruction of its line of enterprises.

The Hitachi Seisakusho Co. Ltd. was able to tide over the damage by the Kanto earthquake and the great panic of early Shōwa and to establish its oligopolistic position in the heavy-electric-machinery industry, in contrast to the painful position of Kuhara-line enterprises. And the success was achieved in a short period of fifteen years or so.