

Vertical Integration, Business Diversification, and Firm Architecture: The Case of the China Egg Produce Company in Shanghai, 1923–1950

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This article is a case study of a Chinese indigenous firm in the refrigerated egg-packing industry during the interwar period. I argue that the China Egg Produce Company (CEPC) was quick to grasp Western management in terms of vertical integration and business diversification. In addition, this firm took advantage of embedded social relations and social networks to construct a strong “internal architecture.” As a result, CEPC not only rivaled some six to eight British and American enterprises, but also took the lead in persuading them to form an international cartel during the 1930s. The data presented in this case study shows the surprising vitality and adaptability of Chinese businesses and suggests that China was in the process of developing a modern business system prior to the chaotic events of the late 1940s.

In the past, conventional wisdom held that Chinese firms operating in the first half of the twentieth century could hardly compete with their Western rivals because they lacked the advantages of new technologies,

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ample capital, and special tax treatment that foreign enterprises enjoyed. Such a view was part of the generally accepted premise that foreigners played a negative role in China's economic development, a view held not only by Marxist scholars but also by leading Western-trained social scientists in China in the 1930s, including H. D. Fong, Fei Hsiao-t'ung, Franklin Ho, and members of the Institute of Pacific Relations.¹ However, recent research on several leading industries in China during the Republican period (1911–1949) indicates that previous scholarship may have underestimated the vitality of Chinese businesses. This article examines this issue with a case study of one industry whose products were sold exclusively to Europe and the United States were controlled by a single Chinese business, the China Egg Produce Company (CEPC), as well as some six to eight British and American enterprises. Among the latter were Jardine, Matheson & Co., a leading British trading company in China, and the International Export Company (IEC), the China subsidiary of the Union Cold Storage Company, a British multinational based in London and owned by the Vestey family. This article argues that CEPC was quick to adopt Western management techniques, including vertical integration and business diversification. In addition, it took advantage of concrete, ongoing social relations and networks of such relations to construct a strong “internal architecture” within the firm. As a result, CEPC not only rivaled IEC and Jardine Matheson; it also took the lead in persuading both foreign and Chinese refrigerating companies to form an international cartel in the 1930s, with the Refrigerated Egg Packers' Association of China being established in Shanghai in 1930 and the Weal Trust Co., Ltd. in London in 1934. Through such price-fixing organizations, these refrigerating companies managed to monopolize the export of frozen egg products from China to Europe. The significance of this monopoly is indicated by the fact that China contributed 80 to 90 percent of “eggs not in shells” imported into the United Kingdom until 1941.

This analysis has been inspired by research undertaken by Sherman Cochran and other scholars that points to the vitality of Chinese businesses during the Republican era. As early as 1980, Cochran convincingly demonstrated that Jian Zhaonan's Nanyang Brothers Tobacco Company rivaled the British and American Tobacco Company (BAT).² Howard Cox's work further reveals that the BAT relied

1. For a revisit of this legacy, see Robert F. Dernberger, “The Role of the Foreigner in China's Economic Development, 1840–1949,” in *China's Modern Economy in Historical Perspective*, ed. Dwight H. Perkins (Stanford, Calif., 1975), 19–47.

2. Sherman Cochran, *Big Business in China: Sino-Foreign Rivalry in the Cigarette Industry, 1890–1930* (Cambridge, Mass., 1980).

heavily on its joint venture with the Chinese Wing Tai Vo Tobacco Corporation in order to successfully distribute its products in China.³ Cochran's recent case studies of two Chinese businesses, the Shenxin Cotton Mills and the China Match Company, reveal their ability to adapt to Western management styles by combining "Western" managerial hierarchies with "Chinese" social networks.⁴ The Shenxin Cotton Mills and the China Match Company distributed their products in China, and their competitors, while including foreign companies, were mainly Chinese firms. Kai Yiu Chan's research on Liu Hongsheng, the founder and manager of the China Match Company, indicates that Liu was not only quick to take advantage of double-entry book-keeping and the newly promulgated company law in expanding his match company, but that he also played an essential role in the distribution system of the Kailan Mining Administration, a Sino-British joint venture.⁵

The success of these Chinese businesses also needs to be understood in the context of world economic history. Economic and business historians all agree that the Industrial Revolution in the nineteenth century led industrialized countries, such as Britain, to seek worldwide sources of foodstuffs and other products for their urban populations.⁶ Most previous scholarship has focused on tea, coffee, sugar, and tropical fruits, with only a few works having been published on refrigerating companies in the meat trade and even fewer on their sideline products, such as eggs.⁷ A notable exception may be found in the work of Geoffrey Jones, whose analysis of British

3. The volume of Wing Tai Vo in BAT's total sale in China in 1923–41 ranged from one-third to one-fourth of total cigarette sales in China. See Howard Cox, *The Global Cigarette: Origins and Evolution of British American Tobacco, 1880–1945* (New York, 2000), 170–72.

4. Sherman Cochran, *Encountering Chinese Networks: Western, Japanese, and Chinese Corporations in China, 1880–1937* (Berkeley, Calif., 2000).

5. Kai Yiu Chan, "The Structure of Chinese Business in Republican China: The Case of Liu Hongsheng and His Enterprises, 1920–1937" (Ph.D. diss., University of Oxford, 1997); Kai Yiu Chan, "A Turning Point in China's Comprador System: KMA's Changing Marketing Structure in the Lower Yangzi Region, 1912–25," *Business History* 43 (April 2001): 51–72.

6. J. T. Critchell and Joseph Raymond, *A History of the Frozen Meat Trade* (London, 1912), 1–17; Ross Grant and David Jones et al., *The Frozen and Chilled Meat Trade*, 2 vols. (London, 1929), 1: 3–7; Geoffrey Jones, *Merchants to Multinationals: British Trading Companies in the Nineteenth and Twentieth Centuries* (Oxford, U.K., 2000), 18, 50.

7. While British refrigerating companies have received little attention, American meatpacking firms, especially Armour & Co. and Swift & Co., have been analyzed in detail for their management and business integration. See Alfred D. Chandler, Jr., *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass., 1977), 299–302, 391–401.

trading companies notes Jardine Matheson's investment in China's egg trade and the involvement of the Vestey family in the huge Argentine meat export business.⁸ However, Jones does not make any connections between these two companies, nor does he evaluate the importance of refrigerated food in British trade. This article goes a step further by offering preliminary considerations regarding the impact on British enterprises of refrigerating companies in China that were involved in the egg trade.

My attempt to determine the factors underlying the growth of Chinese refrigeration companies relies extensively on John Kay's idea of architecture, which both Jones and Cox found useful in their analysis of British trading companies.⁹ Kay defines 'architecture' as "a network of relational contracts within, or around, the firm." He further divides architecture into three types: internal, external, and networks. Internal architecture concerns the types of relationships with and among the firm's employees; external architecture centers on relationships with suppliers or customers; networks involve relations among a group of firms in related activities.¹⁰ Although Kay's research centers on contemporary Western and Japanese firms, his idea of architecture has proven instrumental for this case study in terms of analyzing CEPC's success. As this article will show, the architecture around CEPC, as an indigenous Chinese firm, permitted it to compete successfully with foreign firms, using a different style of management and control.

The Development of the Egg Export Industry

Chinese egg export started relatively late, at the end of the nineteenth century, and came into prominence in the interwar period. At this time, China was losing its cultural charm, and its products their special appeal to Western consumers. Indeed, the idea of a perishable food such as eggs coming all the way from China, even with the help of refrigeration or dehydration technology, was suspect to European and American consumers. To avoid possible consumer resistance, egg marketing firms did not reveal the Chinese origins of the product. Once imported, eggs were sold directly to confectionary and bakery

8. Jones, *Merchants to Multinationals*, 188, 257, 312–13.

9. *Ibid.*, 158; Howard Cox, Huang Biao, and Stuart Metcalfe, "Compradors, Firm Architecture and the 'Reinvention' of British Trading Companies: John Swire & Sons' Operations in Early Twentieth-Century China," *Business History* 45 (April 2003): 15–34.

10. John Kay, *Foundations of Corporate Success* (Oxford, U.K., 1993), 66.

firms as raw materials or to other factories for industrial purposes. Few people realized that they were eating cakes, biscuits, or sandwiches made with eggs from China. On the other hand, this trade was so export-oriented in China that few Chinese had ever consumed these products. Yet by the 1930s, eggs and egg products occupied the second or third position on the list of China's export trade.¹¹

In many respects, the development of China's egg industry is similar to that of the more famous tea and silk exports. There were many varieties. Egg products could be dried, liquid, or frozen, and they appeared on the scene in that order. German firms initiated the dried egg products; the frozen ones were mainly in the control of British refrigerating companies. Like tea and silk, the egg trade responded to foreign demand. Once China was forced to open its market in the latter half of the nineteenth century, foreign firms started searching for Chinese agricultural products that were suitable for export to Europe and the United States. Eggs were singled out at the end of the nineteenth century. Foreign firms found eggs available at very low prices in China as poultry farming was one of the most extensive agricultural enterprises in this country. At the same time, albumen and egg yolk were rising in demand in Western Europe, particularly in the rapidly industrializing Germany, due to their industrial applications.¹² Albumen could be used in preparing varnish, painter's oil, gum water, inks, and photographic paper, while egg yolk was particularly suitable for tanning and dressing leather.¹³ German houses, including Melchers & Co. and Carlowitz & Co., established the first successful albumen factories at Hankou, an interregional market in central China, in 1887.¹⁴ They were later joined in the early twentieth century by several albumen factories owned by German, French, and

11. Isamu Kutsumi, *Shina juuyou shouhin, chouran oyobi chouran kakouhin no kokusaiteki chii to sono shourai* [Chinese Eggs and Egg Products as Important Commodities: Their Place and Future in the International Trade] (Tokyo, 1942), 39.

12. "Chinese Eggs and Egg Products," *Chinese Economic Journal* 14 (Feb. 1934): 188.

13. Wang Chi Tung, *Eggs Industry in China* (Tianjin, 1937), 6–7. After eggs were collected, the white and the yolk were separated. They were then put in shallow zinc or aluminum pans, respectively, and dried in hot ovens until the albumen turned brittle and transparent and the yolk was reduced to powder. Some factories also produced whole dried eggs without separating the white and the yolk. See Arnold Wright, ed., *Twentieth-Century Impressions of Hongkong, Shanghai, and Other Treaty Ports of China* (London, 1908), 695.

14. Chen Zhen, comp., *Zhongguo jindai gongyeshi ziliao* [Source Materials on the History of Modern Industry in China], 2 vols. (Beijing, 1961), 1: 473. Before and around the same time, several attempts were made by American and French firms in north China but met with no success; see G. C. Allen and Audrey G. Donnithorne, *Western Enterprise in Far Eastern Economic Development: China and Japan* (London, 1954), 76.

Belgium houses, including Schnabel, Gaumer & Co., Diederichsen & Co., Adolphe Grosjean & Co., and Société Anonyme Belge pour l'Industrie des Oeufs.¹⁵

In the 1910s two new methods of manufacturing yolk powder were introduced. These were generally adopted by the modern albumen factories in China. In the "German method" the yolk was initially dehydrated for 15 minutes in a vacuum, before being ground into a fine powder. With the "American method" liquid egg yolk was mechanically stirred for 2 hours in a 660-pound capacity can, after which 30 percent by weight of water was added. This mixture was then transported via vacuum pipelines to a drying cabin and squirted into containers under a pressure of 1,000 pounds. Ambient temperature was maintained at the range of 150–180 degrees Fahrenheit. Under these conditions, the spray of liquid readily condensed into powder. The products made by these two methods were easily soluble and could also be used in making cakes and other confectionery.¹⁶ In addition to improving the solubility of dried egg products, sometime in 1909 foreign firms started preserving albumen and yolk by means of boric acid and exporting liquid egg products from China.¹⁷

Due to the improvement in processing, the export of albumen and yolk expanded. In 1905 these products were being listed on the trade returns of Chinese Maritime Customs.¹⁸ In 1915 they reached the fifteenth position on the list of China's exports.¹⁹ They were mainly shipped to Germany, France, Britain, and the United States, with Germany taking more than half the total on the eve of World War I (see table 1). In the meantime, albumen factories also spread from Hankou to other treaty ports, including Jiujiang, Wuhu, Zhenjiang, and Shanghai in the Lower Yangtze region, and Jiaozhou and Tianjin in north China.

A frozen egg trade emerged as the trade in dried and liquid eggs grew. In 1907 IEC built a large refrigerating plant at Hankou and started collecting foodstuffs, including eggs, for export.²⁰ A second plant in Nanjing extended their collection area from central China to the Lower Yangtze region. In 1925 it built its third plant in Tianjin in

15. Chen, comp., *Zhongguo jindai gongyeshi ziliao*, 1: 475.

16. Wang, *Eggs Industry in China*, 31–32.

17. Hankow Trade Returns, Native Goods Exported, 1909, in Chinese Maritime Customs [hereinafter CMC], *Returns of Trade and Trade Reports, 1909, Part II, Vol. II* (Shanghai, 1910).

18. CMC, *Returns of Trade and Trade Reports, 1905, Part III, Vol. II* (Shanghai, 1906).

19. CMC, *Decennial Reports, 1922–1931* (Shanghai, 1933), 186.

20. Hankow Trade Report of 1908, in CMC, *Returns of Trade and Trade Reports, 1908, Part II, Vol. II* (Shanghai, 1909), 213.

Table 1 Quantity of Egg Products (in piculs) Exported from China, 1908–1931

Year	Germany		Britain		France		USA		Other Countries		Total Exports	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
1908	35,141	55	2,091	3	15,629	25	1,752	3	8,768	14	63,381	
1909	53,662	46	436	0	33,129	29	4,478	4	23,797	21	115,502	
1910	58,507	49	3,016	3	21,027	18	3,214	3	34,210	29	119,974	
1911	75,816	59	2,069	2	14,450	11	5,291	4	31,400	24	129,026	
1912	66,587	53	3,208	3	15,027	12	4,976	4	3,539	3	125,167	
1913	84,709	54	4,952	3	24,374	16	9,150	6	32,788	21	155,973	
1914	60,701	21	172,222	58	11,610	4	15,267	5	34,737	12	294,537	
1915	0	0	230,033	77	20,666	7	33,703	11	12,738	4	297,140	
1916	0	0	385,864	82	20,312	4	41,667	9	21,626	5	469,469	
1917	0	0	242,601	55	9,255	2	158,528	36	30,306	7	440,690	
1918	0	0	157,291	52	12,910	4	51,510	17	80,720	27	302,431	
1919	90	0.01	549,731	69	19,903	3	171,715	22	52,949	7	794,388	
1920	10,896	1	509,554	68	16,175	2	146,430	20	62,761	8	745,816	
1921	21,992	5	358,126	74	4,423	1	88,014	18	11,529	2	484,084	
1922	35,534	5	531,064	75	27,728	4	84,001	12	30,084	4	708,411	
1923	19,211	3	468,566	62	61,412	8	172,158	23	31,553	4	752,900	
1924	54,601	8	442,907	62	48,458	7	111,413	16	52,961	7	710,340	
1925	83,814	8	607,496	60	46,069	5	198,284	20	68,552	7	1,004,215	
1926	93,627	9	644,665	65	41,659	4	148,596	15	64,984	7	993,531	
1927	92,733	12	460,015	61	42,286	6	80,845	11	80,541	11	756,420	
1928	98,905	10	537,409	57	62,863	7	159,525	17	92,322	10	951,024	
1929	128,640	11	677,867	60	66,728	6	153,600	14	105,084	9	1,131,919	
1930	113,535	10	752,644	65	84,097	7	86,339	8	113,166	10	1,149,781	
1931	78,275	8	689,704	69	75,150	8	48,300	5	103,117	10	994,546	

Sources: Chinese Maritime Customs (CMC), *Returns of Trade and Trade Reports*, part III, vol. II (Shanghai, 1909–21); CMC, *Foreign Trade of China*, part II, vol. II (Shanghai, 1922–32).

north China. IEC was a subsidiary of the Union Cold Storage Company in London. Union was a multinational founded at the end of the nineteenth century by two brothers, William and Edmund Vestey. The Vestey brothers took advantage of new refrigerated shipping technology and collected large amounts of food from all over the world to feed the urban population in Britain. They shipped frozen partridges and beef from Argentina, then eggs, chicken, ducks, pork, and dairy products from China and Russia, and then mutton and beef from Australia and New Zealand.²¹ Once the eggs were collected, the shells were removed. Instead of being processed to powder, they were put into tin cans and frozen. They were then shipped back to Britain for manufacturing cakes, biscuits, sandwiches, drinks, candy, and ice cream.

No serious competition existed between the albumen factories and the refrigerating company. They served different markets, and indeed both shared the prosperity brought on by World War I. After the outbreak of war, major egg and egg products suppliers such as Egypt, Denmark, and Russia were cut off from their European markets. China became the main egg-producing country in the world. Egg products were not only essential for feeding troops in the field but were also a source of protein for the civilian population. The price of egg products rose tremendously.²²

While the egg trade prospered, German firms, the leading institution in this trade, were forced to suspend their business. Britain's Board of Trade and Foreign Office took steps to prohibit German trade in and with China after the outbreak of the war. German property in China was further sequestered after China entered into the war in 1917.²³ This created a golden opportunity for Chinese merchants. Before the war, there were already a couple of Chinese albumen factories.²⁴ Seeing the rising price for egg powder, more Chinese merchants rushed to the trade after 1914, taking advantage of German firms' inactivity during the war. They soon established their albumen factories along the railway lines in Shanxi, Suiyuan, Henan, Hebei,

21. For details, see Ning Jennifer Chang, "New British Companies in China: The Case of International Export Company in Hankou, 1907–18," *Studies in Chinese History* 8 (Dec. 1998): 29–63.

22. Hankow Trade Reports of 1918, in CMC, *Returns of Trade and Trade Reports, 1918, Part II, Vol. II* (Shanghai, 1919), 565. Dried albumen and yolk were particularly in great demand due to the lower tonnage they needed in transportation.

23. For details, see Ning Jennifer Chang, "Sino-British Relations during 1910–1930: A Case Study of British Business in Hankow" (Ph.D. diss., University of Cambridge, 1995), 37–53.

24. Yang Dajin, *Xiandai Zhongguo shiyezhì* [Records on Modern Industries in China] (Changsha, 1938), 833–34.

Shandong, Anhui, Jiangsu, and Hubei provinces. It was reported that their number reached one hundred in 1919.²⁵ Chinese albumen factories had the advantage that the merchants and managers were familiar with the people and the areas in which they operated. They usually collected fresh eggs cheaply. But lack of connections with Europe and the United States meant that they had to rely on existing foreign firms to handle the shipping and exportation.²⁶

The prosperity during World War I paved the way for the later establishment of CEPC. Several of its shareholders made handsome profits during the war by investing in albumen factories. Zheng Yuanxing (Y. S. Cheng), the manager of CEPC, for example, was the owner of the Yuantong albumen factory. Zheng Kuiyuan, another shareholder of CEPC, established a large albumen factory called Wan He Sheng in the 1910s. It was reckoned as one of “the big three” in Shanghai during the First World War.²⁷ The profits they made later became the initial capital of CEPC.

The rapid growth of Chinese albumen factories during the war, however, was but temporary. After the war the market situation changed. In 1919 Western Europe stopped purchasing dried albumen and yolk, which caused the price to drop. In 1922 the United States also increased import tariffs on egg and egg products.²⁸ The most serious setback, however, was caused by regulations issued by the consuming countries regarding the use of preservatives and metal contamination in food. Zinc containers in the product line were heavily penalized when in 1919 the American authorities banned all Chinese dried egg products from entering the country, claiming that the metal was a health hazard. In Europe, the chief market for Chinese liquid and moist egg products, the use of boric acid as a preservative was first restricted to 1.5 percent in 1917, and then totally prohibited in most European countries after 1924.²⁹ Chinese boricated yolk lost its British market completely in 1927.³⁰ As more and more markets

25. Wang, *Eggs Industry in China*, 3.

26. Zeng Zhaoxiang et al., comps., *Hubei jindai jingji maoyi shiliao xuanji: 1840–1949* [A Collection of Historical Materials on the Economy and Trade in Modern Hubei], 4 vols. (Wuhan, 1984), 1: 206.

27. The other two were owned by Amos Bird & Co. and Henningsen Produce Co. See Wang Xifan, “Zheng Kuiyuan xiansheng xiaozhuan” [A Short Biography of Mr. Zheng Kuiyuan], *Ji yu dan* [Hens and Eggs] 1 (1 April 1936): 61.

28. Liu Zulai, “Maochang danye lengcang gongsi de lishi huigu” [The China Egg Produce Company in Retrospect], *Qingdao wenshi ziliao* [Cultural and Historical Materials in Qingdao] 6 (1984): 103; Report on the Trade of China, 1922, in CMC, *Foreign Trade of China, 1922, Part I* (Shanghai, 1923), 24–25.

29. Wang, *Eggs Industry in China*, 80.

30. Report on the Trade of China, 1926, in CMC, *Foreign Trade of China, 1926, Part I* (Shanghai, 1927), 42.

were lost, many producers went out of business. More than 70 percent of the Chinese factories shut down between 1920 and 1925.³¹ Those remaining in operation found it necessary to seek new techniques that measured up to American and British standards. As a result, tools were subsequently made of steel instead of zinc, the level of borax in liquid eggs was kept below 1.5 percent, and a new method of processing eggs with glycerine was invented.³²

While dried albumen and yolk experienced a serious setback after the war, the market for frozen products grew rapidly. Frozen egg products, being free from preservatives and metal contamination, absorbed the market surrendered by the liquid and dried products. From the returns of the Chinese Maritime Customs it can be seen that although dried products led before 1922 (with the exception of 1914), the trend turned after 1923. The export of dried albumen and yolk decreased, while frozen eggs greatly expanded their share of the export trade. Eventually, frozen egg products reached 87 percent of the total egg export in 1930 and safeguarded that market share until the outbreak of the Pacific War (table 2). In the meantime, Britain's import of Chinese egg products greatly increased, first due to scarcity and the prohibitive price of fresh eggs during the war, and then due to the rapid growth of the country's catering and confectionery industries in the interwar period. When World War I ended, Britain had replaced Germany as the biggest importing country for egg products from China (see table 1).

The Purchasing Organization for Eggs

China's egg export industry was obviously dominated by foreign firms from its beginning. In such an industry, how could there be any chance for a Chinese firm like CEPC? While the profits accumulated by Chinese merchants during World War I provide a partial answer, the rest has to be found in the purchasing organizations for eggs in China.

Poultry production in China was never concentrated in large centers; rather, it was spread out among numerous small production units scattered over the Chinese countryside. The female members of the farming household often bought chicks from the nearby hatching

31. Shanghai Municipal Archives [hereinafter SMA] Q229/01/00181, Yuan Hengtong, "Zhongguo danye fazhan jianshi" [A Brief History of the Egg Industry in China], Feb. 1962, p. 8.

32. Wang, *Eggs Industry in China*, 80; "Chinese Eggs and Egg Products," 158.

Table 2. Quantity (in piculs) and Percentages of Frozen and Dried Egg Products from China, 1914–1940

Year	Frozen Egg Products		Dried Egg Products		Total Amount
	Quantity	%	Quantity	%	Quantity
1914	162,379	55	132,158	45	294,537
1915	106,173	36	190,967	64	297,140
1916	181,123	39	288,346	61	469,469
1917	35,671	8	405,019	92	440,690
1918	13,074	4	289,357	96	302,431
1919	188,206	24	606,182	76	794,388
1920	322,613	43	423,203	57	745,816
1921	91,262	19	392,822	81	484,084
1922	276,097	39	432,314	61	708,411
1923	375,365	50	377,535	50	752,900
1924	555,561	78	154,779	22	710,340
1925	770,066	77	234,149	23	1,004,215
1926	848,767	85	144,764	15	993,531
1927	631,318	83	125,102	17	756,420
1928	802,042	84	148,982	16	951,024
1929	956,103	84	175,816	16	1,131,919
1930	1,005,608	87	144,173	13	1,149,781
1931	880,379	89	114,167	11	994,546
1932	802,103	90	93,103	10	895,206
1933	4,064,102	98	101,579	2	4,165,681
1934	438,278	87	64,379	13	502,657
1935	472,678	84	88,208	16	560,886
1936	530,657	84	101,221	16	631,878
1937	534,688	85	94,520	15	629,208
1938	408,639	87	59,411	13	468,050
1939	449,255	88	60,541	12	509,796
1940	479,342	88	65,828	12	545,170

Sources: Chinese Maritime Customs (CMC), *Returns of Trade and Trade Reports*, part III, vol. II (Shanghai, 1915–21); CMC, *Foreign Trade of China*, part II, vol. II (Shanghai, 1922–32); CMC, *The Foreign Trade of China*, vol. IV (Shanghai, 1933–35); CMC, Appendix to *Monthly Returns of the Foreign Trade*, Nov. 1935 (Shanghai, 1936); Isamu Kutsumi, *Shina juuyou shouhin, chouran oyobi chouran kakouhin no kokusaiteki chii to sono shourai* [Chinese eggs and egg products as important commodities: their place and future in the international trade] (Tokyo, 1942), 41.

house in the spring and raised them as a household sideline. The number of chicks each female member bought could be as few as four or as many as ten. Poultry provided protein to the family, and the sale of eggs generated income for the household. In the Jiangsu and Zhejiang provinces along the coast, for example, eggs were sold for cash, which was kept by the female members as pocket money for buying cosmetics or materials for needlework.³³ In the poorer areas

33. SMA Q229/01/00201, “Yangzi gongsi dui Rijun youguan danye de jianyishu” [Proposal Regarding the Egg Trade by the Yangtze Egg & Cold Storage Co. to the Japanese Army], n.d. [1942], 23–24.

inland, the eggs were used to exchange for salt and other odds and ends.³⁴ According to the statistics of the Chinese Ministry of Industry, as late as 1934 the average number of chickens raised in a middle-sized farming household was only 9.5.³⁵ To collect large amounts of perishable and fragile produce like eggs from so many small units, an efficient purchasing organization was essential.

Such organizations were formed by Chinese egg wholesalers in the 1890s when German and other European albumen factories started purchasing eggs. They were composed of many layers of middlemen between the farming household and the factory, including the small collector (*tiao fan*), usually a farmer or workman who took up egg peddling from village to village as a secondary occupation, the large collector (*dan fan*), who purchased eggs from the small collector and sold them to the egg dealer (*dan hangzhan*), who, after accumulating a certain number of eggs, transported them to an egg wholesaler (*dan hang*) in one of China's treaty ports. The wholesaler fulfilled its contract with the albumen factory by delivering eggs at the prearranged price, quality, quantity, and time. The middlemen of each layer built up connections with those immediately under them by making cash advances and lending capital.³⁶ In this process, the albumen factories were simply the end buyer and had no control over the supply chain.

While most of the albumen factories found this model of supply convenient and economical, IEC, as the China subsidiary of a multinational, tended to integrate its business as far as possible. IEC started to build up its own purchasing organization soon after opening its first refrigerating plant at Hankou in 1907. By sending its own Chinese agents to the towns near the producing areas, it cut into the supply of eggs. From figure 1 we can see that IEC successfully replaced the egg wholesalers with its own purchasing stations and, sometimes, even purchased directly from small collectors.

Though more expensive at the beginning, this model of purchasing gave IEC the chance to control the supply chain. It however also channeled a large volume of eggs away from the egg wholesalers.

34. Wang Jiaju, "Pei Baotang he Shangdang diqu 'dadanchang'" [Pei Baotang and the Albumen Factories at Shangdang], *Shanxi wenshi ziliao* [Cultural and Historical Materials in Shanxi] 7 (1963): 104; Liao Yizhong et al., "Tiajin Heji yanghang shiliao" [The Historical Materials of the International Export Company in Tianjin], *Tianjin lishi ziliao* [Tianjin Historical Materials] 6 (July 1980): 1.

35. Gao Cang, "Nongcun renkou wenti yu yangji shiye" [The Rural Population Problems and Poultry Farming Business], *Ji yu dan* [Hens and Eggs] 2 (1 Aug. 1937): 11–12.

36. Zeng et al., comps., *Hubei jindai jingji maoyi shiliao xuanji*, 1: 236.

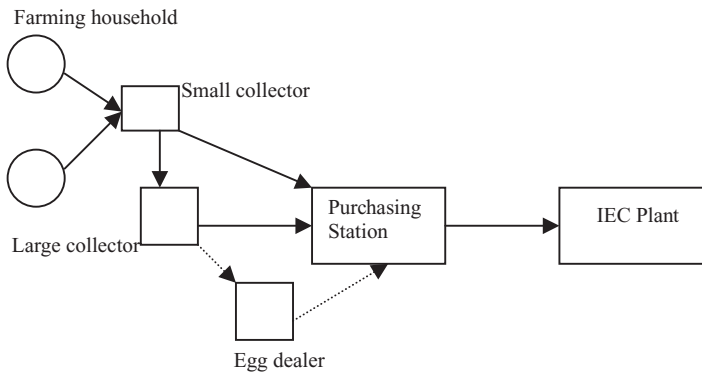


Figure 1 Purchasing Organization for Eggs: Refrigerating Companies' Model.

When IEC expanded its purchasing organization from central China to the Lower Yangtze region after World War I, egg wholesalers in Shanghai were greatly alarmed. After 1920 other refrigerating companies followed suit and built up their own purchasing organizations.³⁷ Chinese egg wholesalers thus lost their main buyers. To survive, eight leading wholesalers formed CEPC in 1923 to forestall IEC's penetration of the egg supply. Originally egg buyers, CEPC could go even closer into the agrarian village production economy and undercut IEC's prices. Indeed, it became a formidable competitor to IEC in the late 1920s due to this ability.

The External Architecture of CEPC

Before the First World War, IEC was the only company in China handling frozen eggs. The war, however, showed the world the potential of refrigeration. It was not only indispensable for logistic service during the war, but, by preserving the freshness of food, it also enabled food merchants to adjust supply according to market demand during peacetime.

Attracted by the potential offered by refrigeration, several foreign companies entered the frozen egg business during the war. In 1915 Amos Bird & Co., a British firm, first established an albumen factory and then a refrigerating plant in Shanghai and started exporting egg

37. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengchang gongsi yange shi" [History of the China Egg Produce Company], Dec. 1961, p. 4. Those companies included S. Behr & Mathew, Ltd., Amos Bird & Co., and Henningsen Produce Co.

products. The same year, another British firm, S. Behr & Mathew, Ltd., opened for business in the same treaty port. In 1918 an American firm, Henningsen Produce Company, established a refrigerating factory in Shanghai and started processing eggs for export, along with the production of ice cream, margarine, and confectionery for China's domestic market.³⁸ Even Jardine, Matheson & Co., an established British trading company in China, felt it necessary to establish the Ewo Cold Storage Company in 1920 to handle egg exports and also to meet the rising demand for cold storage in Shanghai.³⁹

Chinese merchants were also attracted by this rising industry. Several of CEPC's shareholders had extended their activities from wholesaling to manufacturing by investing in albumen factories during the First World War. The decline of the dried egg trade after the war was quick and alarming. The wholesalers had to find new channel for their capital. They had, in one instance, commissioned the Pacific Ice & Cold Storage Company, an American firm in Shanghai, to manufacture ten tons of frozen eggs and sold them in Britain through W. R. Loxley & Co.'s head office in London. This trial sale yielded very satisfactory results, thus giving them the confidence they needed for joining this new industry.⁴⁰ When IEC's purchasing organizations drove them into a corner, the egg wholesalers decided to go for an all-out business venture.

Thus, eight leading wholesalers in Shanghai took 200,000 Mexican dollars out of their profits from the war years and established a refrigerating company of their own in 1923.⁴¹ As Zheng Yuanxing, CEPC's manager, boldly declared, "The foreigner can build refrigerating plants in China and collect eggs. Why can't we Chinese establish a plant and sell the egg products abroad?"⁴² Unique among the new entrants into the egg products business during the interwar period, this company was an indigenous Chinese firm and had a different organizational architecture.

Before CEPC, there were already many Chinese merchants who had invested in albumen factories, but none had invested in refrigerating plants, which involved large capital, new technology, and high

38. Huang Guangyu, *Waiguo zai Hua gongshang qiye cidian* [Dictionary of Foreign Companies in Modern China] (Chengdu, 1995), 562, 596, 615–16.

39. Jardine, Matheson & Co., Ltd., "*Jardine*" and the *Ewo Interests* (New York, 1947), 34.

40. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 5.

41. The Mexican silver dollar was one of the standard currencies in use in China in the nineteenth and twentieth centuries.

42. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 4.

risk, not to mention ties to markets in Europe, which Chinese businesses often lacked. Moreover, China was in the so-called Warlord period and only nominally unified under a series of weak central governments. Local governments imposed various taxes and sub-taxes on goods in transit in the interior. When transporting large amounts of eggs from the interior to the treaty ports, Chinese firms suffered much harassment and delay. Foreign firms, on the other hand, were protected by the privileges of extraterritoriality. Once they had paid the 5 percent export duty and the 2.5 percent coast-wise tax due to Chinese Maritime Customs, they were exempted from the local transit tax.

To enjoy the same tax exemption, CEPC first managed to register at the consulate of Portugal in Shanghai and thus obtained Portuguese nationality.⁴³ Armed with its new status as a “foreign” firm, Zheng Yuanxing then resorted to personal relations he had built up as an egg wholesaler with the foreign staff in the refrigerating companies that were already located in Shanghai and gained access to the new technology and commercial networks. By offering substantial salaries to enlist their services, Zheng first invited W. L. Carleton, an American engineer in the Pacific Ice & Cold Storage Company, to be the plant and construction superintendent, and then Ronald Picozzi, a British staff member in W. R. Loxley & Co., to be the general secretary.⁴⁴ These men not only introduced into CEPC the technological know-how and machines needed for the refrigerating plant but also obtained orders for the new company.

At the beginning the company’s scale was small. Its production of frozen eggs was only about five to ten tons a day, and the number of workers was below one hundred. The situation changed in the second half of 1923, when Picozzi brought in orders from W. R. Loxley & Co., and even more important, orders from Swift & Co. in Chicago arrived through Carleton. Swift’s first order was for 3,000 tons of frozen eggs. It gave great impetus to this newly established company.⁴⁵

Swift & Co. was an American meat giant. It and another American meatpacking firm, Armour, had been competing with Union Cold Storage, IEC’s parent company, in South America and Britain since the 1910s.⁴⁶ Swift had long been interested in China’s egg trade but

43. *Ibid.*, 5.

44. Liu, “Maochang danye lengcang gongsi de lishi huigu,” 105–6.

45. SMA Q229/01/00181, Yuan Hengtong, “Maochang danye lengcang gongsi yange shi,” 6.

46. For details, see Frank Gerrard, *The Book of the Meat Trade*, 2 vols. (London, 1955), 1: 202–20; and Simon G. Hanson, *Argentine Meat and the British Market* (Stanford, Calif., 1938).

had not been able to establish a foothold in China due to IEC's monopoly. Now it had CEPC as its contracted manufacturer. To ensure the quality of the products, Swift sent one of its staff, H. D. Potts, to Shanghai and stationed him at CEPC's plant as both a supervisor and an inspector. CEPC thus learned state-of-the-art processing methods from the Swift people.⁴⁷

Though orders from Swift were large, CEPC pursued a goal of building up its own brand in Europe. In 1925, with capital of 10,000 pounds sterling, it established the Overseas Egg & Produce Company in London as its sales subsidiary. Humphrey Greenall, former manager of S. Behr & Mathew, Ltd. agreed to be the manager and help the new company market the "CEPCO" brand. With Greenall's energetic salesmanship, CEPC's frozen and chilled eggs gradually penetrated into the European market.⁴⁸

By 1927, CEPC's production of frozen eggs reached sixty tons a day, or more than 8,000 tons a year.⁴⁹ Its staff numbered over one thousand. CEPC's scale was still inferior to IEC but comparable to other refrigerating companies in China. In 1928 it increased its capital through reinvestment of profits to 2,000,000 Chinese dollars. Obviously feeling more secure in the industry, and probably also due to the rise of nationalism in China, CEPC chose to re-register with the newly established Chinese Nationalist government that same year. Two years later it became a limited liability company. Zheng Yuanxing continued to lead the company as its general manager, overseeing six departments: factory management, stock replenishment, export, accountancy, transportation, and cold storage.⁵⁰ CEPC had gained a major footing in the trade and was ready to go all out to grasp a lion's share of the market.

The Internal Architecture of CEPC

CEPC did not grow without hindrance. The competition from IEC and other foreign companies was intense from the company's inception. No sooner had CEPC been established, than IEC offered Zheng

47. SMA Q229/01/00066, Charles H. Swift to W. L. Carleton, 3 Jan. 1927; SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 6.

48. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 7, 16.

49. These numbers reveal the fact that due to the seasonal production of eggs, egg factories in China usually operated around 133 days a year.

50. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 7-8.

50,000 taels to close the plant, an offer that Zheng rebuffed. IEC then turned to Carleton and offered him 50,000 Mexican dollars to return to the United States. This also did not work.⁵¹

After it failed to disrupt the new company, IEC tried to hamper its shipping. Frozen and chilled eggs had to be shipped by refrigerated cargo steamers. Both IEC and Ewo Cold Storage shipped on steamers owned by their affiliated firms: IEC shipped through the Blue Star Line, a large fleet of refrigerated ships owned by Union Cold Storage in London, while Ewo relied on the Peninsular and Oriental Steam Navigation Company, with which Jardine Matheson had close relations since the late nineteenth century.⁵² Without affiliated steamers, other companies had to rely on the services of the Glen Line of London or the Ocean Steamship Company (or the Blue Funnel Line), owned by Alfred Holt & Co. in Liverpool. Around 1924 IEC, allied with Ewo, booked all of Blue Funnel's refrigerated chambers to obstruct CEPC's exports. Their cargoes were not enough to fill the chambers, however. As the departure date approached and the chambers were not fully filled, Butterfield & Swire, Blue Funnel's Far East agent, began to complain. Once they found out about the ploy from Swire, CEPC outbid IEC and Ewo for the space by offering to pay higher rates. In future years, CEPC was able to enter into long-term contracts with Nippon Yusen Kaisha, a Japanese steamship company, and thus solved the shipping problem.⁵³

After overcoming the initial obstacles from foreign companies, CEPC started to build up a strong internal architecture. Like IEC, CEPC operated its own purchasing organization. Moreover, CEPC took advantage of its ties to local networks and built and sustained long-term relationships with its agents and the egg suppliers. As a result, CEPC could purchase eggs at a lower price and with better quality. In 1932 it was generally admitted by the refrigerating companies that CEPC could manufacture more cheaply than anyone else in the trade.⁵⁴

51. Ibid., 14; Institute of Economics, Shanghai Academy of Social Sciences, ed., *Shanghai duiwai maoyi, 1840–1949* [The Trade of Shanghai, 1840–1949], 2 vols. (Shanghai, 1989), 1: 301.

52. Tony Atkinson and Kevin O'Donoghue, *Blue Star* (Kendal, U.K., 1985), 6–13; Butterfield & Swire to Alfred Holt & Co., 29 Nov. 1935, Papers of John Swire and Sons Ltd., JSSII2/13, Library of the School of Oriental and African Studies, London; Jones, *Merchants to Multinationals*, 33.

53. Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 301; SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 16.

54. Jardine Matheson Archive, Cambridge University Library [hereinafter JMA] J/25/3, B. D. F. Beith to D. G. M. Bernard, 22 Dec. 1932,

CEPC's internal structure heavily relied on personalized management. It was particularly obvious when compared with IEC's mode of agent control. Egg collection depended on the performance of the purchasing agents, and close monitoring was essential. Owing to a lack of knowledge of Chinese language and culture, IEC recruited its agents through Chinese compradors. IEC's foreign managerial staff shared little social connections with their agents. They had to employ stern monitoring devices to control the organization. For example, IEC kept the same agents but moved them around every year. Few people held the head position at a purchasing station for more than one year.⁵⁵ By this means, IEC hoped to keep agents from developing ties to the local producers that could be used to cheat the company.

CEPC, in contrast, benefited from the concrete personal relations and networks of such relations that it shared with its agents and did not have to resort to rigid regulations to monitor them. Most of its agents were the former staff of the egg wholesalers, who had been working with the wholesalers for a fairly long time. Moreover, these agents came from either the Zhejiang or Jiangsu provinces, as did CEPC's managerial staff. Sometimes, the agents and staff were from the same towns, sharing the same surname and even belonging to the same clans.⁵⁶ Ties back to the native place generated trust and discouraged malfeasance because cheating would bring shame not only to the individual but to the family. As a result, CEPC did not have to shift the agents to guard against the development of interests that ran counter to those of the firm. Instead, each station employee, from the head down to the guard, was allowed to stay in a place for a long time. This policy not only helped to cultivate the loyalty of the agents but also allowed the agent to build up social relations with the small collectors, as well as the producers, and thus put the station in a better position in the collection process.⁵⁷

Personalized management could, of course, be a double-edged sword. CEPC managed to avoid the negative effects by offering the agents other incentives to prevent cheating. This was achieved by operating its purchasing stations year-round.

Eggs were a seasonal product. In spring eggs were available in large quantities and were of better quality. Next best were autumn

55. Foreign Office Archives, Public Record Office, Kew, London [hereinafter FO] 228/4336, R. Barker to W. M. Hewlett, 15 Feb. 1930, enclosed in Hewlett to Miles W. Lampson, 27 Feb. 1930.

56. SMA Q229/01/00208, "Maочhang danye lengchang gongsi 1949 nian zhigong mingce" [1949 staff list of CEPC].

57. Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 305.

eggs. Weather conditions meant that summer and winter eggs were less abundant and of lesser quality. Most manufacturers did not regard them as worth collecting.⁵⁸ IEC and other foreign refrigerating companies therefore purchased eggs in spring and autumn only. They opened the stations only during the season, and neither the agents nor egg experts were permanent staff. Once the season was finished, commissions were paid, and the agents were temporarily discharged. Not until the next season, when the companies opened the stations again, were the agents re-engaged.⁵⁹ By this means, IEC reduced personnel cost. In each re-engagement, the company also had the chance to dismiss those who did not suit its purposes, such as union members in the 1930s, and to appoint new men to take their places.⁶⁰

CEPC adopted a different policy. With its experience operating albumen factories during the First World War, it knew that lower-grade eggs could often be used in the manufacture of yolk powder for industrial purposes. Sometimes, the company could even produce frozen egg products of good quality using summer eggs.⁶¹ CEPC's connection with the domestic Chinese market also gave it an outlet for summer and winter eggs. In 1931, as a result of CEPC's initiative, the Association of Chinese Egg Merchants in Shanghai was established. Through this association, CEPC could control the sale of eggs in the city and thereafter did not fear the lack of a market for eggs. As a result, CEPC established permanent purchasing stations in several of the main egg-producing areas.⁶² By offering the agents job security and opportunities for promotion that IEC and other foreign companies did not, CEPC further assured its agents' loyalty and thereby reduced agency monitoring costs.

So sure about this management system, CEPC even used it in the matter of cash remittance. The movement of cash was an issue for all firms engaged in exchange between the treaty ports and the interior. Although China already had several Western-style modern banks

58. SMA Q229/01/00201, "Yangzi gongsi dui Rijun youguan danye de jianyishu," 46.

59. Zha Futian, "Yingshang Heji yanghang zai Nanjing kaichang shezhuang de genggai" [The Rough Story of the Refrigerating Plant and Purchasing Organization of the British International Export Company in Nanjing], 28 Oct. 1965, Nanjing Meat Packing Factory Collection [hereinafter NMPF], Nanjing, China.

60. FO 228/4336, Barker to Hewlett, 15 Feb. 1930, enclosed in Hewlett to Lampson, 27 Feb. 1930.

61. Wuhan Municipal Archives [hereinafter WMA] 119/130/135, [Wu Zijing], "Wuhan danye yange yu yewu jingyan" [The Egg Trade in Wuhan and My Experience in the Egg Business], March 1962, p. 36.

62. Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 305.

whose remittance services could handle most transactions between large and medium urban places, few modern banks operated branches in rural areas. Movement of cash was unsafe, particularly during the Warlord period. When dealing with the small collectors, agents had to carry large quantities of copper coins, the main currency in circulation in rural markets.⁶³ To deal with this problem, IEC gave each agent a book of blank company drafts. After arriving at the appointed town, the agent had to find reliable shops or old-style native banks and negotiate the drafts with them.⁶⁴ The company's high credit was one reason for the feasibility of this practice; as one shopkeeper later recalled, "Those drafts were even more reliable than Mexican dollars." The mutual convenience was the other. The drafts could be cashed at IEC's offices in Hankou, Nanjing, Shanghai, Tianjin, and Zhenjiang. As many shopkeepers needed to visit these cities regularly for replenishing their stocks, IEC's draft also solved their problems of cash movement.⁶⁵

To avoid having large amounts of cash in hand, the agent was instructed to sell the drafts one by one. The amount on each draft was not to exceed a limit, stamped on each draft. Once a draft was negotiated, an advice had to be sent back to the head office immediately. The cash obtained from selling the draft was then deposited in the shops or native banks and withdrawn gradually. To avoid fraud and embezzlement the agent was not allowed to draw any cash without the countersignature of an IEC inspector. IEC also set strict upper limits for the amounts deposited in these shops and native banks so as to decrease the risk that they might become insolvent.⁶⁶

63. Zha Futian, "Yingshang Heji yanghang zai Nanjing kaichang shezhuang de genggai."

64. Tianjin Municipal Archives W25/1/1500, "Translation of Agent's Rules and Guarantee issued in Feb. 1926 as was known from No. 129," enclosed in T. L. Macartney to Union Cold Storage Company, 3 Dec. 1931; WMA 162/1/33, "Instruction to Comprador, Agents and Inspectors, 1933," enclosed in Note, Feb./March 1948. The old-style, or native, bank was a traditional bank in China that started at the end of the eighteenth century. Its services included short-term financing to merchants and cash remittance. Its capital however was often limited, and so was its operation area. For details see Susan Mann Jones, "Finance in Ningpo: The Ch'ien Chuang, 1750-1880," in *Economic Organization in Chinese Society*, ed. W. E. Willmott (Stanford, Calif., 1970), 47-77; and Andrea Lee McElderry, *Shanghai Old-style Banks (Ch'ien-Chuang), 1800-1935: A Traditional Institution in a Changing Society*, Michigan Papers in Chinese Studies no. 25 (Ann Arbor, Mich., 1976).

65. Zeng et al., comps., *Hubei jindai jingji maoyi shiliao xuanji*, 1: 219, 223.

66. "Nanjing Yingshang Heji yanghang wei Zhuwaizhuang jichayuan zhiding zhi guizhang [Regulations for Inspectors Issued by IEC in Nanjing]," n.d. [1929], NMPF; "Nanjing Heji zhi huajingli dailiren ji jichayuan deng zhi xunhua" [Instructions to Agents, Inspectors etc. by IEC in Nanjing], n.d. [1935], NMPF.

CEPC, on the other hand, could afford to be more liberal with the agent with regard to remittances. It contracted with the native banks near the producing areas. The agent was allowed to draw drafts on the egg collector, which could be cashed at the native banks and then settled at CEPC's head office in Shanghai. By this means CEPC's agent had more flexibility in setting the price they paid for eggs.⁶⁷

In addition to monitoring the agents through personal management, CEPC created incentives for its collectors to increase the number of eggs sold to the company's stations. Refrigerating companies, foreign or Chinese, usually made cash advances to egg collectors so as to secure the produce. The actual price the purchasing stations paid for the eggs, however, fluctuated daily with changes in the egg market.⁶⁸ Because there was a lag between the time the collectors purchased the eggs and the time they were paid by the purchasing station, egg collectors suffered losses due to changes in the quantity of eggs in the market and the international price for egg products. Itself initially an egg buyer, CEPC had more sympathy for the plight of egg collectors and therefore allowed a five-day grace period before dropping the purchase price, thus garnering the loyalty of its collectors. As a result, collectors were more willing to sell eggs to CEPC's stations, even when its price was slightly lower than others.⁶⁹

Business Diversification

After building solid relations with the agents and the egg suppliers, CEPC went on to diversify its Shanghai business. Due to technological improvement in refrigerated shipping, refrigerating companies started shipping chilled shell eggs to Britain in the 1920s. After arrival, instead of being sent to the catering and confectionery industries, shell eggs were delivered to the retail shops and sold with British domestic eggs side by side.⁷⁰ It was, however, an article with high risk. The sale depended on the weather in Europe. If the winter were

67. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 15.

68. Tianjin Municipal Archives W25/1/1500, "Translation of Agent's Rules and Guarantee issued in Feb. 1926 as was known from No. 129," enclosed in T. L. Macartney to Union Cold Storage Company, 3 Dec. 1931.

69. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 15.

70. As late as 1926, the sale of foreign eggs as "English new-laid" and the mixing of foreign and English eggs for the same purpose were common practices in the retail shops in Britain. See Great Britain Ministry of Agriculture and Fisheries, *Report on Egg Marketing in England and Wales* (London, 1926), 70, 111.

cold and the egg production low, shell eggs from China arriving in time for consumption would earn the importer handsome profits. The absence of winter weather, on the other hand, would cause a slump in shell eggs.⁷¹ Thus, most refrigerating companies treated this article with caution. Only Behr & Mathew focused on this trade.⁷²

CEPC entered this business in 1927, and its internal architecture soon helped it obtain a major footing.⁷³ The key to this trade rested on the “c.i.f.” (cost, insurance, freight) cost of the egg. If the eggs were relatively cheap, at the worst losses would be small, but profits might be substantial.⁷⁴ Grading was also important, as the price of shell eggs was directly related to their sizes.⁷⁵ With its strong relationships with its agents and the egg suppliers, CEPC could obtain eggs at a lower price. CEPC’s connection with the albumen factories and domestic market further gave the company a better chance to grade the eggs.

Shell eggs were packed in the autumn. It was a common practice for the egg dealers to store up eggs in the early autumn in the hope of selling them at higher prices later. These stale eggs could not be sold in the shell or frozen egg trade. If they went bad in transportation, they stained other eggs in the same crate. It was difficult to detect stale eggs during collection, however, and they remained a great concern to all the refrigerating companies.⁷⁶ CEPC solved this problem in 1933 by purchasing albumen factories in the producing area. Once eggs were collected, they were examined carefully at the factories. Stale eggs were picked up for manufacturing dried albumen and yolk.⁷⁷ The rest were then sent to Shanghai. When they arrived at the refrigerating plant in Shanghai, they were further examined and sorted. Large ones with first-grade quality were packed as shell eggs. Smaller ones were sent to the breaking and separating department for manufacturing frozen eggs. As for those that were cracked during

71. JMA J/25/2, Bernard to Beith, 22 Jan. 1932; JMA J/7/1, J. J. Paterson to Bernard, 21 Nov. 1930.

72. JMA J/7/1, Bernard to Paterson, 20 Oct. 1930; JMA J/25/2, Bernard to Beith, 18 March 1932.

73. SMA Q229/01/00066, memorandum of meeting between W. L. Carleton and Swift & Co., 16 Dec. 1926; Q229/01/00181, Yuan Hengtong, “Maochang danye lengcang gongsi yange shi,” 7, 17.

74. JMA J/7/1, Bernard to Paterson, 18 Dec. 1930.

75. Liu, “Maochang danye lengcang gongsi de lishi huigu,” 106–7.

76. Zhang Ruizhi, “Wei danye zhujun jin yiyao” [Exhortation to the Egg Dealers], *Ji yu dan* [Hens and Eggs] 1 (1 Oct. 1936): 1–2.

77. SMA Q229/01/00181, Yuan Hengtong, “Maochang danye lengcang gongsi yange shi,” 11; Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 306.

transport, they were sent to the local food market for domestic consumption.⁷⁸

In 1930 CEPC's share of shell eggs had reached 22.5 percent, second only to Behr & Mathew's 35.5 percent.⁷⁹ Moreover, the volume of shell eggs among CEPC's exports continued to increase. On the eve of the Pacific War, it had reached 8,000 tons per year, second only to the volume of frozen eggs, which totaled between 12,000 and 14,000 tons.⁸⁰ CEPC also took advantage of the connection with overseas Chinese in Southeast Asia and shipped shell eggs to Hong Kong, Singapore, and the Philippines, and thus opened up new markets for Chinese eggs.⁸¹

In addition to shell eggs, CEPC developed its refrigeration-related businesses in Shanghai, including cold storage and ice making. Soon after it installed the first refrigerating machine, CEPC encouraged local merchants to store their products there. The storage business grew from fish to pork, poultry, game birds, vegetables, fruits, medicinal herbs, furs, and various dried sea food.⁸² As for ice, it had been in constant demand due to the hot summer in Shanghai. Before the refrigerating machine was introduced, Chinese city dwellers used natural ice cut and stored from nearby lakes and rivers.⁸³ Machine-made ice appeared at the end of the nineteenth century. It was scarce and expensive, however, and mostly for the use of foreign residents. Along with the rapid development of Shanghai's commerce and industries in the early twentieth century, industrial demand for ice increased. CEPC was in place to fill this demand. It first manufactured ice for the fishing and catering businesses. Soon its clients extended to the dyeing, pharmaceutical, and chemical dyestuff industries. Later, the industrial demand became so great that business consumption was secondary.⁸⁴

78. Cang Xia, "Danye hanghua" [Jargon in Egg Wholesaling], *Ji yu dan* [Hens and Eggs] 1 (1 Feb. 1936): 3–4.

79. JMA J/8/1, minutes of conference meeting, London, 30 Dec. 1930, enclosed in Bernard to Paterson, 1 Jan. 1931.

80. SMA Q229/01/00201, "Quanguo danye zhi zhuangkuang" [The Current Situation of the Egg Business in China], n.d. [1945].

81. SMA S373/1/1, Zheng Fangzheng, "Youguan ruhe tuijin danlei shuchu nanyang zhi fuxing" [Proposal on How to Revive the Export of Eggs to the Southeast Asia], 25 Sept. 1946.

82. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 9–10.

83. "Tianranbing de chucang" [Ice Harvesting], *Liangyou huabao* [The Young Companion] 87 (April 1934): 6–7.

84. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengcang gongsi yange shi," 10.

Both IEC (through its affiliated Shanghai Ice and Cold Storage Company) and Jardine Matheson (through Ewo Cold Storage Company) also entered the cold storage and ice-making business. However, their services were not enough to meet the rising demand. Being lofty foreign companies also prevented them from getting access to potential small Chinese customers. Between 1928 and 1933, five more Chinese cold storage companies were established in Shanghai, while CEPC greatly expanded its capacity. In 1931 CEPC built a state-of-the-art cold store on Huangpu Road in north Shanghai. Two years later, another large cold store was built in Nanshi in south Shanghai. The total storage capacity thus reached 5,200 tons, and the daily production of ice was 35 tons, which made CEPC the leader in the cold storage and ice-making industries in Shanghai.⁸⁵ In 1934 CEPC allied with the Chinese cold storage firms and formed the Association of Cold Stores and Ice Manufacturers.⁸⁶ These firms advertised collectively in the leading newspapers and magazines, calling the association “the only cold storage in Shanghai and the most advanced machine-ice factory in China.” The association emphasized that its member firms were run by the Chinese, and the prices were reasonable.⁸⁷ Through this association, CEPC extended its business connection with other industries in Shanghai and grew along with the rapid commercial and industrial development of the city in the 1930s.

Cold storage and ice making not only helped CEPC expand but also proved to be its safety net during the Sino-Japanese War (1937–1945). After the outbreak of the war, exports of eggs were disrupted due to Japan’s occupation of much of northeast, east, and central China. High inflation and unstable supplies of food and goods resulted in a boom in the cold storage business in Shanghai. To meet this demand, CEPC soon converted warehouses and egg factories into cold stores and added another 3,000 tons to its capacity. It charged merchants in goods or produce and thus avoided loss due to inflation. In addition, CEPC took advantage of its facilities and got involved in the fish business. It purchased and froze large amounts of fish in season and sold it at a good price when they were out of stock in the market. When the export of frozen eggs halted completely

85. Ibid.

86. SMA S113/01/00001, “Beihui zhangcheng” [The Regulations of the Association of Cold Stores and Ice Manufacturers in Shanghai], 1934.

87. “Shanghai shi lengqi jibing ye tongye gonghui huiyuan” [Advertisement by the Members of the Association of Cold Stores and Ice Manufacturers in Shanghai], in Sun Mingqi, *Xiandai Shiyejia* [Who’s Who for the Contemporary Industrialists] (Shanghai, 1934), 322.

after 1941, CEPC further built two warehouses in east and south Shanghai. Thanks to these sidelines, CEPC's businesses did not decline but continued to prosper during the war.⁸⁸

Cartel

John Kay divides the "architecture" of a company into three types: external, internal, and networks. While external and internal architectures concern the types of relationships with the customers and the firm's employees, networks involve relations among a group of firms in related activities. As the only indigenous Chinese firm in the frozen egg industry, CEPC proved to be outstanding in this regard. It persuaded the refrigerating companies to form a cartel for the egg trade between China and Europe in the 1930s. This not only ensured its position in the group but also brought China's egg industry to a new stage.

The cartel came about due to severe competition at the end of the 1920s. To obtain larger eggs with lower prices, CEPC extended its purchasing organization to Qingdao in north China in 1927. Satisfied with the eggs' quality and price, the company decided to install its second refrigerating plant there. Greatly alarmed, Behr & Mathew and Ewo Cold Storage found contracted manufacturers in Qingdao in 1928 as an attempt to forestall CEPC. The former contracted with the Dairen Cold Store, a Japanese interest, and the latter contracted with the Chinese American Cold Storage Association Inc., an American firm. As a result, the total output of China's frozen eggs doubled.⁸⁹

While the refrigerating companies were preoccupied with competition and expansion, the Great Depression arrived. When the Depression hit the European market and demand shrank, the Chinese egg industry fell into dire straits of overproduction. It was estimated that the demand in Western Europe was only 40,000 tons of frozen eggs and 100,000 cases of shell eggs, while China's production reached 70,000 tons of frozen eggs and 200,000 cases of shell eggs.⁹⁰

It was amid this situation that an egg cartel was formed. At the end of 1930, Zheng Yuanxing, CEPC's manager, took advantage of the situation and traveled to London. With Greenall's assistance, he

88. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengchang gongsi yange shi," 10–11, 20–21.

89. Liu, "Maochang danye lengchang gongsi de lishi huigu," 107.

90. SMA Q229/01/00229, "Ni tongzhi chukou danye cheng shiyebu wengao" [Draft Proposal Submitted by CEPC to the Ministry of Industry on Government Control on Egg Exports], n.d. [1933], 51.

held individual talks with the foreign companies, and he eventually persuaded them to stop competing and form the Refrigerated Egg Packers' Association of China (REPA) to share the European market in Chinese eggs and egg products.⁹¹ CEPC obtained 25 percent of the total export, next only to IEC's 29 percent.⁹²

REPA did not take off until 1934, owing to the competition of outsiders. Initially, competition among the member firms became even more severe than before the agreement was made. The market was so bad that IEC had to shut down its Nanjing plant again. CEPC also suspended its operation of the Qingdao plant and even converted its business in north China from eggs to peanuts. Zheng revisited Britain in 1934 and negotiated with the London agents or head offices of the refrigerating companies. In the end, they agreed to form the Weal Trust Company in London to control the distribution of Chinese eggs and egg products in Europe, while the corresponding refrigerating companies in China cooperated through the existing REPA. CEPC joined the trust under the name of Overseas Egg & Produce Company. Weal Trust then went a step further to enter into contracts with Britain's Ministry of Food (MOF). Under governmental auspices, the Weal Trust in effect obtained a monopoly on the import of frozen eggs to Britain.⁹³

Through REPA and their counterparts in London, six refrigerating companies monopolized the egg trade between China and Britain. Two more, Cathay Cold Storage Company and British Egg Packing & Cold Storage Company, both British, joined in 1935 and 1939. Following the outbreak of the Sino-Japanese War in 1937, in order to maintain egg exports from the Japanese-occupied areas in China, the Weal Trust invited Mitsui Bussan Kaisha to become a member. Mitsui's membership came to an end at the close of the war (table 3).

After REPA and the Weal Trust started functioning, an operational pattern soon developed. In the fourth quarter of each year, the Weal Trust would investigate the market demand in Europe and the output of other egg exporting countries and then fix the amount and price of the Chinese frozen eggs to be imported into Britain the next year. This often involved time-consuming negotiations both within the Weal Trust and between the Weal Trust and the MOF. After all parties agreed to the terms, the Weal Trust then informed REPA and

91. SMA Q229/01/00181, Yuan Hengtong, "Maochang danye lengchang gongsi yange shi," 16–17.

92. JMA J/8/1, minutes of conference meeting, London, 30 Dec. 1930, enclosed in Bernard to Paterson, 1 Jan. 1931.

93. Liu, "Maochang danye lengchang gongsi de lishi huigu," 108–9.

Table 3 Members of Refrigerated Egg Packers' Association of China (REPA) and Their Counterparts in the Weal Trust Company, 1934–1950

REPA, Shanghai		Weal Trust Co., London
International Export Co.	→←	Union Cold Storage Co. John Layton & Co. Donald Cook & Son
China Egg Produce Co.	→←	Overseas Egg & Produce Co. W. R. Loxley & Co. (London) Swift & Co. J. de Vries & Co.(Rotterdam)
S. Behr & Mathew Ltd.	→←	S. Behr & Mathew Ltd.
Amos Bird Co. (The Borden Co., Amos Bird Division)	→←	Armour & Co.
Jardine, Matheson & Co.	→←	Ch. Goldrei, Foucard & Son Matheson & Co.
Henningsen Produce Co.	→←	J. Lyons & Co.
Cathay Cold Storage Co.	→←	S. Zwick & Sons Ltd.
British Egg Packing & Cold Storage Co.	→←	J. Sakin & Co.
Yangtze Egg & Cold Storage Co.	→←	Mitsui Bussan Kaisha

Sources: Shanghai Municipal Archives (SMA) U155/01/00010, U155/01/00114, U155/01/00117, Q229/01/00005, Q229/01/00151.

requested its members to produce and share the refrigerated tonnage according to their percentages. The idea was to avoid overproduction and to keep the price steady so as to make Chinese eggs competitive in Europe.

On the other end, having received London's instructions, REPA would supervise its members in collection and manufacturing. To avoid competition among its members in collection, REPA divided China's producing areas into four regions, each covered by the plants in Shanghai, Qingdao, Tianjin, and Hankou. Members were requested to collect within their assigned sphere and not to cross into other spheres in order to prevent upward pressure on egg prices. During the season, the heads of the refrigerating companies usually dined at the Shanghai Banker's Association once a week to fix the maximum prices that should be paid for fresh eggs in different districts and also to arbitrate disputes among members and discipline members who violated the agreement. Through strict supervision and continuous negotiations, the purchasing price for eggs remained low, as did the cost.⁹⁴

In addition to supervision, REPA's secondary function was to eradicate potential competitors outside the group. Means once used

94. Ibid.; Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 303.

to undermine CEPC were now adopted to eliminate outsiders—rate wars, shipping obstruction, and mergers. For example, after buying up an outsider's plant, REPA often went a step further and invited the manager to be its nominal consultant with a handsome sinecure, so as to prevent him from working for the competition. Several Chinese and Japanese firms were forced to shut down due to REPA's ruthless methods, and CEPC was in charge of the buyouts of the closed firms.⁹⁵

CEPC played an important role in REPA. From the “responsibility” percentages of the Weal Trust, a quota for contributing to the freight fare and expense of packing materials, we can see that CEPC took 25 to 30 percent of the export of frozen and shell eggs from China, and its margin with IEC was narrow (table 4). Not only did CEPC maintain the second position in the group, it represented REPA in various negotiations with the Chinese government. For example, after the end of the World War II, rising inflation and a low official exchange rate prevented the exporter from resuming business. On the other hand, the Chinese government was desperate for foreign exchange. To overcome this difficulty, the Nationalist government issued regulations for procuring goods and materials for import and export in May 1947. The list first covered silk, tea, wood oil, and bristles only. Through CEPC's negotiation, it was later extended to other articles, including frozen eggs, albumen, and egg yolk.⁹⁶

In practice, the government procured the goods from REPA through the Central Trust of China, a state-owned financial institution, and then commissioned REPA for export. The Central Trust

Table 4 Weal Trust “Responsibility” Percentages, 1931–1948

Year	International Export Co.	Chinese Egg Produce Co.	Behr & Mathew	Amos Bird	Jardine Matheson	Others
1931	29.00%	25.00%	21.50%	10.50%	9.50%	4.50%
1937	32.30	30.34	13.70	9.79	9.79	4.08
1940	28.76	26.71	13.97	8.90	8.79	12.87
1946	25.78	23.94	12.52	8.57	9.17	20.02
1948	30.31	28.13	14.72	9.38	9.26	8.20

Sources: Jardine Matheson Archives (JMA) J/8/1, Minutes of Conference Meeting, London, 30 Dec. 1930, enclosed in D. G. M. Bernard to J. J. Paterson, 1 Jan. 1931; Shanghai Municipal Archive (SMA) Q229/01/00151, Draft proposed agreement between the Packers and Weal Trust Co. Ltd., 1937; SMA U155/01/00114, J. Carter to R. M. Nash, 22 March and 6 Sept. 1946.

95. Liu, “Maochang danye lengcang gongsi de lishi huigu,” 109; Institute of Economics, ed., *Shanghai duiwai maoyi*, 1: 303–4.

96. Institute of Economics, ed., *Shanghai duiwai maoyi*, 2: 146.

paid REPA in Chinese national currency (fab), while REPA returned to the Central Trust 95 percent of the proceeds in pounds sterling. Through this method, REPA could resolve the problem of the unrealistic official rate, while the Chinese government achieved its purpose in export rehabilitation as well as foreign exchange control.⁹⁷ In the meantime, since this line of production was purely for British consumption, the Ancillary Materials Division of the MOF in Britain would arrange the export of tinplate, solder, and other packaging materials to China, which was at the time suffering from a serious shortage of supplies.

Thus from 1947 to 1948, the cartel operated on the model of REPA/Central Trust → Weal Trust/MOF. In 1948 REPA managed to export as much as 15,000 tons of frozen eggs to Britain, around 30 percent of the normal amount before the war.⁹⁸ This temporary recovery, however, did not last for long. The regulations were abolished after the Nationalist government started its currency reform in August 1948.⁹⁹ REPA managed to export another 4,079 tons of eggs to Britain in 1949. After the Communists took over China at the end of that year, many Western nations joined an economic boycott of the Chinese, and the cartel ended. The European market surrendered by China was soon absorbed by the United States, Canada, Argentina, and Australia.

Conclusion

The case of CEPC not only shows the surprising vitality and adaptability of one particular Chinese business, but also suggests that we need to reconsider the seemingly clear-cut distinction between Western and indigenous enterprises when studying Chinese business history. Though wholly owned by Chinese merchants in China, CEPC functioned similarly to its Western rivals in terms of processing, transporting, and selling its products. In addition, this company built a strong internal purchasing structure based on concrete personal

97. SMA Q229/01/00005, Export Rehabilitation Program, Agreement between the Central Trust of China and REPA, Jan. 1947; Institute of Economics, ed., *Shanghai duiwai maoyi*, 2: 300–301.

98. SMA Q229/01/00213, Zheng Yuanxing, “Shanghai Maochang chuangye jingguo yewu qingkuang ji muqian weiji daiyuan zhi baogaoshu” [The Report on the Establishment of the China Egg Produce Company, Its Business Development, and Its Current Crisis], April 1950.

99. Institute of Economics, ed., *Shanghai duiwai maoyi*, 2: 147.

relations and networks of such relations. Thus, CEPC proved highly capable of taking advantage of the best of both worlds.

In analyzing the foundations of corporate success, John Kay argues that while technological know-how can be readily imitated, “architecture” through relational contracts that are difficult to reproduce has proven to be a key factor in helping a firm sustain its competitive advantage.¹⁰⁰ Among the three types of architecture mentioned in this article, Kay particularly highlights internal architecture for its role in forming organizational knowledge and routines. In addition to Kay’s idea of architecture, the result of this research is also in line with Mark Granovetter’s notion of embeddedness in market relations. Granovetter, when analyzing economic behavior, stresses the embeddedness of social relations. He argues that social relations, rather than institutional arrangements, are mainly responsible for the production of trust in economic life.¹⁰¹

Based on this case study, we can see that Chinese merchants readily took advantage of extant cultural resources to form highly personalized purchasing organizations. They further used concrete, ongoing social relations to generate trust and discourage malfeasance, both within their organizations and between the organizations and the suppliers. These advantages were something that foreign companies could not duplicate, due to their lack of cultural resources and embedded social relations. Such cultural and social advantages, plus the quickness of Chinese merchants to grasp Western management techniques, including vertical integration and business diversification, put Chinese businesses in a better position to compete than has been previously recognized.

This case study, along with other research discussed in this article, reveals that Chinese enterprises during the interwar period shared many of the characteristics displayed by the typical early modern enterprise, including vertical integration, business diversification, and architecture formation. When profits were readily attainable, Chinese firms did not hesitate to transfer, absorb, and adapt Western management and technology. Thus, the case of CEPC might cause us to wonder whether this and similar firms might have gradually developed into Chinese-style multinationals during the 1940s and 1950s and consider the extent to which chaotic events like the

100. Kay, *Foundations of Corporate Success*, 64.

101. Mark Granovetter, “Economic Action and Social Structure: The Problem of Embeddedness,” in *The Sociology of Economic Life*, ed. Mark Granovetter and Richard Swedberg (Oxford, U.K., 1992), 53–81.

outbreak of the World War II and the subsequent Communist revolution in China interrupted such growth processes.

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