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Transition in Chinese Building Trade (1840-1937) and its Impact on Building Conservation in Present-day China[1]

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Abstract:

The post-colonial theorist Homi K. Bhabha describes how colonialism creates structures which are often decried as inferior but are fascinating and complex mixtures of cultural practices interwoven to form new systems, different and no less interesting than their original sources. This study demonstrates this in action, looking at the relationship between Chinese native and Western methods in the development of construction in China during 1840-1937. Based on Chinese and British sources, it focuses particularly on building materials and different aspects of the construction processes. The article shows that the complex interactions at work in shaping the architecture of China led to a mixture, a new building trade that combined features of both systems in the supply and use of materials, in the building techniques, in the organisations of builders, in the tools they used, and in the education they received. This article then examines the conservation of Chinese Modern buildings as built heritage from 1840-1937. It argues that, in its aspects pertaining to mixing and conflicts, the development of the emerging industry of architectural conservation in present-day China resembles the history of Chinese Modern building construction.

Key Words: Transition, China, Building trade, Building conservation, Heritage

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1. INTRODUCTION

In 2006, Bund 18 in Shanghai received a UNESCO Asia-Pacific Award for Cultural Heritage Conservation. The building, originally constructed in 1923 as the Chinese headquarters of the Chartered Bank of India, Australia and China, was restored by the Italian Architectural practice Kokaistudios and local partners in 2004.

> 'Five Italian architects oversaw the entire restoration process and worked closely with the Chinese builders and artisans, many of whom were not used to restoring heritage buildings. […] A special plaster combining a Venetian technique and local materials, including sticky rice, was applied to the walls in the central staircase. […] The search of a number of materials that had fallen out of popular use and were hard to source. […] Numerous types of materials were specially commissioned from Italy. […]' [1]

To anyone familiar with the Modern architecture history of China, the project description by the Award is reminiscent of the building fusion it represents. Bund 18, designed by the British architecture practice Palmer & Turner and built by native workers, was just this sort of cooperation. The story of Bund 18 is also the story of many other buildings in China from 1840-1937.

The starting point of this transition, 1840, is marked by the outbreak of the First Opium War, which led to the establishment of Treaty Ports in China. As an intersection of Chinese and Western cultures, these early Modern cities played a crucial role in introducing ideas of industrialisation and scientific construction to China. Western architects and engineers designed and supervised clusters of Western-style buildings, which were constructed by Chinese workers using a mixture of Chinese and Western techniques and a combination of indigenous and imported materials. The termination point, 1937, is the outbreak of the Sino-Japanese War, after which the building trade was severely interrupted, and Western influence was substantially reduced.

2. TRANSITION IN CHINESE BUILDING TRADE

2.1. Material Supply and Building Methods

Previous studies tend to attribute the transition of the building culture (from traditional timber construction to load-bearing brick construction, and to reinforced concrete construction) to a simple effect of 'China importing Western technology'. But this article argues that the situation was more complex than that presented by previous accounts. It seeks to reveal the potential of explaining the transition from a new angle, by looking into the relationship between material

[1] <http://www.unescobkk.org/culture/wh/asia-pacific-heritage-awards/previous-heritage-awards-2000-2013/2006/award-winners/2006dt1/> [accessed 1 August 2015].

supply and building construction. This part is arranged by type of material: timber, brick, and concrete.

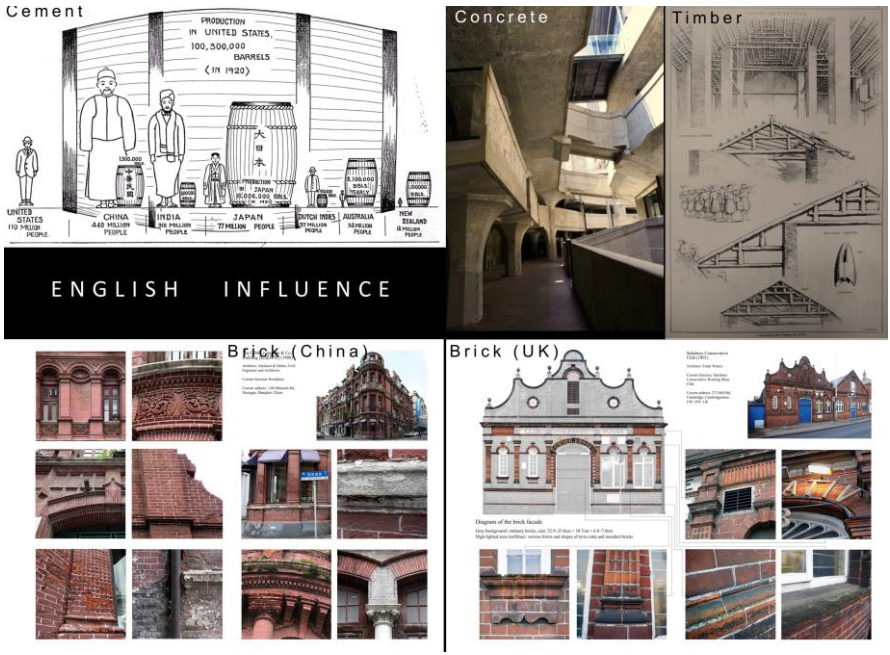

Fig.1. Western influence in building materials and techniques in Modern Chinese architecture between 1840-1937.

The thousands-of-years' tradition of Chinese carpentry meant that timber was one of the most important elements in this extraordinary dynamic process.[2] Chinese builders from the period witnessed the transition of timber supply, from a native trade monopolised by Chinese timber guilds in the 19th century, to an international trade dominated by foreign timber from 1900 to 1935. The reasons were multiple, but the central problems have been revealed: the scarcity of good native timber due to the lack of forest management by the 19th century[3], as well as the great difficulty of obtaining and transporting timber in China, resulted in the foreign timber merchants' increasing active promotion of foreign timber in China in the early 20th century.[4]

[2] For a more complete analysis see: Yiting PAN, James W.P. CAMPBELL. 'A Study of Western Influence on Timber Supply and Carpentry in South China in the Early 20th Century', *Journal of Asian Architecture and Building Engineering*, vol.16, no.2, May 2017, pp.247-54.

[3] Norman SHAW. *Chinese forest trees and timber supply*. London: T. Fisher Unwin, 1914; R. ROSENBLUTH. 'Forests and timber trade of the Chinese Empire'. *Forestry Quarterly* 10, New York: Ithaca, 1912, pp.647-72.

[4] S. W. WILLIAMS. *A Chinese commercial guide.* 5th edn. Hong Kong: A. Shortrede & Co., 1863; 'Tarriff on imports', *North China Herald*, 8 December 1860, p.541; C. YANG et al. 'Table V. Value of import trade by classes of commodities (1867-1928)', in *Statistics of China's Foreign Trades During the Last Sixty-Five Years*. National Research Institute of Social Sciences Academia Sinica, 1931, p.19.

Some of the factors involved in the wide adoption of imported timber are more decisive than others: Imported timber was competitive due to their large sizes, sawn sections, sometimes superior qualities for the purpose, and low prices.[5] Western architects and engineers gave priority to Western timber trusses and foreign timber, which associated with the considerations of structural safety, mechanics calculation, and economical construction.[6] Besides, Western timber merchants played a crucial role in pressing the increase of the market share of foreign timber in China.[7] The competition between native and foreign timber ultimately terminated with the Chinese nationalist rejection to the dumping of foreign timber in the 1930s. Native scholars actively studied Chinese forestry to search for suitable Chinese substitutes, while the National government issued policies to prioritise native timber in Chinese contracts.[8] However, Western techniques had already been adopted, and they would then have a continuing effect on subsequent development.

Fig.2. Chinese traditional carpentry and Modern Chinese roof trusses under Western influence.

The similar kind of transition took place in the brickmaking and brickwork.[9] The reasons for its extensive adoption during this period were many, and they certainly included the relatively limited supply of wood. Moreover, its well-known fire resistance made brick an attractive construction material in its own right, because the merchants of the trading quarters no doubt were wary of losing their goods to conflagration.[10] The building trade in China saw the shift of brickmaking practice, from a family-run craft in the 19th century, to a regional manufacturing industry with gradually increasing levels of mechanisation.[11] The poor quality of blue bricks in

[5] ROSENBLUTH, 'Forests and timber trade', 1912, pp.668-72.

[6] Shanghai Society of Engineers and Architect (SSEA). *Proceedings of the Society and Report of the Council*, 1901-1937.

[7] Li JIN. 'The case of China Import & Export Lumber Company, Ltd. and the dumping of Oregon pine'. *Ningbo wenshi ziliao* 9, 1991.

[8] A. EMMS, 'The practice of joinery and carpentry amongst the Chinese of the Yangtze Valley', *Proceedings of the Society and Report of the Council 1936-1937*, 1937, pp.74-5. Chengyan SHENG. Brief Explanation of Building Construction. 4th edn. Shanghai: Shangwu yinshuguan, 1950 (1st edn.: 1943), pp.59-60.

[9] Yiting PAN. *Local Tradition and British Influence in Building Construction in Shanghai (1840-1937).* unpublished PhD thesis, University of Cambridge, 2016, pp.62-86.

[10] Ibid., p.51.

[11] Ibid., pp.86-87.

general, the old brickmaking methods which were expensive in terms of time, fuel and labour,[12] the Western desire for suitable bricks to replicate a particular architectural style, and the comparative difficulty of transporting bricks from abroad rather than manufacturing them locally, resulted in the rise of a regional brickmaking industry led by Western standards in Chinese cities such as Hankow and Shanghai (European influence), Dairen and Mukden (Japanese influence) up to the 1930s.[13] Among various influencing factors, Western architects and engineers played an important role in promoting Western-style brickwork including the use of foreign bonding patterns such as English and Flemish bonds, and the introduction of the decorative terracotta door and window surrounds. Their preference for Western brickwork and Western-standard bricks partly stemmed from changing tastes in Victorian façades, and partly from the scientific attitudes to structural safety. Although the desire for a particular style was primarily subjective and not 'scientific', the uses and types of brick had been integrated into the European mindset of building construction as the 'proper' way of creating the architecture, albeit an architecture wholly dependent on a Western lineage of architectural history and a Western cultural identity. In the process of the Chinese streetscape shifting from blue bricks to 'Western-style' red bricks, the contribution of Chinese brick manufacturers should not be overlooked.[14] They strived to improve the brickmaking techniques and expanding the scale of the factories. The outcome was a surprising adherence to Victorian and Romantic Eclectic architectural fashions with exposed brick walls for Western-style, and a long-lasting stylistic impact on subsequent Chinese buildings to different extents.

Fig.3. Chinese traditional brickmaking before Western influence and new sources of red bricks in Shanghai since 1858.

[12] Shuyong LIU. 'Reform of the brick and tile industries'. *Ziran kexue* 1, 1928, no.4, pp.59-61.

[13] Linda-Cooke JOHNSON. *Shanghai: from market town to treaty port 1074-1858*. Stanford: Stanford University Press, 1995, p.251; Foreign Office. *List of the principal foreign and Chinese industrial enterprises in China and Hong Kong* (Rev. to December 31st, 1917), compiled by H.M. Commercial Attaché with the assistance of H.M. consuls in China (Shanghai: [British Embassy], 1918), pp.5-7;

[14] China Bricks & Tiles Industrial Association. *Chinese brick and tile historiette*. Beijing: China Building Material Industry Publishing House, 2006; Guoji Maoyi Ju (ed.). *China industrial handbooks. Kiangsu: First series of the reports by the national industrial investigation*. Taipei: Chengwen, 1973. (Reprint of the 1933 edition published by Bureau of Foreign Trade, Minister of Industry, Shanghai).

The adoption of cement and concrete is a more straightforward story of the import of Western ideas and methods.[15] Portland cement in large quantity was first used as unreinforced concrete (e.g., for foundations) and public facilities (e.g., for sewers) in foreign corners of China. Western engineers in Treaty Ports like Shanghai looked at reinforced concrete as a new method of construction that could be possibly adapted to the local circumstances and popularised in China.[16] The significant role of Western engineers in promoting the use of cement was closely associated with the Western desires of structural safety, hygienic living, and economical construction.[17] However, the Chinese awareness of the 'Asiatic problems' (i.e., sanitary issues, foundation, fire, overpopulation, urgent need of permanent housing; flooding, lack of roads, and limited buying power of Asian countries)[18] resulted in the ultimate triumph of reinforced concrete over traditional building materials soon after its introduction from the West. It is fair to say that the localisation of concrete construction in China was a collective Chinese decision to popularise this solution to the recognised Chinese problems,[19] and this was it that promoted the extending use of concrete in China until today.

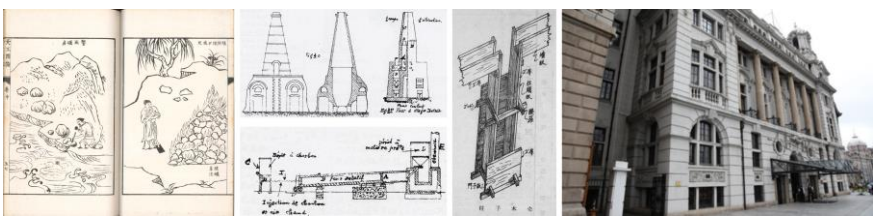

Fig.4. Binding materials before cement in China and Chinese Modern concrete construction.

2.2. Chinese Builders: Organisation, Tools, and Education

The history of building construction is in part the history of the evolving social aspects in building practice. Current scholarship of Modern Chinese architecture has paid considerable attention to architects and engineers, while the significant part that the building workers played

[15] For a more complete analysis see: Yiting PAN. *Local Tradition and British Influence in Building Construction in Shanghai (1840-1937).* 2016, pp. 89-122.

[16] E. J. MULLER, 'Reinforced concrete', *SSEA Proceedings 1904-5*, pp.121-154; N. E. CORNISH, 'Reinforced concrete' in 'The President's address', *SSEA Proceedings 1909-10*, pp.22-23; Anon., 'Reinforced concrete in Shanghai', *Concrete and Constructional Engineering* 4 (1909), 446; Anon., 'Building construction in China', *Concrete and Constructional Engineering* 7 (1912), p.793; 'Reinforced concrete research work', *SSEA Proceedings 1909-10*, pp.75-80; 'Report of the Council', *SSEA Proceedingss 1914-5*, p.166.

[17] Ibid.

[18] P. C. VAN ZANDT. 'Cement great factor in Asia's progress: increasing use of this material solving many important problems of long standing'. *Trans-Pacific* 7, 1922, no.3, pp.43-47.

[19] *China Year Book* (*CYB*) *1926*, pp.719-720; *CYB 1928*, pp.101-106; Foreign Office, *List of enterprises*, pp.5-7; *CIH-Kiangsu*, pp.688-690; Shizhen Lin, 'Advantages and Disadvantages of Building Factories and Warehouses in Reinforced Concrete', *Gongye Tongzhi Jinxinghui Zazhi*, 1 (1917), 1-7; Yong LING, 'Concrete buildings and their values', *Kexue huabao* 7, no.11 (1941), 628-629; Yanmou WANG et al. *A history of cement in China*. 2nd edn. Beijing: Zhongguo jiancai gongye chubanshe, 2017, pp.54-7.

has been largely left unexplored. This article, therefore, examines the other important side of the building trade: Chinese builders. It seeks to address how they adapted to the new building methods under Western influence. This part focuses on their organisations, tools, and education.

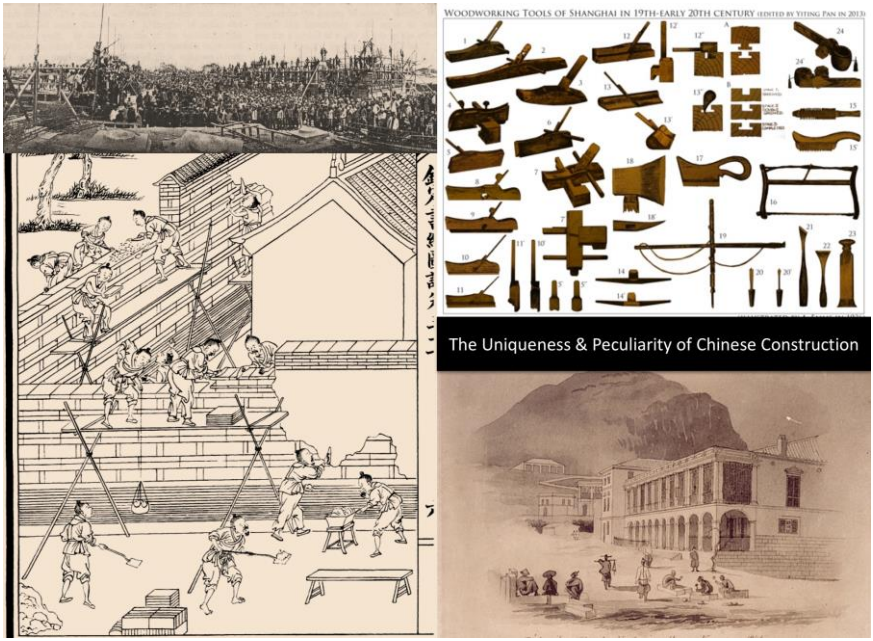

Fig.5. The uniqueness and peculiarity of Chinese construction under Western influence.

The builders' world in China before Western influence revolved around Chinese building guilds based in the Lu Ban Temple.[20] These specific Guilds, which existed all over China, emerged in the 18th century and flourished in the 19th and 20th centuries,[21] and were surprisingly similar in many ways[22] to the English Guilds of the Medieval Period (the latter having disappeared at the end of the 17th and in the early 18th century) .[23] For the Treaty Ports under Western influence, economic growth was necessary for the rise of Lu Ban Guilds, and the Guilds played an invaluable role in both providing networks to enable workers from elsewhere to get jobs and controlling civil unrest. Since the end of the 19th century, for its

[20] For a more complete analysis see: Yiting PAN. *Local Tradition and British Influence in Building Construction in Shanghai (1840-1937).* 2016, pp.125-50.

[21] An extensive coverage of Chinese guilds from a sociological perspective is given in Moll-Murata's paper, which includes a large bibliography on the subject. See Moll-Murata, 'Chinese guilds from the seventeenth to the twentieth centuries', pp.213-247.

[22] 'Tab. 1 A Comparison between Chinese and British Building Craftsmen', in Yiting PAN. 'Revealing the construction history behind the Western façade：based on an architect's memoir of an English house project published in 1851', *Jianzhushi* 170, no.4 (2014), pp.117-126.

[23] Based on Donald WOODWARD. *Men at work: labourers and building craftsmen in the towns of Northern England, 1450-1750*. Cambridge: Cambridge University Press, 1995.

growing building markets, Treaty Ports became increasingly attractive destinations for building craftsmen.[24] Western influence and the sheer scale of building projects brought about a new form of work relationships. The old system of Lu Ban Guilds gradually exposed its limitations in solving the new problems related to the tension between building workers and construction firm owners, as well as foreign affairs.[25] They were replaced in the early 20th century by new organisations initiated by rising industrialists with a democratic hope to provide better support for the building trade, yet without power granted from the governments. The gulf between workers and those who owned building firms and profited from the scale of Western construction projects led to strikes since the late 19th century in China, mainly concerning wages, dismissals, and sometimes treatment. In the early 1930s, the National government's top-down reform to solve labour problems (e.g., strikes) led to a nation-wide movement for the unionsation of guilds under the control of the governments.[26]

Building tools are significant evidence for the transition of craftsmanship.[27] This period witnessed the shift of tools from Chinese hand tools with regional features,[28] to the increasing use of Western-inspired but Chinese manufactured machinery in the 1930s. Native artisans trained through Chinese apprenticeship, in general, were arguably more skilled in using a small number of tools to do all kinds of work, compared to their Western counterparts who relied on a large collection of tools, each suited to a particular purpose. Tools inevitably affected the sort of work done. Chinese tools remained in use for a remarkably long time while the rest of the industry changed radically.[29] The transformation of tools could and did lag behind the visual imitation of Western façades and the revolution in materials and building techniques for decades. On the other hand, eventually, the later fascination with machines among the national bourgeoisie, governments, educators, and native workers was also conspicuous. The Chinese governments had been deliberately delaying the construction of the patent system, in order to encourage the Chinese imitation of Western machines in a blatant attempt to catch up and exceed perceived Western technological dominance.[30] The result was a nationalist passion for making machines starting in the 1920s, with in the 1930s Western-style tools and machines becoming an important part of the teaching of building construction in China.

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[24] *CYB 1926*, p.898.

[25] < http://www.shtong.gov.cn/Newsite/node2/node2245/node69543/node69547/index.html> [accessed 1 February 2019]; also according to the report of 'cases of industrial disputes/strikes classified according to industries', in *CYB 1938*, p.327; *CYB 1939*, p.494;

[26] 'Labour in modern industry, problem, wages, hours and cost of living', in *CYB 1933*, pp.358-9; *CYB 1929-30*, p.613.

[27] For a more complete analysis see: Yiting PAN, James W.P. CAMPBELL. 'A Study of Western Influence on Chinese Building Tools in Chinese Treaty Ports in the Early 20th Century', *Journal of Asian Architecture and Building Engineering*, vol.17, no.2, May 2018, pp.183-190.

[28] Zhen LI. *Chinese traditional woodworking tools for buildings*. Shanghai: Tongji daxue chubanshe, 2004.

[29] A. EMMS. 'The practice of joinery and carpentry'. 1937, pp.1-78.

[30] Xiang WANG. *Chinese patent law and patent litigation in China*. School of Law, University of Maryland, 1998.

The transition of technical education and Chinese books on Building Construction is a key to holistically understanding the Chinese building world in the early 20th century. Previously native buildings had no architects and were built only by craftsmen according to the tradition. Like its European equivalent prior to the Industrial Revolution, the apprenticeship system in Imperial China was based on strong kinship bonds and was geographically exclusive.[31] Chinese craftsmen passed down technical teaching orally, commonly in a form of rhyming songs.[32] The year 1905 marked a turning point in the Chinese education system: the Imperial Civil Service Examination was abolished by Imperial edict and the Qing government actively encouraged Western learning and Modern scientific education. In the building trade in particular, the increases in literacy, Western influences in building practice, and the importation of many Western techniques gradually fostered a new technical education system for building workers.[33] The scientific 'Building Construction' mindset is a Western introduction, which was turned into a Chinese discipline by the use of Building Construction textbooks devised to teach a new syllabus in contemporary technical schools.[34] These construction books were Chinese educators' Nationalistic attempt to link Western Building Construction knowledge with specific Chinese circumstances, and Chinese traditions with contemporary trends.[35] The standardisation process of the terminology of building construction and the appearing of the building regulations in China were also reflected from these early Building Construction books.

2.3. Two Conflicting Perspectives

During the transition of the building trade, conflicting perspectives could emerge on a daily basis on the construction site. According to his memoir 'How Chinese workmen built an English House', the English architect Edward Ashworth had to allow Lu Ban worship in the English house project under his supervision.[36] This revealed the differences in the mindsets of Western and Chinese builders understanding the process of building. Despite the 'tough'

[31] Li SHEN. *A study on the traditional architectural craftsmanship of Xiangshan school*. Shanghai: Tongji daxue chubanshe, 2011, p.74.

[32] Bowen SUN, *Craftsman's language: building construction of housing in Jiangnan area and some problems in Lu Ban Jing Ying Zao Zheng Shi*. unpublished master's dissertation, Tongji University, 2008.

[33] Haiqing LI. *The Modernization of Chinese architecture*. Nanjing: Dongnan daxue chubanshe, 2004; Delin LAI, '*Jianzhu Xinfa*, the earliest book of architecture in Modern China, and its author', in Lai, *Zhongguo jindai jianzhu*, pp.87-100; Subin XU, *The beginning of Chinese Modern architecture*. Tianjin: Tianjin daxue chubanshe, 2010; Ling ZHAO, 'Case study on the localization of modern architectural discipline: "Building Construction" serialised paper of *The Builder*)', *Huanzhong jianzhu* 28, no.5 (2010), pp.155-58.

[34] Good examples include: Yingxu ZHANG. *Jianzhu Xinfa* (Building construction). Shanghai: Shangwu yinshuguan, 1910; Yangeng DU. 'Yingzao Xue (Building construction)', published in *Jianzhu Yuekan*, between February 1935 and April 1937.

[35] For a more complete analysis see: Yiting PAN, James W.P. CAMPBELL. 'The influence of English books on building construction on early 20th century Chinese building manuals', pp.33-42, in J. Campbell, etc. (eds.), Studies in the History of Construction: The Proceedings of the Second Conference of the Construction History Society, Queens' College, Cambridge, 20-21 March 2015.

[36] Edward ASHWORTH. 'How Chinese workmen built an English house', *Builder*, no.456, 1 November 1851, pp.686-688.

cooperation, some of these 'foreign interveners', after years of working in China, could also develop affections for the culture of this land. Arthur De C. Sowerby, the editor of The China Journal of Science & Art, offered a different point of view from the later Chinese fascination with Western technology and industrialisation: 'What these Modern Chinese do not realise is that the efficiency, science and other advantages of Western civilisation may become an utter weariness to the souls of those immersed in and surrounded by them, […] By all means let present-day China adopt what is advantageous in the civilisation and culture of the West, but let not these blind her to or prejudice her against her own heritage, which other countries so greatly envy her.' [37] (1934) It expressed the concern of the 'Western colonists' towards the future of Eastern societies like China under the influence of the Western culture.

From the Chinese side, insecurity and anxiety may also permeate the landscape of construction history. The stone tablet of the Building Trade Guild in Shanghai (1911)[38] reviewed the ideal and the work of this new Guild. It criticised the way traditional Chinese society dismissed the craftsmen's work as 'diabolic tricks and wicked craft'.[39] It argued that the older literati's condemnation and craftsmen's humble status discouraged the development of knowledge and skills, and that this was the primary cause that hindered China's development. From the elite building industrialists' point of view, the inevitable result was China's dependence, not only on imported products but also on the Western advisors in Chinese governments, Western engineers and Western teachers. Therefore, the Guild's ideal was for China to become 'independent',[40] more specifically, 'to know foreigners' tastes, but not depend on their teaching; to make use of foreigners' money, but not allow foreigners to intervene'.[41] It stated that 'then among my four hundred million Chinese compatriots, the situation is far from satisfactory, and probably only the building industry can be independent'. [42] These statements may sound aggressive, xenophobic and arrogant from today's perspective, but they are also revealing of the level of hurt and the sense of having been exploited at the time, and the eagerness to make a change. When the Western influence provided the grounds for the Chinese to question their own building traditions and showed them the benefits of Modernisation, but, simultaneously, the Chinese challenged the authority assigned to Western traditions and to the Western-led building practices in China. Corresponding measures included nationalising the building material production and machine manufacturing, as well as developing Western-style technical colleges, etc. All of these have significant impacts on present-day China.

3. IMPACT ON BUILDING CONSERVATION IN PRESENT-DAY CHINA

[37] Arthur De C. SOWERBY. 'China's wonderful heritage', *China Journal of Science & Art* 21, no.1 (1934), p.1-3.

[38] A commemorative stone tablet of the Building Trade Guild, SMA: S133-1-2; The transcription can be found in *Shanghai xian xuzhi*, vol.3, (1918), 14-15; SMM (ed.), *Shanghai beike ziliao xuanji*, pp.321-2.

[39] 奇技淫巧

[40] 自立

[41] 能知外人之嗜好,而未尝求师于外人; 能吸收外人之金钱, 而不容外人插足其间

[42] 然则吾中国四万万同胞中，差强人意，不倚赖而能自立者，惟此水木工业耳！

3.1. 'Mixing' in Chinese Modern Architecture

Just as a century ago when Modern buildings sprung up in China, today these buildings have become 'historic', and conservation projects for their adaptive reuse are increasing. As Emms noted in 1936, 'We are now entering the transition period when the industry will scrap the tools and methods of the East in favour of those of the West', today the evidence of the transition, if we are to look for careful, can be detected from the physical fabrics of Chinese Modern architecture from 1840-1937.

Today, when we start thinking of how to approach conservation of these Modern buildings, we have to understand our conservation subjects from their construction history characterised by their mixing traditions. We need to know not only the original Chinese name of the building for Chinese archival searching but also the original English name to serve as the keywords for searching in archives and libraries abroad. Similarly, when we investigate the architects, engineers and construction contractors of the building – they were likely to have both English and Chinese names.

When we approach conservation from materiality and tectonics' point of view, history tells us that our conservation subjects were a complex interaction between the Western desires and the local circumstances that resulted in the 'hybridity' of building construction.[43] Take bricks for example, we need to know whether they were locally-made or imported bricks. Besides the types of bricks (i.e., blue brick, red brick, non-load hollow brick, fire brick, Terracotta, decorative moulded brick, etc.), we also need to know their production places (e.g., Shanghai local, Jiashan, England, France, etc.). We should measure the dimension of the bricks in their original units (i.e., inches). We should investigate the brickmaking techniques involved: Were they from hand-moulded, traditional small family-run brick clamps (mostly before 1900)? Or from simple brick-press machines driven by men, natural drying, and firing in small-scale Hoffmann kilns (mostly in 1900-1920)? Or belonged to 'machine-making', but of a doubtful degree of mechanisation (mostly after 1920)? Regarding the brick construction techniques adopted, we need to understand whether they were Chinese-style, Western-style, or a mixed mode of brickwork. More specifically, we need to investigate the thickness of external brick walls of each floor and identify the brick bonds adopted (i.e., Chinese, cavity bond, English, Flemish, etc.). We are also interested in the decorative detailing (i.e., brick carving, Terracotta, fireplace and chimney, decorative door and window surrounding, etc.) and their references. The list can go on, but the construction history leads us to the new recognition of their historic values, the systematic understanding of their scientific values, and the unbiased appreciation of their aesthetic values.

3.2. Understanding Chinese Building Conservation

[43] Felipe HERNÁNDEZ. *Bhabha for architects*. London: Routledge, 2009.

Just as a century ago when the Chinese welcomed the imported new building methods and technical education, today the Chinese conservation desires and critically imports Western conservation philosophy, technology, and experience. Just as one hundred years ago when the Modern building trade was established in China under Western pressures, today a new building conservation industry was developed in China, in the context of voluntary internationalisation process. Today, the Chinese have been quietly catching up in this new field, as Chinese native conservation specialists carried out more and more conservation projects through drawing on Western experience based on Chinese actual conditions.

No doubt some of the conservation projects in China represent the frontier of the world's conservation progress and the best international professional collaboration. Some Chinese 'conservation' projects, however, could be controversial. To Western eyes, some of these projects are not building conservation at all, with the original building construction discarded and only the shape of the original remaining, rebuilt in new materials - not to mention those reconstruction projects (they may be advertised to the public as conservation projects). Some Chinese scholars in building conservation theory also remark that in the Chinese academia of building conservation, the majority of scholars emphasise the development and utilization of heritage, while only a much smaller percentage of scholars focus on historic preservation and repairs. This may be considered abnormal from an orthodox conservationist perspective. However, history tells us that this is also normal.

Today the Chinese generally welcome Western conservation ideas but some of the conservation practitioners do not situate themselves 'in the core of a battle' to claim 'conservation yes, reconstruction no!' – rather, they may treat conservation or reconstruction as 'the same cup of tea', and use them as an instrument to solve local problems caused by the economic development.[44] The reactions of Western conservation specialists towards 'improper' Chinese conservation sound a bit like the English architect Ashworth's exclamations of surprise: 'Every morning some blunder stared me in the face',[45] when he saw how Chinese workers built an English house in 1844-45. However, as this article has shown, Modern China was a place of mixing of traditions. The comments about conservation (Western vs Chinese) sound in this context strangely reminiscent of the comments being made one hundred years ago, when the Western influence in building construction provided the grounds for the Chinese to question their own traditions, but meanwhile the Chinese challenged the authority assigned by the Western tradition. Similar challenges and anxieties, misunderstandings and debates – the competition of two cultural authorities – surround these issues. If this article has shown nothing else, it has shown that history tells us that the result of these debates will not be a whole-hearted acceptance of one system or the other, but a new system, adopting elements of both, not necessarily better or worse than either, but some strange mixture of the two.

[44] Through an informal written discussion with Professor Giorgio Gianghian of the University IUAV of Venice, Italy.

[45] ASHWORTH, 'How Chinese workmen built an English house', 1851, pp.686-8.

4. CONCLUSION

This article has looked at the transition in Chinese building trade under the Western influence during 1840-1937 and discussed today's approach to the conservation of Chinese Modern architecture from that period. It investigated how the building trade became a special mixture of both Western and Chinese materials, building techniques, organisations, tools, and education. It highlighted, alongside the remarkable visual and physical revolutions, the challenge of anxieties, misunderstandings, and debates. It presented Western and Chinese perceptions and actions with their own prejudice or bias in shaping the mixing of building construction. Overall this article adopted a postcolonial perspective focusing on the theoretical concept of 'hybridity'. It showed that the development of the emerging building conservation industry in present-day China resembles that history of Chinese Modern building construction characterised of mixing and conflicting.