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Railway station and urban transition in China

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China is an outstanding example to focus the relationship between railway station and urban transition. My paper shall start considering the railway development at the turn of the 20th century, which radically changed the pre-existing territorial hierarchy in the regions concerned, implying the foundation of new cities, or a fast-paced development of existing ones. After the colonization period, the communist regime changed the location of original station, or build new station to integrate with new civic center, thus created an unified urban image and model for Chinese cities. At present China is facing her 'golden age' of high speed rail, the network and stations play again a critical role in shaping of the future cities.
My paper shall conclude considering some analogies and distinctions between the present time and the 20th century's Chinese railway station and urban transition.

Keywords: Architecture, railway station, China, urban transition.

1. Introduction

China is an outstanding example to interpret the relationship between railway station and urban transition. To discuss the changing urban language in Chinese cities in the past century and nowadays, railway station is a not to be missed protagonist.
The early railway development which was built by foreign forces at the end of 19 century and the beginning of 20 century, radically changed the pre-existing territorial hierarchy in the regions concerned, implying the foundation of new cities, or a fast-paced development of existing ones. Some foreign countries set up railway companies to plan and establish the new city/district by using the same urban language, for instance, Russia in Harbin and Dalian, Japan in Shenyang, Changchun, Fushun, and Jiamusi.
After the colonization period, the communist regime changed the location of original station, or build new station to integrate with new civic center, thus created an unified urban image and model for some Chinese capital cities. While this urban language can be also trace to 1920s, when the Nationalist government made the Capital Plan in Nanjing; and even nowadays, in Shenzhen Central the station is set underground and integrated with the municipal government; the long promenade which links stations and surrounding facilities in Shenzhen North and Guangzhou South helps to establish a new civic center for the new urban district.

Nowadays the boom of HSR (High Speed Railway) construction in China is an exciting event and process that never happened before in this planet. The HSR network changes the travel time between big cities with long distance and cities in the same metropolitan area, which enhances the regional structure and relations of cities. Moreover, the stations play again a critical role in shaping of the future cities. Some stations help to create a double city which remind us what happened nearly one century ago in some colonial cities. Even the stations themselves represent the architectural concept of new generation.
Considering some analogies and distinctions between the present time and the 20th century, this paper summarizes the relation between railway station and urban transition in China by inducing and categorizing the various phenomena.

2. Station and the foundation of city

Until the end of the nineteenth century, Harbin was a ferry on the Sungari River near to some scattered villages.
In 1898, the Russian company CER (Chinese Eastern Railway) started to construct the railway junction in Harbin, as an interchange point between the Trans-Manchurian line ("Chita -Vladivostok" shortcut of Trans-Siberian Railway) and the new railway connection to the port cites of Dalian and Lushun in Bohai gulf. CER immediately took the form not only as a railway company but also, and especially, as "enterprise of urban and regional planning."

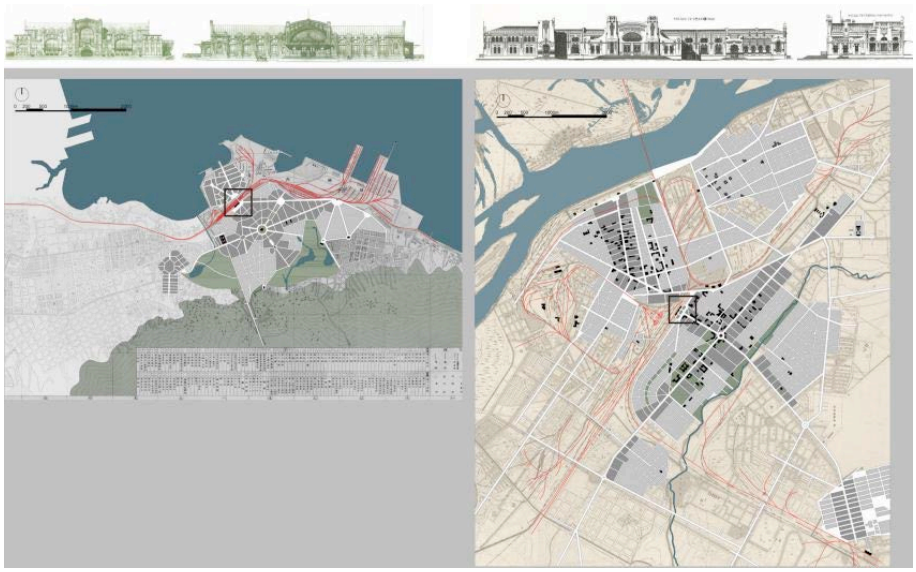

Figure 1. *The Dalian station (CER architect, 1899) and Harbin station (Zhitkovich, 1903) with the urban form during the foundation period of two cities*

The urban layout is divided by the railway lines into a series of geographically, functionally and "ethnically" distinct neighborhoods: Pristan, the district between the river port and the central station was set up as railway factories, in front of which were residential area predominantly inhabited by Westerners, with dwelling houses and commercial building, characterized by dense blocks and buildings of 4-5 floors designed for business people from the international community (Russians, Polish, Jews and Japanese, etc); in Fujiadian, under the administration of the Chinese government, building characters appeared similar to those of Pristan; in Novij Gorod (New Town), based on two main axes (on the head of one was central station) with a central circular plaza and the cathedral St. Nicholas in the intersection, the major roads were constellated with elegant "modern" style cottages: here, were located the headquarters of CER, major

cultural, administrative, religious institutions and commercial centers of the city, whose economic vitality and elegant buildings made the reputation of the city as the "the East Paris".
The same layout of New town also appeared in Dalian which was also planned by Russians, from the station square extended the "station street" to the main church - the geographic center of the city. Another main street, formed intersection of the church and square, linked the sea port on one end, and shopping center on the other end.
Harbin was born by the train. Thanks to the railway, the city had a rapid development and the population exceeded 500,000 in 1934, of which approximately 160,000 came from 33 different countries. Harbin was one of the most important financial centers of north-east Asia at the beginning of the twentieth century.

3. Double city

During both of the early railway and nowadays HSR construction periods we have observed some cities double themselves thanks to the railway station.

Japanese in Manchuria

About one century ago, during the foreign force occupation period, the Japanese in Manchuria and German in Jinan built railway station far to ancient Chinese city, and using it as a center to organize new colonial city. In this process, the station was like a bridgehead that brought into the new city.
In some cities of Manchuria (Shenyang, Changchun, Fushun, Jiamusi), the new city reflected a similar model based on a rectangular area with the longer side parallel to the railway line, divided in regular blocks by a network of orthogonal roads, crossed by a trident axes originated from the rectangular station square.
In the case of Shenyang the new city was nearly two kilometers far from the ancient Chinese walled city.

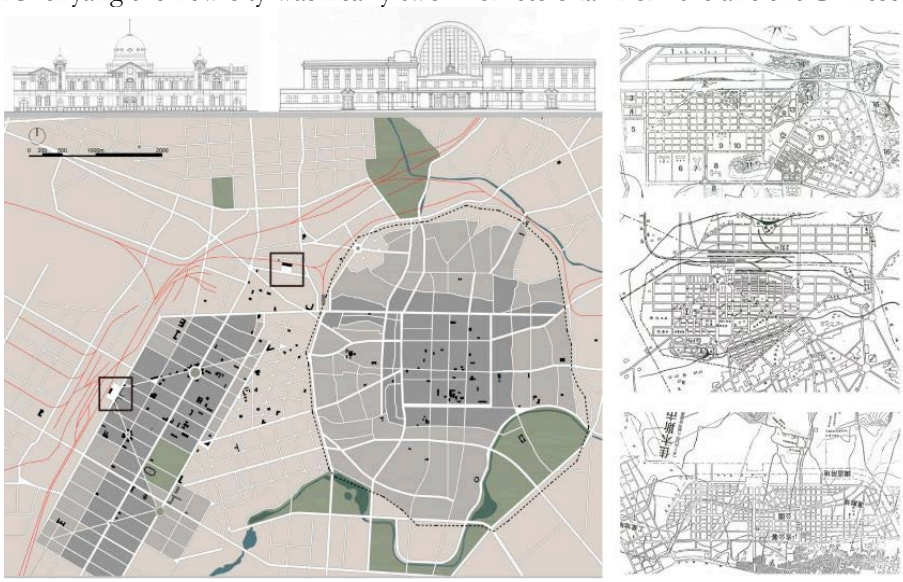

Figure 2. *The Shenyang double city and stations (Japanese station of South Manchuria Railway, Yasushi Tatakeshi e Soutarou Yoshida, 1909; Chinese station of Beijing-Shenyang Railway, Yang Tingbao,1927), and other three Manchurian double cities planned during Japanese occupation - Fushun (1924), Changchun (1932), Jiamusi (1937)*

The main offices, administration buildings and hotels were located in the rectangular station square, along the main streets and around the other two "circus". The station was located exactly in the intersection point of the trident, with a dome set in the middle, and was visible from all the avenues of the three axes.
In the new city, the colonizers built many public buildings, like office, hotel, bank, hospital, school, etc, using the typology of western architecture. The western architectural typologies, different architectural volumes and city images in the new city formed a distinct atmosphere from the original Chinese city.

With the support of the efficient railway transport, the modern industry and commerce developed rapidly. The new coming migrations grew fast and soon helped to double the original city.

German in Jinan

The same story happened in the German-influenced city Jinan too. After the Qingdao-Jinan railway (In 1897, German occupied Qingdao, a beautiful fishing village of Shandong Peninsula, and started to construct a new port city. In order to strengthen the control of the rich Shandong province, they began to build the Qingdao-Jinan railway in 1901) was completed in 1904, the Chinese Qing government took the initiative to open a commercial port area to the west of the ancient city, south of the station. This area covered about two square kilometers and had a grid road network. The dense road network spawned many street shops, western consulates, churches, banks, housing, hospitals and other large occident-style buildings. Independently of the ancient city, at the beginning this isolated area had only two roads to connect with the original one.

Figure 3. *The Shenyang double city and stations - Station of Tianjin-Pukou Railway (H. Fischer, 1908), station of Qingdao-Jinan Railway (1914)*

In 1912, the Tianjin-Nanjing Railway (The Tianjin-Nanjing Railway crossed the Yellow River in the north of Jinan. From Tianjin the railway could extend to Beijing or Manchurian cities, and reach shanghai from Nanjing) was completed, and a railway station was also established in the foreign settlement area. Jinan had since become an important transportation hub of east China north-south railway, linking Beijing northward, Shanghai southward, and the Qingdao seaport to the east. Soon, modern industrial and commercial businesses developed rapidly; the population of settlement grew fast and this new district of

settlement expanded outward. In this case, we also realized the very important role of station, as a machine to create the new city and thus double the original city.

4. Cities with HSR Stations

Nowadays, the huge national HSR network underway in China comes along with the rising phenomenon of high speed urbanization, started some 30 years ago. From 1996 until now, and probably also for the next 20 years, urban population grew at a 20 millions per year rate, mainly nurtured by rural exodus. Many cities proposed new master plans to settle the new residents. HSR is a kind of infrastructure that could create a much closer relation between cities, and attract capital, business, labor, commerce, etc. Bearing some analogies with the early 20th century's Chinese urban development, the present HSR network's development and its stations play again a critical role in the shaping of Chinese cities.

In some Chinese cities such as Dezhou, Xinyang, Yangzhou, the chosen location for the new stations shows the ambitious and exciting vision of these cities' urban development. Many HSR stations were built in the suburb far away from the city center. Although it due to some factors include the requirement of enough semi diameter of curve for high speed train, or the reduction of the relocation compensation for the former inhabitants, but the most important reason is that the local governments are eager for a new master plan to develop a new city with the huge opportunity offered by the HSR project.

These stations, certainly related to other transportation means, form integrated urban transportation hubs and drive the development of new city. At the same time, the existing city can maintain its present activities, and the old railway station is dedicated to passenger transportation at the regional scale and to freight traffic.

Combined to the recent urban master plans, the HSR stations could foster the development of the new territory, to double the city: like one century ago happened in Shenyang and Jinan, the railway station nowadays is still a catalyst for urban civilization.

Figure 4. *The Dezhou double city and new HSR station area (Atkins, 2011)*

5. Station and Civic center

Chinese ancient cities constructed usually following the Chinese traditional planning theory. City had square shape with one or three gates opened on each side. The streets connecting the gates were mainly the main road, thus creating a layout of grid street network. After the demolition of the walls, the city gates and the sense of ceremony of entering city through gate disappeared too. While Station locates at one end of the main street that assumes in a certain sense the role of city's entrance. This street, usually acts as the principal axis and one instrument to lead the city, along with the most magnificent public buildings on both sides.

Passengers get out of station and instantly see the most spectacular street. The case of Henry Murphy's project of Central Administrative District and station in 1930 shows how this American architect tried to

design not only an adaptive architecture but also an adaptive plan. Chinese Architect Liang Sicheng also proposed, in early 1950, the New Beijing Station to build "in Yongdingmen gate (the South gate of outer city wall/end of the central axis) area, to let passengers experience the splendor of Beijing axis soon after they get out of the station".

The new Communist regime, who claimed to be independent, in order to thoroughly eliminate the memory of the humiliate experience during colonial times, moved the legation area out of the Zhengyangmen (the South gate of the inner city wall) area, where two colonizers-constructed stations were set like a pair of pliers to hold the Zhengyangmen city gate and its barbican, as a symbol and metaphor for the control of Chinese feudal court by the foreign forces. In 1959, the new Beijing Central Station built near the east end of Chang'an Avenue, the new East-West axis, as the "First Street" of China, along which there were most important public buildings, where became a political and cultural center in Beijing, and strengthened the new urban image of the new regime.
Subsequently, Taiyuan Station with Yingze Avenue, and Changsha Station with First May Avenue were built during the 1960s to 1980s by using the prototype of the Beijing station and the Chang'an avenue. The concept of Beijing cases eventually developed when the West station was built up in 1996 towards the westward extension of Chang'an avenue.
This urban language was represented in these capital cities by a typical model that the railway station acted as an important participant to form a civic center.

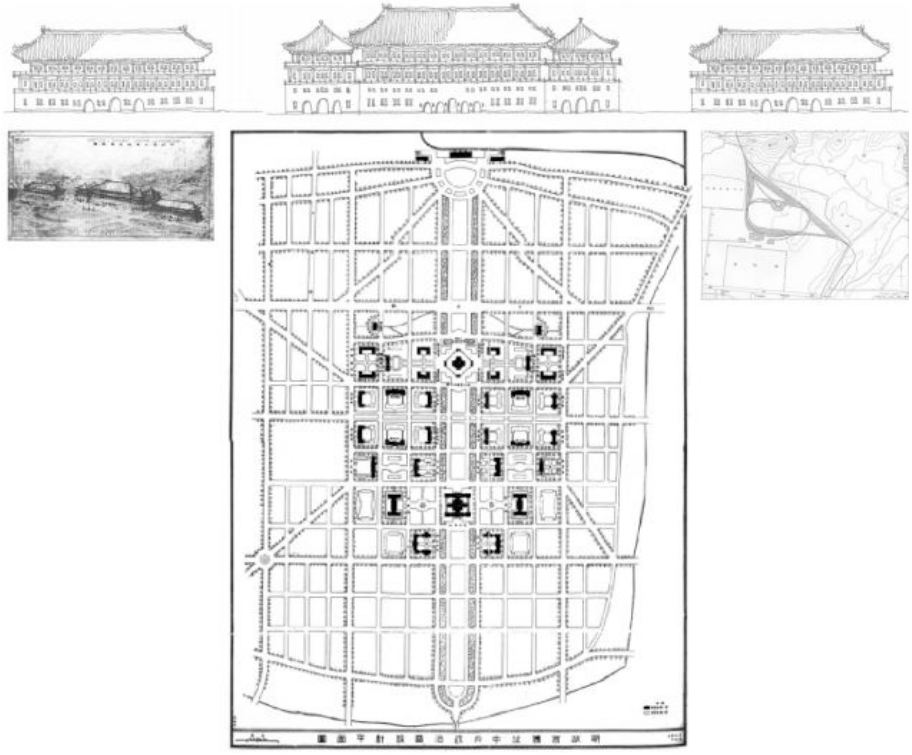

Figure 5. *Central station (Henry Murphy, 1930) and Central Administrative District in Nanjing Capital Plan*

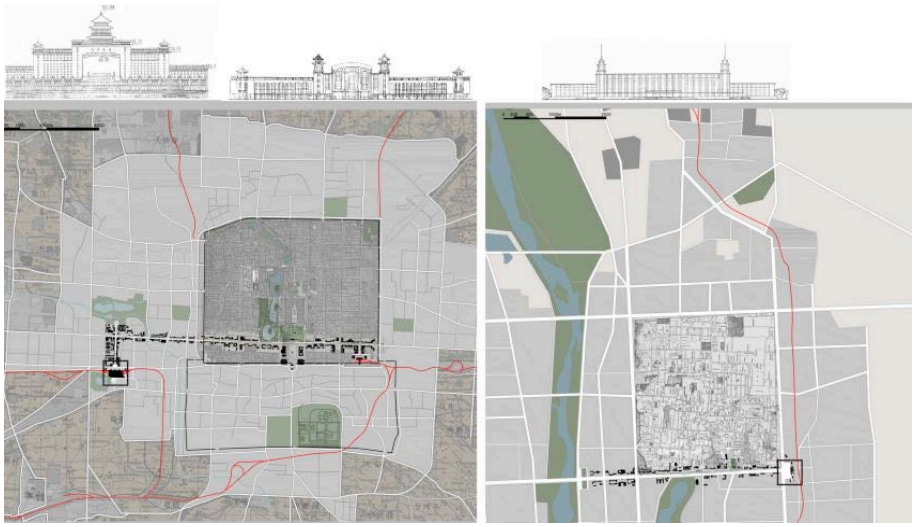

Figure 6. *Beijing Central station (Yang Tinghao, 1959), West station (Zhu Jialu, 1996) and Changan Avenue. Taiyuan station (Shanxi architecture design institute, 1975) and Yingze Avenue*

6. HSR and metropolitan area

The opening of Qinghai-Tibet railway in 2006 was a symbol of the preliminary completion of national railway network. The total railway length developed from 21,000 km (1949) to 75,000 km (2006). Since 2004, China has formulated a "long-term railway network plan" to continue to supplement the ordinary railways, vigorously to build new high-speed railways (passengers dedicated lines), and the intercity high speed railways in important metropolitan areas.

We can not ignore the tremendous figures of the recent railway construction achievement and the future project: 378 new stations realized during the year 2006-2012; another about 400 new stations will be constructed until 2015. By the end of 2015, the high speed railway will reach 40,000 km (total national railway 120,000 km), in that moment it is expected to have more high-speed railway track than in all the rest of the world.

The HSR network efficiently linked the megacities with long distance and also those in the same metropolitan area, that enhances the regional structure and relations of these cities.

On the one hand, the HSR network changes the travel time between the megacities with long distance. A famous example is the Beijing-Shanghai HSR which has already completed in 2011, each day operates 90 pairs (two services: 65 pairs of 300 km/h, and 27 pairs of 250 km/h) of high-speed trains , and offers extra trains during Spring Festival travel season. The total length of it is 1318 km, the fastest just need 4 hour 48 minutes. More and more people choose train to travel between Beijing and Shanghai. For instance, the fastest train to connect Beijing and Nanjing (1023 km) costing 3 hours 39 minutes, it is no reason to take plane any more that the custom of passengers greatly changed.

On the other hand, in Pearl River Delta, Yangtze River Delta, and Beijing-Tianjin Megalopolitan area, HSR system is used to connect cities - almost like a fast subway.

The system was constituted by two kinds of HSR - one is the long-distance national arteries, the other is the intercity lines.

For instance, the Beijing-Shanghai HSR offers the service of Nanjing-Shanghai (301km) with a smallest travel time of 69 minutes without stops, and also the service to stop in the cities between Nanjing and Shanghai with no more than two hours. While the Nanjing-Shanghai intercity HSR, operated in a separate HSR line, also offers services of Nanjing-Shanghai with direct express, or usually more stops within two hours. They are operated by two different companies and in a certain sense are competitors. The 146 pairs

of high-speed trains of these two companies move 170,000 passengers per day, with a minimum interval of five minutes - like the urban metro service.
The same realities we could also notice in the Beijing-Tianjin and Pearl River Delta metropolitan areas. Therefore, nowadays the megacities of these three metropolitan areas in China, where cover more than 100 million inhabitants, become closer and closer.
Besides these two system which belongs to the national railway corporation, in fact there is the third level of rail infrastructure which belongs to the cities: the metro system acts also for the exchange between the railway stations and the urban areas.

Figure 7. *The main infrastructure of Pearl River Delta*

HSR station and cities

When focus to the relation between new HSR stations and the city, we notice the new station revolution is that they mainly contribute themselves as a piece to the natural or urban landscape.
What we can assume is that these HSR stations are reflecting the new task and trend by their places and characters in the urban scene. Although we can find some stations like "flying disc" or "starship" still show the aspect of form to demonstrate power, but the general tendency is not to emphasis themselves at all. Especially if we consider the Hong Kong West Kowloon and Tianjin Yujiapu cases, the stations seem to be a geographic metaphor, as a sort of hill and park mixed with urban landscape. The Shenzhen north station and Huiyang station have one side facing to the city, and the other side is the conclusion of the continuity of the landscape of a park.
The function of the concourse of Tianjin west station also seems to be an urban gallery to connect the two part of the city - the downtown and a new urban center. Station is not anymore in his own emphasis, but is a part of making the urban structure – reminding the idea of galleries in Europe which were largely used as a way to create a new kind of buildings associated with urban blocks. Citizens were invited to pass through the station even do not "hear the sound of the train".
Therefore, the tendency of stations nowadays is to make station as a part of landscape, could be a natural landscape, and also be a mega structure of urban landscape.

Figure 8. *Hong Kong West Kowloon terminus (Aedas, 2009-2015) and Tianjin Yujiapu station (SOM, 2011-2014)*

Figure 9. *Tianjin West station (GMP, 2005-2011)*

7. Conclusion

From the different topics we can summarize the role of stations in the cities. In the case of the colonial times, like Harbin, Dalian, Shijiazhuang, Shenyang, Jinan, the new stations helps to found or double the cities. The stations were profoundly involved in the specific urban layouts. While as soon as the People's Republic of China was founded, the remove of the old stations and the construction of the new one which involved in the development of the new urban axis shows a strong image of civic center and reflects the symbol of the political power.

In the recent cases, the HSR stations still create, or participate to form, the new civic centers, but with less political factors, to integrate with the axis or group of cultural, commercial and entertainment facilities. In the case of Shenzhen North and Guangzhou South the long promenade axis combines with the multi-layer commercial structures; the Hong Kong West Kowloon terminus and Tianjin Yujiapu station as a civic square and park integrate with the nearby cultural and commercial areas. So that the stations are as a piece of the natural or urban landscape.

Like the stations in past times, nowadays they change the cities as a critical element to participate in forming the new urban language of the future.

Figure 10. *Guangzhou South station (Terry Farrel, 2004-2010) and the long promenade*

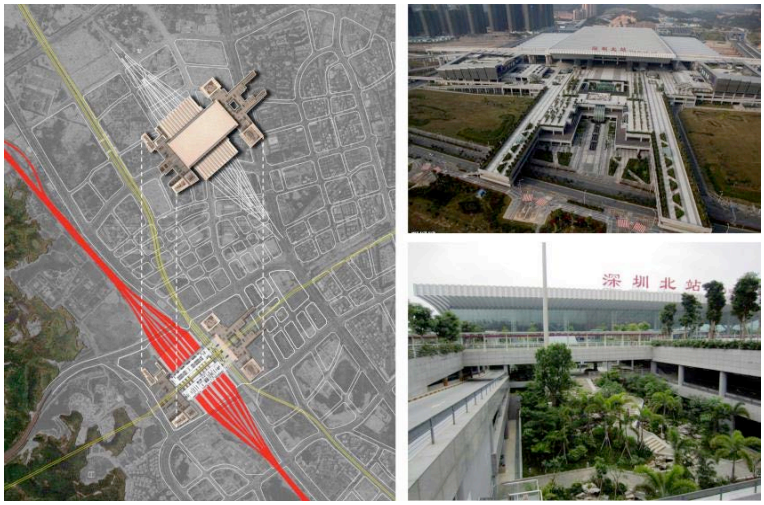

Figure 11. *Shenzhen North station (China Railway Fourth Survey and Design Group Co.,Ltd., The institute of Architecture Design & Research of Shenzhen University, 2007-2011) and the promenade to connect the surrounding future facilities*

Figure 12. *Hong Kong West Kowloon terminus (Aedas, 2009-2015) and the surrounding facilities*

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