

*Wugongchuan* (centipede-ship), from *Longjiang chuanchang zhi*.

## The *Wugongchuan* (Centipede Ships) and the Portuguese

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I. Several Chinese sources associate the so-called *wugongchuan* 蜈蚣船, or “Centipede Ships”, with early Portuguese trading activities in Central Guangdong, prior to the foundation of Macao. The present note is a comment on these ships and the texts which mention them.<sup>1</sup>

One of the earliest Chinese works describing the *wugongchuan* is Li Zhaoxiang’s 李昭祥 famous *Longjiang chuanchang zhi* 龙江船厂志 (now *LJCCZ*), an account of the Longjiang shipyard in Nanjing. This work was printed in the second half of the Jiajing period (1522-1566). It carries a preface by Ouyang Qu 欧阳衢, dated 1553, and was thus written more or less at around the time when the Portuguese were about to settle on the southern part of the Macao peninsula. In 1999 Wang Liangong 王亮功 prepared a fully

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punctuated edition of this text, which was also used for the present essay.<sup>2</sup>

According to the *Songjiang fuzhi* 松江府志, a local gazetteer, Li Zhaoxiang hailed from the Shanghai area. In 1537 he passed the provincial examinations as the top candidate, which enabled him to become a government official, and in 1547 he was also successful in the *jinsbi* 进士 examination. From 1551 onwards he directed the Longjiang shipyard in Nanjing, his post being placed under the Ministry of Work (*gongbu* 工部). He wrote several works of which, apparently, only the one in question has survived.<sup>3</sup>

The *LJCCZ*, in eight chapters or *juan* 卷, contains detailed information on the internal organization of the Longjiang shipyard, the materials needed for the construction of different vessels, various descriptions of these vessels, a historical section with references to Chinese ships and shipbuilding in earlier periods, all kinds of illustrations, including a plan of the shipyard, and segments on many other relevant subjects. The illustrations and many descriptions, including the lists of the materials required for the construction of individual ships, are very similar to or identical with the ones found in an earlier work, namely Shen Qi's 沈启 *Nan chuan ji* 南船记, which carries a preface dated 1541. Since this last work is difficult to find, I shall mostly rely on the *LJCCZ* here, giving references to the *Nan chuan ji* only where needed.<sup>4</sup>

Chapter 1 of Li Zhaoxiang's book carries a large number of official regulations, imperial edicts and administrative guidelines related to the construction of ships. This also includes some statistically relevant data and information on individual types of vessels. One type of vessel is the *wugongchuan*. Below the relevant passages are paraphrased in English:<sup>5</sup>

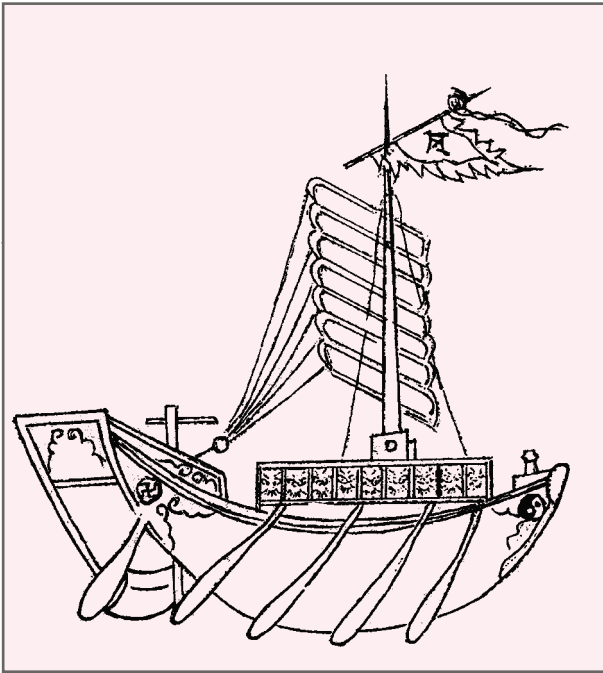
In the fourth year of Jiaping (1525) the garrison of Nanjing was allowed to construct one *wugongchuan* with six *folangji* 佛郎(朗)机 – or “Portuguese” – guns. According to a memorial by Wang Hong 汪鏞, the *anchashi* 按察使 [surveillance commissioner] of Guangdong, the ships of the Portuguese had a length of ten *zhang* 丈 and a width of three *zhang* [approximately 36 x 11 meters]. They had forty oars on each side, carried three to four guns, had a sharp-pointed keel and a flat deck and were thus safe against storms and high waves. Moreover, the crew was protected by breastwork [or bulwarks]

and therefore had no need to fear arrows and stones. There were two hundred men altogether, with many pulling the oars, which made these ships very fast, even if there was no wind. When the guns were fired and the gun balls poured down like rain, no enemy could resist. These ships were called *wugongchuan*. Their guns were made out of bronze, the heavier ones weighing more than one thousand *jin* 斤 [circa five hundred pounds], the medium ones over five hundred *jin*, and the small ones one hundred and fifty *jin*. Each gun was mounted on four iron “legs”. The iron gun balls were covered by lead. The method of producing gunpowder, however, differed from the techniques current in China. The guns could fire over a distance of more than one hundred *zhang* [circa 350 meters], smashing wooden and stone structures to pieces. They were thus much superior to the guns produced in China since ancient times.

After this introduction the text continues by saying that in this same year (still 1525) Liang Yahong 梁亚洪, a ship carpenter, and three other specialists, all from Guangdong, were ordered to Nanjing and materials were gathered for the construction of one *wugongchuan* with a length of 7.5 *zhang* and a width of 1.6 *zhang* (these measurements can also be found in *Nan chuan ji*). Finally, the Nanjing ammunition depot made six *folangji* guns. All this was then handed over to the naval base in Xinjiangkou 新江口 (along the Yangzi River, near Nanjing) for military experiments.<sup>6</sup>

Chapter 2 of the *LJCCZ* contains an illustration of a *wugongchuan* (identical to an illustration found in *Nan chuan ji*) and further text passages. The illustration shows a two-masted vessel with nine oars on one side, which means there were eighteen oars altogether. This is also confirmed through the *Nan chuan ji*. The colophon on the *LJCCZ* illustration says, however, this ship had a length of eight *zhang* and a width of one *zhang* and six *chi* 尺. The length is thus different from the one given in chapter 1 of the text. The prow is drawn in such a way that it appears to have been “flat” (a common feature of traditional Chinese shipping).<sup>7</sup>

The *LJCCZ* text itself confirms some of the details given in the first chapter: From 1525 onwards the *wugongchuan* were used with guns (the wording is ambivalent here). Wang Hong presented a memorial, thereafter Nanjing was instructed to build these ships



*Qingqian libianchuan, from Longjiang chuanchang zhi.*

(or one ship only?) for defensive purposes. The second part of the text adds some new aspects: The name of the ship was derived from its appearance. More important, in 1534 the construction of the *wugongchuan* was stopped (this is not clearly expressed in the *Nan chuan ji*). It was argued that warships of the 150 *liao* 料 category would be similar, if only they were equipped with oars.<sup>8</sup> After a few more technical changes one might no longer call them *wugongchuan*, but they would essentially fulfill the same functions and would also be very speedy. Therefore, why should the mighty imperial court bother to copy the models of “inferior barbarians” (*xiao yi* 小夷) and cling to an exotic name? The *Nan chuan ji* has many passages, which are partly similar, but different in tone. It praises the efficiency of *folangji* cannon saying they could be placed on ships. This is followed by some remarks on the excellent qualities of the *wugongchuan*. A further statement is cited which also confirms this view.<sup>9</sup>

Reading the above, several observations are of interest: (1) The technical knowledge of how the *wugongchuan* were made, was obviously brought from Guangdong to Nanjing. (2) The *wugongchuan*, with forty oars on each side, obviously some type of galley, was associated with the Portuguese. A smaller version was built in Nanjing, possibly with eighteen oars. (3)

These ships carried modern artillery, considered more efficient than any other guns available at that time. Below I shall comment on these and other points, one by one. I shall begin by discussing further sources and by trying to reconstruct how the Chinese may have become acquainted with the *wugongchuan*.

II. The first text to consider is Shen Defu’s 沈德符 *Ye huo bian* 野获编 (Wanli period). This work mentions a certain He Ru 何儒, who was a government officer in Guangdong. In 1533, the *Ye huo bian* reports, he obtained the “method” of (producing) guns, *wugongchuan*, etc.” (*wugongchuan, chong deng fa* 蜈蚣船, 銃等法). Obviously this was after the Portuguese had been defeated in a battle.<sup>10</sup> The incidence seems to refer to the well-known clashes of 1521 and 1522, in which the Portuguese had lost some men and vessels. These battles took place in the Pearl River area, especially near a place called Xicaowan 西草湾.<sup>11</sup> The *Ye huo bian*, however, is difficult to interpret. First, the hostile encounters occurred eleven years prior to 1533 and one must ask therefore, what had happened in the years between 1522 and 1533. Second, it is not clear whether “method” (technology) is restricted to the art of cannon making, or whether it refers to the ships as well. Furthermore, *wugongchuan chong* could stand for one thing – *folangji* gun(s) mounted on *wugongchuan* – or two separate “items”, namely ship (s) and gun(s).<sup>12</sup>

Another text, the *Shuyu zhou zi lu* 殊域周咨录 (1574) by Yan Congjian 严从简, also mentions the *wugongchuan*.<sup>13</sup> This text is very similar to the above passages found in *LJCCZ*, although some numbers are presented differently. Thus, Li Zhaoxiang speaks of three to four guns, as we saw, while the *Shuyu zhou zi lu* has “thirty-four”. Furthermore, in the *Shuyu zhou zi lu* “ten *zhang*” and “three *chi*” (not three *zhang*) are given as the size of the bulwarks, and not as the ship’s length and width. From that source we also learn that He Ru had once encountered two Chinese on a Portuguese vessel while collecting duties. These men, Yang San 杨三 and Dai Ming 戴明, had spent many years with the Portuguese and knew their art of making ships, guns and powder. Arrangements were thus taken to obtain all relevant information from “Yang San and others” (Yang San *deng* 等) – essentially through He Ru, who had received instructions from Wang Hong, to collect these “secrets”.

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To accomplish his task, He Ru fitted out a small boat, which eventually took Yang (and Dai?) ashore in the middle of the night. Thereafter “they were ordered to manufacture [cannon] in accordance with this pattern”. Later Wang Hong obtained a victory over the Portuguese, using these new guns.<sup>14</sup> During this battle he captured several large and small artillery pieces. Finally, in 1523, a memorial was presented to the throne, which drew attention to the efficiency of the *folangji* and the *wugongchuan*. It also suggested to make cannon for defensive purposes. This request was approved.

There is one important point here: The quotation in the last part of the text is usually related to the casting of *folangji* guns only (therefore only “cannon” appears in brackets), and not to the building of *wugongchuan*. Casting a gun could probably be accomplished within a short period of time, constructing a ship certainly required more preparation. In other words, the time span between Yang’s and Dai’s arrival and Wang Hong’s victory may have been too short for the construction of a *wugongchuan*. Yet, it is quite obvious that Yang San and his colleagues must have told their countrymen how to make these ships.

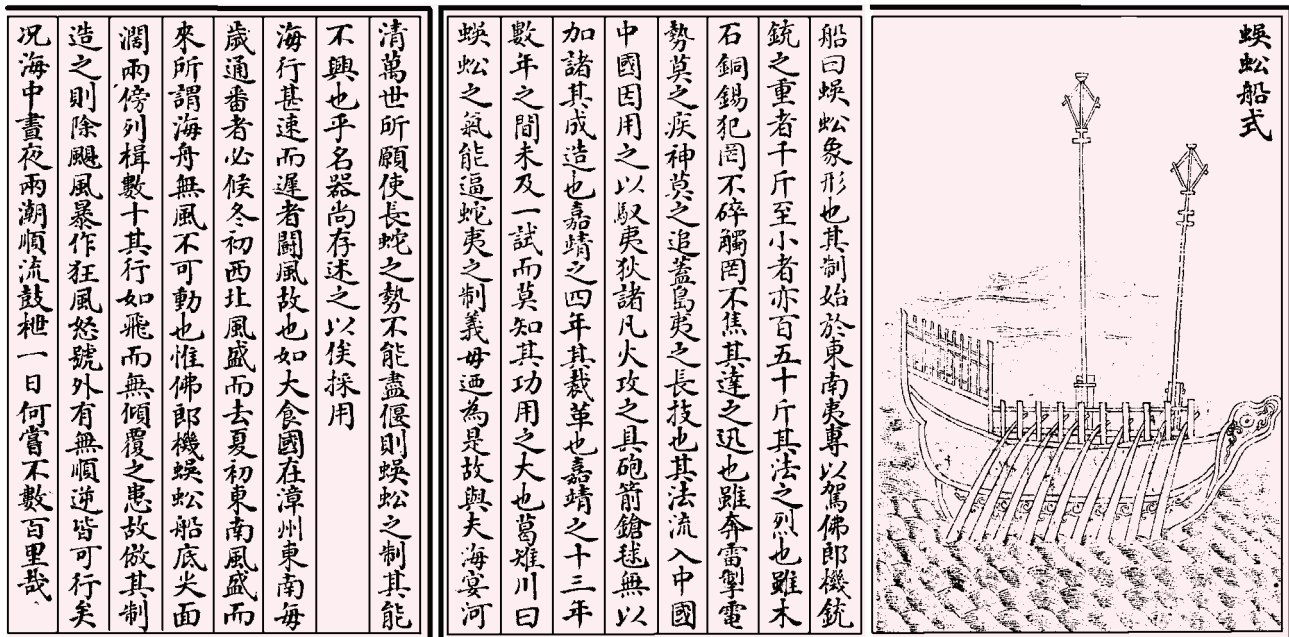
Further evidence comes from the “Veritable Records of the Ming Dynasty”, the *Ming shilu* 明实录. An entry dated 25 May 1524 says this: “The Duke of Weiguo 魏国公, Xu Pengju 徐鹏举, commandant of Nanjing, and others memorialized a request to obtain the methods and artisan skills for making the *folangji* cannons, which had been obtained by Guangdong. The Ministry of War advised: ‘The cannons cannot be mounted on other than the *wugongchuan*. Guangdong should also be instructed to obtain artisans from Nanjing to manufacture these.’ This was imperially approved.”<sup>15</sup>

A second entry, of 5 March 1530, tells us that – earlier – Cui Wen 崔文, a regional commander, had presented a memorial in which he had proposed to construct ships of the *wugongchuan* type that had then already been made in Guangdong, and to place *folangji* guns on these vessels.<sup>16</sup> The interesting part about this notice is that, if the text is correct, the Cantonese must have started to make their own *wugongchuan* prior to 1530.

A third entry, related to 7 October 1533, reads (in Wade’s translation): “Previously, He Ru, a police officer in Guangdong, had repeatedly brought to capture *fan* persons from the country of the Folangji and thereby obtained their *wugongchuan* guns and other technologies. For his achievements he was promoted to

assistant magistrate of Shangyuan 上元 County in Yingtian 应天 Prefecture (Nanjing), and was instructed to supervise construction in the River-Controller’s Office, so as to provide for the riverine defence...”<sup>17</sup> Again, the text contains the same ambivalent phrase as the *Ye huo bian*, namely *wugongchuan chong deng fa*.

Putting together the above, the following picture emerges: He Ru got hold of Yang San and Dai Ming some time *before* the Portuguese lost ships and men in the battle of the early 1520s. Yang and Dai then told the Chinese how to make *folangji* guns, and possibly also how to construct a *wugongchuan*. Using the freshly-copied *folangji*, the Chinese won a victory over the Portuguese, capturing additional artillery. This was in 1522. One year later a memorial was presented, which praised the qualities of both the *folangji* and *wugongchuan* (*Ye huo bian*, *Shuyu zhou zi lu*). Nanjing thus became interested in the new technology and in 1524 a further request was filed to circulate the new methods of casting guns from Guangdong to the southern capital. At the same time, it was proposed that Nanjing should assist Guangdong in building *wugongchuan* (the first *Ming shilu* entry). This reads like a suggestion to start some kind of reciprocal “development program” involving both Guangdong *and* Nanjing. It also seems to presuppose that Guangdong did not have the skills yet to construct its own *wugongchuan*. The *LJCCZ*, however, conveys a different picture: In 1525 Guangdong artisans came to Nanjing to produce these ships. From this it follows that Guangdong had already acquired the necessary technology. Probably the last text is more reliable here, especially in view of the hostile encounters in 1521/1522, which had certainly provided local technicians with a good opportunity to study the enemy’s military capacities. Indeed, the *Ming shilu* entry of 1530 confirms that Guangdong had begun producing “local” *wugongchuan* – possibly in around 1522, i.e., after Yang San (plus Dai Ming and others?) had transmitted the necessary “knowhow” to his colleagues in Guangdong. Given the date of 1525 in Li Zhaoxiang’s text, one may then even narrow down the period in which Guangdong built its first *wugongchuan* to the years between Wang Hong’s victory in 1522 and the said year of 1525. Considering that information about the availability of technical skills in Guangdong needed some time to reach Nanjing and the Longjiang



Wugongchuan and description, all from *Chouhai tubian*.

shipyard, the second date could perhaps be pushed back further, to, say, 1523 or 1524.

Three further points need to be considered: First, the *Ming shilu* entry of 1530 could imply that earlier proposals to build *wugongchuan* for the imperial navy, in Nanjing or some other site (I exclude Guangdong), had not been carried out yet, or at least, that not too many ships of this type had been made by then. This could be in line with the the first chapter of the *LJCCZ*, which mentions the construction of only one vessel. Second, the *Ye huo bian's* claim that He Ru obtained the methods of producing *wugongchuan* in 1533, is wrong. The year in question refers to He Ru's promotion; this year is transmitted through the third entry quoted from *Ming shilu*. Third, according to the *LJCCZ* the construction of *wugongchuan* was stopped in 1534, obviously because it had been found out that other ships could easily be converted to vessels with similar qualities. Considerations of cost and time may have contributed to this decision.

III. The sequence of events as outlined above may be enriched by some additional facettes. The *Ming shi* 明史, which was compiled much later, under the Qing, says that a certain Pan Dinggou 潘丁苟 and others seized several Portuguese in battle and captured two of their ships. Although these events are dated to 1523,

they must refer to the clash in 1522. More important, Jin Guoping believes that Pan Dinggou was among those who had been attracted to work for the Chinese through the arrangements made by He Ru. More precisely, Jin argues that the reading “Yang San and others”, found in Yan Congjian's *Shuyu zhou zi lu*, should be understood to include Pan Dinggou.<sup>18</sup>

Next, one of the Portuguese prisoners held in Guangzhou during the 1520s, reports the following (in the words of Ferguson): “...there came a Christian Chinese..., named Pedro. This man... took the opportunity, when he got security from the mandarins, to say that he would tell them the force that the Portuguese had in Malacca and in Cochim: that he knew it all; that he knew how to make gunpowder, bombards and galleys. He said that in Malacca there were three hundred Portuguese men, that in Cochim there were none; and he commenced in Cantão to build two galleys. He made two; and when quite finished they were shown to the great mandarins. They found that they were very lop-sided, that they were useless, that they had caused a great waste of wood. They ordered that no more should be made, discontinued the work of the galleys, and set to making *gelfas* at Nanto. They found that he knew something about gunpowder and bombards...”<sup>19</sup> Clearly, the above refers to the events of 1521/1522. However, whether

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the Chinese man in question was identical with Pan Dinggou, Yang San or Dai Ming, is not known, but perhaps he should be equated with one of them.

The other surprising part about the Portuguese text is that, obviously, the Chinese were not at all fascinated about the idea of building galleys as too many materials were needed for their construction. If these ships were the same as our *wugongchuan*, then we are facing a dilemma, indeed, because all Chinese sources agree in the fact that these ships were excellent vessels, which should be copied. One solution would be to argue, that the Portuguese writer received wrong information or that he, perhaps deliberately, did not want to communicate the truth to his countrymen in Melaka and Goa. It must be considered here that the Portuguese prisoners in Guangzhou favoured a military move against southern China because they wanted to get liberated. Therefore, they portrayed China as a weak country, which could be defeated easily. Saying that China had not only succeeded in constructing Portuguese guns but also galleys, might have been a strong argument against a suggested attack, which would in turn explain the information quoted above.<sup>20</sup>

Be this as it may, the Portuguese text also tells us that the Chinese man in question began building two vessels in Guangzhou – certainly with the assistance of others. This is in line with the Chinese sources. As will be recalled from the above, they suggest that the knowledge of constructing *wugongchuan* originated in Guangdong and was then transferred to Nanjing. Unfortunately, however, no precise dates are given. All one may say is, that these two ships were probably made between 1522 and 1524, as was proposed in the previous segment. Whether they were ever finished remains unclear.

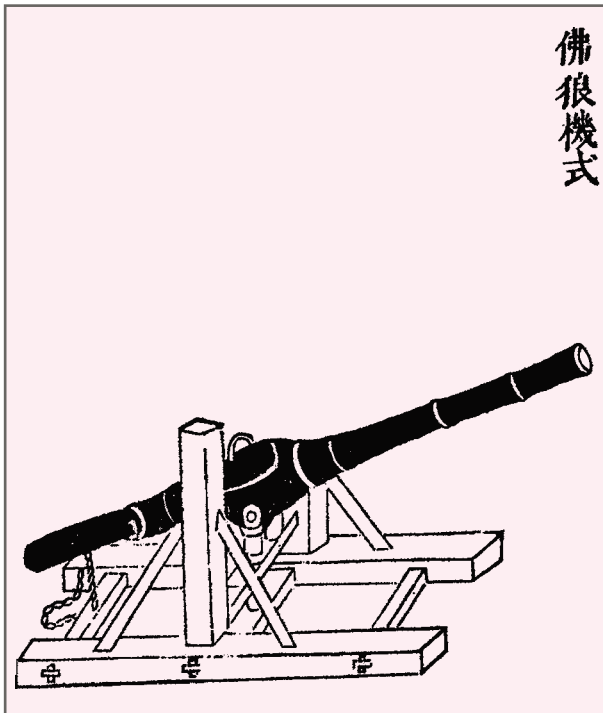
Finally, there are some details which were interpreted differently by modern editors and translators. “Cochim”, for example, was either referred to as Jiaozhi 交址 (趾, 隄) (Annam) or Cochim in South India. “Set to make *gelfas* in Nanto” does not give the full Portuguese version, which reads “Llevarão mão da obra das galés e botarão-nas em Nantó, à gelfa...” (Loureiro’s text). The Portuguese text seems to imply that the two ships built in Guangzhou were moved to “Nanto”, i.e., Nantou 南头, then a small but important port along the Guangdong coast. Moreover, they were called *galés*. This term was normally used for vessels with oars and often with two masts. It would thus seem very likely that our author was referring to

*wugongchuan*. Next, “a gelfa” was understood as “chalupa” (d’Intino), or “ao abandono” (Loureiro).<sup>21</sup> The first version makes little sense, the second version would imply that the two ships in question, and perhaps the whole idea of constructing further vessels of this type, was given up. Again one may argue here that the information given in the original was not adequate because, contrary to what the text says, the Chinese may have continued the construction work, if not in Guangzhou, then in Nantou.

IV. The sources cited above suggest that China built its first *wugongchuan* in the early 1520s – in the Guangzhou region. Apparently, these were modelled after some Portuguese “prototype”. However, a further review of the primary materials raises additional questions. Chapter 2 of the *LJCCZ* reveals, for example, that other ships could easily be converted to vessels looking similar to the *wugongchuan*, as had been said. Were these “adjustments” undertaken regularly? When did they occur first? Furthermore, which were the typical features of a *wugongchuan* that distinguished it from other “models”?

The last question can be answered rather straightforwardly. A *wugongchuan* carried *folangji* guns, unlike all or most other vessels then constructed in China. It had a large number of oars, probably more than any other ship combining sails and oars. The illustration found in Li Zhaoxiang’s book suggests, however, that domestically-produced *wugongchuan* were reduced in scale, if compared to the Portuguese prototype, and that the number of oars was limited to eighteen. This difference may be explained by substituting “proper” oars through the so-called *yaolu* 摇橹 (or *yuloh*) system of “oars”, which has been described, for example, by Needham.<sup>22</sup>

Furthermore, the proportion of the ship was also altered. If the figures are correct, the ratio (length / width) was about 3.5 / 1 in the Portuguese case, and 5.2 / 1 in the Chinese model. Both the change of ratio and the reduction in size may have implied that mounting small *folangji* on a Chinese *wugongchuan* was easier than installing large cannon. This in turn may have reduced the military potential of these vessels and could be one of the unnamed reasons for stopping their production in the 1530s. One might even go on speculating here: Perhaps the technical alterations had something to do with the bad experiences reported in



Folangji cannon, from *Chouhai tubian*.



the context of “Pedro’s” efforts to construct two of these ships in Guangzhou. It will be remembered, they were “lop-sided”. Could this be related to the change in proportions?

Chapter 2 of the *LJCCZ* also alludes to the fact that the prow and stern of a *wugongchuan* differed from the prow and stern of other ships.<sup>23</sup> No details are given, but this could refer to the construction of the rudder, the bowsprit, and other elements. Chinese vessels, it is well known, normally had a flat “front”, quite in contrast to most European vessels. The alterations in design undertaken by the Ming – the illustration suggests a “flat” prow, as had been mentioned – may have entailed further difficulties in adjusting a European model to China’s own shibuilding traditions.

Indeed, when the *wugongchuan* were first mentioned, China had already gone through a long history of building similar vessels, but under different names. Some of these are described in the *LJCCZ* and earlier works. Judging from the illustrations found in Li’s book, patrol vessels of the Anqing type (*Anqing shi shaochuan* 安庆式哨船) and certain ships apt for shallow waters (*qingqian libianchuan* 轻浅利便船) had several oars or yulohs (to use Needham’s classification) and one mast. Both types, however, were significantly smaller than the

*wugongchuan*.<sup>24</sup> Earlier vessels, often called *haihu* 海鹞, may have been similar, but the illustrations included in the texts are poor and difficult to interpret.

The *Nan chuan ji* provides a few more details in a list of raw materials and basic constituents needed for the construction of a *wugongchuan*. Similar lists are also given for other craft. The *LJCCZ* offers comparable data, organised in different form, but it has no such list for the “centipede class”, possibly because these vessels had already been deleted from the building program of the Longjiang shipyard when Li Zhaoxiang compiled his book. Here only a few entries from the *Nan chuan ji* table will be mentioned as many of the constituents listed there can be encountered in the lists for other ships as well. Thus, a *wugongchuan* had eighteen oars, was made of pine wood, and had a flat bottom (other segments below the water-line are also enumerated), bulwarks, various stern parts, all kinds of beams, a mainmast plus *dawei* 大桅 beam etc., a foremast plus *touwei* 头桅 beam etc., rudderpost and tiller, winches, flagpoles, bollards, and so forth. Cabin parts, materials for caulking and the sails are also recorded.<sup>25</sup>

Here we can return to the *LJCCZ*. Although Li Zhaoxiang’s book remains the most important source

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for our knowledge of the *wugongchuan*, later texts refer to them as well. Needham, for example, cites two cases: Qi Jiguang's 戚继光 *Ji xiao xin shu* 纪校新书 (1575) and Mao Yuanyi's 茅元仪 *Wu bei zhi* 武备志 (1628).<sup>26</sup> The *wugongchuan* are also mentioned in a section on shipping in the Ming annals and in the Qing encyclopedia *Qinding gujin tushu jicheng* 钦定古今图书集成, where an illustration almost identical to the one originally included in Li Zhaoxiang's book is found.<sup>27</sup> Similar illustrations are reproduced in several Ming works, usually compiled after the *LJCCZ*, for example in *Chouhai tubian* 筹海图编 (1562), *Qiantai wozuan* 虔台倭纂 (1595), *Dengtan bijiu* 登坛必研 (not seen), *Sancai tuhui* 三才图会 (1609), etc. All these drawings go back to one and the same source, but they provide no new details. There are only two small "variations":

*Indeed, when the wugongchuan were first mentioned, China had already gone through a long history of building similar vessels, but under different names.*

the tops of the masts and the way in which the oars are tightened to the deck differ slightly. The same may be said in regard to the texts. They mostly follow the *LJCCZ* and the earlier *Nan chuan ji*. Only in a few cases are there any "additional" remarks. The *Qiantai wozuan* says, for example, that the *wugongchuan* were made after a Portuguese "model".<sup>28</sup>

Of the above texts the *Qinding gujin tushu jicheng* is selected for a few more comments here because it is widely distributed and furnishes one or two additional aspects.<sup>29</sup> Among other things, it praises the speed of the *wugongchuan* and the efficiency of the *folangji* guns, but it also says that between 1525 and 1534 no further "experiments" were undertaken with these weapons and their qualities were ignored. The structure of the text is ambivalent here as some phrases were possibly taken

from the *Nan chuan ji* and got "distorted" in that way. Thus "experiments" could refer to the usage in war of both the ships and cannon, or just to one of these.<sup>30</sup> This is followed by a quotation from some other text, which again praises the *wugongchuan*, arguing that "centipedes" would be stronger than "snakes", hence one might efficiently use "centipedes" – *wugongchuan* – to tame the seas. A similar passage can also be found in the earlier *Sancai tuhui* and – more elaborate in form – again in the *Nan chuan ji*. Finally we are once more told that *wugongchuan* would not depend on the pattern of winds and would rarely capsizes; they would be able to move around fast under normal conditions, but of course not in stormy weather.

Several points in the description of the *Qinding gujin tushu jicheng* deserve a comment. First, if between 1525 and 1534 no further "experiments" were conducted with *wugongchuan* vessels, this could mean that the ship ordered in 1525 (as indicated in *LJCCZ*) remained the only one of its kind ever constructed under the supervision of the central authorities (not Guangdong!), at least in the 1520s and 1530s – which may or may not be in line with the information found in chapter 2 of the *LJCCZ*, depending on the interpretation of that text. Second, we do not know what occurred after 1534. According to Li Zhaoxiang the *wugongchuan* "program" was stopped in that year. But most likely similar ships were built thereafter, which were classified differently, due to technical alterations (I was unable to find references to *wugongchuan* being produced after 1534). Third, the positive image given in *Qinding gujin tushu jicheng* seems to contradict the pragmatic view presented in chapter 2 of Li Zhaoxiang's text. This points to some kind of internal debate on the qualities of the *wugongchuan*. Obviously those favouring their construction did not get through with their proposals. Fourth, the Portuguese text quoted above tells us that the *wugongchuan* built in Guangzhou were "lop-sided"; the *Qinding gujin tushu jicheng* reports they would not capsizes. Could it be that initial technical difficulties were overcome in the course of time? Or did the Chinese text deliberately draw an overly positive picture to push production?

V. The *LJCCZ* contains one more passage, which does not go together with the above. In 1518, we are told, construction of war ships and patrol vessels was reduced to 254 units altogether – among these were two *wugongchuan*.<sup>31</sup> If this information and the date



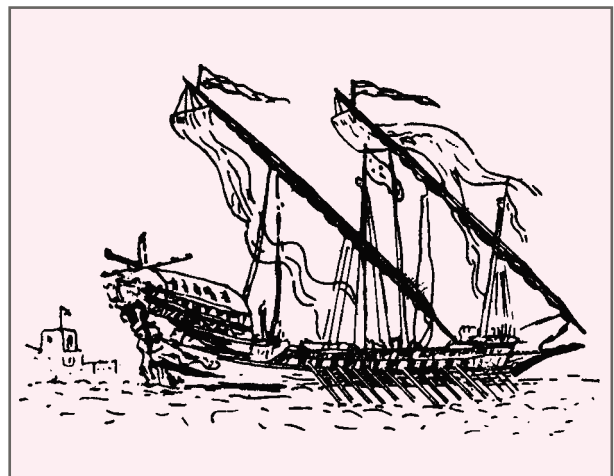
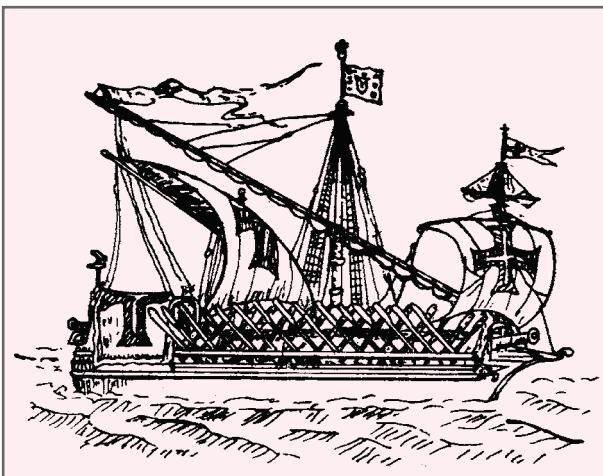
are correct, then China had already built *wugongchuan* before the events of 1521/1522. This is interesting because the term *folangji* – for cannon – also occurs prior to that date, as may be gathered, for example, from the material quoted in the Needham collection.<sup>32</sup> Obviously both expressions *folangji* and *wugongchuan* were in use earlier, possibly even before China was in direct touch with the Portuguese, via Melaka or through other channels.

Supporting evidence may come again from the *Qinding gujin tushu jicheng* and related sources: The *wugongchuan*, it is reported there, originated from the “southeastern barbarians”, in contrast, for example, to what we had learned from the *Qiantai wozuan*. The term “southeastern barbarians” is of course vague. It can refer to the Portuguese, but it can also stand for some other nation, or place, especially in South and Southeast Asia. Indeed, several modern authors thought that the *wugongchuan* came from there. The Portuguese, it was argued, had first encountered similar vessels in the Asian world. They had then installed guns on these ships. The term *wugongchuan* may thus refer to a vessel of Asian origin with Portuguese arms.<sup>33</sup> Whether this term was also in use prior to the conquest of Melaka, for ships without cannon, can no longer be established. If it was only invented after the coming of the Portuguese to Melaka, this must have occurred in the mid 1510s.

Nothing precise is known in regard to the possible Asian or Portuguese “prototypes” of the *wugongchuan*. Ships with sails and oars were common in many places. The *korakora* vessels, for example,

which were mainly distributed in the eastern parts of insular Southeast Asia, could be related to the *wugongchuan* in some way, but similar assumptions may also be made with respect to other craft.<sup>34</sup> An examination of the *Lembranças das Cousas da India* (1525) reveals that various vessels with oars were available in Cochin, then under Portuguese control. These were the well-known *galés*, *galeotas*, and so forth. Both types, mostly with two masts, had fifteen to thirty oars on each side and carried guns. Larger vessels – sometimes called *galeacas* – had up to twenty or more pieces of artillery. How often such vessels were employed in the Bay of Bengal and the South China Sea remains unclear, but there are references to *galés* in the Southeast Asian context and – even indirectly through Barros – in the context of events in China during the early 1520s.<sup>35</sup>

Finally, since guns of the *folangji* type were often associated with the *wugongchuan* in Chinese texts, the following must also be considered here: initially the name “Folangji” was not exclusively reserved for the Portuguese and this certainly had its implications for the *folangji* guns as well. Indeed, *folang-ji* may have meant something like the “machines of the Franks”.<sup>36</sup> These were probably known to the Chinese not through the Portuguese, but through others, for example the Siamese or Malays. Small fire arms and guns were already distributed in Southeast Asia prior to the arrival of the Portuguese and used in local warfare, hence the word *folangji* – for cannon – was perhaps applied to several kinds of guns and only later, after the 1521/1522 incidents, became reserved for Portuguese artillery. By analogy, the term



Two *galés*, both from K. M. Mathew, *History of the Portuguese Navigation in India*, Mittal Publications, Delhi, 1988.

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*wugongchuan* was possibly related to native Asian vessels first before it was transferred to Portuguese *galés*.

There is one problem with the above, however: no source tells us of Southeast Asian guns being mounted on Southeast Asian ships similar to the *wugongchuan* type. Hence, the idea of putting cannon on a seagoing vessel could have originated in China herself – independently of external influence. Early in the fifteenth century Zheng He's 郑和 fleets had already carried "fire arms" (*huoqi* 火器) – either guns or other weapons.<sup>37</sup> From a technical point of view, installing cannon on a large ocean junk was "no big deal". Therefore, China was quick in responding to the new military challenge in the 1520s. Trying to copy a foreign *wugongchuan*, no doubt, was no major challenge, in spite of the meagre results mentioned in the Portuguese letter cited above. When Martim Afonso de Melo Coutinho wrote a lengthy report on what had occurred

in the early 1520s, he mentioned, among other things, eighty "very large junks... armed with small artillery...", and he also referred to the usage of oars. These vessels, even if carrying small cannon only, could not have been built within one day. Some of them certainly stood in China's own naval tradition, others were perhaps similar to the Portuguese *galé* or the mysterious *wugongchuan*.<sup>38</sup>

Admittedly, the picture presented above is not very sharp. Too many details remain unclear. But on a general level the case of the *wugongchuan* shows that the first few Luso-Chinese encounters in the early sixteenth century set off an interesting discussion in China. In modern terms, this was a case of "technology transfer". The other, more famous and definitely much more important case was that of the *folangji* guns, which became a "hot" topic in Chinese military circles. **RC**

## NOTES

- 1 For modern Western surveys of China's traditional navies and shipping, see, for example, José Ta-san Din and Francisco F. Olesa Muñido, *El poder naval chino, desde sus orígenes hasta la caída de la dinastía Ming (siglos VI a. de J.C. – XVII d. de J.C.)* (Barcelona: Ediciones Ariel, 1965), or Joseph Needham et al., *Science and Civilisation in China*. Vol. IV: *Physics and Physical Technology*. Part 3: *Civil Engineering and Nautics* (Cambridge: Cambridge University Press, 1971), pp. 379 et seq.. Some works refer to the *wugongchuan*, for example, L. Audemard, *Les jonques chinoises*, vol. 1: *Histoire de la jonque* (Rotterdam: Museum voor Land- en Volkenkunde and Maritim Museum "Prins Hendrik", 1959), pp. 75-77, or Jacques Dars, *La marine chinoise du Xe siècle au XIVE siècle*, Études d'histoire maritime 11 (Paris: Economica, 1992), p. 107.
- 2 Li Zhaoxiang (author), Wang Lianggong (ed.), *Longjiang chuanchang zhi*, Ser. Jiangsu difang wenxian congshu (Nanjing: Jiangsu guji chubanshe, 1999). – Earlier the *LJCCZ* was included in the Xuanlantang congshu xuji collection (volumes 117-119; Nanjing: Guoli zhongyang tushuguan, 1947). – The most important Western work on Li's text is: Hans Lothar Scheuring, *Die Drachenfluß-Werft von Nanking. Das Lung-chiang ch'uan-chang chih, eine Ming-zeitliche Quelle zur Geschichte des chinesischen Schiffbaus*, Ser. Heidelberger Schriften zur Ostasienkunde 9 (Frankfurt: Haag und Herchen, 1987), 417 pages. Scheuring based his study on the Xuanlantang edition.
- 3 Scheuring, *Drachenfluß-Werft*, pp. 11-13; *LJCCZ*, pp. 275-276; L. Carrington Goodrich and Fang Chaoying, *Dictionary of Ming Biography, 1368-1644. The Ming Biographical History Project of the Association for Asian Studies*, 2 vols. (New York and London: Columbia University Press, 1976), pp. 804-805.
- 4 The *Nan chuan ji* is included in the series *Siku quanshu cunmu congshu*, shibu section, vol. 276 (Ji'nan: Qi Lu shushe, 1996).
- 5 Scheuring, *Drachenfluß-Werft*, pp. 33-34; *LJCCZ*, j. 1, p. 13. One part of this description, especially the sentences referring to cannon, can also be found in *Nan chuan ji*, j. 1, 83b (p. 779).
- 6 The Xinjiangkou base is frequently mentioned in the text, see for example, *LJCCZ*, p. 6. Also see Zhang Tingyu 张廷玉 et al., *Ming shi* 明史, 28 vols. (Beijing: Zhonghua shuju, 1974), VIII, j. 92, p. 2268, and other works. – For the measurements: *Nan chuan ji*, 83b (p. 779).
- 7 Scheuring, *Drachenfluß-Werft*, pp. 66-67, 79; *LJCCZ*, p. 9 of Wang's modern preface, j. 2, pp. 78-79.
- 8 These ships are described elsewhere in the text; see, for example, Scheuring, *Drachenfluß-Werft*, pp. 53, 66-67, 71. – There are different explanations for the term *liao*. See there p. 65 n. 8, pp. 120-121 n. 4. Scheuring cites various sources.
- 9 *Nan chuan ji*, 83b (p. 779). This statement also appears, for example, in *Qinding gujin tushu jicheng* (see below).
- 10 Zhang Haipeng 张海鹏 et al. (eds.), *Zhong Pu guanxi shi ziliao ji* 中葡关系史资料集, 2 vols. (Chengdu: Sichuan renmin chubanshe, 1999), I, p. 329; Shen Defu, *Wanli Ye huo bian*, Mingji shiliao jizhen, 5 vols. (Taipei: Weiwen tushu chubanshe, 1976). – For bibliographical information on important Chinese texts related to the period in question, recently James Chin Kong, "A Critical Survey of the Chinese Sources on Early Portuguese Activities in China", in Jorge M. dos Santos Alves (coordinator), *Portugal e a China. Conferências nos Encontros de História Luso-Chinesa* (Lisbon: Fundação Oriente, 2000), pp. 317-356 (here p. 348). – Several other modern collections of Chinese sources on Luso-Sino issues exist, similar to the one edited by Zhang Haipeng, but these are not listed here.
- 11 Details, for example, in Roderich Ptak, *Portugal in China. Kurzer Abriss der portugiesisch-chinesischen Beziehungen und der Geschichte Macaus im 16. und beginnenden 17. Jahrhundert* (Bad Boll: Klemmerberg Verlag, 1980), pp. 25-26. The best and most detailed account is Jin Guoping 金国平, "1521-1522 nian jian Zhong Pu junshi chongtu – 'Xicaowan' shikao" 1521-1522 年间中葡军事冲突 – 西草湾试考, in his *Xi li dong jian*. *Zhong Pu zaoqi jiechu zhuixi* 西力东渐. 中葡早期接触追昔, Ser. Haohai congkan (Macao: Fundação Macau, 2000), pp. 1-18. For the general background also see the comprehensive account in Rui Manuel Loureiro, *Fidalgos, Missionários e Mandarins. Portugal e a China no*

- Século XVI*, ser. Orientalia 1 (Lisbon: Fundação Oriente, 2000), chapters 9 to 11. For an annotated version of the relevant passages in *Ming shi*, see Zhang Weihua 张惟华, *Ming shi Ouzhou si guo zhuan zhushi* 明史欧洲四国传注释 (Shanghai: Shanghai guji chubanshe, 1982), pp. 16-21, and Dai Yixuan 戴裔焯, “*Ming shi Folangji zhuan*” *jianzheng* 明史佛郎机传笺正 (Beijing: Zhongguo shehui kexueyuan, 1984), pp. 19-25. For other Chinese sources on early Sino-Portuguese clashes, see Zhang Haipeng, *Zhong Pu*, I, pp. 202-208.
- 12 Zhang Haipeng put a comma between the two: “ship(s), gun(s), etc.”
- 13 See Yan Congjian, *Shuyu zhou zi lu*, Ser. Zhongwai jiaotong shiji congkan (Beijing: Zhonghua shuju, 1993), j. 9, p. 233; Zhang Haipeng, *Zhong Pu*, I, pp. 331-332; Paul Pelliot, “Le Hoja et le Sayyid Husain de l’Histoire des Ming”, *T’oung Pao* 38 (1948), pp. 107-108 n. 42; Ptak, *Portugal in China*, pp. 26-27; Geoff Wade, “The Portuguese as Represented in Some Chinese Sources of the Ming Dynasty”, in Alves, *Portugal e a China*, pp. 271-272. Recently also Kazunori Fukuda, “The Relations between China and Portugal in the Early Sixteenth Century. Some Observations on the *Yue shan cong tan*”, *Revista de Cultura* (internat. ed.) 1.1 (2002), pp. 100-105.
- 14 Obviously the Portuguese were then impressed by China’s military power. See, for example, letter by Martin Afonso de Melo Coutinho to the Portuguese king, dated 25 October 1523, published, for example, in João Paulo Oliveira e Costa, “A coroa portuguesa e a China (1508-1531) – do sonho manuelino ao realismo joanino”, in António Vasconcelos de Saldanha and Jorge Manuel dos Santos Alves (eds.), *Estudos de História do Relacionamento Luso-Chinês, séculos XVI-XIX*, ser. Memória do Oriente 6 (Macao: Instituto Português do Oriente, 1996). There, on pp. 76 and 78, we are told the Chinese had strong guns and ships with sails and oars. For a Chinese translation see Jin Guoping, “1521-1522”, pp. 3 and 4.
- 15 *Ming shilu* (Shizong) (Academia Sinica edition), j. 38, fol. 13b (p. 974); Zhang Haipeng, *Zhong Pu*, I, p. 332; Wade, “The Portuguese”, p. 294.
- 16 *Ming shilu* (Shizong), j. 110, fol. 10a (p. 2604); Zhang Haipeng, *Zhong Pu*, I, p. 331.
- 17 *Ming shilu* (Shizong), j. 154, fol. 7b-8a (pp. 3494-3495); Zhang Haipeng, *Zhong Pu*, I, p. 332; Wade, “The Portuguese”, pp. 295-296.
- 18 *Ming shi*, XXVIII, j. 325, p. 8431; annotated versions in the works by Zhang Weihua and Dai Yixuan, as quoted in n. 11, above. Also see, for example, Jin Guoping, “1521-1522”, pp. 15-16.
- 19 Translation by Donald Ferguson, *Letters from Portuguese Captives in Canton, Written in 1534 and 1536...* (rpt. from *Indian Antiquary*; Bombay: Education Society’s Steam Press, 1902), pp. 116-117. Also see pp. 66-67 there. Furthermore: Raffaella d’Intino, *Enformação das Cousas da China. Textos do Século XVI* (Lisbon: Imprensa Nacional-Casa da Moeda, 1989), p. 19; Rui Manuel Loureiro, *Cartas dos Cativos de Cantão: Cristóvão Vieira e Vasco Calvo (1524?)* (Macao: Instituto Cultural de Macau, 1992), p. 38; Pelliot, “Le Hoja”, p. 108 n. 42; Jin Guoping, “1521-1522”, p. 16 n. 1, and *Zhong Pu guanxi shidi kaozheng* 中葡关系实地考证, ser. Haohai congkan (Macao: Fundação Macau, 2000), p. 159; Zhang Haipeng, *Zhong Pu*, p. 168.
- 20 For an analysis of the military “propaganda” in the texts, see, for example, Francisco Roque de Oliveira, “A China em três leituras europeias do século XVI. Das notícias de Cantão de 1534 e 1536 ao ‘país visitado’ em 1590”, in *Garcia de Orta, Geografia* 15.2 (1996), especially pp. 22 et seq., and Loureiro, *Fidalgos, Missionários e Mandarins*, pp. 351-355.
- 21 See sources cited in n. 19 above and Pelliot, “Le Hoja”, p. 108 n. 42, where Dalgado and Yule are quoted. Details in Sebastião Rodolfo Dalgado, *Glossário Luso-Asiático*, 2 vols. (rpt. New Delhi: Asian Educational Services, 1988), I, p. 428, and Yule, *Hobson-Jobson. A Glossary of Colloquial Anglo-Indian Words and Phrases* (rpt. Calcutta: Rupa & Co., 1986), pp. 361-363.
- 22 Needham, *Science*, IV:3, pp. 620-627, especially p. 626 note e.
- 23 *LJCCZ*, j. 2, p. 79.
- 24 Scheuring, *Drachenfluß Werft*, for example pp. 75, 76, 191-195.
- 25 *Nan chuan ji*, 84a-85b (p. 780). Several technical terms can be identified through the tables in Scheuring, *Drachenfluß-Werft*, pp. 56-61, 162-163. But a special Chinese-German-English glossary of the terms in *Nan chuan ji* and *LJCCZ* would have to be established to identify all expressions beyond doubt.
- 26 Needham, *Science*, IV:3, p. 626 note e; Mao Yuanyi, *Wu bei zhi*, 22 vols. (Taipei: Huashi chubanshe, 1984), II, j. 18, 21a; XXI, j. 117, 5a-b, 12b-13a; Qi Jiguang, *Ji xiao xin shu*, Xuejin taoyuan collection in ser. Baibu congshu jicheng ed., tao 46.14, j. 18, 36.
- 27 *Ming shi*, VIII, j. 92, p. 2269; Chen Menglei 陈梦雷 et al., *Qinding gujin tushu jicheng*, Rongzheng dian (Zhonghua shuju ed.), ce 749, j. 97, 10a. – On Qi Jiguang’s text also: Kai Werhahn-Mees, *Neue Abhandlung über den disziplinierten Dienst von Ch’i Chi-kuang* (Munich: W. und I. M. Salzer, 1977; dissertation).
- 28 The *Sancai tubui* is perhaps the best known of these works. See Wang Qi 王圻, *Sancai tubui*, 6 vols. (Taipei: Chengwen chubanshe, 1970), III, S. 1161. – For Xie Jie’s 谢杰 *Qiantai wozuan* see the Xuanlantang congshu xuji edition (vols. 17 and 18; Nanjing: Guoli zhongyong tushuguan, 1947), j. 1, 25b. – Also see, for example, the modern works by Wang Guanzhuo 王冠倬, *Zhongguo guchuan* 中国古船 (Beijing: Haiyang chubanshe, 1991), illustrations 206, 248, 272, 285, 315, 339, and same, *Zhongguo guchuan tupu* 中国古船图谱 (Beijing: Sanlian shudian, 2000), pp. 187, illustration 20, pp. 256-257, illustrations 355-359.
- 29 The text is identical with that found in Hu Zongxian’s 胡宗宪 *Chouhai tubian*, ser. Siku quanshu zhenben 5.92-94, 3 vols., here III, j. 13, 17b-18a, and in *Wu bei zhi*, XXI, j. 117, 12b-13a (pp. 4810-4812). The first part of the *Qinding gujin tushu jicheng* text is also identical to the one in *Sancai tubui*.
- 30 The corresponding passage in *Nan chuan ji* seems to refer to cannon only. See 83b (p. 779) there.
- 31 Scheuring, *Drachenfluß-Werft*, pp. 49-50; *LJCCZ*, j. 1, p. 28.
- 32 See, for example, Needham, *Science*, Vol. V: *Chemistry and Chemical Technology*. Part 7: *Military Technology: The Gunpowder Epic* (Cambridge: Cambridge University Press, 1986), pp. 369, et seq., where several sources are cited.
- 33 Scheuring, *Drachenfluß-Werft*, p. 33 n. 2.
- 34 For native craft in eastern Indonesia and the Philippines, some with sails and oars, see, for example, references in R. Ptak, “The Northern Trade Route to the Spice Islands: South China Sea – Sulu Zone – North Moluccas (14th to early 16th Century)”, *Archipel* 43 (1992), n. 57 and 58.
- 35 Rodrigo José de Lima Felner (dir.), *Subsidios para a História da Índia Portuguesa*, Collecção de Monumentos Inéditos...5, 1st. ser.: História da Ásia (Lisbon: Typographia da Academia Real das Sciencias, 1868), “Lembranças”, pp. 21 et seq. Also see, for example, K. M. Mathew, *History of the Portuguese Navigation in India (1497-1600)* (Delhi: Mittal Publications, 1988), pp. 284-288, 313, and documents in Oliveira e Costa, “A coroa portuguesa”, p. 70, and Artur Basílio de Sá (ed.), *Documentação para a História das Missões do Padroado Português do Oriente: Insulíndia*, vol. 1 (Lisbon: Agência Geral do Ultramar, 1954), pp. 35, 52, 63, 73, 83, furthermore João de Barros, *Terceira Década*, VI.2.
- 36 Needham, *Science*, V:7, pp. 372-373, and sources there.
- 37 See, for example, Gong Zhen 鞏珍 (author), Xiang Da 向达 (ed.), *Xiyang fanguo zhi* 西洋番国志, ser. Zhongwai jiaotong shiji congkan (Beijing: Zhonghua shuju, 1982), orders p. 10.
- 38 Oliveira e Costa, “A coroa portuguesa”, pp. 76 and 78.