Building Techniques in Baroque Manila as a Global Technical Transfer

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Introduction

Architecture, whether in its decorative, technical or spatial features, can be considered a good starting point to analyze the globalization phenomenon of the Early Modern Period. The scarcity or absence of European professionals and materials forced the developers to encourage architectonic hybridization. Gradually, these patterns, as the result of the coexistence of diverse building traditions, were accepted as idiosyncrasies of the local societies. Obviously, during more than three centuries of European presence in Asia, Africa and America, a deep cultural and technical transfer developed.

A highly significant sample of this phenomenon in the early eighteenth century is Manila. Sixteenth- to eighteenth-century Philippine Architecture is heir to many and diverse traditions[ii] . The aforementioned vary all the way from the palm, bamboo and wood-based tradition to the Novo-Hispanic, a Spanish-centered yet mediated style. In between is an array of Far-Eastern influences, most notably Chinese. All influences are essential for the comprehension of the Philippine Architectural identity[iii.]. Said synthesis of influences is reflected, one way or another, in the process undertaken in the course of the construction of most of its works. The *sangleys*, as the Chinese residents in the capital were referred to, were in control of the supply of most of the architectonic materials[iv] . This notwithstanding, Philippine historiography has remained silent on the matter. Instead it has opted to highlight other influences, such as the incorporation of the octagonal shape. The building of the church in Tondo in 1727 is an archetypical demonstration of the role of the *sangleys* in construction. After all, they accounted for most of the work force and, occasionally, its senior foremen. Actually, early accounts during the initial decades of Spanish presence in the isles depict the awarding of building contracts – following a bidding process – to *sangleys* who would then turn over the completed project at a fixed price. Thus, the friars could disregard technical considerations and, in the process, facilitate the economic management of the projects – this being confined to the purchase of materials and the payment of the honoraria of the *cabecillas*, as the unit foremen for carpentry and brick-making as well as laying were known. This construction-awarding process is probably the reason why there are very few building contracts preserved to date, and likewise it most likely explains why there are hardly any records on master *sangleys*. It is true, though, that an increasing number of names are surfacing as of late. Understandably, this framework allowed the missionaries to focus their attention primarily on the adequacy of the construction according to religious demands about space and decorum, which – in turn – explains the buildings' Western touch.

To further appreciate this facet, it is indispensable to consider the previously mentioned documents to as pertinent to the construction of the church in Tondo in 1727[v.]. These include not only a roster of professionals, most of which were Chinese, but also listings of materials, their prices, amounts and formats, as well as a reference to their provenance. By virtue of this information, we are now in a position to analyze *sangley* construction at this particular historical juncture, as well as identify possible sources of influence. The challenges encountered by these authors, as well as matters relative to how to structure the work, have been the subject of a recent study[vi].

The Tondo Church

The Tondo church, in its current location in the outskirts of Manila, has experienced a number of interventions in the eighteenth, nineteenth and twentieth centuries[vii.], all of which have left an imprint. For this very reason, in order to undertake a formal analysis we would have to take into account contemporary constructions that would most likely have been built following the same patterns. Probably the best preserved among these is the Franciscan convent of Santa Ana de Sapa, constructed during the early decades of the eighteenth century within the perimeter of the capital of the Philippines.

Table 1. Extract of the Repair Expenses	
Item	*Amount in Pesos*
Timber	710 pesos 1 real
Stones from the Sangley from Guadalupe	221 " 6 "
Stones from Santa Rosa	37 " 6 "
Stones from Meycauayan	86 " 3 "
Lime	115 " 3 "
Nails	167 " 1 "
Saw	76 " 5 "
Bricks	61 " 2 "

The total costs of the reforms amounted to 3,566 *pesos*, five *reales* and six *granos*. At the helm of this project was a *sangley* master stonemason by the name of Juangco – possibly a poor transcription of Guangco. He worked side by side with another Chinese person referred to as Liangco. A substantial part of the said amount was divided between these two Chinese men. The supplies were purchased separately, as concisely recorded in Table 1. The amount spent on wood more than doubles that spent on stones. This is most likely attributable to the fact that they were dealing with the remodeling of a stone-built temple, in a location where weather conditions are more punishing to wooden elements. Having said this, the three stone-based items offer very illuminating information for the understanding their architectonic use in eighteenth-century Manila.

Table 2. Type of masonry			
Name	*Soga*	*Tizon*	*Grueso*
Tablillas de ciudad	63 centimeters	Half vara of 21 cm	Cuarto de vara[viii]
Tablilla ordinaria	Ten *puntos*		Ten puntos
Tablilla de a vara	83.5 centimeters		One *vara*
Sillar de a cinco	100 centimeters		Five *palmos*
Sillar ordinario	83.5 centimeters	One vara of 42 centimeters	Half vara
Sillar Herbella	90-120 centimeters	45-60 centimeters	30 centimeters

Alcina mentions that, as far as architecture is concerned, there was a before and after the earthquake that shook the Philippines in 1645. It marked the turning point between the "European Architecture" and the "*Mestizo* architecture"[ix]. Despite this, it is not easy to differentiate one from the other during the seventeenth century. This is because the differences are mere construction solutions – with either approach – which were introduced in both private and public businesses. Both were to segue into forms that were halfway between Eastern and Western styles.

Stone Building in Tondo

More often than not, the problems that came about with the stone-based construction in cities such as Manila gravitated around finding quality quarries and convenient transport. As far as the church in Tondo is concerned, stones were extracted from the quarries of Guadalupe, Santa Rosa and Meycauayan.

The sites of both Guadalupe and Meycauayan were discovered shortly after the arrival of the Spaniards, though it was most likely the *sangleys* who would profit from their subsequent exploitation and management. Some studies show that the quarry in Guadalupe was used as a source for the materials required in laying the foundations, while the one in Meycauayan was resorted to for the building of walls[x]. This, however, is not consistent with the findings of studies on the church in Tondo. On the contrary, the quarry in Guadalupe was indiscriminately used for all purposes; it was the other quarries that were mined for specific products, which explains the quantities presented in the table. In fact, practically all the formats mentioned in the document can be traced to the quarry in Guadalupe: many of the five-palm-span *sillares*; the larger stones used for the arch of the presbytery; the ordinary *sillares* and *tablillas*; as well as the *tablillas de ciudad*.

The information analyzed proves that, within formats, prices would vary based on the quality of the materials. Thus, the prices of a hundred ordinary *tablillas* could go from anywhere between three to seven *pesos*. For this very same reason, the price cannot be used as a basis to identify the size of an unknown format. The preeminence of the quarry in Guadalupe should be understood by considering its proximity to Manila and the facility for transporting the material. After all, it was closer than the quarry in Meycauayan. Moreover, fluvial transport to Manila Bay by way of the Polo river worked to the advantage of the quarry in Guadalupe. Finally, the quarry in Santa Rosa was situated in the province of Laguna, between Biñan and Cabuyao, to be more precise. Transporting the material from Santa Rosa to the capital was done by land, which increased the price of the materials while also damaging them.

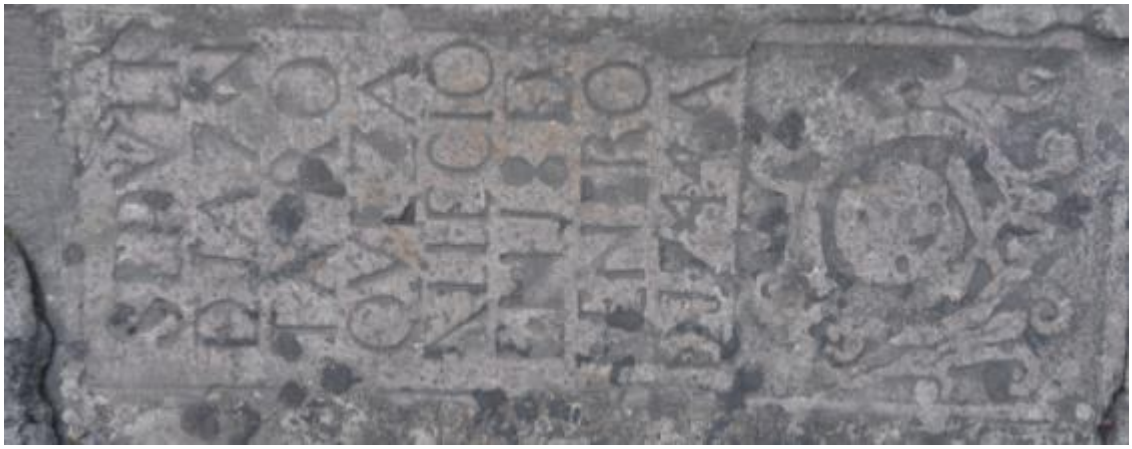

Fig. 1. Manila. Santa Cruz. Tombstone of Jacinta Roqueza. Died on January 18, 1744.

Orders for *tablillas de dado* for an arch, several *tablillas de ciudad*, and a number of *tablillas de a vara* were made to the quarry in Meycauayan. The information available shows that the latter were used for tombstones and steps. Only the *tablillas de ciudad* appear in orders made to other quarries; the product from Meycauayan was more expensive. It is distinctly possible that this quarry may have specialized in decorative pieces – as in the case of the tombs, and probably the coating of the arches – on the basis of the quality of the material. This would, in turn, justify its higher price. Unfortunately, there are very few tombstones from this period that can still be found today, those best preserved being from Binondo or Santa Cruz. The quarry of Santa Rosa is the least known of the three and the one from which the fewest purchases were made. Only a few *tablillas ordinarias* and *tablillas de ciudad*, as well as twelve *sillares* for an arch, were ordered from this quarry. All these were most likely smaller than those used for the presbytery.

Some documents would show that by the middle of eighteenth century, the measurement of the pieces had been regulated by the local authorities of the City of Manila, thus avoiding "the practice of unscrupulous vendors to trade substandard materials"[xi]. This could have been an offshoot of the development that architecture was experiencing during those years or a previously existing practice. The truth of the matter is that the municipal documentation referred to by friar Lucas de Jesús María has been lost, thus making his accounts the only available source on the matter to date.

Worth noting are the differences in prices between the three quarries. Since there weren't always repeat orders, the inspection cannot be considered exhaustive in nature. The three-*peso tablillas*, the *tablillas de ciudad*, or the five palm-span *sillares* had the same price in Guadalupe and in Santa Rosa.

They were a bit more expensive in Meycauayan[xii]. All were ordered from, manufactured by and laid by *sangleys*. It is therefore reasonable to conclude that the patterns used were those of the Chinese architecture of that period. Clearly the continental tradition was by and large based on wooden structures, while stone and brick laying were the exception. In the southern provinces such as *Fújiàn* (福建), stone was commonly used, as is the case of *Tǔlóu* (土楼)[xiii]. Clearly, the southern zones were those most in touch with the archipelago, and as such the most likely origin of the imported masons that worked in Manila. It is unlikely that the first Spaniards, among whom there were hardly any engineers or architects, could teach brick-making to the *sangleys* and put in motion a truly active supply chain.

It was probably the Chinese themselves who imported their own construction traditions to the archipelago, adopting them to the needs of the missionaries and private individuals. Among the several templates that were proposed, there seems to be a clear distinction between the *tablilla* and the *sillar*, from which a number of sub-groups were born. The first of the two refers most likely to the pattern wherein the length and depth are greater than the width. The *sillar* is box-shaped. Nevertheless, considering the available information it is also possible that *tablillas* and *sillares* were both used in the same wall, as is the case in the main nave of Santa Ana de Sapa (Fig. 2).

There is not much information relative to the width of the pieces in Table 2. This should not come as a surprise, given that the height of the course remains constant even in the more sophisticated bonds. Likewise, the depth is not significant, while the length permits us to deal with the different sizes in a manner that allows us to economize. There are only two terms mentioned in the document: the *tablilla de dado* and *piedra mayor,* for which no measurements are indicated. For this reason they have not been included in Table 2. The explanation for this stems from the fact that these pieces were used in the construction of arches. The larger stones would constitute the interiors while the *tablillas* would be used for covering them. In any case, there were no standard sizes for these two items, as there were with the rest of the pieces.

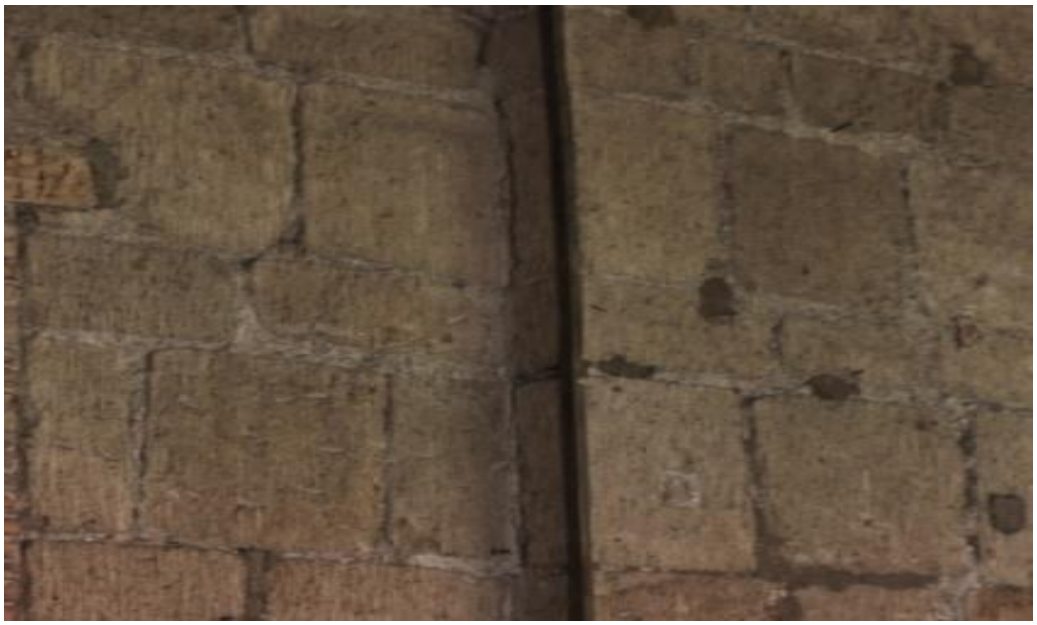

Fig. 2. Manila. Sta. Ana de Sapa. Cloister. Detail

Eighteenth-century Tagalog contained many terms related to construction materials[xiv]. Case in point is the “piedra China” – used for luxury floor tiles – which was commonly referred to as *obaticos*. In fact, the term “bato” could refer to stone in general, as well as to a particular shape or its use. This may contain significant phonetic value, for tombstone was known as “basa.” More detailed linguistic research in the future may reveal an even larger penetration of Chinese and Spanish terms into the Tagalog language, thus being added to the list of aspects worth further study. Moreover, a greater appreciation of the *stereotomic* patterns of Chinese Architecture will deepen our understanding of the interrelationship between the later and Western models, thus unveiling Chinese traditions in Filipino constructions. Nevertheless, the masonry templates evolved towards more unified models. This is what can be derived from the Treatise of Herbella (1882)[xv].

The proposals set forward in this nineteenth-century publication make reference to larger pieces, most likely due to the introduction of machinery, transport and factories.

Other Building Materials

Bricks were not extensively used in Manila, yet were resorted to by religious institutions in other parts of the archipelago. As this document clarifies, the Chinese were very much engaged in the oven activities that had a significant bearing on constructions in the Philippines. As mentioned earlier, the bricks were of relatively good quality. The same was not true of the roof tiles. Alcina attributes this to the inability to fire the bricks properly. In fact, there are church facades in Laguna built on cut-bricks, proof of the quality of the material. In the church of Tondo alone, over a thousand and a half large bricks were used to cover the temple, to which we would have to add more than a thousand small bricks for several purposes and fifty master channel roof tiles. They were not all that expensive, especially compared to the price of stone. Its poor quality, as mentioned by Alcina, is most likely the reason why it wasn't considered as the sole building material. This notwithstanding, it was introduced into stone bonds. Along these lines, it should be mentioned that in 1762, for the remodeling of the cistern of Santa Potenciana in Manila, the *sangley* Juan Peauco resorted to a multi-layer solution. At the bottom there was Meycauayan stone, followed by two layers of local bricks and two more of *Piedra China* – all of these bound together by a waterproof mix of duck eggs, powdered lime and sugar cane honey[xvi].

This might lead us to think that the stones from Guadalupe were produced side by side with small bricks. There would be no other reason to use them to such an extent in the aforementioned reconstruction works. Unfortunately, the church in Tondo was completely rebuilt in the second half of the nineteenth century, thus making it necessary to conduct studies with nearby contemporary buildings. The Spanish missionaries were probably not all that surprised, as they were familiar with this tradition that could be traced both to the times of the Romans and to Islam in the Iberian Peninsula. Actually, even Sevillian Baroque resorted to these types of brick and stone factories. Case in point is the church of *San Luis de los Franceses* (Seville). This having been said, it must be noted that it is not exactly the same as it was in the Philippines.

Indeed, we cannot properly assure that the missionaries were responsible for the adaptation of these building practices to the Philippines. Clearly, these solutions of mixed brick and stone can be appreciated even today in Santa Ana de Sapa, but the method was not the same as in Laguna, close to Manila. As far as the Santa Ana church is concerned, bricks are only used at the upper-end. This gives a lighter appearance. As Fig. 3 shows, at the bottom of the approach to the spiral of the tower, there are only two layers of bricks over the lintel. However, just a flight higher the number of layers is now four.

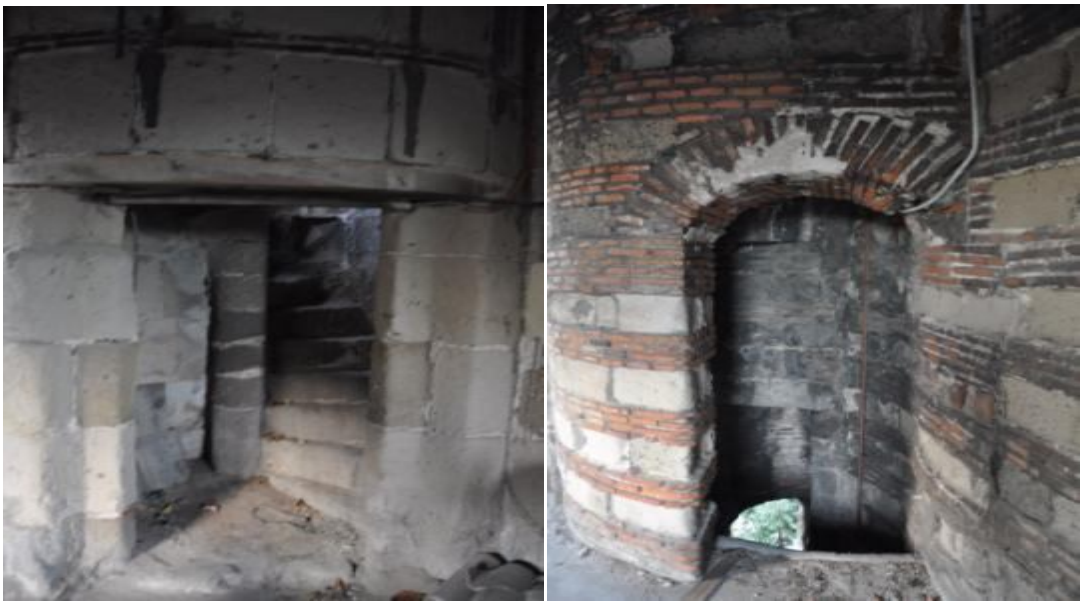

Fig.3. Manila. Santa Ana de Sapa. Tower. Spiral staircase

Bricks slowly but steadily replaced stone, to the point that they are used even with *sillares* at the same row. To crown the structure just brick is used. In Laguna, as well as in other places throughout the archipelago with problems procuring stone, masons developed different patterns of brick bonds, as can be seen today in many eighteenth-century churches which underwent later modifications, such as Nagcarlan or Majayjay. Similarly, these bonds can be seen in Intramuros structures, in most cases plastered. The second cloister of San Agustin and, perhaps more clearly, the ruins of the Felix Rojas San Ignacio church, display these mixed bonds with different particularities. It could be thought that the mixed bonds of brick and stone were due to the lack of professional masons in many areas far from the capital. Although this is the major reason in some cases, other examples, like the Nagcarlan church façade (Laguna), show great development both in stone work and brick ornamentation. This suggests that the use of both materials was due, on the one hand to decorative purposes and on the other hand to technical demands.

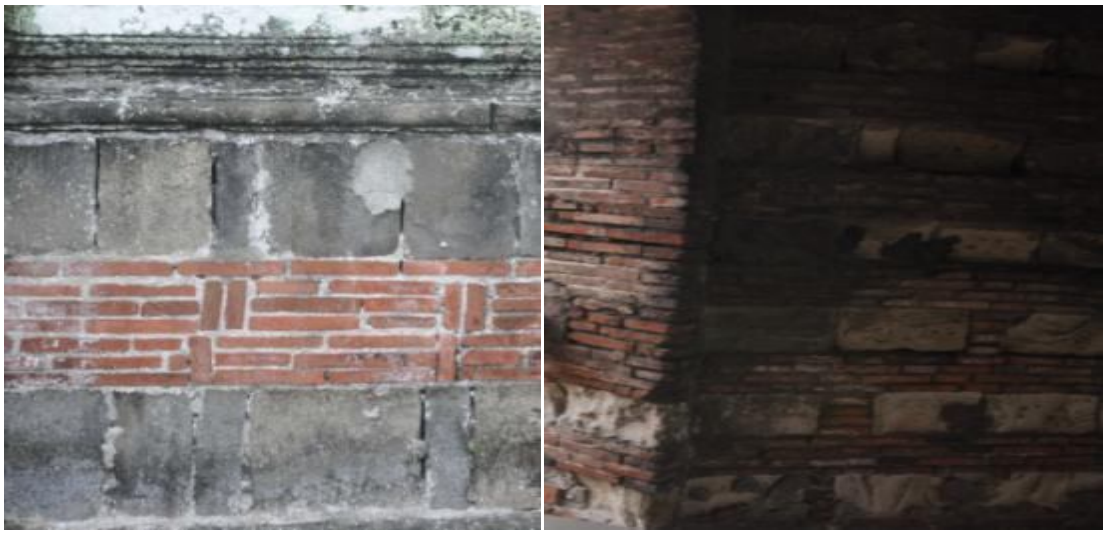

Fig. 3. Manila. Santa Ana de Sapa. Tower. Top floor. Laguna. Nagcarlan church

Every part of this construction process, especially when the blocks were large, required specific machinery for which very little is known. However, there is documental evidence that it was the Chinese who made their own technology available for Filipino architecture. For example, it is known that they used different *ingenios* that dazzled the Spanish engineers[xvii] , and which were responsible for the *sangley* masons being able to gain control of most construction supplies in the capital. Unfortunately, very little is known about their peculiarities because neither descriptions nor drawings have been preserved. Most likely, these *ingenios* were cranes, dredges, etc., which differed from their occidental versions. In any case, according to the Herbella Treaty, the use of these tools that were linked with the *sangley* tradition had disappeared by 1882, at least in Manila, before the impetuous advance of new professionals coming from the Iberian Peninsula.

Conclusions

We are now able to present some conclusions. The *sangleys* were able to set up and market a simple offering that was suited for both the works to be undertaken as well as the *sangley* professionals. Most likely these were the patterns – with understandable changes throughout the passage of time – that guided Manila's architecture and that of its environs, from the arrival of the Spaniards up to the earthquake of 1863, when its decline had become manifest.

They were able to create quarries specializing in concrete building elements. This allowed for a supply flow to a large area in the early eighteenth century, when the capital´s economic rise also meant an increase in construction initiatives. *Sangley* masons had to take advantage of the versatility of those products in order to adapt them to the requirements of every building. Furthermore, many of these structures have survived to this date from as early as the eighteenth century, which goes to show how soundly they were built so as to endure earthquakes, the weather, and even wars. In more ways than one, they have proven their capability to adapt in a ways that have been more successful than those of the architects trained in the Metropolis.

Finally, we have to highlight the fact that these structures are a living example of the cultural synthesis that occurred in the archipelago during the Spanish Period, without which they would have never existed; nor would it be possible to understand the architectural idiosyncrasies observed in the Philippines in the absence of this fusion of cultures.

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[i] Pedro Luengo (History of Art, Ph. D., Universidad de Sevilla, 2010) specializes in the History of Architecture in the Philippines and other European settlements before the nineteenth century. His first book, *Intramuros: arquitectura en Manila, 1739-1762* (Fundación de Universidades Españolas, , 2012) focuses on the different building traditions present in the city at this time. He teaches Art History at the Universidad de Sevilla.

[ii] This reality was shown by distinct publications, with a special mention for the stand-out work of Díaz-Trechuelo Spínola, Mª Lourdes. (1959) *Arquitectura española en Filipinas (1565-1800).* Sevilla, CSIC-EEHA. Coseteng, Alice M. L. (1972). *Spanish churches in the Philippines.* Manila, UNESCO. Galende, Pedro G. (1996). *Angels in Stone. Augustinian Churches in the Philippines.* Manila, G. A. Formoso Pub.

[iii] Perhaps the investigator that has worked particularly in Filipino architecture has been Javier Galván Guijo, whose following titles should be emphasized, "Nociones de la arquitectura colonial española en Filipinas" Luque Talabán Miguel, Pacheco Torrubia Juan José y Palanco Fernando. (1999) *1898, España y el Pacífico.* Valladolid. "Notas acerca de la historia del faro de la isla del corregidor durante la época de soberanía española", (2001) *Ingeniería civil*, nº 121; (2001) "Arquitectura fil-hispánica en el valle del río Cagayán", en Elizalde López-Grueso Mª Dolores; Fradera Barceló José María y Álvarez Luis Alonso: *Imperios y naciones en el Pacífico*. Madrid, CSIC; "La arquitectura fil-hispana como síntesis de

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[iv] The presence of sangley in Manila presents itself as fundamental to understand the operation of the city since the arrival of the Spanish. For this reason, distinctive studies have been produced, of which we can highlight Felix, Alfonso Jr. (1966-1969) *The Chinese in the Philippines.* Manila, Solidaridad Publishing House; so, like the numerous works of Antonio García Abásolo González, of which we can highlight "Relaciones entre españoles y chinos en Filipinas: siglos XVI y XVII" in Cabrero, Leoncio (coord.) (2004). *España y el Pacífico: Legazpi*. Vol. 2. San Sebastián, SECC.

[v] *Quaderno que contiene los materiales y gastos que hizo la provincia del Santísimo Nombre de Jesus en la reedificación de la iglesia de Tondo.* Lilly Library (Indiana University). Philippine Mss. I. Papeles de Tagalos. Collection of documents… c. 16. ll. 400-414. Document 2.

[vi] Luengo, Pedro. (2009) "Noticias sobre obras en la iglesia de Tondo en el siglo XVIII ". *Laboratorio de Arte*. 22. Sevilla: Universidad de Sevilla, 2010, pp. 217-233.

[vii] One of the last studies was published by Galende, Pedro G. (2008). *Philippine Church Façades*. Manila, San Agustin Museum, 2007.

[viii] The dimensions are cited in Regalado Trota José, Patrick D. Flores, Emmanuel Torres. (2003). *Zero in 2003.* Ateneo Art Gallery. With all of this, this article demonstrates that it was not exclusively from Meycauayán but that they were also able to buy it in Guadalupe at a lower price.

[ix] This passage was already underlined in Merino, Luis. (1987). *Arquitectura y urbanismo en el siglo XIX: Introducción general y monografías.* Vol. II. Manila, CCE-IA.

[x] Ruiz Gutiérrez, Ana. (2005). "Las técnicas constructivas en Manila a partir de los terremotos de 1863 y 1880" in Huerta Fernández, Santiago (coord.). (2005) *Actas del Cuarto Congreso Nacional de Historia de la Construcción.* Vol. 2. Cádiz, Instituto Juan de Herrera, 2005, pp. 993-1000.

[xi] So at least it affirms brother Lucas de Jesús María in the construction of the Alcaicería. Merino, Luis. *Op. cit.* P. 216.

[xii] Included in the end of the 19th century, when the normal municipality only permitted the use of the rocks of Guadalupe y Meycauayán; the former had a price of 10 pstas./m^3, compared to 16 pstas/m^3 for the latter.

[xiii] These constructions of great interest were marked UNESCO World Heritage Sites in 2008.

[xiv] Noceda, Juan de y Sanlúcar, Pedro de. (1753). *Vocabulario de la lengua tagala.* Manila: Imprenta de Ramirez y Gibaudier (reimpresión de 1860).

[xv] Herbella y Pérez, Manuel. (1882) *Manual de construcciones y de fortificaciones de Campaña en Filipinas*. Madrid, Imprenta Memorial de Ingenieros.

[xvi] Díaz Trechuelo Spínola, Mª Lourdes. (1959) *Op.cit.* p. 244.

[xvii] "Cartas y expedientes del cabildo secular de Manila". AGI, FILIPINAS, 27. Cited in Merino, Luis. *Op. cit.* P. 65.