

An 18th Century Manual on Architecture: Fray Juan Albarrán's *Barias Reglas de Arquitectura*, 1735*

*Regalado Trota José***

Archivo de la Universidad de Santo Tomas, Manila, Philippines

Introduction

The “Barias Reglas de Arquitectura” (Various Rules for Architecture) (Fig. 1) preceded by “Advertencias para obras que se puedan ofrecer en este Convento” (Words of advice for projects that can be offered in this convento”) (Fig. 2) form part of a larger volume, the *Libro y Inventario*, prepared by Fray Juan Albarrán in 1735. This *Libro* in turn was copied from another fragile book of *papel de China* which listed the lands owned by the Santo Niño convento in Cebu. The inventory was made to facilitate the search of documents in the archive of that convento. Albarrán exhorts the proper return, care, and repair of the documents, to prevent the papers from falling into the “confusion that the archive has always been in.” The volume is now kept in the Archivo de la Provincia de los Agustinos Filipinos (APAF) in Valladolid, Spain.

Fray Juan Albarrán was born in San Pablo de los Montes, Toledo, Spain, in 1696. He professed in the Augustinian convent in Toledo in 1714. After his arrival

* Transcribed, translated, and annotated by Regalado Trota José, with assistance from Rona Repancol in the translation of the Piedra-Advertencias section, and with additional translation aids and notes from Architect Michael Manalo.

** Regalado Trota Jose can be contacted at trotajose13@gmail.com. <https://orcid.org/0000-0001-9873-7411>.

in Manila in 1718, he ministered successively to the Tagalog towns of Tambobong (1723), Angat (1728), Hagonoy (1731), Bauan (1734), Taal (1740), Bulacán (1744), Batangas (1748), Parañaque (1750), and Bauan (second time, 1753). In between these assignments, he was also elected as Definitor, Commissary of the Holy Office, and Visitor of the Province. He had hardly settled in Bauan in 1734 when he was sent as Prior to the Convento of the Sto. Niño in Cebu, serving for two terms (1735 and 1737) (Figs. 3 and 4). He also served as Prior of the conventos in Guadalupe (1742), and Manila (1745), where he died in 1761. The Augustinian biographer Elviro Jorde Pérez credits Albarrán with building the present church of the Santo Niño, as well as a large part of its convento. Pérez also cites Albarrán as the author of a manuscript entitled “Arte de construir edificios en Filipinas” (The art of constructing buildings in the Philippines), and “Modo de fabricar ladrillos, tejas, cal &.” (How to manufacture bricks, roof tiles, lime, and so on), both of which were kept in the archives in Cebu.¹ The first work is undoubtedly the one that is featured in the present article, although it now forms part of the venerable Archivo de la Provincia de los Agustinos Filipinos (APAF) in Valladolid, Spain. Nothing else is known about the second work.

One of the earliest modern references to Albarrán’s work was in Pedro Galende’s *Angels in Stone*.² The first thorough examination of the document was published by Santiago Porras y Alvarez (“A Philippine Architectural Treatise: Fray Albarrán’s Manuscript,”)³ which was drawn from his dissertation, “Asian Baroque: A Study on the Interaction between the Iberian Baroque and the Native Cultures in South East Asia.” This latter work was defended in the University of Tokyo in March 1992 and awaits publication. Porras later cited Albarrán in a more general essay published in 1999.⁴ Fr. Galende provided this author a photocopy of Albarrán’s “Advertencias” and “Reglas,” which proved invaluable in the writing of the article, “Palitada: Skin of the Church,” published in conjunction with an exhibition at

¹ Elviro J[orde]Perez, O.S.A., *Catálogo Bio-bibliográfico de los Religiosos Agustinos de la Provincia del Santísimo Nombre de Jesús de las Islas Filipinas desde su fundación hasta nuestros días* (Manila: Establecimiento tipográfico del Colegio de Sto. Tomás, 1901), 237-238.

² Pedro G. Galende, O.S.A., *Angels in Stone. Architecture of Augustinian Churches in the Philippines* (Pasay City: G. A. Formoso Publishing, 1987), 442; endnotes, 516.

³ Santiago Porras y Alvarez, “A Philippine Architectural Treatise: Fray Albarrán’s Manuscript,” *The Institute of Asian Architecture Newsletter* (Japan) 5 (July 1992) no.3: 16-18.

⁴ Santiago Porras y Alvarez, “Arquitectura religiosa hispano-filipina,” in 1898, *España y el Pacífico*, ed. Miguel Luque Talaván, Juan José Pacheco Onrubia, and Fernando Palanco (Valladolid: Asociación Española de Estudios del Pacífico, 1999), 463-484. My thanks to Dr. Porras for sharing a copy of this with me.

the Ayala Museum in 2003.⁵ Drawing from Porras' 1992 essay, this author cited Albarrán and his work in the second edition of the *Cultural Center of the Philippines Encyclopedia of Philippine Art* (2017).⁶ Finally, this author was given an opportunity to visit Valladolid in 2019. With the gracious permission of the archivist, Fr. Policarpo Hernández, O.S.A., and the assistance of Roberto Blanco Andrés, clear photographs were taken of the entire volume including the precious Albarrán texts, from which the present article was crafted.

Porras' patient spadework has shown that Albarrán had access to various architecture and building manuals. The Augustinian lifted sections of these in his "Reglas," sometimes by direct quotation, other times by rewording. It remains to be seen how much of these citations were used in the Santo Niño church and monastery. Albarrán's major contribution is the documentation of his experience in building, especially in detailing the truss system designed to withstand the peculiar geo-climate conditions of the islands.

A text signed by Albarrán includes his name in the first line, written in the same style as his signature (Fig. 5). A comparison of this text with the rest of the "Advertencias," "Reglas," and most other sections of the volume shows a different hand, most possibly that of the scribe (Fig. 6). This would explain lapses in grammar and spelling that would have been inconsistent with Albarrán's status as a Spanish friar, and a high administrative official at that.

In the transcription, most of the archaic Spanish spelling has been retained (including misspellings, grammatical errors, and even what must have been miscopying) to the preserve the context of the writing. Minimal changes include completion of abbreviations: letters added for completion have been italicized. Accents were provided in accordance with contemporary Spanish usage. First letters of names of persons and places are capitalized. Comparison with those sections lifted from other texts such as those of Palladio, has allowed us to place periods and commas in their pertinent positions, to improve understanding the writing of the scribe; such marks have been enclosed in brackets. As in other transcriptions, a forward slash (/)

⁵ Regalado Trota José, "Palitada: Skin of the Church," in *Zero In: skin surface essence* (N.p: Ateneo Art Gallery, Ayala Foundation, Inc., and Eugenio Lopez Foundation, Inc., and Museo Pambata Foundation, Inc., 2003), 6-52. In the photocopy, some edges and areas were cut or unclear.

⁶ Regalado Trota José, with notes from Rene B. Javellana, S.J., "Manuals for construction, design, and planning," in *Cultural Center of the Philippines Encyclopedia of Philippine Art Second Edition*, editor-in-chief Nicanor G. Tiongson, vol. 4, *Architecture*, ed. René B. Javellana, (Manila: Cultural Center of the Philippines, 2017), 302-304.

indicates the end of the line in the original manuscript; this will facilitate comparison between the transcription and the manuscript. Some of the long passages in the text have been broken down into smaller paragraphs for better reading.

I wish to thank Ms. Rona Repancol for assistance in the translation of the “Piedra” section of “Advertencias.” I also thank Architect Michael Manalo for helpful sources and notes on a better understanding of Albarrán’s work. Most of the second installment of Albarrán’s “Reglas,” to be featured in the next number of *Philippiniana Sacra*, will be on wood and truss systems, which will be translated by Dr. Cheek Fadriquela.

In this translation, certain Spanish titles and nouns such as *convento*, *Santo Niño*, and *señor*, have been retained. As in Spanish usage, certain personal titles (*don*, *fray*, *padre*, *señor*) are not capitalized. **PS**

References

- Abordo, Filonila G. 1949. “Making lime.” *The Manila Times Midweek Review*, June 1, 8-9. Photo essay on making lime from seashells in Tangos, (misrepresented in the article as Tanza), Navotas, Metro Manila.
- Albarrán, Juan. 1735. “Fabrica de la Yglesia Año de 1735,” “Advertencias para obras que se puedan ofrecer en este Convento,” and “Barias Reglas de Arquitectura.” In “Convento de Cebu: Registro-inventario. Rudimentos de edificación, 1735-1883.” Archivo de la Provincia de los Agustinos Filipinos, Valladolid; 316/1.
- Cayme, Jan-Michael C. 2022. “Analytical chemistry methods of estimating the hydraulic lime characteristics of mortars from a Spanish colonial period fortification in the Philippines: perspective of a Southeast Asian country.” *SPAF Journal* 6:1-12. doi.org/10.26721/spafajournal.5fabjq9471.
- Galende, Pedro G., O.S.A. 1987. *Angels in Stone. Architecture of Augustinian Churches in the Philippines*. Pasay City: G. A. Formoso Publishing.
- Gárate Rojas, Ignacio. 1999. *Artes de los Yesos*. Madrid: Editorial Munilla-Leria.
- Javellana, Rene B., S.J. 1991. *Wood & Stone for God’s Greater Glory. Jesuit Art & Architecture in the Philippines*. Quezon City: Ateneo de Manila University Press.
- José, Regalado Trota. 2003. “Palitada: Skin of the Church,” in *Zero In: skin surface*

essence, 6-52. N.p: Ateneo Art Gallery, Ayala Foundation, Inc., and Eugenio Lopez Foundation, Inc., and Museo Pambata Foundation, Inc.

_____, with notes from Rene B. Javellana. 2017. "Manuals for construction, design, and planning," in *Cultural Center of the Philippines Encyclopedia of Philippine Art Second Edition*, editor-in-chief Nicanor G. Tiongson, vol. 4, *Architecture*, edited by René B. Javellana, 300-307. Manila: Cultural Center of the Philippines.

Palladio, Andrea. 1988 [Venice, 1570]. *Los cuatro libros de arquitectura*. Translated from Italian to Spanish by Luisa de Aliprandini and Alicia Martínez Crespo. Madrid: Ediciones Akal.

_____. 1997. *The Four Books of Architecture*. Translated by Robert Tavernor and Richard Schofield. Cambridge, Mass. and London, England: Massachusetts Institute of Technology.

Perez, Elviro J[orde]. 1901. *Catálogo Bio-bibliográfico de los Religiosos Agustinos de la Provincia del Santísimo Nombre de Jesús de las Islas Filipinas desde su fundación hasta nuestros días*. Manila: Establecimiento tipográfico del Colegio de Sto. Tomás.

Porras y Alvarez, Santiago. 1992. "A Philippine Architectural Treatise: Fray Albarrán's Manuscript." *The Institute of Asian Architecture Newsletter (Japan)* 5 (July) no.3: 16-18.

_____. 1999. "Arquitectura religiosa hispano-filipina." In *1898, España y el Pacífico*, edited by Miguel Luque Talaván, Juan José Pacheco Onrubia, and Fernando Palanco, 463-484. Valladolid: Asociación Española de Estudios del Pacífico.

Villalpando (Juan Bautista), in *Enciclopedia Vniversal Ilvstrada Evropeo-Americana*, Tomo 68, 1409-1410. Bilbao, Madrid, and Barcelona: Espasa-Calpe, S.A., 1929.





Fig. 1. Title page of “Barias Reglas ...,” fol. 82 in the “Libro y Inventario ...” (hereafter LYI). Courtesy of Archivo de la Provincia de los Agustinos Filipinos, Valladolid (hereafter, APAF).



Fig. 2. First folio of “Advertencias para O...” fol. 80 of LYI. Courtesy of APAF.

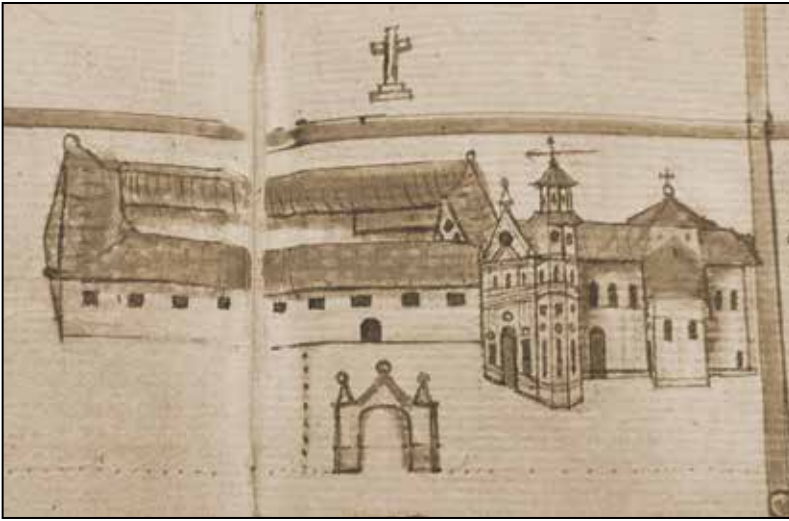


Fig. 3. Plan of Santo Niño, on fols. 23v and 24 of LYI. Indicated in the map that it was copied from a map dated 1699 in the Jesuit Colegio. Curiously, the drawing shows the church as it must have looked like in the late 1730s. Could the artist have updated this section of the map? Today's monastery adjoins the church on the same line as the façade. On the map, the monastery appears on a different angle, and separate from the church. Could this have been how it looked like before its eventual building in 1760 (the date inscribed on the portal over the grand stairway)? Courtesy of APAF.



Fig. 4. General view of the Santo Niño Basilica and monastery. Photo taken by Richard Ahlborn, circa 1960.

En esta Nueva Orleans, a 10 de Agosto de 1763. Don Juan de Albarán, Provisor de la
 Sagrada Iglesia, se dirige al buen Señor Don Juan de Albarán, y su con-
 sejo. Q. d. a.
 Certifico a Sr. Don Juan de Albarán, Provisor de la Sagrada
 Iglesia, que el escrito de arriba fue remitido a N. M. R.
 Sr. Don Juan de Albarán, para los efectos en el
 expresado, pero no teniendo razón de su proveído,
 para que en su caso se le abra el proceso de la aclaración
 de las Capellanías que este punto en el referido
 firmé en N. M. R. Diciembre de 1762.




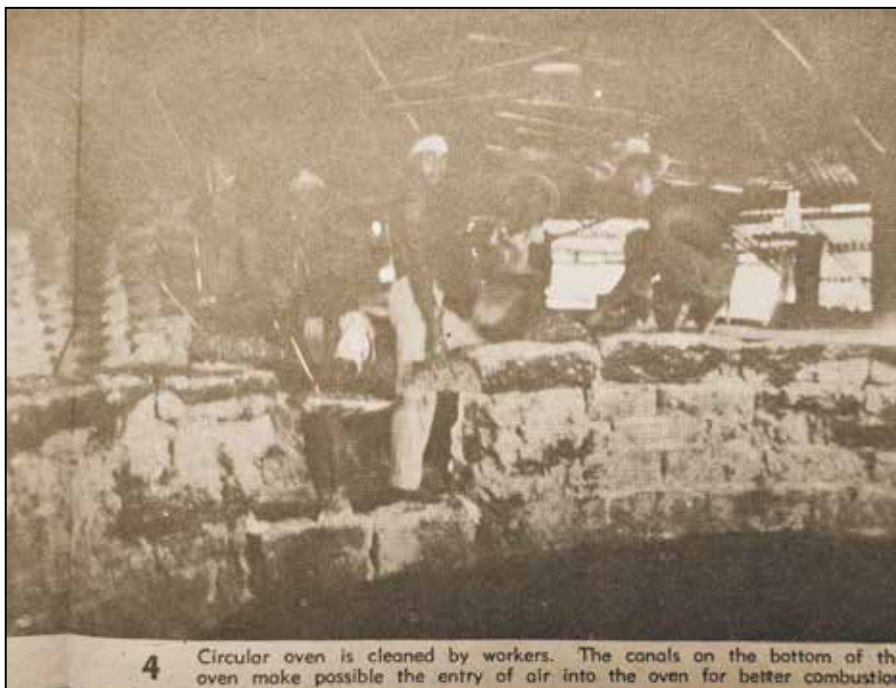
Fig. 5. Text in Albarán's handwriting, with his signature. Courtesy of APAF.

Cuando tantas las dificultades y impedimentos que se ofrecieron para
 principiarse de Canter la fábrica de la Iglesia del Santo Niño, que para los
 tales este sumo trabajo, y de velo, con mucha feza en plata. Todo motivado
 en las dificultades que se oían para conseguir los materiales necesarios por quan-
 to de los de aquí se habían ya consumido en la fábrica del Colegio de la Compañía,
 y que para el fin de sacar la piedra a dorre, y otras cosas, y habiendome
 al Sr. Don Juan de Albarán facilitado materiales para principiar su Iglesia, y
 la Experiencia en haberse prosiguido una fábrica de maderas se denique
 valor los impedim. y dificultades que se oían en las fábricas de Canter. Y
 quanto a falta de experiencia al principio me hizo pasar muchos papeles. Lo

Fig. 6. Sample text of the “Reglas,” in another hand. Courtesy of APAF.



Fig. 7. Jesuit Colegio in Cebu (see note for Fig. 3). Courtesy of APAF.



4 Circular oven is cleaned by workers. The canals on the bottom of the oven make possible the entry of air into the oven for better combustion

Fig. 8. Lime kiln in Tangos, Navotas. Filonila G. Abordo, "Making lime," *The Manila Times Midweek Review*, June 1, 1949, 9. Photo essay on making lime from seashells in Tangos, (misrepresented in the article as Tanza), Navotas, Metro Manila.

Document

[fol. 1] **LIBRO, Y INVENTARIO DE LOS/ papeles, Escrituras, y instrumentos que/ ai en este Archivo de el Convento del/ Santo Niño puesto solo para este/ efecto en este Trienio de Nuestro Muy Reverendo/ Padre Lector Fray Diego Bergaño, y Prior/ de este convento el Padre Fray Juan Albarrán A/ ño de 1735.**

[fol. 25v] **Fabrica de la Yglesia/ Año de 1735**

En el año de mil setecientos y treinta siendo Prior de este convento el Padre fray Joseph Bosqued por orden/ que tuvo para ello comenzó a fabricar la yglesia del Santo Niño, y en al año de 1733 siendo prior/ el Padre Lector fray Joseph Treviño, hallandose ia dicha fabrica mui cerca de comenzarse las ventanas/ reconoció dicho Padre Lector estar dicha fabrica falza, assi los cimientos, como lo restante de la/ obra por causa de ser de ladrillo y este deshacerse solo con el viento, assi consta de el libro/ del recivo a foxas siete anotado por dicho Padre Lector por cuia causa se suspendió dicha fabrica./ En el año de 1734 se dio orden berbal por Nuestro Lector Provincial el que se comenzan nueva fabrica y/ se abandonase la de ladrillo como consta de libro de consultas al folio 35, y de la re/serva concedida por el superior gobierno a quien el procurador general represente hallanse falza al jui/cio de todos lo qual dicha reserva fue dada en 29 de Marzo de 1735 para los efectos en/ ella espressados y para en al archivo de este convento en el cajón 3 por todo lo qual/ En 14 de Febrero de 1735 siendo provincial Nuestro Muy Reverendo Padre Lector Fray Diego Bergaño, go/vernando estas Islas el Señor don Fernando Valdes Tamón cavallero del horden de Santiago/ Obispo de este obispado el Señor don Manuel Anttonio de Ocio y Ocampo, General y Justicia mayor/ en esta provincia don Miguel de Aragón. Y prior de este convento el Padre fray Juan de Albarrán/ comenzó dicho padre a hacer los cimientos de la yglesia de piedra para cuio efecto el padre prior/ de San Nicolas fray Antonio Lopez concurrió con todos los Zebuanos de su partido, entran/do assimesmo los residentes de la estancia de Tarisay con cuatro semanas de trabajo, con la qual ayuda (pues fue sin paga), se consiguíó el haverse echo con brevedad la poca costa./ Los Zibuanos de la isla de Mactan con su padre ministro que lo era el padre fray Francisco Aballe concurrie/ron assimesmo a la fabrica de los cimientos, pero estos no fueron mas que unos cuantos de ellos./ En 16 de Henero de 1740 siendo provincial de esta provincia Nuestro Muy Reverendo Padre fray Vizente Ybarra, y lector/ de este convento el padre visitador fray Juan Albarrán se hizo y colocó al señor Santo Niño en su nue/va yglesia. Quedanos concluida, y en el estado y con las alajas que se expresan en el libro del re/civo corriente al folio 31 en donde se puede ber en el estado en que queda en dicho año por el mes de/ febrero que es último del trienio de dicho Muy Reverendo Padre fray Vizente Ybarra.

Translation of the Document

[fol. 1] **Book, and inventory of the papers, documents, and instruments that are in this Archive of the Convento of the Santo Niño prepared solely for this purpose during this triennium of our very reverend father lector fray Diego Bergaño, by the prior of this convento father fray Juan Albarrán, in the year 1735.**

[On folio 25v, the building of the Santo Niño church is narrated, by the same scribe who wrote down Albarran's texts:]

[fol. 25v]. **The church fabric, in the year 1735.**

In the year 1730, the building the church of the Santo Niño was begun by padre fray Joseph Busqued, prior of this convento, who was instructed to this effect. In the year 1733 the project was about to commence construction of the windows when the new rector, padre lector fray Joseph Treviño, inspected it. The said padre lector found the construction 'false' since the foundations as well as the rest of the work were of brick, which easily disintegrated in the wind.¹ This was noted in the Book of Income on folio seven by the said rector, who suspended the work. In the year 1734 our provincial lector gave verbal instructions to start a new construction and abandon that of brick, as noted in folio 35 of the Book of Consultations. The *reserva*² was granted by the superior government on the 29th of March, 1735, as documented in Box 3 of this convento's archive. The procurator general, upon the judgment of everyone, protested that the provision was lacking. On 14 February 1735, with our very reverend padre lector fray Diego Bergaño as provincial; señor don Fernando Valdés Tamon, cavalier of the Order of St. James, as governor of these Islands; señor don Manuel Antonio de Ocio y Ocampo, bishop of this diocese; don Miguel de Aragón, high justice of this province; and padre fray Juan de Albarrán as prior of this convento; this latter priest began to lay the foundations of this church of stone. He was assisted by the father prior of San Nicolás³ fray Antonio López, who brought along all his Cebuano constituents, as well as by the residents of the *estancia* of Tarisay⁴ who contributed four weeks of work. All this help (since this was without payment) resulted in a short construction time, and at little cost. The Zibuanos of the island of Mactan under their father minister, padre fray Francisco Aballe also assisted in the laying of the foundations, but they were not much more than the others. On the 16th of January 1740, when the provincial of our province was our very reverend padre fray Vizente Ybarra, and the lector of this convento was the father visitator fray Juan Albarrán, the image of señor Santo Niño was enshrined in its new church. Now we are finished, and the condition and the jewels as of February of that same year, the last of the triennium of very reverend padre fray Vizente Ybarra, can be found on folio 31 in the current Book of Income.

¹ As early as the 1660s, the Jesuit Ignacio Alzina, who ministered in the Visayas, counseled his confreres against using bricks and tiles. Rene B. Javellana, S.J., *Wood & Stone for God's Greater Glory. Jesuit Art & Architecture in the Philippines* (Quezon City: Ateneo de Manila University Press, 1991), 53.

² Teams of workers recruited from the *polo y servicio* system.

³ Now a southern district of Cebú City.

⁴ Talisay City adjoins Cebu City to the south.

[folio 80]

Advertencias Para Obras que se puedan ofrecer en este Convento

An sido tantas las dificultades e ympedimentos que se ofrecieron para/ principiarse de Cantería la fabrica de la Yglesia del Santo Niño, que para ven/cerlas costó sumo trabajo, y desvelo, con muchos pesos en plata: Todo motivado/ en las dificultades que se ponían para conseguir los materiales *necessarios* por quan/to esta decían se habían ya consumido en la fabrica del Colegio de la *Compañía*, / y que para el se yba a sacar la piedra a Poroc, y a otras Yslas, y haviendome ami el Santo Niño facilitado materiales para principiar su Yglesia, y/ la esperiencia en haver proseguido dicha fabrica demostrado ser de ningun/ balor los impedimentos y dificultades *que* se ponían a las fabricas de Cantería y *por/* quanto la falta de esperiencia al principio me hizo gastar muchos pesos: *Por/* tanto para que en adelante mis Soceres se ahorren de gastos, y assi mesmo ha/llen *alguna* norma para la cuncicución de materiales de Cantería me atrevo a/ poner las Advertencias siguientes.

Bancas

Vna de las dificultades mayores q aqui encontré fue la consecución de Ban/cas para el acarreto de piedra y demas materiales, y fue tanta que me hallé/ presiado el ocurrir a Capiz, y Panay, para su consecución, pero no omití/ *diligencia alguna* para conseguir las en esta Ysla como lo conseguí en los Montes de Tari/say, y Pitalo de madera muy aproposito para piedra y en dichos Montes, Car/car, y Argao, se puedan encontrar los Bancas que se quisiesen, costandome ci/erta m.te [sic: monto] el haver palos suficientes para ellas, y el no haver io sacado los/ a ssido *por* no necesitarlos: Y assi quando en este *Comvento* se necesitacen Ban/cas no ay mas que ocurrir a dichos Montes sin admitir escusa a los Yndios que/ la suelen dar mui de ordinario.

Las Bancas mas convenientes para una obra son cascicos medianas de nue/ve hasta doce brazas, y estos sin cates¹ pues assi pueden entrar, y salir en los/ Manglares, pues siendo Bancas grandes se pierden muchas Uiages/ [fol. 80v] por quedarse baradas en los Manglares. Yo al principio puse a las bancas/ cates, para que cargasen mas pero solo sirvió de gastar muchas cañas pu/es en cada Uiaje eran *necessario* mudarlas.

¹ The word *cate* is used here, from the Visayan *catig*, outrigger.

[fol. 80]

Words of advice for projects, that can be offered in this convento.

There have been so many difficulties and impediments that presented themselves upon initiating the cut stonework of the church of the Santo Niño, that overcoming them cost so much work and insomnia, apart from so much silver pesos. This was all motivated by the difficulties they said in acquiring those materials necessary for the construction of the Colegio of the Compañía,⁵ (Fig. 6) for which they brought stone from Poroc⁶ and from other islands. The aid given me by the Santo Niño in procuring materials to initiate the construction of his church; the experience in having embarked on the said construction showing the little value of those impediments and difficulties in the stonework; and the lack of experience in the beginning, that made me spend a lot of money: have made me dare to prepare the following ‘warnings’ in order for my successors to be able to save on expenses, and at the same time to find some kind of guide in working with stone.

Canoes

One of the greatest problems I encountered was getting canoes to carry stones and other materials. I had to go to Capiz, and Panay,⁷ to get them. However, I left no stone unturned to find them in this island [Cebu], as I did in the mountains of Tarisay and Pitalo⁸ where I found wood strong enough to carry the stone. And in these mountains, in Carcar⁹ and Argao,¹⁰ such canoes as desired can be found, costing me some amount to have the oars made for them, and not having taken them because they were not needed. Hence, when this convento has need of canoes, one just has to ascend the mountains without any excuse, since the natives usually give them at an ordinary [price].

The canoes most useful for a project are those of median size, of nine up to twelve *brazas* long,¹¹ and these without outriggers because they are able to enter and leave the mangrove swamps. With large canoes, many trips are wasted, [fol. 80v] because they get snarled among the mangroves. In the beginning, I placed outriggers on the canoes, so that they could carry more;¹² but this only ended up with wasting many bamboos, since with each trip it was necessary to change or repair them.

⁵ The Jesuit college of San Idefonso, built outside the city towards the beach, on the site of Plaza Independencia, a hundred meters or so north of Fort San Pedro.

⁶ Poro Island, among the Camotes Islands between northeast Cebu and Leyte?

⁷ Capiz and Panay are present-day Roxas City and adjacent Pan-ay municipality on Panay Island, respectively.

⁸ Pitalo is a barangay of the municipality of San Fernando, south of Cebu City, after Talisay City, Minglanilla, and Naga.

⁹ Present-day Carcar City is south of Cebu City, adjoining San Fernando to its south.

¹⁰ Argao is a town south of Carcar City, after Sibonga.

¹¹ One *braza* is equivalent to two *varas*, or a fathom; 1.6718 meters. In this case, the canoes would have been 15 to 20 meters long.

¹² The outriggers provided more buoyancy and balance to the canoe, so it could carry more weight.

Cal

Para hacerla cal practicavan tales circunstancias que era muy esorbitante/ el gasto que había en hacerse un calero y lo que practicavan era el no echar/ otra piedra que era la que aqui llaman Manongol, y esa avia de ser mui es/cogida, sin que las raises de dha Piedra se mezclasen con dicha piedra Manongol:/ y si se queria hechar en el calero otra piedra, decían no bolverse cal, asimesmo practicavan el no bolver a hechar en el calero la piedra, *que/* en otro calero, huviese servido, y no se huviese acavado de quemar, dici/endo que aquello ia no se bolvia cal. Yo practiqué todo lo arriva expre/sado falso. Pues toda piedra blanca, que sea Manongol, que no lo sea, *que/* sea piedra de Mangle, o sea de la misma piedra que sirve para Vito/ca,² con tal que sea blanca toda ella es bueno para hacer cal, como *assimesmo/* todo aquel cascaxo, o vigío que queda de un calero se puede bolver a e/char en otro por quanto todo se buelve cal, como io lo tengo experimentado/ con grande aorro de gasto. Pues no cuesta trabajo alguno en conseguir la piedra, para la cal, por quanto haciendose de qualquiera piedra./ Las bancas al dia hacen dos viaxes pero haciendose de Manongol/ como se hacia de antes, con dificultad se haze al dia un viage.

[to right of page]

Y referido/ al principio lo/ qual me fue/ de grandísi/mos gastos pe/ro la esperien/cia me ense/ñó el ser todo/ lo de arriva.

La piedra para el calero no la partían muy menuda porque devan/ la derretía el fuego pero lo mejor es partirla pues asísale/ mejor cocida la cal como io lo experimenté.

La leña para el calero usaban el ponerla con tanta proligidad que para/ armarla se solían gastar dos, y tres semanas, y todo este tiempo la vine/ io arreducir en dos o tres dias esto lo conseguí no permitiendo partiesen la/ leña muy menuda, sino es aquello que era preciso para ocupar los gue/cos que suelen quedar por lo tuerto de la leña.

Se usava el echar en un calero mas leña que piedra, pero lo que se deve ha/cer es el hechar tanta piedra como leña: de suerte que se se echa una bra/za de leña, se le puede hechar otra braza de piedra assi lo practiqué/ io y experimenté ser lo mejor.

Los caleros es lo mexor no hacerlo muy grandes, pues se pierde mucha cal/ [fol. 81] por no poderse entrar en el camarín con brevedad y assi para lograrse bien, *que/* sea de veinte a veinte quatro brazas de boxeo. Esto se sabrá *Vsted* si quiere hacer/ el calero de veinte y quatro brazas se hechará un cordel de quatro brazas/ y puesta la una punta en donde a de ir el fogón, con la otra se yrá señalando/ un circulo en rredondo, y assi saldrá el calero de veinte y quatro brazas de su/erte que lo que un círculo tiene de centro doblado tres veces, hirás tres veces/ biene a tener de circunferencia de manera que si tiene seis brazas de centro, la cir/cunferencia serán dies y ocho y assí respective.

² *Bituca*, Visayan and other Philippine languages for intestines. The context here is the aggregates poured as infill (the 'intestines') with lime, sand, and water, into the wall construction.

Lime

To produce lime they used methods which were quite costly in setting up a kiln. They used no other stone but that which is here called *manongol*,¹³ and this had to be well selected, without the roots of said stone being mixed with the said *manongol*.¹⁴ If any other stone was cooked in the kiln, they said this would not result in lime. Similarly, they did not return the stone to the kiln, but to another kiln, it would have been used, and would not have finished burning;¹⁵ they explained that that material would not then render lime. I found all the above to be false. All white stone,¹⁶ be it *manongol* or not, be it stone from the mangroves, or be it the same stone which is used for infill [*bitoca*] between the walls, so long as it is white can be a source of lime. The same is true for the rubblework, or remnants in the kiln, which can be recooked in the kiln to render lime. All these then can be used for lime, which I myself have experienced with great savings in cost. This is because it does not take too much labor to procure the stone for the lime, this material being derived from whichever stone. At present the canoes make two trips a day, whereas one day was barely enough when they used to search for *manongol*.

[on the right margin of the above paragraph] With reference to the beginning, I incurred very great expenses, but experience taught me all the above.

They did not break down the stone for the kiln into small pieces because [they let] the fire to melt the stone; but I have experienced that for a better firing of lime, it would be best to first break down the stone into small pieces.

They used to pile so much firewood into the kiln, that it would take two, or three weeks. This length of time I was able to reduce to two or three days, by not permitting the firewood to be chopped too finely but only those necessary to fill in the spaces due to the twistedness of the wood.

They used to pile more firewood than stone in the kiln. But what should be done is to place as much wood as stone, such that stoking one *braza* of firewood, should be enough for another *braza* of stone. This is what I practiced and found to be the best way.

It is better not to have the kilns built too large; so much lime is lost [fol. 81] because one cannot enter quickly. Thus, for good results, the perimeter should be from twenty to twenty-four *brazas*.¹⁷ This you will know if you want the lime kiln to be twenty-four *brazas*, place one end of a rope four *brazas* long where the fire will be lit, and draw a circle around this with the other. The kiln will be twenty-four *brazas* in such a way that for a circle whose center is doubled three times, you go three times the circumference. Similarly, if you have six *brazas* in the middle, the circumference will be 18 *brazas*. (**Fig. 7**).

¹³ *Manunggul* is the Visayan word for coral stone. Javellana, op.cit., 53.

¹⁴ The sense of this text is not clear.

¹⁵ The sense is similarly not clear.

¹⁶ The whiteness indicates the presence of calcium carbonate (CaCO₃); Rona Repancol, pers. com.

¹⁷ 24 *brazas* is equal to 40.1232 meters.

Los caleros el mejor dia para pegarlos fuego es el Sabado por la tarde, y así/ se consigue el Lunes por la mañana el comenzar a entrar la cal en el camarín/ pero si otro día se le pegase fuego se perderá mucha cal por quanto ocurrirán/ en el tiempo que se está entrando la cal en el camarín uno, o dos Domin/gos en que no se pueda trabajar y con esta demora se enfría la cal y despu/es cuesta doblado travaxo para beneficiarla.

Piedra

Uno de los motivos que hubo para principiarse la Iglesia que se abandonó de/ ladrillo fue el estar en la inteligencia que la piedra no se podía encontrar/ sino es con grande dificultad tales fueron estas que io la primera piedra/ que condujo para la fabrica de la iglesia le traxe de cerca de Carcar. Pero se falició/ [facilitó] este impedimento encontrandola en la Isla de Mactan y con tanta abundan/cia *que* para qualquiera obra que se ofrezca en este Convento, de dicha Isla se puede sacar toda la piedra que fuese *necessaria* assi para tablillas como para bitoca/ y cal.

El mexor modo para conducir la piedra para tablillas es dando a los indios/ numero señalado a la semana de tarea Yo despues de muchas resoluciones *que*/ sobre esto tomé vine a poner en practica y corriente, el que tres indios a la sema/na diesen puestas aqui en la playa cien tablillas de media bara poco mas o me/nos, y si no daban el cumplimiento a ello les quitaba del socorro rata por *cantidad*:/ pues si no me dan cumplimiento a ello no es porque no puedan, sino es por su floxera, pe/ro quando llegan las bancas es *necessario* estar con sumo cuidado pues suelen/ traer quarenta piedras, y dicen despues haver traído sesenta. Por lo que/ en adelante a lo menos a tres personas se le deverán pedir a la semana ci/en tablillas.

Para la conducción de piedra o tablillas grandes que en una obra son *necessarias*, ia para arcos, cornisas, y puertas, en esto no se puede dar reg/la fixa para su conducción, pues estas cuesta mas travaxo el en/[fol. 81v]contrarlas, partirlas, y cargarlas en las bancas por lo que se deverá regu/lar las tareas que se les diese a los indios segun las medidas que de lo grue/so y de lo largo se les pidiese dichas piedras aunque siempre es lo mejor/ y mas conveniente pedirles algunas mas de las que puedan dar para que/ así den la que conmodamente puedan conducir.

La piedra para vitoca se conduce sin dificultad alguna se pueden al/ día hacer dos viajes y si se apura un poco a los indios aun tres, assi lo/ executado io, pero es *necessario* tener cuidado quando llegan las ban/cas pues de no las traen vien cargadas biniendose con media ban/ca de bitoca. Los *mismos* viages se asen para conducir la piedra para la cal.

The best time to fire the lime kilns is Saturday afternoon, so that by Monday morning it will be possible to transfer the lime to the shed. If the kiln is fired on any other day much lime will be lost when no work is done on the first, or second Sunday; this delay results in the cooling of the lime, and then it will take double the effort to benefit from it.¹⁸

Stone

One of the reasons to use bricks for the church that was abandoned was the thinking that the stone could not be found except with great difficulty. Such were these [thoughts when] the first stone that I bring [sic] to construct the church was brought from the environs of Carcar. But this impediment was overcome by finding it on the Island of Mactan, and in such abundance for whatever work that is necessary in this Convent. From said Island can be extracted all the stone needed for *tablillas*¹⁹ as well as for in-fill and lime.

The best way to transport the stone for *tablillas* is by giving the natives a designated number for the week of work. After many resolutions that I took on this point, I came to put into current practice the one wherein three natives a week would deliver here on the beach a hundred *tablillas* measuring half a *vara*²⁰ more or less. If they did not comply with this, they would be deprived of their ration according to quantity. If they don't complete their work for me, it is not because they can't, but because of their laziness. But when the canoes arrive it is necessary to be very careful because they usually carry forty stones, and later they say that they have brought sixty. Therefore, from now on, at least three people should be asked for one hundred *tablillas* a week.

No fixed rule can be given for the transport of stone or large *tablillas* that in a project are necessary for arches, cornices, and doors. Since it costs more work [fol. 81v] to locate, cut, and load the stones on the canoes, the tasks that are given to the natives should be regulated according to the measurements of the thickness and length of these stones. However, it is always the best and most convenient to ask them for a few more than they can give; that way they deliver what they can comfortably transport.

The stone for *vitoca* [infill] is brought without any difficulty; two trips can be made in a day, and if the natives are hurried, even three. That is how I carried it out; but it is necessary to be careful when the canoes arrive, because if they do not bring them well loaded, they come with half a boatload of *bitoca*. The same trips are made to transport the stone meant for lime.

¹⁸ The most recent and detailed analysis on lime-making in Spanish colonial Philippines is Jan-Michael C. Cayme, "Analytical chemistry methods of estimating the hydraulic lime characteristics of mortars from a Spanish colonial period fortification in the Philippines: Perspective of a Southeast Asian country," SPAFA Journal 6 (2022): 1-12, doi.org/10.26721/spafajournal.5fabjq9471.

¹⁹ *Tablilla* was the word used in the Visayas for cut stone blocks, or ashlar. Architect Michael Manalo adds that such *tablillas* were dressed, or flat, on the outside, but cut on the back to resemble a pyramid; the finished *tablilla* would bring to mind an old-fashioned TV picture tube (pers. com.).

²⁰ The *vara* was a Spanish unit of length equivalent to two spans or 84 cm. Thus, half a *vara* would be about 42 cm.

Para labrar piedra si a los indios no se le diese número señalado de las/ que an de labrar al día suelen en todo semana no labrar una piedra por lo que/ se deve pedir lo numero señalado, de ellas al día y este será ocho tabli/llas al día al que conmutadamente pueden dar cumplimiento como a mi me le an/ dado después que lo practiqué assi: pero para recibirles las tareas es necesario es/ tar con grande cuidado, pues de no con grande garbo las tareas de un día las cuenta por de dos, o tres días, y suelen tambien de noche coger las ta/blillas que estan ia passadas en quenta y acarrearlas alugar [sic] donde esta/ labrando para despues entregarlas por nuebamente labradas. Y assi lo mas com/veniente es el que la piedra se labre en la playa, y el sabado recibir/les las tareas por junto, y assi como se les ban contando las tablillas ir las cargando en los carretones y meterlas en el Patio, y assi no acen tan/tas drogas los indios.

Para labrar las piedras grandes, hacer cornisas como assi mesmo piedra pa/ra arcos, y todas las demas que no fuesen tablillas ordinarias, no se pue/de dar regla fixa y lo mas conveniente es el que en un lugar estén jun/tos todos los labradores sin permitirlos esten divididos, pue[s] estandolo tra/vajan mui poco, o nada, y estando juntos con facilidad seles hace ban/tay, y se hecha de ber el que viene a travaxar o no.

Sobre el asentar piedra, i echar lechadas assi mesmo no se puede dar/ regla alguna, si solo dando o ofreciendo el dar a los indios un real o dos/ para tubá suelen entonces concluir no solo aquello por lo que se les o/frece darles tubá sino es mucho mas, que no lo hecieran ni en dos días.

[fol. 82] **Barias Reglas de Arquitectura.**

Suma es la falta de Maestros y oficiales que en este de Zebú, se padece para qualquiera/ fabrica por lo que haviendo adquerido algunas noticias sobre reglas de Arquitectura me animo/ anotarlas en este Libro, aunque me espongo a la notta de que me digan, que como/ yo no las edrerbado³ en la fabrica de la Iglesia algunas de ellas, pero a esto digo⁴ que a si/do la causa el ignorarlas, y que para que no las ignore otro quando se ofresga/ por esso las anoto aqui.

Tres cosas se deven atender en todo edificio es a saber, la utilidad la duraci/ón, y la hermosura. La utilidad se consigue dando a cada parte de el edificio lu/gar, y sittio acomodado, de modo que no sea menor de lo que pide, ni/ mayor de lo que lleva el uso y poniendo en su lugar cada parte. La duración se/ a de atender a que todas las paredes esten derechas que sean mas anchas en la parte inferior, que en la superior, que tengan buenos cimientos que todos los guecos co/mo por bentanas, y puertas caigan derechamente una

³ This was probably meant to be written *he observado*, 'I have observed.' Small misspellings such as these throughout the work lead the authors to suspect that the present manuscript was prepared by a scribe from a draft written by Albarrán.

⁴ The scribe or Albarrán corrects himself without crossing the previous wrong phrase. "Pero a esto," being followed by "digo," indicates that this phrase should be replaced by "que a sido la causa" and the words that follow.

To work on stone: if the natives are not given a designated number of those they must work on in a day, they usually do not work on a stone for the whole week. Therefore, a designated number must be required of them per day: and this will be eight *tablillas* a day. This they can silently comply with, as they have delivered them to me after I put this into practice. But to receive their output it is necessary to be very careful since one [laborer] devises with great elegance the tasks of one day and he counts them for two, or three days. At night, they also usually bring out those *tablillas* worked and accounted for back to the workplace, to be passed off later as newly worked. And so the most convenient thing is for the stone to be cut on the beach, and on Saturday to receive the combined output; and as they count the *tablillas*, they load them on the carts and deposit them in the Patio. This way the natives do not make so much drugs.²¹

To cut large stones, make cornices as well as stone for arches, and all others that are not ordinary *tablillas*, no fixed rule can be made. The most convenient thing is that all the laborers be gathered in one place without allowing them to be divided, since they work very little, or not at all. But when they are together, they readily watch over each other [*bantay*], and one's presence or absence from work is made obvious.

Similarly, on the laying of stone, or the application of plaster, no fixed rule can be given. However, by giving or offering to give the natives a *real*²² or two for *tuba*,²³ they usually finish not only that for which they are offered the *tuba*, but much more than they could do even in two days.

[fol. 82] **Various rules for Architecture**

The lack of masters and professionals here in Cebu is keenly felt in whatever building project, such that I am motivated to put down in this Book some notes on rules for architecture that I have acquired. Although I note down what they tell me, I have not observed some of them in the fabric of the Church, and this has been the cause of not knowing them. And so that these will not be unknown by someone when he embarks on a project, I put them down here.

Three things must be considered in all buildings, which are: its usefulness, its durability, and its beauty. The usefulness of a building is achieved by giving each part of the building an adequate place and site, in such a way that it should not be less than what is required, or not more than its purpose; and by putting everything in its own place. For durability, one has to ensure: that all the walls are straight; that the lower sections are wider than the upper parts; that they have good foundations; and that all openings such as windows and doors are built over similar openings, such that a solid rises above

²¹ The reference to "drugs" is not clear.

²² A *real* was a Spanish silver coin, the basic unit of currency. Eight *reales* equaled one peso. Here we see that the laborers were paid for their work. What remains to be seen is how much one *real* could buy at this time.

²³ *Tubá*- rice wine.

sobre otras, de manera que/ *siempre* un sólido esté sobre otro sólido, y sobre bacio esté otro bacio. La/ *hermosura* nace de la *fechura* y correspondencia del todo con sus *partes*, y de/ las *partes* entre sí, y con el todo.

Por que los edificios deven ser un buen formado cuerpo en que un miembro/ convenga con otro y todos los miembros sirban al uso a que se destinan. Y ob/servando la calidad i grueso de las paredes mirando el peso del techo.

Consideradas pues estas cosas, se an de prevenir los materiales para que a su *tiempo*/ no falte cosa alguna que empida la conclusión de la obra pues es grande el pro/vecho de la fabrica si todas las paredes comenzacen a un tiempo y se acaban/ al mismo tiempo: por lo qual no quedan espuestas a sentirse y raxarse o abrirse,/ como suele acontecer en edificios fabricados en diversos *tiempos*, y conclui/dos con desygualdad.

Piedra

Aquí en Zebu no ai mas piedra de que se pueda fabricar, y hacer una obra/ sino es de piedra de la mar por lo *que* en esto solo digo⁵ *que dicha* piedra se labrara lue/go *que* se traiga *que* se seca de la mar. Pero despues se deve dejar al sol y al/ agua, y sino fuera tiempo de Aguaceros se deve labar con agua dulce para que/ assi salga los salitrosos *que* en sí tiene dicha piedra. Pero si la piedra fuese del/ monte de ningún modo se permitirá se moxe en agua salada.

Arena

Tres generos de Arena ponen los arquitectos son con que se suelen hacer las obras;/ El uno de ellos es la arena de la mar y esta dicen ser la peor, pero venificia/ [fol. 82v] da sirve como otra *qualquiera* para fabricar y por quanto aqui en Zebú no ai o/tra digo⁶ que esta se deve algunas *Partes*. antes sacar de la playa y ponerla en/ *parte* donde con los aguaceros se bañe, y de no regarla con agua dulce y es/ta de ningun modo sera la blanca, sino es que se debe escoger la negra,/ y relioc.te [?]⁷ como vidrio, y la mexor es aquella que se alla mas cerca al/ Agua por estar mas bien labada, y sin tierra alguna. Para la paletada, y hor/namentos arinaicos de un ydificio se a de procurar por dificultad que aiga arena/ de rio: Pues la de la mar por el salitre que tiene se seca presto, y presto tambien se/ umedece, y consiguientemente se deshaze, y cae de los paredes. Y finalmente la/ arena que hechada en agua la intubiare⁸ y formare algun genero de lodo es/ ciertamente mala, y tambien es mala aquella que por mucho *tiempo* a estado al/ sol, luna y llubias, porque esta tendrá mucha tierra, y humor apto para pro/ducir algunos arbolillos que dañan muchísimo los edificios.

⁵ “Digo” following “que en esto solo” indicates that the latter phrase should be disregarded and replaced by “*que dicha* piedra” and the rest of the sentence.

⁶ “Digo” following “no ai otra” indicates that the latter phrase should be replaced by “que esta se deve algunas *Partes*.”

⁷ This verb or past participle is unidentifiable.

⁸ This word is unidentifiable.

a solid, and a void rises above another void. The beauty of a building results from the technique and correspondence of all the parts, of all the parts among themselves, and with the whole project.

Buildings should be a well-formed body, in which each member agrees with the other, and all the members serve the purpose for which it was meant. Also, the quality and thickness of the walls have to support the weight of the roof.

Therefore, considering these things, the lack of materials that will interrupt construction must be prevented. It is a great advantage for the building fabric for all the walls to be begun and finished at the same time. This way, the walls are not subject to cracks or fissures, which usually affect buildings built over different periods, and completed with inequalities.

Stone

Here in Zebu there is no other stone that lends itself to building, and can be used for construction, than that from the sea; that is, it should be worked once it is dried after having been brought from the sea. But after this it should be exposed to the sun and water; if it is not the rainy season, the stone has to be washed in fresh water to remove all of its saline properties. However, if the stone is obtained from the mountains, it should by no means come into contact with salt water.

Sand

The architects suggest three types of sand that are usually utilized for construction. The first of these is the sand from the sea, which they say is the worst; but if it is refined [fol. 82v] it serves like any other for construction, and here in Zebu some parts have utilized it. Before removing it from the sea and placing it in the waterways to wash it, and it should not be watered with fresh water [the sense of this sentence is not clear]; and by no means should this be white sand, but the black kind is to be chosen, and [unreadable participle or adjective] like glass. The best kind is that found nearest the water, for it is well washed, and without any soil. For the lime plaster and ornamentation of a building, much effort should be taken to procure river sand. This is so because the sand from the sea is saline, and dries quickly; since it also humidifies quickly, it degenerates, and falls from the walls. Finally, the sand kept in water [the phrase is not understandable] and will form some type of mud; this is definitely bad. Just as bad is that sand that has been exposed for a long time to the sun, moon, and rains, because this sand will have much earth and soil from which will sprout small trees that greatly damage the edifices.

Cal y modo de Amasarla

Sobre el modo de hacerse la cal ia tengo dicho arriba y solo añado aqui/ que la piedra blanca y sólida, y que quemada que dé la tercera parte más ligera/ que lo que pesaba antes de quemarse es la mejor para cal, pero aqui no ay/ otra piedra mas que la de la mar, y assi homito el poner los muchos generos/ de piedra que los Autores ponen, que ai de la qual se puede hacer cal; la qual co/cida se deve umedecer con agua pero no toda a un mismo tiempo, sino es sucesivamente/ con cuydado, por que sino se rrequema, y despues se deve poner en lugar [sic] sonbrio y/ umedo sin mesclarle otra cosa, sino es que sea una capa de Arena, y quan/to mas se amasare la cal tanto sera mas tenaz, y fuerte. Para hacerse/ la mezcla se tomaran dos partes de arena, y una de cal, y esto es si la piedra/ con que se ase la cal es de la mar que si fuese del Monte se deve tomar tres/ partes de arena y una de cal; pero lo mejor es hazer la Prueba con amasar/ cantidades, y proporciones, y aguardando algunas días para provar qual/ proporción es la mejor.

De la Calidad de la tierra en que se/ an de poner los Simientos.

En unas partes dan hechos los cimientos la naturaleza, en otras los forma el Arte./ Los de naturaleza son el peñasco o tierra petrosa y se puede fabricar sobre e/llo: por quanto bastan para sustentar qualquiera [sic] edificio. Para formar los cimientos que el Ar/te enseña se a de atender bien donde se fabrican atendiendo assi la tierra es/ solida, o arenosa, móvil, o zenagosa.

Si la tierra fuere solida se ara caval tanto quanto se quiere la calidad de la/ fábrica. Quando mas cavarase [?] hasta la Sexta parte del edificio. Para co/nocer la solivez [sic: solidez] de la tierra se conocerá si hechando sobre ella un gran peso/ no rresonare, o temblare. Assimesmo podrase conocer por las pieles de los tam/bores puestos en el suelo si iriendolas ligeramente no rresonare será señal/ de ser tierra solida. La tierra arenosa es la peor para fabricar sobre ella,/ y mucho mas si es en agua, y asi siempre se a de cavar hasta encontrar/ [fol. 83] tierra solida y si esta fuere dificil encontrarla se deven clavar estacas/ y estas se an de poner tan juntas que entre cada dos no pueda entrar tercera,/ y se an de clavar con golpes continuados y no rrecios, para que mejor se solide/ la tierra. No se ha de fabricar sobre cimientos antiguos, sin saver primero/ quanto tienen de profundo, y se pueden sustentar el edificio nuevo.

De los cimientos

Deven ser los cimientos al doble mas grueso que la pared que sobre ellos se a de fabri/car: en lo qual se a de atender a la grandeza del edificio de manera que los cimientos/ deben ser mas anchos en tierra móvil y tambien deven ser mas solidos en tierra/ móvil y para fabricas de mucho peso que en tierra solida. El plan de los cimien/tos deve ser igual para que el peso oprima yualmente y no se incline mas a una parte/ que a otra por peligro de rrajarse las paredes. Deven ser los cimientos suvir en dismi/nución de tal suerte que tanto

Lime and how to knead it

I have already described the production of lime above. I will just add here that the white and solid stone when burned, yields a third of its pre-firing weight and is the lightest; this is the best lime. But here there is no other source than the stone from the sea, therefore I omit mentioning the other types of stones from which lime may be derived, as prescribed by the authors. Said lime upon firing should be kept humid with water: not all at the same time, but successively with care. If this is not done, it will burn again. Then it will have to be placed in a shady and humid place without being mixed with anything else except a coating of sand. The more the lime is kneaded, the more it becomes firm and strong.²⁴ For a mixture, two parts of sand and one of lime are needed. This proportion is for lime derived from marine rocks. If the stone is obtained from the mountains, three parts of sand are mixed with one of lime. However, the best way is to test by kneading various quantities of various proportions, and keeping these for a few days to see which proportion is the best.

On the quality of the earth for foundations

In some places the foundations are made by nature, in others by art. Those made by nature are rocky or stony grounds, and it is possible to build over these; therefore they are sufficient for any type of edifice. To form the foundations that art teaches, the place of construction will have to be studied well, determining if the soil is solid, sandy, shaky, or marshy.

If the land is solid it will be able to support whatever quality of structure is desired. As long as digging allows, it is possible to excavate up to the sixth part of the edifice. The solidity of the earth can be determined by throwing an object of great weight on it and nothing resonates or trembles. Another way is by lightly tapping the leather covers of drums laid on the ground: if they do not resonate, the land is solid. Sandy soil is the worst to build over, and much worse yet if it is watery. For this, it is necessary to excavate [fol. 83] until solid ground is encountered. If it is difficult to reach solid ground, piles will have to be driven into the soil, and they will have to be placed so close to each other that there is no space for a third pile between any two. They will have to be driven with continuous but not swift blows, the better to solidify the ground. Do not build over an old foundation, without knowing how deep it is and if it will support a new building.

On the foundations

The foundations should be twice the thickness of the wall over which the structure will be built. Therefore, depending on the size of the edifice, the foundations will have to be wider in shaky ground, and must as well be more solid in shaky ground and for buildings of great weight, than in solid ground. The plan of the foundations must be equal so that the weight is distributed evenly and does not incline to any one side, which could crack the walls.

²⁴ This method is similar to that recommended by the Renaissance architect, Leon Battista Alberti. Ignacio Gárate Rojas, *Artes de los Yesos* (Madrid: Editorial Munilla-Leria, 1999), 45.

disminuyen quanto mas suben, pero de tal ma/nera que tanto se dexen por una parte como por otra, y de modo que el medio de arriba/ cayga perpendicular sobre el medio de abajo. Lo qual tambien se a de observar en/ la disminucion de las paredes sobre la tierra Deven ser las piedras primeras/ que se ponen en los cimientos ser grandes; y si sobre ser grandes se quadrasen i a/planasen bien y se asentasen con golpes continuados sera mejor por quanto car/gados assi los cimientos cederán por igual, y igualmente asentará la fabrica.

Paredes

Seis generos de paredes ponen los Arquitectos, y dejando los cinco por no usarse/ aqui en Zebú solo pongo aqui el quinto que es el que se forma con piedras quadradas el qual es el ordinario en esta tierra y se *fabrica* colocando las piedras,/ o tablillas que sirven de nervios y legazones poniendo vitoca y lechada en medio/ de ella. Pondrasen estas ordenes de piedras quadradas en forma que abrasen/ toda la pared, y a cada dos tablillas leantadas se deve poner una hechada; pe/ro por quanto aqui en Zebú es dificultoso poner las piedras hechadas se su/plirá esta falta poniendo en cada cajón de tablillas en medio de cada cajon/ unas piedras grandes leantadas de suerte que sirban de dientes para el/ cajón que se sigue arriba; i de distancia unas de otras de una vara.

De las paredes y su diminución⁹

Quanto mas suben las paredes tanto se han de ir adelgazando, de modo que/ las que salen sobre la haz de la tierra sean la mitad mas delgadas que las de los cimientos, y las del segundo cuerpo sean mas delgadas que las del primero como/ la mitad de un ladrillo y assi sucesivamente hasta lo ultimo de la fabrica, pe/ro con mucha discrecion y cuydado, no sea que por arriba den demasiada/mente delgadas [.]. el medio de las paredes superiores debe caer perpendicularmente/ sobre el medio de las paredes inferiores, de modo que toda la pared tenga ci/erta forma pyramidal. Pero si alguno quisiera que la superficie del mu/ro superior cayga *derechamente* sobre la superficie de la inferior se avia de/ [fol. 83v] hazer esto solo por la parte de adentro, porque las vigas o llaves, pavimentos/ o techos etcetera no dejarán o embarazarán qualquiera [sic] movimiento de la pa/red peligrosa de ruina. La pared de afuera se cubrirá con corniza, cinto ó/ faja que rodee todo el edificio, porque no solo adornara sino que tambi/én ligará toda la fabrica.

⁹ This paragraph is from Chapter XI, Book One, “De la disminucion de los muros y de sus partes,” of Andrea Palladio’s *Los cuatro libros de arquitectura* [Venice, 1570], Translated from Italian to Spanish by Luisa de Aliprandini and Alicia Martínez Crespo (Madrid: Ediciones Akal, 1988), 70.

The foundations must diminish as they rise, such that the higher they are built the lesser they are. This should be in a manner that the same amount is decreased in one part as in another, and in such a way that the middle of the upper part falls perpendicularly on the middle of the lower part. The same procedure has also to be observed in the decrease of the walls above ground. The first blocks of stone laid in the foundation must be large. If apart from using large stones, above these were fitted and aligned blocks which were laid by continuous blows, the elements of the foundations would “give way” to each other, and thus the entire building fabric will settle evenly.

Walls

The architects distinguish six types of walls, but I leave behind five of those which are not used here in Zebu. I only present here the fifth, which is that formed by laying stones or *tablillas* which serve as “tendons” and connections, pouring *vitoca* [infill] and *lechada* [mortar]²⁵ in the middle of the wall. Layers of these squared stones that will constitute the whole wall are placed, and for every two courses of *tablillas* one *lechada*²⁶ should be placed. Since here in Zebu it is difficult to place the *piedras hechadas*,²⁷ this lack is supplied by placing in the middle of each quadrangular receptacle of *tablillas* some large vertical stones in such a way that they serve as ‘teeth’ for the above-mentioned box.²⁸ The distance between each box should be one *vara*.

On walls and their diminution²⁹

As the walls grow higher they must be thinner, in such a way that those that rise from the ground should be half the thickness of those of the foundations. Those of the second level should be thinner than those of the first, like the half of a brick, and all the way thus until the top of the structure. However, there must be much discretion and care; there is no reason for the upper walls to be too thin. The middle of the upper walls should fall perpendicularly over the middle of the lower walls, such that the [cross-section of the] whole wall will somewhat resemble a pyramid. But if one wishes that the surface of the upper wall falls onto the surface of the lower wall, only [fol. 83v] the inner section will have to be undone. This is so because the beams [*vigas*] or ‘keys,’ pavements or roofs, etcetera, will not allow, or will obstruct any movement of the wall that is in danger of ruin. The exterior wall shall be covered with a cornice, embrasure, or band that encircles the whole edifice, because it will not only adorn but link the whole structure together.

²⁵ The liquid quality of the mortar will seep into the crevices. The more liquidy form of mortar is known as slurry; Michael Manalo, pers. com.

²⁶ This could refer to an amount of *lechada*, the lime mortar, thrown into the wall construction after every two stone courses.

²⁷ The definition of this *piedra hechada* is yet unknown. It is also unknown if it refers to the *lechada*.

²⁸ These ‘teeth’ provide traction between the lower and upper courses of stones. Michael Manalo, pers. comm.

²⁹ This paragraph is from Chapter XI, Book One of Andrea Palladio’s *The Four Books of Architecture*, trans. Robert Tavernor and Richard Schofield (Cambridge, Mass. and London, England: Massachusetts Institute of Technology, 1997). Santiago Porras (1992, 18) elaborates on Albarrán’s references to Palladio.

De la aliza de los aposentos y pro/porción de las contiguaciones o cuerpos/ de la obra.

Comenzando por esto último nótese aquí por ser el mas proprio lugar la pro/porción que tienen entresi los cuerpos de un edificio si estuviere repartido/ en muchos y es sacada del Padre Juan Bautista Villalpando en el Tomo Segundo Disput. 1.

Supongamos en un edificio ú otra obra tal ha de tener quantos cuerpos: el primero/ pues ha de exceder al segundo en la quarta parte del primero: y assi si el primero/ tiene veinte palmos de alto, el segundo tendrá solos 15. porque desde 15. hasta 20./ faltan 5. que es quarta parte de 20. El segundo cuerpo ha de exceder al tercero,/ en la quinta parte y assi supuestos los 15. palmos sobre dichos del segundo cuerpo,/ el tercero tendrá solos 15. faltan 3. que es el quinto del 15. El tercer cuerpo/ debe exceder al quarto en la sexta parte y assi supuestos los 12. palmos/ del tercer cuerpo, el quarto avrá de tener solos 10 palmos, porque 10, a 12.,/ faltan 2 que es el sexto de 12. Y a este modo se debrían [sic: deberían] proporcionar los demas/ cuerpos si mas huviere de tener el edificio de modo que el quinto cuerpo ex/ceda al sexto en la séptima parte, el sexto al séptimo en la octava parte etcetera.

La razón de esto trae en el lugar citado el Padre Villalpando, y es porque/ el Arte se deve conformar con la naturaleza y las cosas mas remotas de/ nuestra vista, parecen menores: y el arte debe imitar esta apariencia./

Volviendo pues a la primera parte propuesta del Capítulo digo que a los aposentos,¹⁰/ se hazen o con techos de bobeda, o entablados: si con entablados su altura desde el pa/vimiento hasta las vigas será tanta quan es la latitud de los mismos aposentos:/ y los superiores serán menos altos que los inferiores, en la sexta parte [.] si con/ bobedas (como suelen acerse los de la primera contignación [sic]¹¹ para hermosura/ y contra el fuego) la altura de la bobeda será un tercio mas de la latitud de/ los aposentos, si estos fueren quadrados. Pero en aquellos que son mas lar/gos que anchos extiendanse la latitud y longitud juntamente en una mis/ma linea recta. (O añadanse por numeros la longitud y latitud) y la me/tad del todo sera la altura del aposento.

De las puertas y ventanas¹²

No se puede dar regla cierta acerca de la altura y anchura de las puertas prin/cipales de la fábrica como ni de las puertas y ventanas de los aposentos por/ donde

¹⁰ The rest of this paragraph is from Palladio, XXIII, “De la altura de las habitaciones,” 121.

¹¹ This is probably a misreading of *configuración*.

¹² This section except for the last paragraph is a rewording from Palladio, XXV, “De las medidas de puertas y ventanas,” 125-126.

On the planning of the rooms and the proportion of adjoining structures or levels of the building.

I begin with this latter point, being the most appropriate place on the proportion between the floors of a building if it was divided into many spaces, which is taken from the Second Book of the *Disput.* 1 of Father Juan Bautista Villalpando.³⁰

Let us suppose that an edifice or a similar work will have a number of levels. The first level then has to exceed the second by a fourth of the former; hence, if the first level is 20 palms in height, the second should have only 15; from 15 up to 20 is a difference of 5, which is the fourth part of 20. The second level has to exceed the third by a fifth; supposing the second level is of 15 palms, the third should only have 15 less 3, which is a fifth of 15. The third level should exceed the fourth by a sixth; thus taking the 12 palms of the third level, the fourth level should only have 10 palms, because the difference of 10 and 12 is 2, which is the sixth of 12. Thus, this is the manner by which the proportions of the other levels must be calculated, if the building will have more floors. The fifth level will exceed the sixth in the seventh part, the sixth will exceed the seventh in the eighth part, etcetera. The rationale for this is by Padre Villalpando in the cited work, and it is because Art has to conform to nature. The farther the things in our vision, the smaller; and art must imitate this appearance.

Now returning to the first part expressed in this Chapter, that is the rooms:³¹ these are constructed either with roofs of vaulting, or of timber frames. If the roofs are of timber frames, their height from the pavement up to the beams must be the same as the width of the room itself; and the upper rooms should be a sixth less in height than the lower rooms. If vaulted (as is usual with those of the first level, for beauty and as a measure against fire), the height of the vault should be a third more than its width, for square rooms. But for those rooms which are longer than wider, the width and length must be extended together in the same straight line.³² (Or add the length and height by numbers) and half of the total will be the height of the room.

On the doors and windows³³

It is not possible to give rigid rules for the height and width of the principal doors of the structure, nor for those of the doors and windows of the rooms, or where to situate

³⁰ Juan Bautista Villalpando (1552-1608) was a Spanish Jesuit who wrote on architecture, mathematics, and theology. "Villalpando (Juan Bautista)," in *Enciclopedia Universal Ilustrada Europeo-Americana*, Tomo 68, 1409-1410 (Bilbao, Madrid, and Barcelona: Espasa-Calpe, S.A., 1929). Santiago Porras (1992, 18) elaborates on Albarrán's citations from Villalpando.

³¹ The rest of this paragraph is from Chapter XIII, Book One "On the heights of rooms," of Palladio (1997, 58).

³² This rather confusing calculation is better understood in the published English translation of the pertinent section in Palladio (1997, 58): "But with those that are longer than they are broad it is essential to derive the height from the breadth and length, so that they are in proportion to each other."

³³ This section except for the last paragraph is a rewording from Palladio, Chapter XXV, Book One "On the dimensions of doors and windows" of Palladio (1997, 60). *Luz* in the published English version is translated as "clear breadth" or "clear height," depending on the context.

para hacer las puertas principales, debe el Arquitecto acomodar/ se a la grandeza de la fabrica a la calidad de su dueño, y a las cosas *que*/ [fol. 84] han de entrar y salir por ella [...] a mi me parece bien dividir el espacio/ desde el suelo hasta la superficie del primer alto en tres partes y me/dia y de las dos hazer la luz¹³ en altura y de la vna la luz en latitud/ menos una duodécima de la altura.

Para las puertas principales escoxa/se el lugar a *donde* facilmente acudan o concurren de todas *partes* de la casas [sic]. Las puertas de los aposentos no excedan de tres pies en anchura, ni de/ sies [sic: diez] y medio en altura ni tengan menos de dos pies en anchura y cinco en/ altura [...]

En el hacer la [sic] Bentanas se atienda no solo el que reciban mas/ o menos luz de lo que conviene sino tambien que ni estén muy juntas ni/ muy apartadas y para esto considerese bien la grandesa de los aposentos/ que han de ser iluminados y por tanto no se hagan las ventanas mas an/chas que la *quarte parte* de la latitud del aposento, ni mas estrechas que la *quin/ta* [;] y tengan en alto dos quadrados y una sexta de su latitud esto es el *du/plo* de la latitud y una sexta *parte* mas y porque en una casa no¹⁴ todas las/ ventanas deben ser yguales en la L.^a y aun en qualquiera contiguación,¹⁵ y por otra *parte* los aposentos otros son grandes y otros pequeños, me *agra/da* la regla siguiente en tomar la medida de las ventanas: *excoxanse*/ pues aquellos aposentos cuya longitud excede a su latitud en dos *ter/cias Yguales* si la latitud de 18. y la longitud sea de 30, y dividido la latitud en/ *quatro partes y media* [;] de una de estas hago la latitud de la Luz de las ven/tanas y de dos con una sexta de latitud hago la altura de la luz: y se/gún la grandeza de estas, hago las demas ventanas de los demas a/posentos. Las ventanas de la segunda contignación deben ser *meno/res* que las inferiores en una sexta de la longitud de la Luz de las Ven/tanas inferiores y si otras se hazen sobre estas assi mismo tendrán u/na sexta parte menos que las inferiores inmediatas. Las Bentanas/ diestras deben corresponder a las siniestras, y las superiores a las/ inferiores *derechamente* como tambien las puertas que estan unas sobre/ otras de modo que el hueco cayga sobre el hueco y el solido sobre soli/do y aun corresponderse de modo que el que esta en un extremo de/ la Cassa pueda ver y registrar lo que ay en el otro extremo.

Advertase que siempre sean proporcionadas las Bentanas segun/ altura, respeto de su anchura fuere como la proporción de 16. y mucho/ mexor si como 20. respeto de 5 y ½ porque esta proporción es la mejor/ de todas: puede ser tambien dupla como 10 respeto de 5. Lo mismo se/ entienda acerca de las puertas.



¹³ *Luz* in this context refers to the space or distance between two supports, whether vertical or horizontal.

¹⁴ In the published Spanish rendition, the opposite is stated: “las ventanas deben ser todas iguales en su orden, o en su piso.” Palladio, 126. The published English translation is also in the affirmative.

¹⁵ Both this and the same word a few lines later, should also probably read *configuración*.

the principal entrances. The architect must consider the scale of the structure according to the status of his patron, and to the things [fol. 84] which will enter and exit from it. I think it well to divide the space of the first level from the floor up to the ceiling in three and a half parts. Let the first two provide the clear height, with the third the breadth, with a twelfth less of the height.

For the principal doors, choose a location where all things from all parts can easily congregate or enter. The doors of the rooms should not exceed three feet in width and six and a half feet in height, nor measure less than two feet in width and five feet in height.

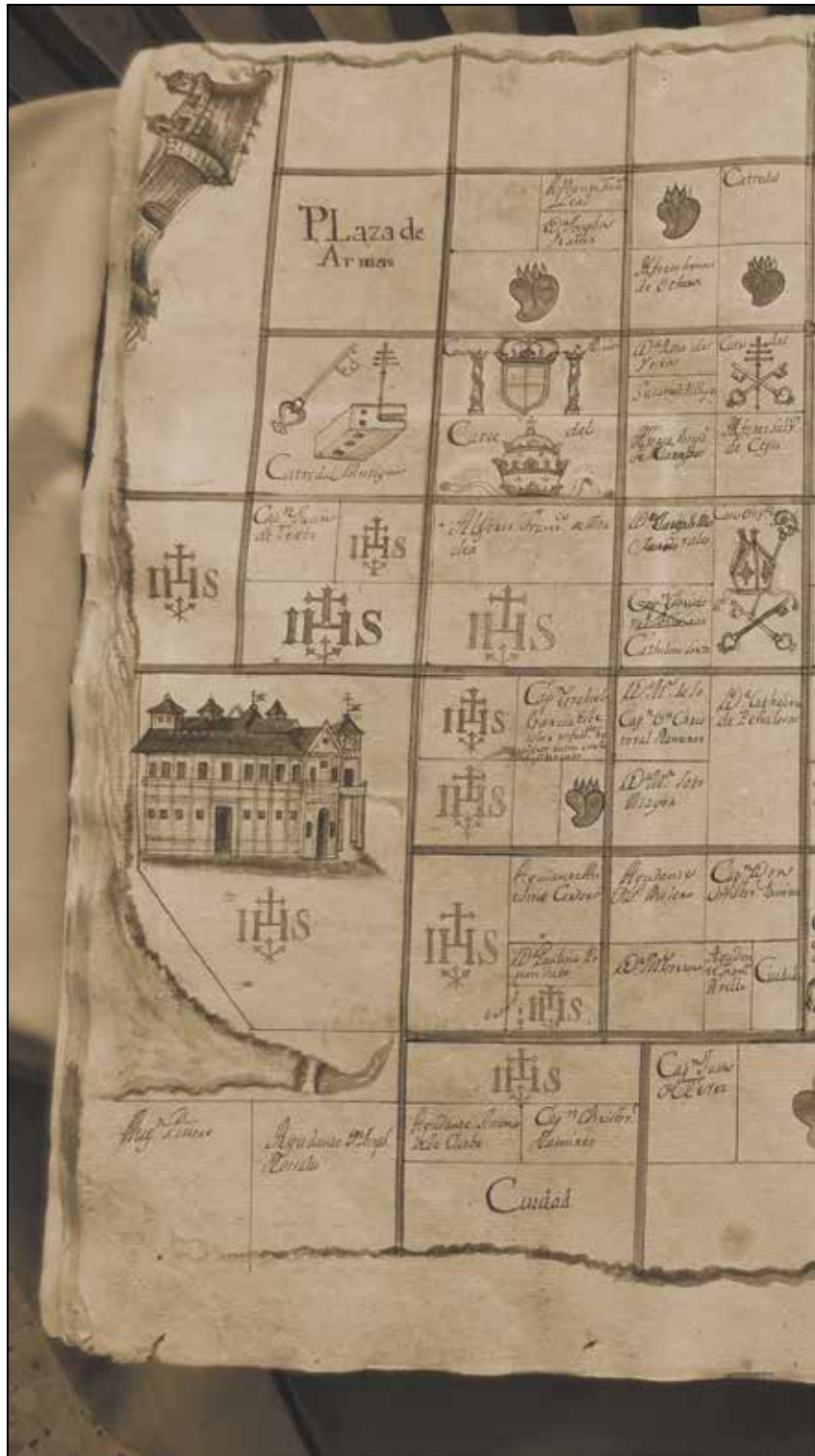
For windows, one has to consider not just which will have more or less light, but it would also be good to make sure that the windows are neither too near nor too separate from each other. Towards this, think well about the size of the rooms that have to be illuminated; therefore, the windows should not be made wider than the fourth part of the length of the room, nor narrower than the fifth part. They should also be two squares and a sixth of the width; this is double the width and a sixth part more. Considering that, in a house, not all the windows should be equal in providing light, even in whatever configuration;³⁴ and, on the other hand, there are both large and small rooms, I am pleased with the following rule regarding the measuring of windows. Select those rooms whose length exceeds their width by two equal thirds. If the width is 18, the length is 30, and I divide the width into four and a half parts; with one part I make the clear breadth of the windows, and with the other two, adding a sixth of the breadth, I calculate the size of these windows, from which I design the rest of the windows of the other rooms. The windows of the second configuration should be smaller than those of the lower ones by a sixth of the clear height of the lower window. If others are made over these, they as well will be a sixth part less of the windows immediately below. The windows on the right should correspond to those on the left, and the upper ones to the lower ones in a straight fashion. The same goes for doors that are over other doors, such that an opening is directly above another opening, and a solid directly over another solid. They should even correspond to one another, such that from one extreme end of the house, its counterpart can be seen and recorded on the opposite extreme.

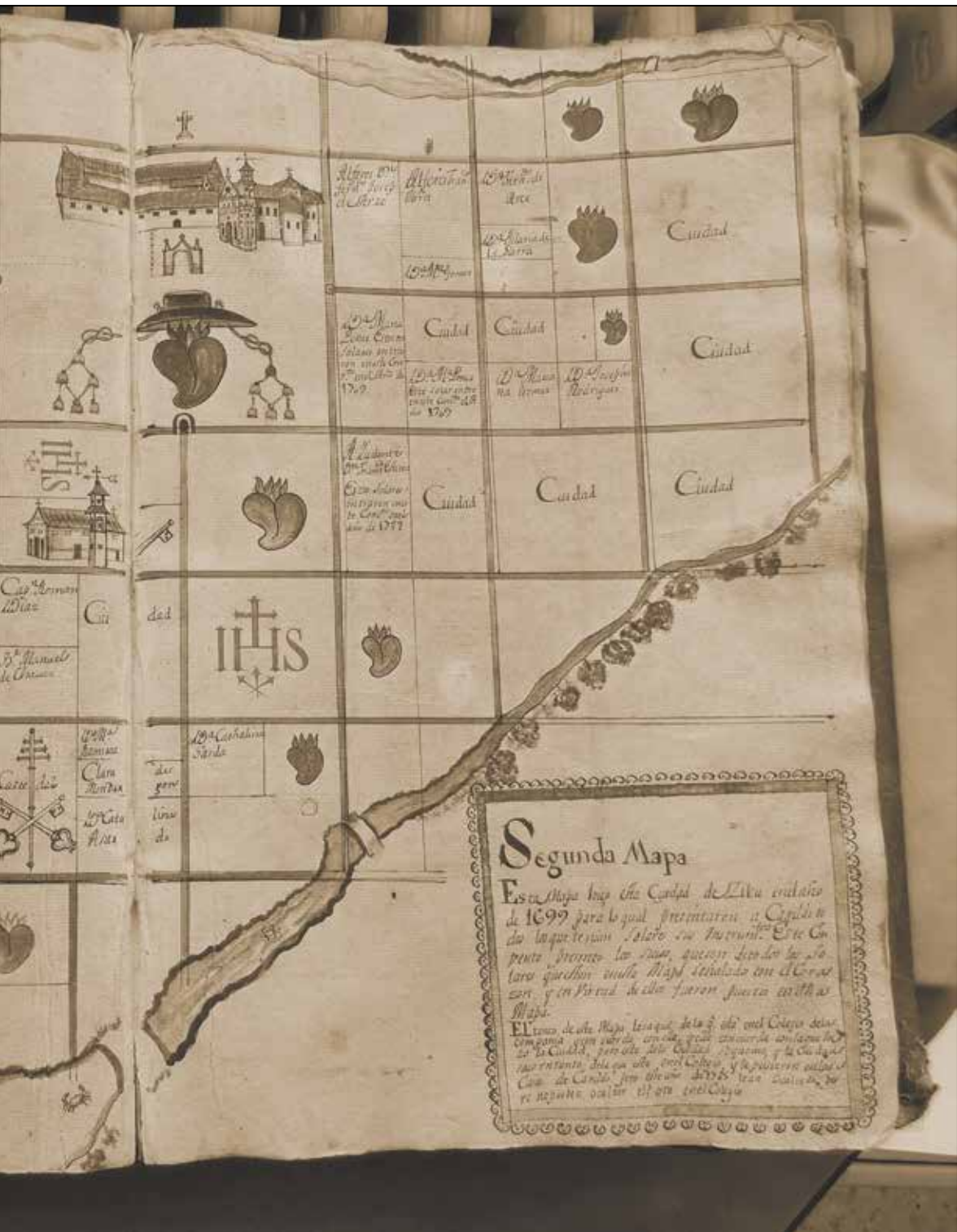
Make sure that the windows will always be proportional to their height. With respect to their width, it should be according to the proportion of 16, and better if it is around 20, with respect to 5 1/2. This proportion is the best of all; it can also be doubled like 10 with respect to 5. The same can be applied to the doors as well.

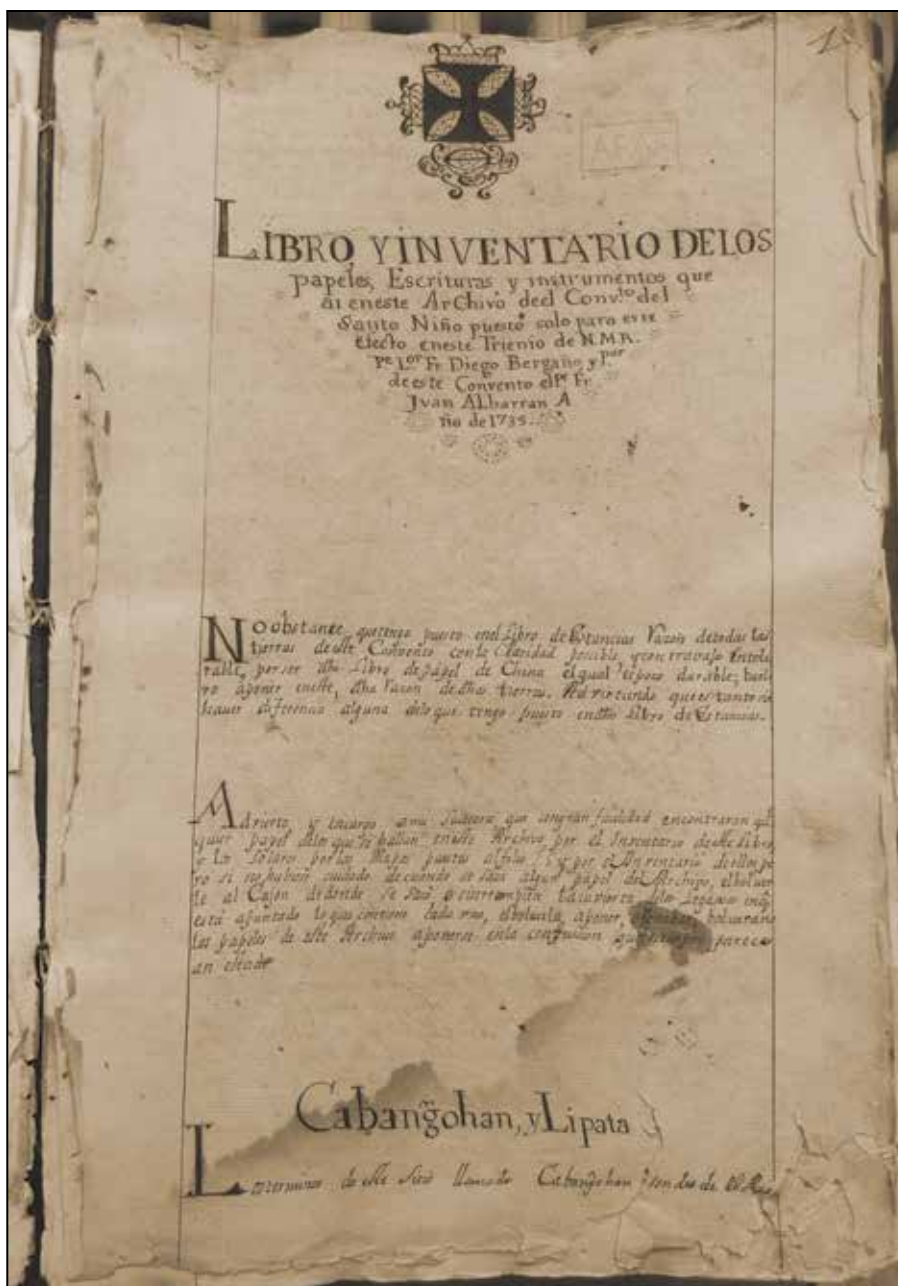


³⁴ In both published Spanish and English versions of Palladio, the opposite is stated.

Fig. 9. Map of Cebu City, on fold. 23v and 24 of the LYI. See the note for Fig. 3. The caption on this map may be translated as: "Second Map. This map was made by the City of Cebu in the year 1699, for the purpose of being presented to the Chapter, along with other land-owners who had their titles. This Convento presented its own documents, which are for all its lands represented in the map with a Heart, and thus they were indicated in this map. The copy of this map was made by me from that which is in the College of the Company [of Jesus], and is in concordance with it, and it is in concordance with that which the City made. But the map of the City was burned, and the City made a copy of that in the College, and they placed it in the Chapter House. But this year of 1735 they have hidden it, but they cannot hide this map in the College." Courtesy of APAF.







Title page of **LIBRO, Y INVENTARIO DE LOS** papeles, Escrituras, y instrumentos que ai en este Archivo de el Convento del Santo Niño puesto solo para este efecto en este Trienio de Nuestro Muy Reverendo Padre Lector Fray Diego Bergaño, y Prior de este convento el Padre Fray Juan Albarrán Año de 1735. This folio is numbered "1" on the upper right corner, but it is preceded by two folios for the contents of the volume. Courtesy of APAF.