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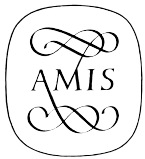


The Raffles Gamelan at Claydon House

Sam Quigley

Sir Thomas Stamford Raffles (1781–1826) is known to many as the founder of Singapore, probably his greatest and most lasting accomplishment (fig. 1). Others know him as the brilliant young man who served as Lieutenant Governor of Java from 1811 to 1816, after the Dutch requested British stewardship of their colonies during the Napoleonic era. Yet another segment of society knows him as a tireless collector of botanical and zoological specimens and is indebted to him for having founded the London Zoological Society. Some contemporary observers viewed him as an enlightened ruler since he spoke with local nobility in their own languages, introduced significant land reforms, and outlawed slavery. Others held him in contempt as a military colonialist, who, after having successfully invaded the royal palace in Yogyakarta, allowed his troops to ransack it and carry off some 150 illuminated manuscripts and other precious spoils. The jealousies of some erstwhile underlings temporarily undermined him with false accusations, forcing him to return to London in March 1816 to clear his name. During his stay in England that year, among many high profile activities, he also wrote the monumental two-volume *History of Java* (London, 1817), a work for which he is widely admired. His reputation runs the gamut from the admiring appellation "Builder of Empire" to the dubious distinction of being a renegade colonialist. There is no doubt that he was a remarkably gifted and multi-faceted man.[1]

To those interested in the culture of Indonesia, however, he is remembered primarily as a collector of objects used in the Javanese performing arts, the most famous of which is the fantastically zoomorphic

All illustrations and photos not otherwise attributed were made by the author.

1. Among his many biographies, the most definitive is that by Charles Edward Wurtzburg, whose work was edited posthumously for publication by Clifford Witting: *Raffles of the Eastern Isles* (London: Hodder and Stoughton, 1954). A romanticized view is *Life of Sir Stamford Raffles* by Demetrius Charles de Kavanagh Boulger (London, 1897; newly edited with an introduction by Adrian Johnson [London: Knight, 1973]). The most skeptical view can be found in *Thomas Stamford Raffles, 1781–1826: Schemer or Reformer?* by Syed Hussein Alatas (Singapore: Angus and Robertson, 1971).

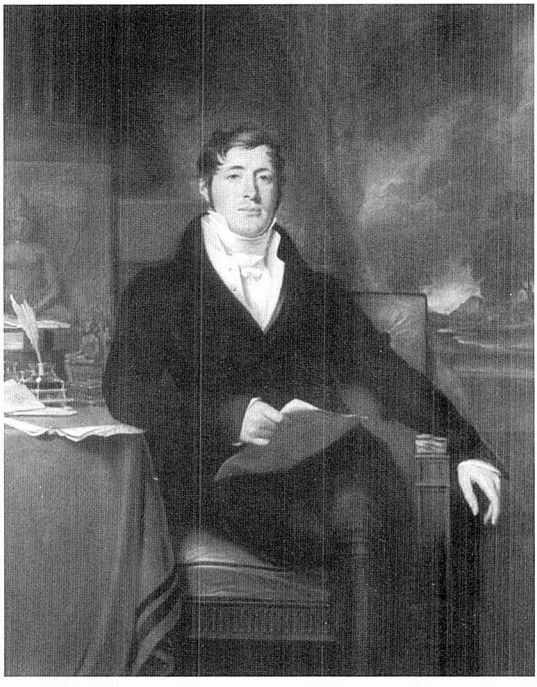


FIGURE 1. Portrait of Sir Thomas Stamford Raffles by G. F. Joseph, 1817. Courtesy of the National Portrait Gallery, London.

gamelan in the British Museum's Department of Ethnology at the Museum of Mankind (fig. 2).[2] Complementing that gamelan, there are some 360 *wayang kulit* (flat leather puppets), a number of *wayang kerucil* (flat wooden puppets), some three-dimensional wooden puppet-like figures, and a large collection of *topeng* (wooden masks).[3] Much less well known, but of interest, is a complete miniature gamelan donated to the British Museum in 1939 by Mrs. J. H. Drake, Raffles's granddaughter. Intermingled with these Javanese items are two early-nineteenth-century Balinese *gambuh suling*, a Balinese *kecer*, a Sundanese *tarawangsa*, some drums from Thailand, and a few other musical objects. Yet another gamelan (fig. 3) brought back by Raffles now belongs to the Verney family and is located in their ancestral home, Claydon House, in Buck-

2. See *The Raffles Gamelan: A Historical Note*, ed. William Fagg, with a biographical note by Douglas Barrett (London: British Museum, 1970).

3. See Jeune Scott-Kemball, *Javanese Shadow Puppets: The Raffles Collection in the British Museum* (London: British Museum, 1970).

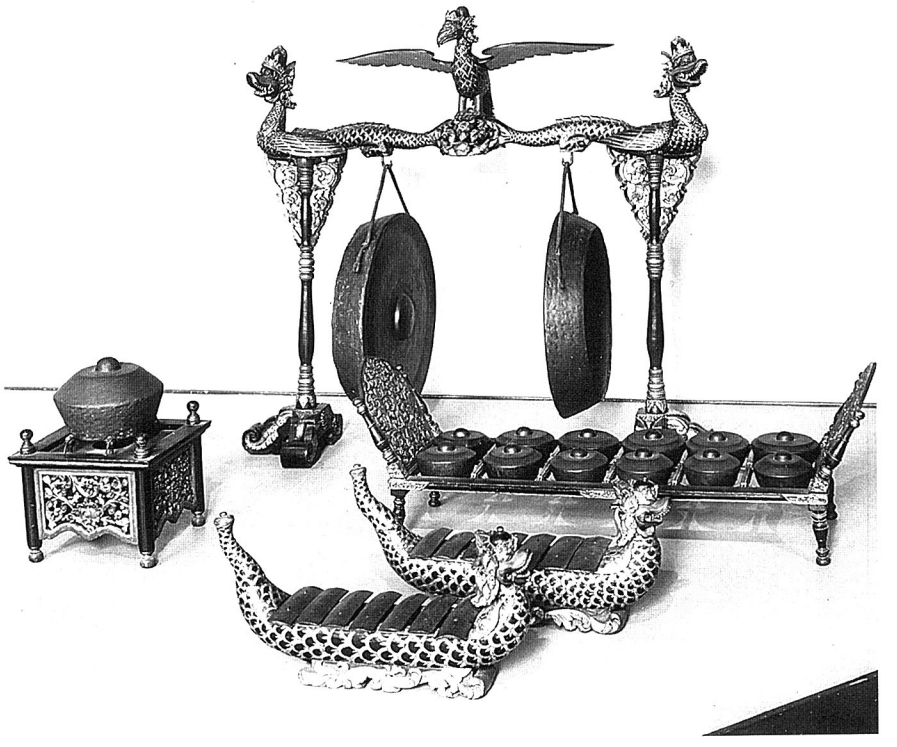


FIGURE 2. Representative instruments from the Raffles Gamelan at the British Museum. Courtesy of the British Museum.

inghamshire. Taken together, these artifacts are of singular importance to the study of Javanese culture as they are the earliest known objects of this kind to have been exported from Java.

Nearly unknown, with only one published photograph, the Claydon House gamelan is a fascinating set of instruments with several very surprising characteristics.[4] In November 1994 and January 1995 I was fortunate enough to realize a nearly twenty-year ambition to examine closely both of these remarkable large gamelans.[5] After discussing

4. *Antique Collector* 42 (April–May 1971): 56.

5. A very generous Mellon/Lamb Curatorial Sabbatical Grant from the Museum of Fine Arts, Boston, supported this research. I am deeply grateful to Sir Ralph and Lady Verney for welcoming me to their ancestral home and allowing unlimited access to their instruments. Many thanks are also due to Tony Bingham, who greatly facilitated my project with introductions and excellent preliminary photography. Finally, I am very thankful for the

FIGURE 3. The Raffles gamelan at Claydon House.

recently discovered proof that Raffles himself commissioned the Claydon House gamelan, I will discuss the physical attributes of the instruments and through analysis show that the tuning accords to the diatonic scale. The supposition that it was originally intended as such will be supported by contemporaneous writings. Attention will then be focused on the reasons why this has escaped notice until now. Following some suggestions for the future of these instruments, I will close with a brief discussion of some especially interesting features of individual instruments. To the extent possible, I will show that the instruments were made by highly skilled artisans working in different workshops in the northeastern coastal region of Java, probably somewhere between Semarang and Surabaya.

The Raffles Provenance

The vast archive of the Verney Family Trust contains approximately 30,000 letters covering three centuries of family history. Recently it

assistance and kindness given to me by Mr. and Mrs. Michael Sandford, Keepers of Claydon House, a property of the National Trust.

yielded two documents of great importance to the present inquiry.[6] The first is a letter, dated 12 September 1861 and addressed to Sir Harry Verney from the Rev. William Charles Raffles Flint, which is in essence a confirmation of sale and transmittal of the instruments:

> My dear Sir Harry
>
> I am extremely glad that you should be the possessor of the Musical Instruments, as with you then will be both valued, & kept together. Had I not felt disinclined from the first to part any of them from the rest, they might have been disposed of long since. The collection I presented to the British Museum though of far greater antiquity & composed of [rare (?)] instruments, is far less perfect. These you will find figured and explained at page 470 in the History of Java Vol I. It is from thence that I took the descriptive Catalogue. No other exists. I have sent you a list which, with the Instruments & the Plate before you, you can easily identify.
>
> Whatever imperfections Exist are such as have always been known to us. The 'Gender' should be repaired with a few pieces of brass being soldered on to make the metal pieces stand clear of the frames. This is one of the most interesting & curious of the set. A little soap & water, *cold,* may be safely applied to clean the gilding & painting, & with good effect. . . .
>
> I am your sincerely W. Raffles Flint[7]

Attached to the letter is the "Catalogue," with the following statement:

> Javanese Band of Musical Instruments made to the order of the late Sir T. Stamford Raffles and brought by him from Java 1816 (fig. 4)

The list is somewhat confusing since the nomenclature is not entirely accurate, and the numbers in parentheses refer to similar instruments depicted in Raffles's *History of Java*. The so-called "(2) Gambang Gangsa, the keys are of *wood*" is in fact a *Gambang kayu,* since *kayu* means wood while *gangsa* means bronze. Further, the line "(6) Demong" refers to the seven instruments which have a nearly identical appearance in both size and decoration but sound in three different octaves and therefore have different names. In fact, the Claydon House gamelan is comprised of the following instruments (approximating the order of Flint's list):

6. For searching out these documents, I am greatly indebted to Mrs. S. R. Ranson, Archivist of the Verney Archives; this archive is in the possession of the Claydon House Trust, located at Claydon House.

7. Aside from being the son of Raffles's sister, Mary Ann, William Charles Raffles Flint was married to Jenny Rosdew Mudge—the daughter of Raffles's youngest sister, Alice Hull—who inherited the bulk of Lady Raffles's estate in 1858. Flint effectively became the arbiter of the distribution of Sir Thomas Stamford Raffles's collections.

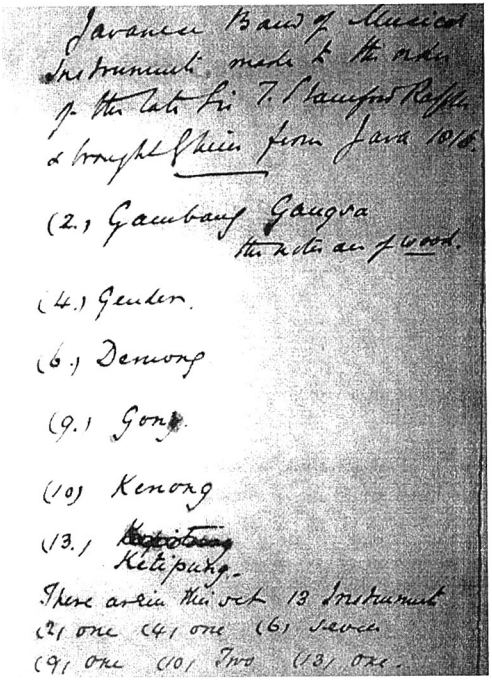


FIGURE 4. Flint's handwritten "Catalogue." Reproduced from a document in the Verney Archives in the possesion of the Claydon House Trust by kind permission of Sir Ralph Verney.

one *Gambang kayu,* hereinafter referred to as a gambang (fig. 5)
one *Gendèr barung,* hereinafter referred to as a gendèr (fig. 6)
one "*Saron slénthem*" (fig. 7)[8]
two *Saron demung*

8. Determining a proper name for this instrument is not easily accomplished. This lowest sounding of the seven seven-keyed instruments has the appearance of a typical saron demung but is in the same octave as the lowest portion of the gendèr barung—a range normally associated with the slénthem and the *slèntho.* The modern slénthem has keys suspended by cord over tuned resonating tubes. Slénthem keys usually have two longitudinal ridges which divide the width of the keys into thirds, like gendèr keys. The slèntho is considered archaic today, and all of the slèntho with which I am familiar have keys which rest on a saron-like support. Slèntho keys lack ridges and are characterized by a prominently raised boss in the center, similar to the keys of a *gong kemodhong.* The Claydon House gamelan and the British Museum gamelan each have an instrument whose support looks like a saron but whose keys lack either the longitudinal ridges or the raised boss. If this were a newly developed instrument, one might consider it to be a hybrid, but since this type is unknown today, I refer to it here as a saron slénthem.

FIGURE 5. The Claydon House gambang.

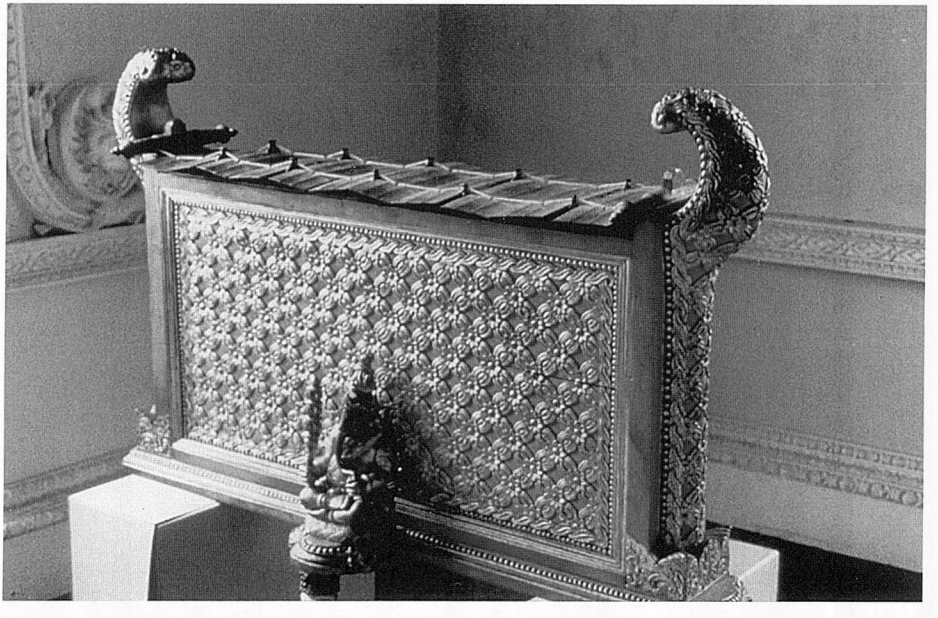


FIGURE 6. The Claydon House gendèr.

four *Saron barung*
two *Gong ageng* on a single support
two *Kenong* on individual supports (fig. 8)
one *Kendhang* (a large *ketipung* or possibly a small *ciblon*); see foreground in fig. 3.

The other letter was written by Lady Verney sometime in 1861 and indicates that she intended to help in the *purchase* of the gamelan.[9]

> I also mean to pay for the Gongs etc. Papa was very anxious to buy them & would not do it without my approbation which I could only [indecipherable] by giving my allowance again for this 6 months, and I must hope that the Gongs will preserve a good sound of me to Claydon. . . .

Thus, we know that Raffles commissioned this gamelan (therefore, it cannot be dated before 1812) and that it was purchased by the Verney family—it was *not* a gift from Sir Stamford Raffles, as is reported in the booklet distributed at Claydon House.[10] That Raffles commissioned these instruments helps explain many questions: why they were so exquisitely made, why the decoration is so appealing to Western eyes, why they are in such extraordinary condition, why the instrumentation is not complete enough to be musically viable, and why the gamelan is tuned to a diatonic scale.

Owing to his political position, his military supremacy and his comparative wealth, Raffles would have been viewed by the Javanese as the most powerful lord of the land. He was known to speak and read Malay and Javanese and, for a Westerner, to have an unprecedented interest in Malay traditional culture. Thus, when he ordered a gamelan, we can assume that the finest artisans were approached to carry out the work and that, as if for a royal patron, the set would be lavish and impressive. Further, as is the custom, he would have been expected to specify elements of the carved decoration, the paint colors, and the character of the tuning, the latter being not as standardized in Java as is it in the West.

Raffles seems not to have left much to chance. This inveterate collector traveled widely within Java and, as a keen observer, might well have assembled a portfolio of decorative schema which could be referenced when commissioning a gamelan. It is quite possible that he specified indigenous decorative vocabulary, which appealed to his European taste; he may even have suggested some Westernizing alterations and

9. Lady Verney (Frances Parthenope Verney) was the older sister of Florence Nightingale, a long-term and illustrious resident of Claydon House.

10. *Claydon House, Buckinghamshire* (rev. ed., London: National Trust, 1984), 21.

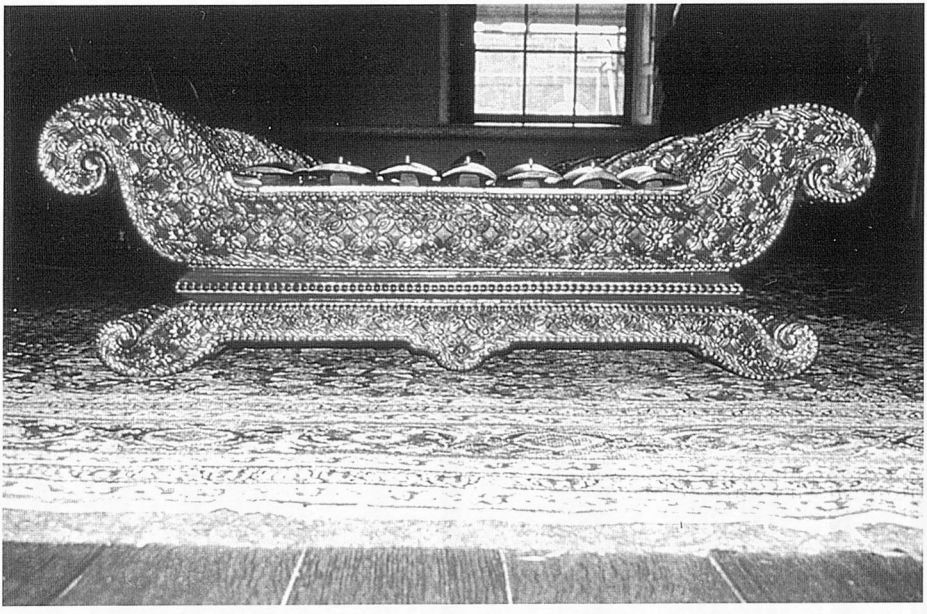


FIGURE 7. The Claydon House saron.

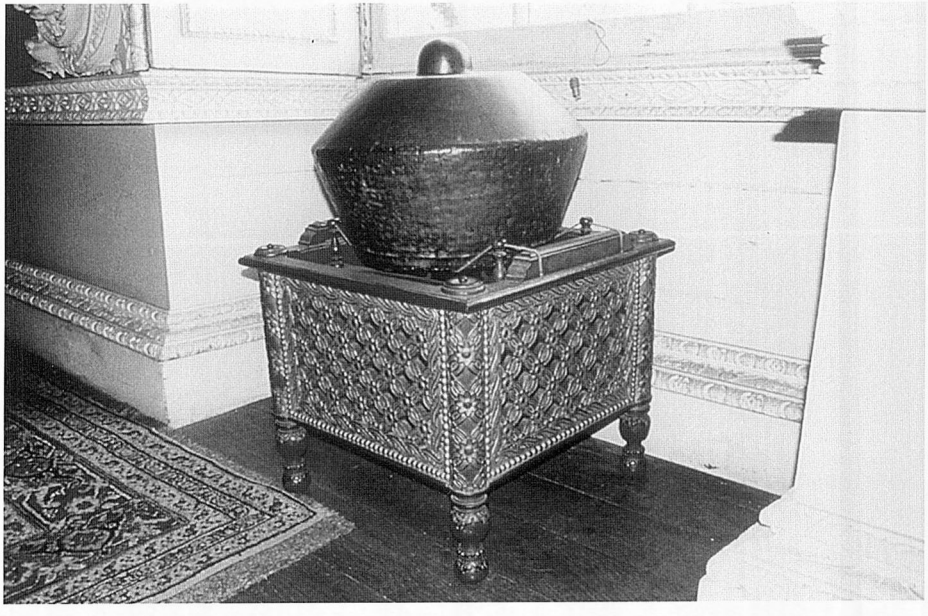


FIGURE 8. The Claydon House kenong.

then left it to the artisans to incorporate his ideas. Among the traditional motifs he could have easily stipulated are: the intersecting flower-petal grillwork (common to many batik designs) and the upholstery-like decorative beading on all the instruments, the undulating *C* scrolls (fig. 23) and spiral-fluted balusters on the gongstand (fig. 9), and the precious treatment of the finial at the end of both the gongstand and the gendèr key holders (fig. 21).[11] The care with which the decoration was planned as an integral part of each case piece and the quality of its execution are stunning. The carved decoration is restrained but opulent; its gilding has great depth and complements the deep ochre-painted ground. The heavily patinated bronze keys silently convey the great age of the set, while the superb condition of the teakwood (*Tectonis grandis*[12]) cases leads one to wonder how much, if ever, the gamelan had been used before it was brought to the more temperate climate of Great Britain.

The Tuning of the Gamelan

It is not only in appearance that Raffles specified the aesthetic principles he found pleasing, he must also have requested a specific tuning. Despite the slight aberrations audible today (due to age-related changes in bronze[13]) it would appear that the original tuning of the gamelan was intended to be diatonic. However, upon a first hearing, this determination would seem to be quite wide of the mark: the tuning seems to accord to no logic at all. Its diatonicity became apparent only after close visual examination of the seven seven-keyed saron; this inspection revealed that nine keys—nearly twenty percent of the saron keys—are replacements, made as castings of other keys in the same set. Of these, only the

11. Several of these motifs can be found on other Javanese instruments and other utilitarian articles. It is difficult to know if the designs were influenced by European aesthetics or if they pre-dated Dutch colonialism.

12. I am grateful to John Koster for having made this determination through microscopic analysis of a small chip removed from one of the saron resonator cavities.

13. Among gamelan makers and musicians it is well known that the pitch of bronze keys and gongs tends to rise at a decreasing rate during the first several decades following their manufacture. Thus, it is considered normal that a gamelan will require tuning (by filing away material and/or by hammering) in its first year, fifth year, fifteenth year, and thirtieth year. It is said that after approximately thirty years, the resulting "seasoned" bronze is no longer subject to change in pitch. While I do not question this oral tradition, I am unaware of any long-term study which provides a detailed analysis of this phenomenon.

FIGURE 9. Gongstand, gong ageng, and bonang at the Tropenmuseum, Amsterdam. Courtesy of the Tropenmuseum.

saron slénthem and one of the two saron demung retain their full complement of original keys. A third instrument, the gendèr, also completely original, covers two octaves using eleven keys: a tone row that lacks the fourth and seventh degrees of the scale, owing to the nature of its traditional pentatonic performance style.[14] By removing from consideration the replacement keys, the original intent of the gamelan tuner becomes quite apparent.

14. In a modern *pélog* (heptatonic tuning system) gamelan there would normally be two gendèr barung. One, the *Bem* gendèr, would include the *nada* (the Javanese term for the concept of note name) 1, 2, 3, 5, and 6, while the other, the *Barang* gendèr, would include the nada 2, 3, 5, 6, and 7. In both cases, the fourth degree of the tuning system is omitted. Depending on the mode of the composition being played in either case, only five of the seven nada of the pélog tuning system are used. This pentatonic arrangement of the pélog tuning system allows for the necessary transposition of melodic material to and from the pentatonic *slendro* tuning system, the other ubiquitous tuning system in Java.

Although the tuning of the Claydon House gamelan does not accord *exactly* with any of the main diatonic temperaments, it is easily recognizable to the ear as such.[15] Allowing for slight intonation aberrations within the Claydon House tone row, a Western musician can readily discern the intervals of a perfect fifth, a major third, a major sixth, and a major second. Less acceptably in tune—but still reasonably recognizable—are the intervals of the rather sharp perfect fourth and the somewhat flat major seventh. By contrast, the degree of tolerance employed in order to comprehend the gamelan's diatonicity pales in comparison with that which would be necessary to understand its tuning as a variant of the Javanese *laras* (tuning system) pélog. (See Appendix A for a graphical expression of these comparisons.)

There are two contemporaneous accounts which support the claim that the gamelan was originally tuned to the diatonic scale. In his 1828 article, "On the Resonances, or Reciprocated Vibrations of Columns of Air," Charles Wheatstone refers to the gendèr in question and states quite clearly and with no additional comment or equivocation: "Of these plates there are eleven; their sounds correspond with the notes of the diatonic scale, deprived of its fourth and seventh, and extend through two octaves."[16] Adjacent to this statement is an accurate drawing of the instrument, then said to be in the museum of the Honourable East India Company. In a memoir dated 4 March 1839 Baron Christian Bunsen,

15. A discussion of the subjective nature of diatonic intonation perception is well beyond the scope of this article, but it can be quantified to a certain extent. In his book *The Structure of Recognizable Diatonic Tunings* (Princeton: Princeton University Press, 1985), composer and microtonal theorist Easley Blackwood provides mathematically derived parameters for what he calls the "range of recognizability" (p. 199). He posits that, according to his experience, recognizable diatonic scales can be constructed based on the perfect fifth interval ranging between 689 and 715 cents (with all other intervals being adjusted accordingly). In Appendix A of this article Blackwood's numerical values for a recognizably diatonic tone row based on the smallest possible perfect fifth are graphed along with those of the more widely known 5-Limit Just Temperament to facilitate comparison of the Claydon House gamelan tuning with these diatonic tunings. Also included in this graph for comparison is an expression of what Jaap Kunst refers to as a "Normalized Pélog," i.e., an averaged "standard" pélog tuning. These tunings viewed together reveal that the Claydon House gamelan is much more similar to diatonic tuning than it is to laras pélog.

16. *Quarterly Journal of Science, Literature, and Art* 25 (January–June, 1828): 175–83; esp. 178–9. Charles Wheatstone (1802–75) is best remembered for his invention of the English concertina (patented in 1844) and the small mouth organ, known as the Symphonium (patented in 1829). Both instruments employ free reeds as their sounding elements. He was also a scientist with interests in electricity and an acoustician of some standing, with broad interests in the physics of music. I am grateful to John Koster for having brought this important evidence to my attention.

Minister Plenipotentiary of the King of Prussia, is quoted as saying about Lady Raffles's gamelans: "Her set of Japanese [*sic*] instruments of music —(plates of brass, &c.)—have no *quart* or *septima,* but otherwise our scale."[17]

Quite a bit later than these two references, none other than Alexander Ellis examined the instruments at Albert Hall in 1885, while they were on loan from Sir Harry Verney.[18] The gendèr keys were not properly suspended over the resonators, and Ellis could not get adequate measurements. He also commented that the saron keys were all so jumbled that he and Alfred James Hipkins (of John Broadwood & Sons) had to measure them first and then try to make sense of the scale, for which he noted the frequencies (fig. 10).[19]

As can be seen, Ellis's 1885 measurements are generally in accord with those I made in 1994. However, he came to a different conclusion about the nature of the scale. In this context and with all due respect, I present the following quotation from the Appendix to Ellis's 1885 article: "Although these do not agree with the seven Pélog notes on p. 512 of my paper, yet they must certainly be another version of a Pélog set of notes."[20] Indeed, this may be the only written record of the Western diatonic scale referred to as a version of laras pélog. It is probably fortunate for us all that Ellis did not try to develop a theory for Javanese music that could account for the tuning system of the Claydon House gamelan.

Figure 11 presents the tuning measurements of the gamelan as a whole. When the present distribution of the keys was codified in 1962,[21] the seven individual saron were assigned the labels *A* through *G,* and the

17. Frances Baroness Bunsen, *A Memoir of Baron Bunsen* (London, 1868), 1: 512; quoted by John Bastin in "Korte Mededelingen: The Raffles Gamelan: Some Remarks Occasioned by William Fagg (ed.) *The Raffles Gamelan: A Historical Note* (British Museum, London, 1970)," *Bijdragen Tot de Taal-, Land-, en Volkenkunde,* 127 (1971): 274–78.

18. The Historic Loan Collection of Musical Instruments at the Inventions Exhibition, 1885. It should be noted that the initial listing of these instruments is quite misleading. For a more accurate analysis of these instruments, see the Appendix to Alexander Ellis's "On the Musical Scales of Various Nations," *The Journal of the Society of Arts* (30 October 1885): 1102–11, esp. 1107–8.

19. Nada is used in fig. 10 to facilitate comparison with the tuning charts in figs. 11 and 15.

20. Ellis, op. cit., 1108.

21. Mantle Hood was asked to make this determination so that Mr. Langton, a technician from the British Museum's Department of Ethnography, who was also then engaged by Sir Ralph Verney, could re-peg the instruments. This was part of the process of making the entire gamelan visually more presentable.

Nada	2	3	4	5	6	7	1	2
Ellis's measurements (Hz.)	124.0	140.0	158.0	167.0	189.0	202.0	222.0	248.0
Quigley's measurements (Hz.)	123.6	138.3	155.9	168.7	187.2	206.4	224.5	245.6
Differential (Hz.)	0.4	1.7	2.1	1.7	1.8	4.4	2.5	2.5

FIGURE 10. Ellis's frequency measurements and comparison.

keys were then marked 1 through 7 (highest to lowest) with white painted numbers, so that specific keys can easily be referred to as, e.g., A1, D4, or G7. For convenience, I have extended this scheme to include the remaining instruments, i.e., the gendèr and the kenong. Before returning to the question of the diatonicity of the gamelan, we must consider the replacement keys more thoroughly. Which ones are not original, and how it is possible to identify them?

Aside from the dissimilar coloration and barely perceptible differences in size, the hammering patterns on the undersides of the keys provide indisputable evidence for the determination of which keys are replacements. All sounding elements of a gamelan result from being hammered out of red-hot bronze ingots. The set of impressions left by hundreds of hammer blows on a key make it inconceivable that two keys could be identical in appearance. Thus, when two keys have the same pattern of hammering marks, one is, by definition, a casting of the other. The two representative photographs (figs. 12 and 13) show a few of the correlations indicated by arrows. Further supporting this evidence, the holes of the replacements are perfectly round whereas the holes of the originals are slightly ovoid, the result of traditional technique, in which the holes are punched during forging rather than being drilled after the casting process. Figure 14 itemizes the replacement keys and the respective originals from which they were cast.[22]

22. Determining when and where these replacements were made is impossible. Based on two considerations, it appears likely that the keys had been missing — and were replaced in England—three or perhaps four decades before their sale to Sir Harry. The patination of the replacement keys matches that of the original keys today, and I believe the wording of Flint's letter to Sir Harry, "Whatever imperfections Exist are such that have always been known to us," acknowledges the existence of the replacements at the time of transmittal. Secondly, in the same letter Flint states: ". . . the collection I presented to the British Museum . . . is far less perfect"; indeed, that gamelan is lacking an even greater percentage of keys and they were never replaced!

	Nada:	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1
Instrument name:																							
			H11	H10		H9	H8		H7	H6	H5		H4	H3		H2	H1						
Gender barung H			122.2	136.5		167.2	186.2		224.5	245.8	274.8		333.6	373.8		447.1	492.1						
			b -18	c# -26		e +25	f# +11		a +35	b -8	c# -15		e +21	f# +18		a +28	b -6						
		A7*	A6*	A5*	A4*	A3*	A2*	A1*															
Slenthem A		112.04	123.6	138.26	155.91	168.75	187.24	206.44															
* Painted key labels reversed		a +32	b +2	c# -4	d +54	e +41	f# +21	g# -10															
									B7	B6	B5	B4	B3	B2	B1								
Saron demung B									224.5	245.5	277.0	312.4	335.4	375.3	410.7								
									a +35	b -10	c# -1	d +57	e +30	f# +25	g# -19								
									C7	C6	C5	C4	C3	C2	C1								
Saron demung C									226.7	246.1	275.6	311.8	336.9	376.6	411.7								
									a +52	b -6	c# -10	d +54	e +38	f# +31	g# -15								
			ID													D7	D6	D5	D4	D3	D2	D1	
Saron barung D		Legend:	Hertz													426.2	451.5	506.8	564.3	624.4	671.5	750.3	
			Cents													g# +45	a +45	b +45	c# +31	d +56	e +32	f# +24	
		Gray shading														E7	E6	E5	E4	E3	E2	E1	Outside
Saron barung E		indicates this is														421.8	632.3	670.3	759.4	847.5	902.0	976.3	820.5
		a replacement														g# +27	d +53	e +29	f# +45	g# +35	a +43	b -20	g# -21
		Hatched area														F7	F6	F5	F4	F3	F2	F1	
Saron barung F		indicates a very														462.1	495.3	539.5	624.0	670.7	750.7	823.4	
		anomalous key														a +85	b +5	c# -47	d +55	e +30	f# +25	g# -15	
																G7	G6	G5	G4	G3	G2	G1	
Saron barung G																450.2	458.9	497.6	562.4	622.9	673.8	755.0	
																a +40	a +73	b +13	c# +25	d +52	e +38	f# +35	
Kenong J													336.3	376.2									
													e +35	f# +29									

Measurements made in November 1994 using a Sony TCD-7 and a Korg AT 12 (margin of error: +/- 5 cents).
Room temperature approximately 16.4 C

FIGURE 11. Current tuning of the Claydon House gamelan.

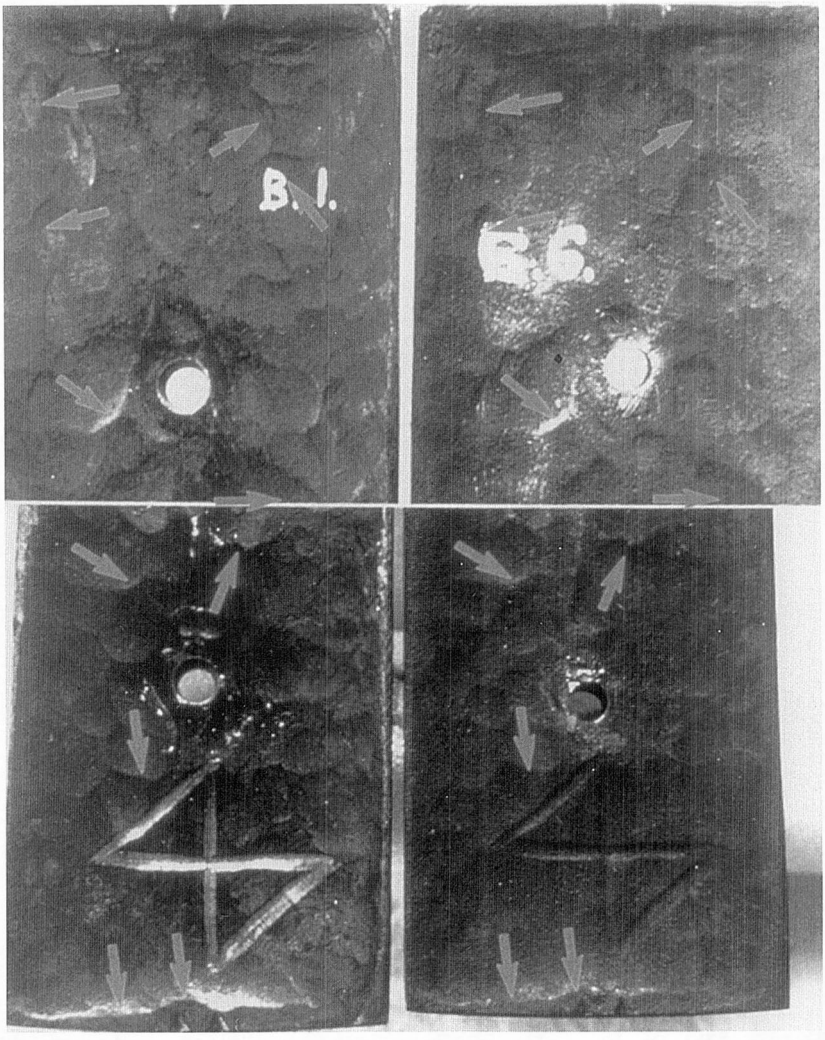


FIGURE 12. Two Claydon House saron keys, showing the undersides of the original and its corresponding cast.

The so-called "outsider key" is in the possession of the British Museum and is recognized by their staff as being dissimilar to any of the keys belonging to the zoomorphic Raffles gamelan. There is no question that it is originally from the Claydon House gamelan and it is my opinion that this key should be re-united with it. The key labeled *F7* is an

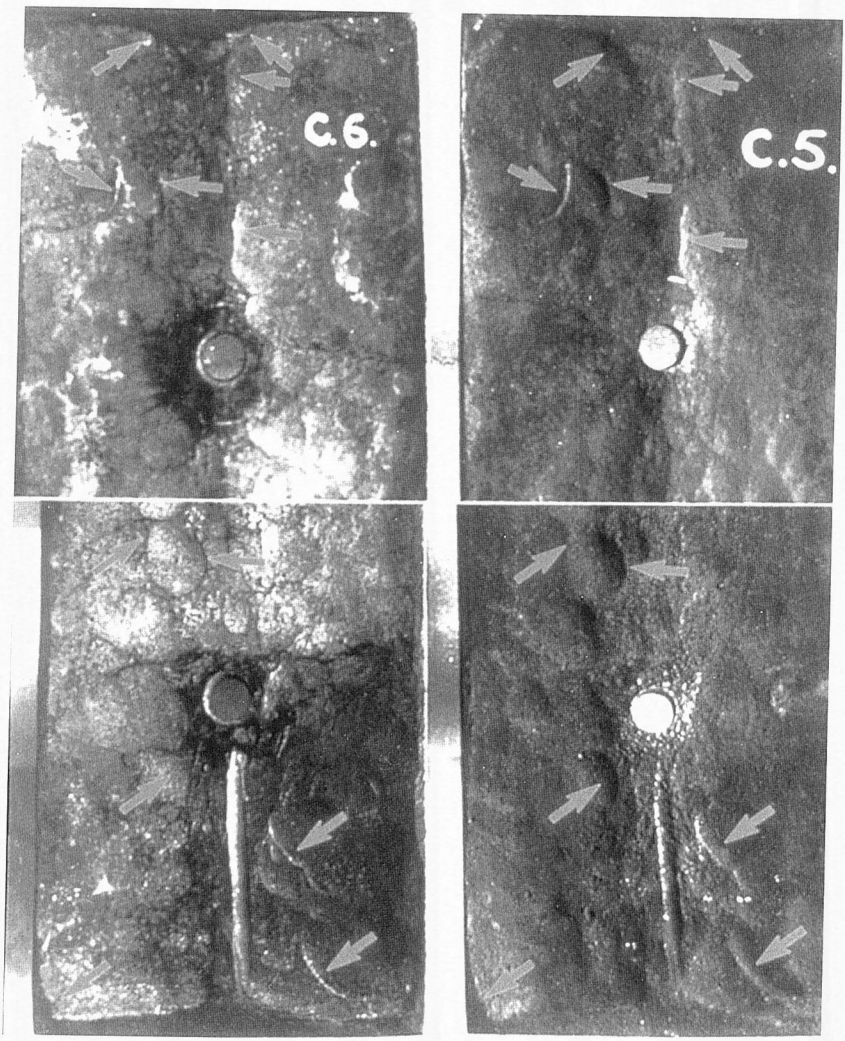


FIGURE 13. Two Claydon House saron keys, showing the undersides of the original and its corresponding cast.

Original key	C6	B2	D6	E5	D1	"Outsider key"		F6	B1
Cast copy	C5	D7	D5	E4	E3	E2	E1	F5	G6

FIGURE 14. Itemization of replacement saron keys.

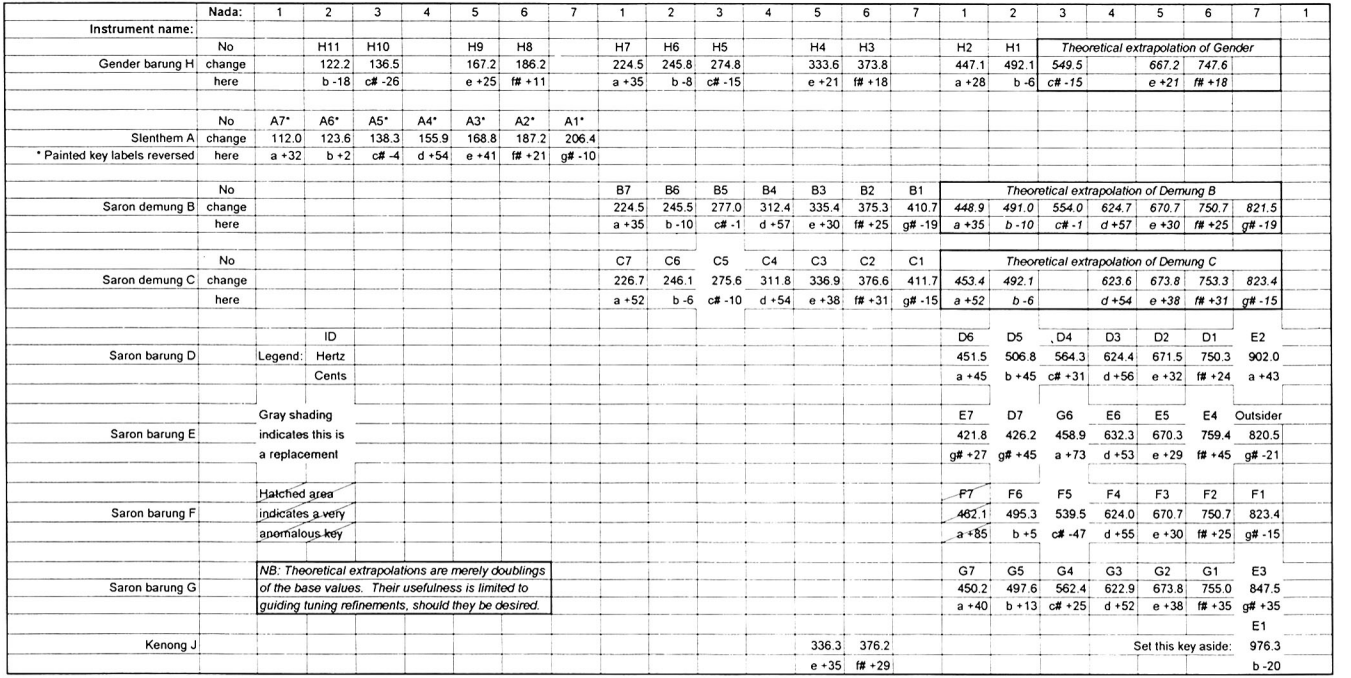
anomaly. It is not a casting of any other key in the set, but it appears to be very different in color and manufacture.[23]

Having identified and discounted the replacements, I find that the current tuning of the gamelan makes sense as a near-diatonic scale. If the saron keys were redistributed and the replacements re-tuned, it would be possible to make the gamelan more accurately reflect the original intent of the maker and its first owner. Figure 15 shows how this might be done; it is based on two assumptions: (1) that the "outsider key" be returned to Claydon House, and (2) that it would be ethically acceptable to alter the tuning of the replacement keys (*only* the replacement keys) in order to bring them into accord with the original keys. Figure 16 shows this proposal graphically.

Instrumentation and Physical Description

However beautiful and visually coherent the gamelan may be, the instrumentation of the ensemble is musically limited. It is very surprising that the gamelan has no *bonang*, since this instrument is essential to the loud style of playing that one would expect from an ensemble with such massive saron. Alternatively, it is possible that the gamelan was intended for a quiet style of performance. If this were to be the case, the absence of a bonang would be acceptable, but one would then expect to find at least a *rebab* and *suling*, and possibly a *celempung*. However, because of their more ephemeral nature, each of these three latter instrument types tend to have a looser association with a unified ensemble and frequently become lost or replaced over time. Usually, if a rebab and suling are

23. There has been a persistent rumor that at some time in the past the keys of the Raffles gamelan at Claydon House had been intermingled with the keys of the Raffles gamelan at the British Museum. According to files in the British Museum, Langton proposed this theory to Mantle Hood and Klaus Wachsmann when they examined the Claydon House gamelan on 7 September 1962. On the following day the trio examined the British Museum gamelan, which was on exhibition at the Victoria and Albert Museum. In a letter, dated 5 October 1970, from Wachsmann to the British Museum's Keeper of Ethnography, William Fagg, Wachsmann stated that he and Hood were in agreement that there had been no transposition of keys from the two ensembles. Based on my close examination of both sets of keys, I am certain that, with the single exception of the "outsider key," Hood and Wachsmann were correct in making this determination. The lengths, widths, shapes, and weights of the Claydon House keys are completely dissimilar to those attributes of the British Museum keys. Furthermore, there is no correlation whatsoever between the tunings of the two ensembles.



	Nada:	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1
Instrument name:																							
	No		H11	H10		H9	H8		H7	H6	H5		H4	H3		H2	H1	*Theoretical extrapolation of Gender*				
Gender barung H	change		122.2	136.5		167.2	186.2		224.5	245.8	274.8		333.6	373.8		447.1	492.1	549.5		*667.2*	*747.6*		
	here		b -18	c# -26		e +25	f# +11		a +35	b -8	c# -15		e +21	f# +18		a +28	b -6	*c# -15*		*e +21*	*f# +18*		
	No	A7*	A6*	A5*	A4*	A3*	A2*	A1*															
Slenthem A	change	112.0	123.6	138.3	155.9	168.8	187.2	206.4															
* Painted key labels reversed	here	a +32	b +2	c# -4	d +54	e +41	f# +21	g# -10															
	No								B7	B6	B5	B4	B3	B2	B1	*Theoretical extrapolation of Demung B*							
Saron demung B	change								224.5	245.5	277.0	312.4	335.4	375.3	410.7	*448.9*	*491.0*	*554.0*	*624.7*	*670.7*	*750.7*	*821.5*	
	here								a +35	b -10	c# -1	d +57	e +30	f# +25	g# -19	*a +35*	*b -10*	*c# -1*	*d +57*	*e +30*	*f# +25*	*g# -19*	
	No								C7	C6	C5	C4	C3	C2	C1	*Theoretical extrapolation of Demung C*							
Saron demung C	change								226.7	246.1	275.6	311.8	336.9	376.6	411.7	*453.4*	*492.1*		*623.6*	*673.8*	*753.3*	*823.4*	
	here								a +52	b -6	c# -10	d +54	e +38	f# +31	g# -15	*a +52*	*b -6*		*d +54*	*e +38*	*f# +31*	*g# -15*	
			ID													D6	D5	D4	D3	D2	D1	E2	
Saron barung D		Legend:	Hertz													451.5	506.8	564.3	624.4	671.5	750.3	902.0	
			Cents													a +45	b +45	c# +31	d +56	e +32	f# +24	a +43	
		Gray shading														E7	D7	G6	E6	E5	E4	Outsider	
Saron barung E		indicates this is														421.8	426.2	458.9	632.3	670.3	759.4	820.5	
		a replacement														g# +27	g# +45	a +73	d +53	e +29	f# +45	g# -21	
		Hatched area														F7	F6	F5	F4	F3	F2	F1	
Saron barung F		indicates a very														462.1	495.3	539.5	624.0	670.7	750.7	823.4	
		anomalous key														a +85	b +5	c# -47	d +55	e +30	f# +25	g# -15	
		NB: Theoretical extrapolations are merely doublings														G7	G5	G4	G3	G2	G1	E3	
Saron barung G		*of the base values. Their usefulness is limited to*														450.2	497.6	562.4	622.9	673.8	755.0	847.5	
		guiding tuning refinements, should they be desired.														a +40	b +13	c# +25	d +52	e +38	f# +35	g# +35	
																						E1	
Kenong J													336.3	376.2						Set this key aside:		976.3	
													e +35	f# +29								b -20	

Measurements made in November 1994 using a Sony TCD-7 and Korg AT 12 (margin of error: +/- 5 cents).
Room temperature approximately 16.4 C

FIGURE 15. Proposed redistribution of saron keys.

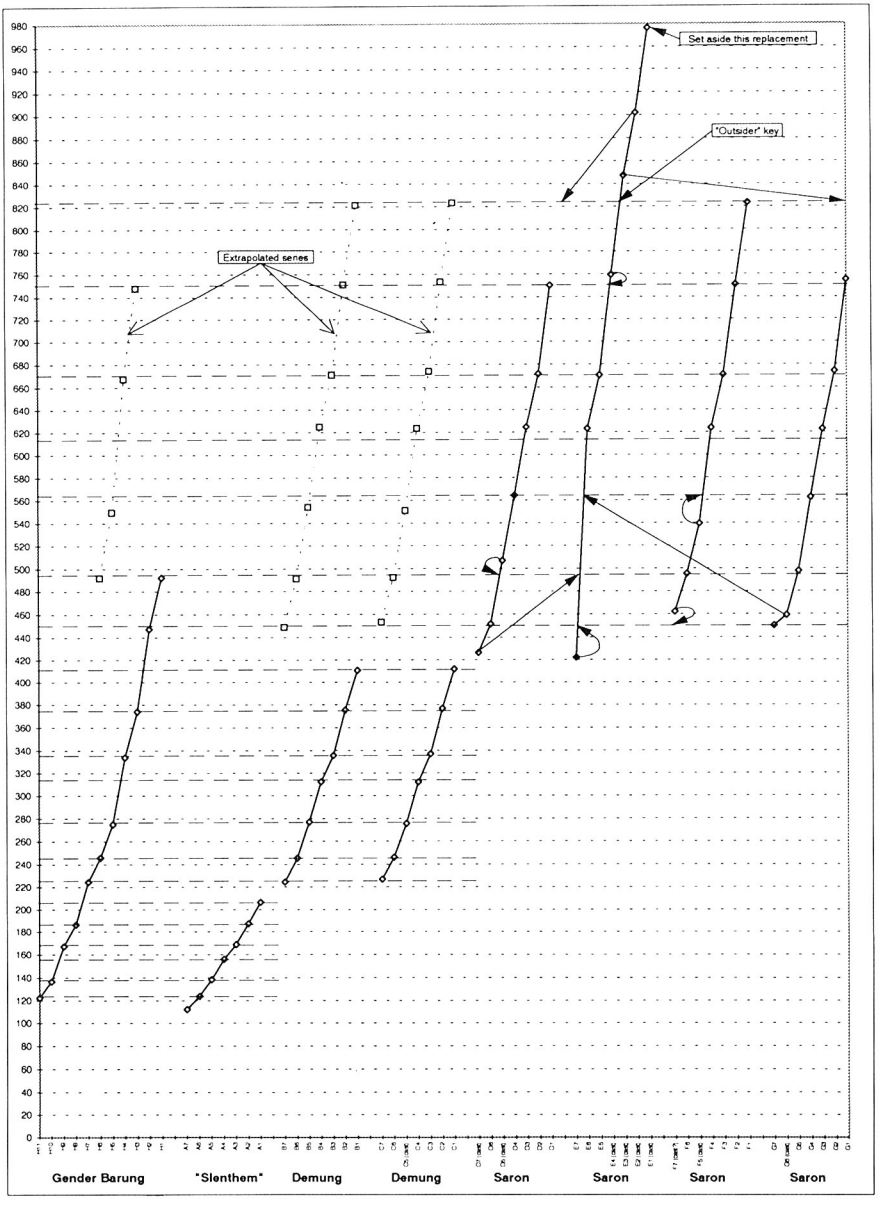


FIGURE 16. Proposed redistribution of saron keys.

included as parts of the gamelan, there are individual supports decorated en suite with the rest of the casework; at Claydon House there is no evidence of such supports. Gamelan ensembles from approximately the same era and the same general region usually do include a bonang; therefore, if any of the original instruments of the Claydon House gamelan are missing, I believe it more likely to have been the bonang that has been lost.[24] However, there is no evidence of the ensemble ever having been more or less complete than it is today. Indeed, Flint's letter seems to indicate that the ensemble was as complete in 1861 as it always had been. Thus, we must assume either that the gamelan comes from a tradition which does not require a more complete instrumentation, that something is missing, or that its instrumentation vis-à-vis the local performance practices was not an issue, because it was commissioned by a Westerner for purposes unknown.

The Seven Saron

Externally, the seven seven-keyed instruments share an identical design. In this regard they reflect common practice represented by most old gamelan surviving in Java (unlike the zoomorphic gamelan at the British Museum and another remarkable one at the Field Museum in Chicago, both of which have individually sculpted instruments). Among the several generally recognized saron forms, i.e., those now associated with Yogyakarta, Surakarta, and the northern coastal areas (the *pasisir*), the Claydon House saron may initially appear to be Yogyanese in form. A review of nineteenth-century archival photographs reveals, however, that in the past these forms were not nearly so easily identified as they are today with specific geographical areas. Thus, it is not safe to attribute these instruments to the Yogyanese orbit.

Interestingly, the dimensions of all the Claydon House saron cases are nearly identical; unlike current practice (or that of earlier eras in the royal court cities) the size of the saron do not visually convey the octave level (fig. 17). Among the three octaves represented, the overall length of the lowest octave instrument is only 80 mm. longer than the highest.

24. See, for example, the zoomorphic gamelan and the Drake miniature gamelan, both at the British Museum, and the photographs of the Sultan's gamelan in Bangkalan, Madura, in Brandt Buys's monumental article "De Toonkunst bij de Madoereezen," which constitutes nearly the entire 377-page eighth volume of the annual *Djawa* (Soerakarta: Java Instituut, 1928). All of these are similar in instrumentation.

Instrument ID	Overall length	Overall height	Width at bass	Width at treble	Keybed length	Keybed height
S.Slenthem A	1350	445	255	255	760	305
S.Demung B	1300	430	215	215	720	295
S.Demung C	1305	430	225	225	730	290
S.Barung D	1270	430	215	215	690	290
S.Barung E	1270	440	210	210	690	295
S.Barung F	1270	430	225	220	690	294
S.Barung G	1270	430	220	220	695	293

FIGURE 17. Claydon House saron case dimensions in millimeters.

It is much more typical to find the length of the lowest instrument measuring about twice that of the highest.[25] (See Appendix B for measurements of the saron keys.)

There are subtle differences in construction which are not apparent until the instruments are carefully examined. Most of the saron appear to be carved from single pieces of teakwood, and the absence of noticeable checking in these massive logs would indicate that the wood was well seasoned and carefully chosen for the commission. (Nowadays, saron are made in three horizontal sections and assembled with screws.) Each instrument has seven individually carved out resonating chambers, which are specifically tuned to the keys resting above them; this is in contrast to current practice of providing one common resonator trough for all seven keys. On the saron slenthem and both saron demung, these cavities are capped by a horizontal board joined into the top surface of the instrument and fitted with variously sized apertures for fine tuning. On the four saron barung the individual cavities are entirely open. The interior vertical walls of the cavities, normally unseen and usually roughed out with coarse adzes, are remarkably smooth. The finish of these walls, which are perpendicular to the grain, indicates that the

25. I know of only one other gamelan comprised of equal-dimensioned massive saron cases; it is from Banjarmasin, a sultanate on the southeastern coast of Kalimantan (formerly Borneo) and is now in the National Museum in Jakarta. It is said that this highly regarded ensemble was already very old when it was removed from Banjarmasin in 1862. It can be heard on the UNESCO recording *Java: Historic Gamelans*, Series Musical Sources: Art Music from South-East Asia IX, no. 2, (Philips 6586 004 [197-]), the slipcover of which includes some photographs.

carvers kept their tools extremely sharp and took great care in every aspect of the instruments' manufacture. This, along with the remarkably consistent measurements, the high quality of decorative and hidden carving, and the massiveness and quality of wood further support the contention that this commission was placed by a patron of the highest rank.

The Gendèr barung

The gendèr might warrant an entire monograph devoted to it alone. The casework and decorative carving are magnificent; the eleven keys are beautifully made and provide evidence of interesting tuning practice; and the resonating tubes were made of very thick-walled bamboo and, perhaps as a consequence, are in perfect condition. Finally, as was noted above, the nature of its tuning is surprising and was commented upon in two early-nineteenth-century articles.

The four turned legs, which raise the base about 500 mm. above the floor, were almost certainly made in England. Like many European table legs, they thread into metal plates which are set into the underside of the base. However unsightly these accretions may be to modern eyes, they at least served to protect from accidental harm the exquisitely carved likeness of the Hindu deity Ganeśa, which sits on the little platform protruding at the center of the instrument's base.

The original frame holding the resonating tubes is significantly taller and appears more Balinese in form than Javanese gendèr made today. The overall height minus the legs is 845 mm., and the height of the resonator tube cavity is 567 mm. A solid, carved front panel runs between the two vertical end pieces in the front, while on the player's side the end pieces are connected at top and bottom by horizontal rails, which also receive vertical rails to form a decorative frame about 100 mm. wide (fig. 18). The resonator tubes contained within can be plainly seen through this frame, and just above them is joined into the frame a most unusual horizontal capping board, which runs the length of the instrument. The underside of this capping board is chiseled out to receive the tops of the resonator tubes, an ingenious means of preventing the tubes from rattling during performance. Affixed on an axle near the top of two of the eleven resonator tubes—for the keys tuned to the tonic pitch, i.e., nada 1—are fascinating "butterfly valves," not unlike those found in carburetors. By partially closing the opening of their tubes, these valves

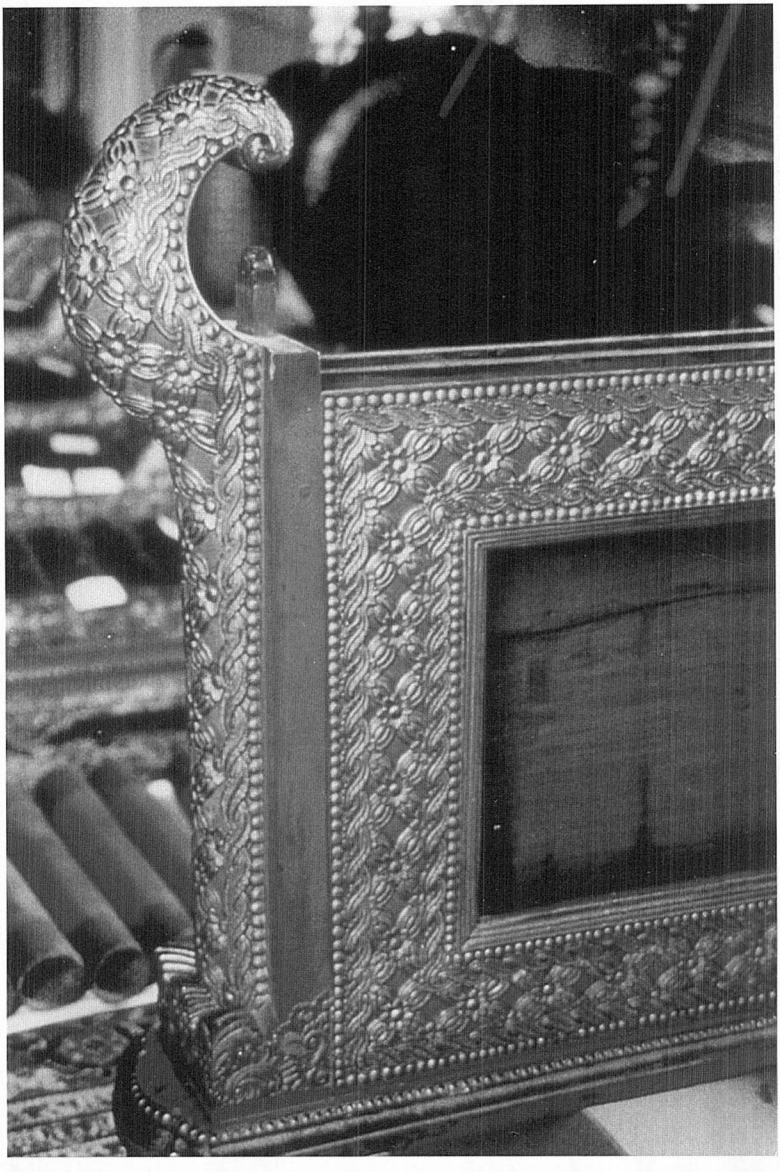


FIGURE 18. The Claydon House gendèr. Detail.

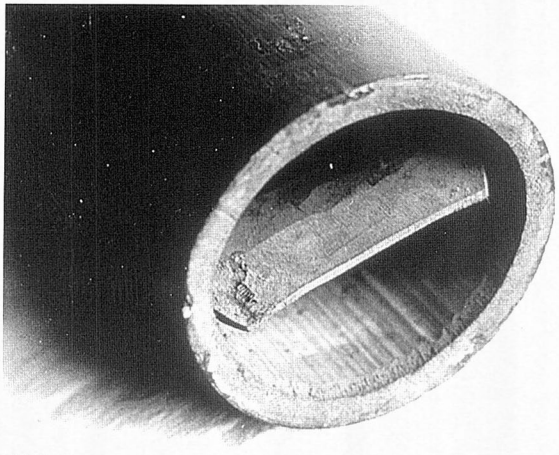


FIGURE 19. The Claydon House gendèr butterfly valve in resonator tube.

alter the resonant pitch of the tubes (fig. 19).[26] Five w-shaped bronze castings (*sangan*) sit in fitted holes atop the capping board and function to support the cord from which the keys are suspended above the tube resonators. These are probably the fixtures that Flint indicated could be fixed by soldering on small pieces of brass. Indeed, several of them still lack the little locating prongs which would fit into the corresponding holes on the top of the wooden capping board.

The eleven bronze keys, all of which are original, were forged and then filed to form the ridges which divide the tops of the keys into three longitudinally concave facets (*blimbingan*). Except for their comparatively large size and the fact that the corners are not at all rounded, they have the appearance of "normal" modern gendèr keys. There is no evidence of the wear patterns typical of old gendèr, either in the middle where the mallets strike them or at the ends where the player's hands dampen their sound (fig. 20). The undersides were thoroughly scraped down except for a prominent central ridge, approximately 10 mm. wide

26. This may point to a forgotten practice associated with the use of *sorogan* keys: a single pélog gendèr can be used in either bem or barang modes by exchanging the *7* keys for the *1* keys (or vice versa). In making this switch, all the other keys remain the same, but since the resonating tubes under the sorogan keys are tuned to one of the pitches, the volume of sound is greatly diminished when the "wrong" key is suspended above it. Since the resonating pitch of a tube can be altered by narrowing its aperture, the "butterfly valves" on the Claydon House gendèr may reflect an extraordinary solution to this problem.

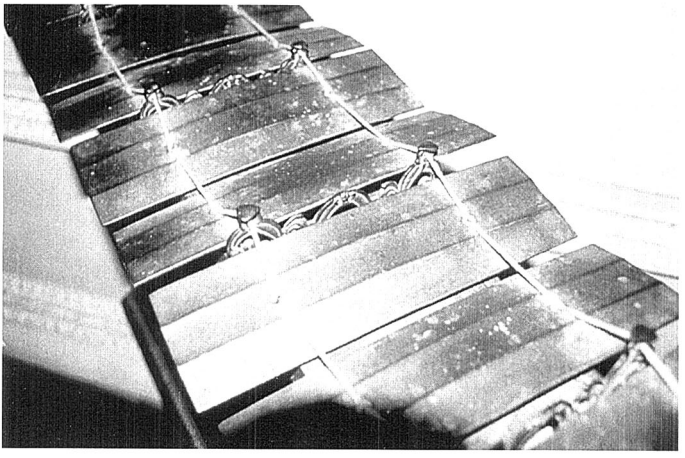


FIGURE 20. The Claydon House gendèr keys, showing suspension cord holders.

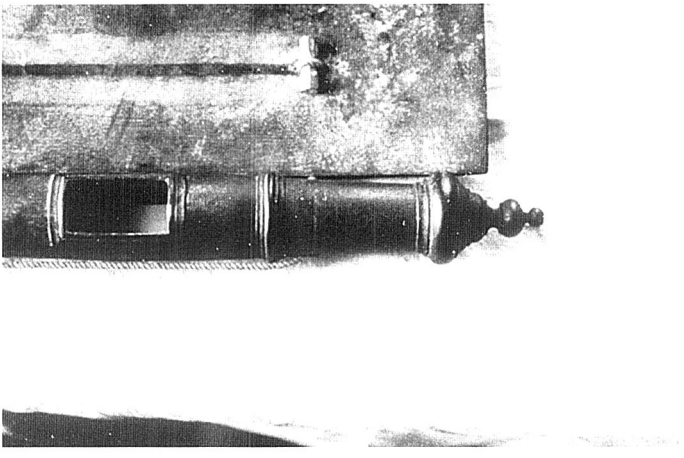


FIGURE 21. The Claydon House gendèr keys, showing the underside and central ridge.

at its base, which runs between the suspension holes (fig. 21). The undersides show evidence of a kind of tool which might be thought of as a "comb-plane," in that it leaves tiny parallel longitudinal furrows the entire length of the key (fig. 22). Other than the gendèr at the British Museum, I have never seen any gamelan keys with this kind of scraping.

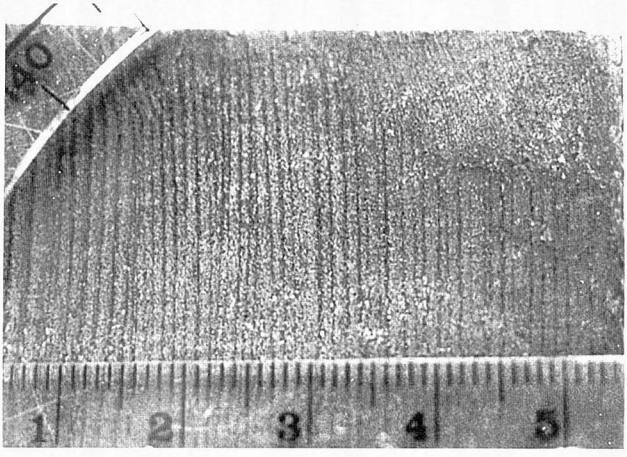


FIGURE 22. The Claydon House gendèr keys, showing the scraping furrows on the undersides.

In my experience the only knobbed instruments showing evidence of this tool are from the 1840 gamelan at the Museum of Fine Arts, Boston; this gamelan may have been made in the northeastern coastal region around the city of Blora. It is possible that the use of this kind of scraping tool was typical of the early-nineteenth century or of the Eastern parts of Java and the island of Madura.

The Gambang kayu

A large and impressive instrument, the size of the gambang accords with the rest of the instruments in the ensemble. Because the case is so tall, the eighteen keys rest 415 mm. above the floor, a distance much higher than modern gambang. Judging from archival photographs, however, one sees that the size of the Claydon House gambang may not be atypical. The keys are made of a dark hardwood and produce a very pleasing sound.[27] As in modern practice, the keys each have only one locating hole to keep them properly aligned on pegs which are driven into the edge of the instrument on the player's side. The large

27. The tuning of the gambang was not considered since wooden keys are not reliable specimens for pitch measurements because of their hygroscopic nature. During humid seasons the pitch tends to be higher than that in drier climatic conditions.

resonating cavity, formed by the joined boards comprising the upper part of the case, is open at the top and shows no evidence of the horizontal capping boards in widespread use today.

In modern performance the gambang, while a significant embellishing instrument, is somewhat eclipsed in importance by the rebab and the gendèr. Because of this, one can forget that the gambang is highly favored by many Javanese traditions outside of Central Java. Indeed, it can be frequently seen in many nineteenth-century photographs in the center of the front row of instruments, with an important-looking man sitting behind it.[28] Thus it may not be surprising that the only inscriptions to be found on any of the Claydon House gamelan instruments were written on the underside of the gambang case (fig. 24). Unfortunately, the Arabic-influenced cursive script (middle left) and the sloppy Javanese calligraphy (upper right) have proven to be undecipherable by several experts.[29]

The Kendhang

Flint called the only drum in the ensemble a kendhang ketipung, but, in comparison to modern examples, it is quite large. Its measurements are: 715 mm., overall length; 324 mm., shell diameter at the large end; 260 mm., shell diameter at the small end. At this size it could be considered a kendhang ciblon, but it is impossible to make such a determination without knowing the shape of the drum's interior. Both heads and the shell are in excellent shape, and there are no longitudinal abrasions between the laces; this indicates that the drum had rarely, if ever, been tensioned for use in performance. The carving, which covers the drum's entire conical surface, is perfectly scaled, and the pattern wraps around the body continuously with no overlapping. The extraordinary execution of the decoration of this drum makes it unique.

The Kenong

There are only two kenong, and their tunings accord to the nada 5 and 6 of the saron demung. Kenong 5 has an overall diameter of 490

28. See, for example, fig. 23, or the photo of the Sultan of Bangkalan's gamelan referred to in note 24, or the photo of the Regent of Kediri in Kunst's *Music in Java* (3d ed., The Hague: Nijhoff, 1974).

29. I am very grateful to Dr. Nancy Florida, Dr. Sumarsam, and I. M. Harjito for attempting to discover the meaning of these inscriptions. Of the two hands at work, the former does not appear to mean anything, while the latter may be a chronogram (*candrasengkala*) and may possibly be interpreted meaningfully at some time in the future.

FIGURE 23. Gamelan belonging to the Regent of Malang, not dated. Courtesy of the Koninklijk Instituut voor Taal-, Land-, en Volkenkunde Archiv, Leiden.

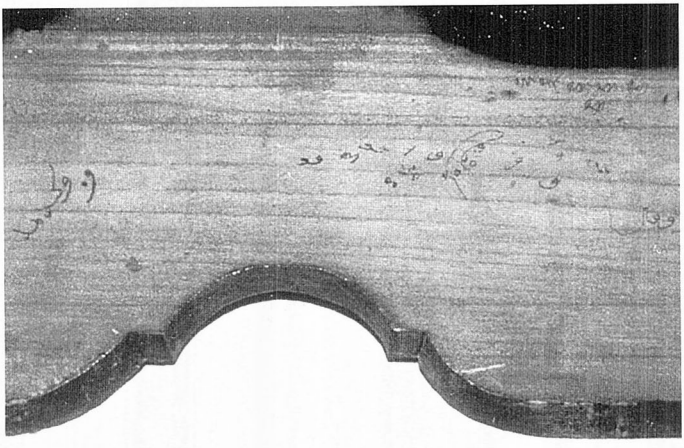


FIGURE 24. The Claydon House gambang inscriptions.

mm. and an overall height of 376 mm., whereas the overall diameter of kenong 6 is 490 mm. and its height is 370 mm. On each, the entire top half—i.e., the central boss, the flat, and sloping collars (the *pencu*, *rai*, and *recep*, respectively)—is filed smooth and shows evidence of the "comb-plane" mentioned above. The lower half (the *bau*) on each kenong is somewhat filed but left heavily dimpled with the hammering marks clearly visible. Similar to the kenong at the British Museum, each has a very prominent ridge indented all around the sidewall about 30 mm. above the bottom edge. Both Claydon House kenong kettles were very well made, but the sound of the higher one is superior to that of the lower one.

The free-standing individual kenong supports are identical. They are four-sided boxes, open to the top and bottom, made of pierce-carved panels, which are tenoned into round cornerposts. There has been considerable alteration to the means by which the suspension ropes are fastened to the top of the box; it is therefore not possible to describe the original disposition with certainty. The most salient features of these two support boxes are the magnificent design and the careful execution of the decoration.

The Gong Ageng

There are two gong ageng, which measure 880 mm. and 840 mm. in diameter. Today they are both disappointing in terms of sound produc-

tion. The larger one produces a loud buzz when struck and appears to have had a crack on its face which was repaired by lost-wax method. For years there also have been two small gongs hanging with the two Javanese gong ageng: one from Burma, the other probably from Japan.

In general, observations about the overall shape and proportionality of knobbed gongs can support an attribution of a particular instrument to a known gong-making tradition or even provide enough evidence to point to a particular workshop. However, the body of comparative research is far too small to allow for any conclusive statement about the origin of the two Claydon House gong ageng.[30] Nevertheless, certain features of these gongs are noteworthy since they distinguish them from most others; in *all* of these important characteristics the Claydon House gongs very closely resemble the two gong ageng of the Raffles gamelan at the British Museum. The latter zoomorphic gamelan may well have come from the island of Madura, just off the northeast coast of Java, near Surabaya.[31] Obviously, if it could be shown that the characteristics of the gongs were quite specific to a single gong-making tradition, one would be inclined to attribute the two Claydon House gong ageng (and kenong) to that tradition. Indeed, there was a thriving gong-making industry in the town of Grĕsik during Raffles's time, and he is known to have had strong connections with both the indigenous Regent and the Dutch Resident, Carel van Naerssen.[32]

Figure 25 is a drawing which compares the profile characterizing the two Claydon House gong ageng on the left, to that of modern Javanese gong ageng on the right. The most immediately apparent difference

30. This area of research is still in its infancy. To my knowledge, characteristics of only three generalized types of gongs are currently identified by Javanese academics and organologists. These types, *Bondhan, Siyem,* and *Gunapawiran* (oldest to most modern, respectively), are distinguished by the angle and depth of the sidewall and the relative diameters of various parts of the gong. A detailed discussion of gong morphology in Java has yet to be written and is well beyond the scope of the present article.

31. This likely provenance was first put forward by the late Jeune Scott-Kemball in her unpublished manuscript "The Raffles Gamelan," now in the files of the British Museum. I am deeply indebted to Dr. Brian Durrans, Deputy Keeper of the Department of Ethnography, for allowing me to study Scott-Kemball's work and the instruments themselves.

32. See F. De Haan, "Personalia der Periode van het Engelsch Bestuur over Java 1811–1816" in *Bijdragen Tot de Taal-, Land-, en Volkenkunde* 92 (1935): 477–681, esp. 619; and Bendara Pangeran Arya Panular, *The British in Java, 1811–1816: A Javanese Account,* ed. Peter Carey (Oxford and New York: Oxford University Press, 1992), 421, n. 111. I am grateful that Amrit T. Gomperts pointed out the significance of this connection to Carey, who included the correction to the record in the footnote cited above.

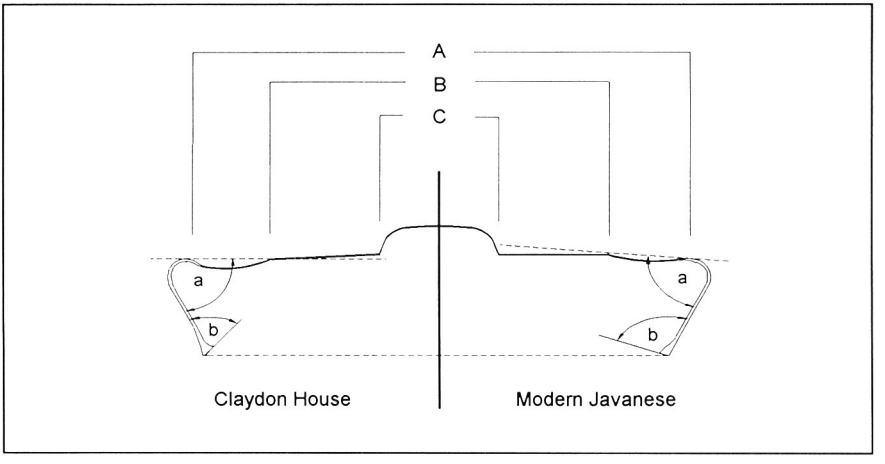


FIGURE 25. Gong profile comparison.

Gong identifier	pencu/diameter	pencu/rai
Claydon House 880 mm. gong	21%	28%
British Museum 880 mm. gong	21%	29%
Claydon House 840 mm. gong	23%	32%
British Museum 870 mm. gong	23%	31%

FIGURE 26. Ratios of gong diameters.

lies in the prominence and height of the shoulder *A* (or *dudu*) and the resulting depth of the adjacent wide trough between *A* and *B* (or *recep*). Also significant is the angle *a* formed by the plane between *A* and *B* and the sidewall (or *bau*). Corollary to this is the equal height of points *A* and *B* when compared to the mouth of the gong; it is modern practice to make point *B* slightly higher than point *A*. The large central flat lying between points *B* and *C* (or *rai*) slopes upward slightly, compared to the modern style, in which this plane is generally parallel to the mouth. Also differing from modern construction is the line of very prominent hammer blows near the bottom of the sidewall; these have caused the lip of the gong to be prominently flared outward. Furthermore, the thickness of the edge (*lambé*) and the acute angle *b* it forms with the sidewall (*bau*) are quite different from the treatment of this area today. The ratio

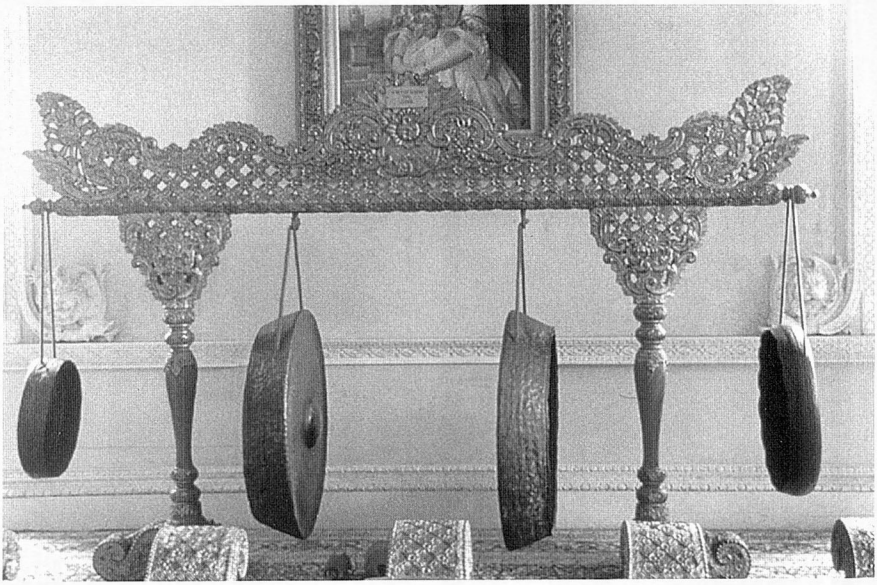


FIGURE 27. The Claydon House gongstand. Photo courtesy of Tony Bingham.

between the overall diameter and the *pencu* (boss, or knob) (*C*), and that between the diameter of the rai (*B*) and the pencu for both the Claydon House gongs are also almost exactly in accord with the British Museum gongs (fig. 26). Finally, the surfaces of all four of the gongs were finished to the same degree. Contrary to current general practice, where only the pencu is scraped and polished, or that for very special gongs, where the entire outside surface is scraped and polished, the four Raffles gongs are scraped and polished only on the face; in each case the sidewall is left only partially filed, and large hammer marks are clearly visible.

The gongstand is usually the visual focal point of any gamelan. As such, a gongstand is lavishly decorated with motifs applied to the other instruments, as well as additional special motifs appropriate only to the gongstand. In this regard the Claydon House gongstand is no exception (fig. 27). It is a truly masterful blending of the motifs used throughout in the decoration of the gamelan. The carving above the crossbar is enclosed by a line of undulating *C* scrolls, which contain the flower-petal gridwork pattern characteristic of the whole ensemble. The gridwork supports this line and also seems to wrap around the circumference of

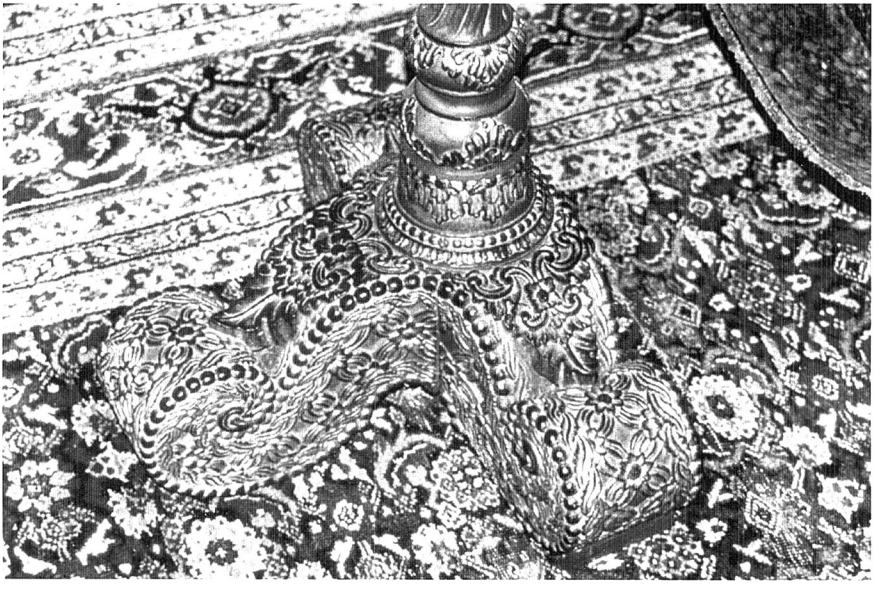


FIGURE 28. The Claydon House gongstand foot detail. Photo courtesy of Tony Bingham.

the crossbar itself. At the top of the legs, the capitals continue the gridwork as they taper to the elegantly carved spiral balusters. These balusters are themselves bordered by rings of the repetitive beading pattern. Figure 28 shows a detail of one of the feet at the base of these columns.[33]

The gongstand most similar to the one at Claydon House is one which belonged to the Regent of Malang, an important city in the center of East Java (fig. 23). The most striking similarities to the Claydon House gongstand are the undulating *C* scrolls and the continuation of the floral work around the crossbar itself and into the capitals of the upright columns. Also of interest is the fully sculpted termination of a saron case, visible just behind the gambang, in front of the gongstand's foot.

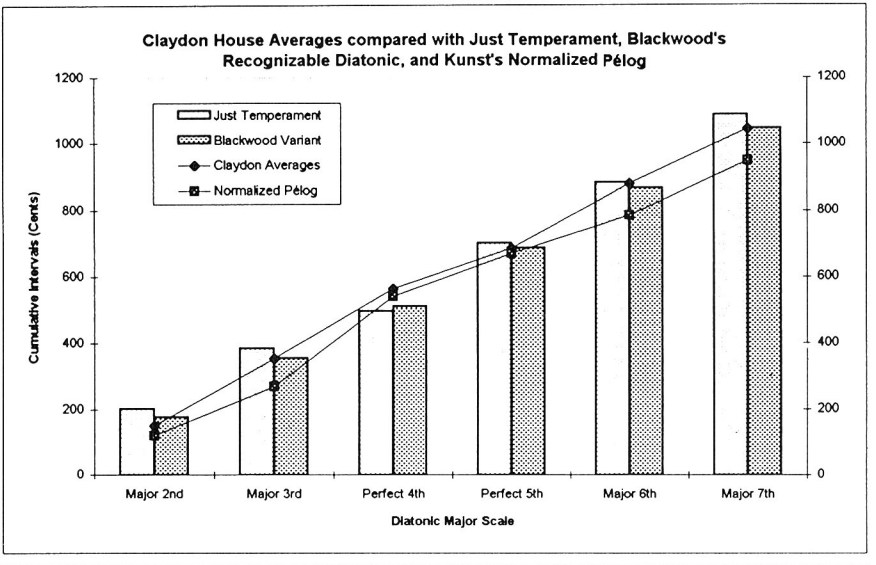
33. At the Tropenmuseum in Amsterdam there is a gongstand, inventory no. 450–2 (fig. 9), which has carved spiral balusters and repetitive beadwork virtually identical to those of the Claydon House gongstand. The crossbar itself is composed of two intertwining Naga (mythical water snake kings), upon which a web-footed bird is perched—both iconographical elements not uncommon in Madurese gamelan decoration. According to the Tropenmuseum's records, the gongstand was a gift of Prof. Dr. Jan Veth in 1928 and is said to derive from Central Java. I am grateful to Ms. J. Boers and Mrs. E. Den Otter for supplying this information.

Summary

Judging from the instrumentation and the massive size of its instruments, I believe that the Claydon House gamelan is reminiscent of Majapahit, the ancient kingdom which was centered in East Java. It also appears likely that the two gong ageng and the two kenong of the Claydon House gamelan may have come from the northeastern coastal area, somewhere between Rembang and Surabaya—very possibly from the gong-making tradition centered in Grĕsik. The carved wooden cases could have been made in this region as well; however, because of the use of some specific stylistic motifs and the extraordinary execution of the carving, an attribution to the more central coastal area around Jepara, now famous for its exquisite woodcarving tradition, may also be justified. Even though a number of the Claydon House gamelan saron keys are missing, the surviving ones and the extraordinary gendèr keys appear very dissimilar in proportion and quality of manufacture to those of the Raffles gamelan at the British Museum. In fact, the Claydon House keys appear quite similar to those found in the central coastal regions of Java; for these reasons it is probable that they were manufactured by artisans adhering to a different tradition, perhaps that of Semarang or possibly even one of the royal court cities in Central Java. The separate manufacture of components is not uncommon today, and it seems entirely plausible that an important commission, such as the one for the Lieutenant-Governor, would have warranted the employment of the very best specialists in their respective fields, no matter where they may have lived.

The Claydon House gamelan, a grand and expensive ensemble, presents remarkable evidence of a keen interest in Javanese music on the part of an important European. Its diatonic tuning gives us an insight into Raffles's own appreciation of Javanese music—albeit somewhat altered to suit his taste—and serendipitously has the potential of shedding some light on British pitch level, or some facsimile thereof, at the beginning of the nineteenth century. It is my hope that this newly discovered information will help the Claydon House gamelan to be better appreciated as a benchmark attesting to the refined state of Javanese decorative and musical arts about 1815. Further, I would urge others to reexamine gamelan instruments in their possession in order that a larger body of comparative information can be developed for future research.

Appendix A



Diatonic Interval	Just Temperament[1] (Cents)	Blackwood Variant[2] (Fifth = 689 Cents)	Claydon Averages[3] (Cents)	Normalized Pélog[4] (Cents)	Laras Interval
	Cumulative Interval Size in Cents				
Major 2nd	204	179	151	120	1-2
Major 3rd	386	357	354	270	1-3
Perfect 4th	498	511	564	540	1-4
Perfect 5th	702	689	686	670	1-5
Major 6th	884	868	881	785	1-6
Major 7th	1088	1046	1044	950	1-7

[1] 5-Limit Just Temperament (theoretically ideal Western intonation)
[2] A recognizably diatonic tone row based on the smallest possible perfect fifth (see Blackwood, *The Structure of Recognizable Diatonic Tunings* (Princeton: Princeton University Press, 1985), 199.
[3] Tuning averages from Gendèr barung, Saron slénthem A, Sarons demung B and C, and Saron barung D
[4] See Jaap Kunst, *Music in Java* (3rd ed. The Hague: Nijhoff, 1974), 14.

Appendix B

Claydon House Saron Key Dimensions

Key	Length mm.	Width mm.	Thick mm.	Weight gr.
A7 (ex-A1)	365	98	6.3	1400
A6 (ex-A2)	362	95	6.3	1480
A5 (ex-A3)	358	94	6.3	1590
A4 (ex-A4)	358	98	6.3	1820
A3 (ex-A5)	353	96	7.6	1790
A2 (ex-A6)	348	97	7.5	1780
A1 (ex-A7)	344	92	9.0	1820
B7	320	93	7.6	1630
B6	319	93	9.7	1650
B5	316	92	11.5	1620
B4	316	92	8.7	1670
B3	311	92	8.7	1640
B2	312	90	9.7	1840
B1	306	86	12.6	1780
C7	321	93	7.9	1570
C6	322	92	12.2	1530
C5	319	91	9.9	1480
C4	315	92	7.1	1730
C3	313	92	9.4	1620
C2	310	90	10.7	1730
C1	305	88	10.9	1960
D7 (cast)	309	90	10.2	1640
D6	312	91	14.0	1790
D5 (cast)	309	90	13.3	1760
D4	304	90	13.9	1780
D3	304	87	15.2	2050
D2	297	86	16.4	1950
D1	295	84	18.3	2160
E? "outsider"	294	84		2435
E7	300	89	14.7	2000
E6	301	86	18.2	2420
E5	295	85	18.7	2150
E4 (cast)	291	84	19.6	1970
E3 (cast)	292	83	19.0	2140
E2 (cast)	289	82	20.4	2080
E1 (cast)	280	82	20.8	2250
F7 (cast?)	327	89	13.7	1850
F6	314	90	13.2	1830
F5 (cast)	310	88	16.7	1690
F4	304	84	12.7	1830
F3	303	85	17.2	2350
F2	302	84	19.9	2320
F1	299	82	17.2	2310
G7	315	92	13.3	1860
G6 (cast)	302	88	12.4	1580
G5	312	89	11.4	1910
G4	304	84	12.2	1780
G3	304	86	16.2	2020
G2	302	82	14.6	1970
G1	295	79	15.8	2050