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Gaining Insight into Cultural Geography through the Study of Musical Instruments

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Geographic literacy enables students to comprehend the delicate balance between the human and physical elements that bind people to this planet. Knowledge of geography is a key component in understanding—and acting effectively in—our increasingly interconnected world. Yet, American youth struggle with basic geographic facts. Confronted with an unlabeled world map, 58 percent of 18 to 24-year-olds living in the United States cannot locate Japan; 65 percent cannot find France; 29 percent cannot locate the Pacific Ocean (Roper, 2006).

Complaints about the lack of geographic literacy among American students are not new. Lucy Sprague Mitchell (1991) described the children of the 1930's as living in a world of disconnected "end products." This "disconnect" has become more apparent in our own era, when students routinely arrive at school wearing clothes stitched by workers who live in countries the students cannot find on a map. This level of ignorance takes on a special poignancy at the present time: young Americans have been fighting in Iraq since 2003, yet only 37% of their peers in the U.S. can even find Iraq on a map (Roper, 2006).

In an era when high-stakes testing has fixed the media spotlight on student achievement in language arts and math, finding time to teach geography takes ingenuity. This article describes an inquiry approach to teaching cultural geography that integrates literacy instruction with research into world music. The case study presented in this article focuses on an expanded sixth grade world history curriculum that uses inquiry methods, active participation in music activities, oral discussions, and written reflections, to explore three of the main concepts – environment, identity, and movement -- outlined in the National Geography Standards, *Geography for Life* (Boehm and Bednarz, 1994).

Taking a student-centered, inquiry-based approach to social studies provided the opportunity to incorporate multiple and varied voices into the curriculum. Student generated questions were used to guide the investigation. This allowed social studies knowledge to be constructed through student research, enabling students to form their own interpretations of evidence and submit them for review (Scheurman, 1998). Through this experience, students learned to view issues from different angles and to identify multiple perspectives.

Conceptual Framework

To understand the spirit and inner life of a people--the joys, values, and drives that caused it to find life tolerable and meaningful--one must examine its art, literature, philosophy, dances and music. (Fleming, 1970)

Instrumental music is the most abstract form of artistic expression found in traditional cultures; it is not constrained by the semantic necessities of poetry, song, and literature. Nor is it restricted by the practical requirements of architecture, design, or cuisine. Even the preference for tangible representation that is prevalent in traditional visual arts is absent in instrumental music. Still, instrumental music is deeply affected by two influences: the environment in which it develops and the collective imagination of the culture that develops it. For this reason, instrumental music can be considered one of the most direct forms of cultural expression.

The hypothesis underlying this study is that organology, or the study of musical instruments, can provide insight into how a culture sees itself, presents itself, and locates itself in relation to the physical environment and to other cultures, both current and historical. Currently, organology tends to be restricted to the realms of musicology and ethnomusicology. Systems of instrument classification are helpful in early music and world music courses, as they give

students a way of making sense of the vast array of unfamiliar and foreign instruments they encounter. As a basis for inquiry within the K-12 social studies curriculum, however, organology would have a different focus. In this context, the study of musical instruments would function as a means of helping students engage in hands-on exploration of a culture, through thoughtfully exploring the characteristics of varied instruments.

Mode of Inquiry

The case study described below was carried out in a sixth grade class, which was observed during weekly organology workshops throughout the Fall term (September through December). Student work was collected and analyzed. The teacher was interviewed on multiple occasions. The research project in which the students were engaged used strategies suggested by the National Geography Standards (Boehm & Bednarz, 1994), including a five-part process in which students:

1. Asked a geographic question.
2. Acquired geographic resources.
3. Explored geographic data.
4. Analyzed geographic information.
5. Acted upon geographic knowledge.

Asking a geographic question: The process of learning began with the collection and preparation phase. This phase allowed students to explore various cultures and choose one on which to focus. The students wrote and presented a brief report on their chosen culture, detailing what they had learned and also answering the following three questions: What do you think this culture values most? What aspects of its history and belief systems are most important to the people in this culture? What do you think people in this culture may want *you* to know about them? What question(s) would you like to ask about this culture?

Acquiring geographic resources: During this phase, after identifying and selecting countries—and specific cultures within those countries—to investigate, students collected geographic, economic, and sociological information on the culture they had chosen. This information included local environmental conditions, economic bases, technologies, language(s) spoken, and religious beliefs, together with a basic outline of the culture's history. These reports were saved and compared with the students' final reports in order to show the development of students' cultural understanding during this project. Next, they gathered information on their chosen culture's music, especially: What types of musical instruments do they use?

Exploring geographic data: Before continuing to the analysis phase, students learned to apply the Hornbostle-Sachsⁱ system of instrument categorization. Students learned the five main categories of instruments: idiophone, membranophone, aerophone, chordophone, and electrophone.ⁱⁱ They then proceeded to categorize every instrument they were already familiar with, according to this system, to produce a wall chart to hang in the classroom. Next, they categorized the instruments that they had identified as associated with their chosen culture.

Analyzing geographic information: Students now listed, in as much detail as possible, the materials and technologies used in making these instruments. They also identified the sources of these materials and technologies. This allowed them to relate the instrument's design to its

environment, both natural and social. The social environment category was then organized into three basic categories by the social/cultural function of the music: sacred/ceremonial, social, or practical, (Some cultures also featured a separate commercial category.)

Acting upon geographic knowledge: After the categorization was done, students began the connections phase. In this phase, students identified those materials and technologies used in the making of the instruments that might be culturally significant. They looked for anomalies and tried to find historical or environmental explanations for idiosyncratic aspects of the musical culture. Finally, they suggested actions that might be taken to address specific cultural and environmental challenges that they had identified.

Evidence Gathered

In addition to the evidence provided by researchers' field notes, students prepared a report and presentation on their chosen culture, which focused on the cultural connections they had uncovered and their hypotheses as to their meaning. By comparing the students' initial reports with their final reports, it was possible to measure the growth of students' understanding of the perspective of the culture they had chosen to study. The case study below provides a close-up look at what this approach might look like in the classroom.

Case Study: Musical Instruments as Key to Cultural Exploration

The focus of the case study described below is a writing class made up of a group of 23 students at the Museum School, a public charter school in San Diego whose curriculum focuses on experiential and project-based learning. This group of fourth, fifth, and sixth graders meets for one hour daily. The class regularly conducts student-driven projects. This researcher worked with the students two or three times weekly over a period of two months. The inquiry process went through the phases described above.

Background: *Gamelan* at the Museum School

The unique music program at the Museum School began in 2000, when the Center for World Music in San Diego sent musicians into local schools to bring world music to elementary school children. The world music program quickly took root at the Museum School, where study of the performing arts was foundational to the curriculum. In choosing to make world music an ongoing part of the curriculum, the Museum School staff faced an additional choice: Would children be encouraged to explore in depth a single world music tradition or to sample multiple traditions on a more superficial level? A decision was made (partly due to the availability of expert instructors and instruments) to encourage ongoing involvement with Balinese music.

Study of Balinese music complements the overall music curriculum, which features intensive study of solfège, recorder, guitar, choral music, and staff notation. Children in the upper grades also study computer music, instrument building, and music history. The world music program was designed to encourage children to achieve bi-musicality, which parallels bilingualism. Today, the Museum School has a flourishing Balinese *gamelan* ensemble, taught by local and visiting artists. Museum school students each take a one-hour *gamelan* class weekly as part of their music curriculum. Students who are interested may join the after school *gamelan* program. These students receive an additional two-and-a-half to five hours of instruction in *gamelan* and dance by participating in Giri Nata, the school's own Balinese music and dance ensemble.

The Indonesian word *gamelan* comes from the verb *gamel*, meaning “to hit.” With the “*an*” suffix, it literally means “percussion.” But, just as there is no single instrument called “orchestra,” there is no instrument called “*gamelan*”—even though all of the instruments together form *gamelan*. The *gamelan* instruments used at the school, known as Balinese *gamelan gong angklung*, feature only four pitches per instrument. This facilitates study for even young children.

Because of this unusual circumstance—the Museum School being home to one of the few Balinese performing groups for children in the United States—Bali seemed the natural focus for the organology inquiry project at this school. Each of the students in the organology workshop had from 1 to 9 trimesters of experience in learning to play Balinese *gamelan gong angklung*. As will be seen, this experience informed other aspects of their learning. The goal of the researcher was to connect the experiential and implicit knowledge students had gained through their musical studies with their current geographic and cultural studies.



Figure 1: *gamelan* class at the Museum School.

Inquiry I: Exploring Music

The project began with inquiries into different musical traditions. Students were assigned to seek out forms of music they found interesting and explain why they had selected them. The students, who were from diverse backgrounds, selected a wide range of music, from Ethiopian folk music to *norteno*. Most students selected music that was familiar to them. Many referred to the Balinese *gamelan*, since it was part of their music curriculum. The researcher therefore took their spontaneous discussions of Balinese *gamelan* as a starting point for the project.

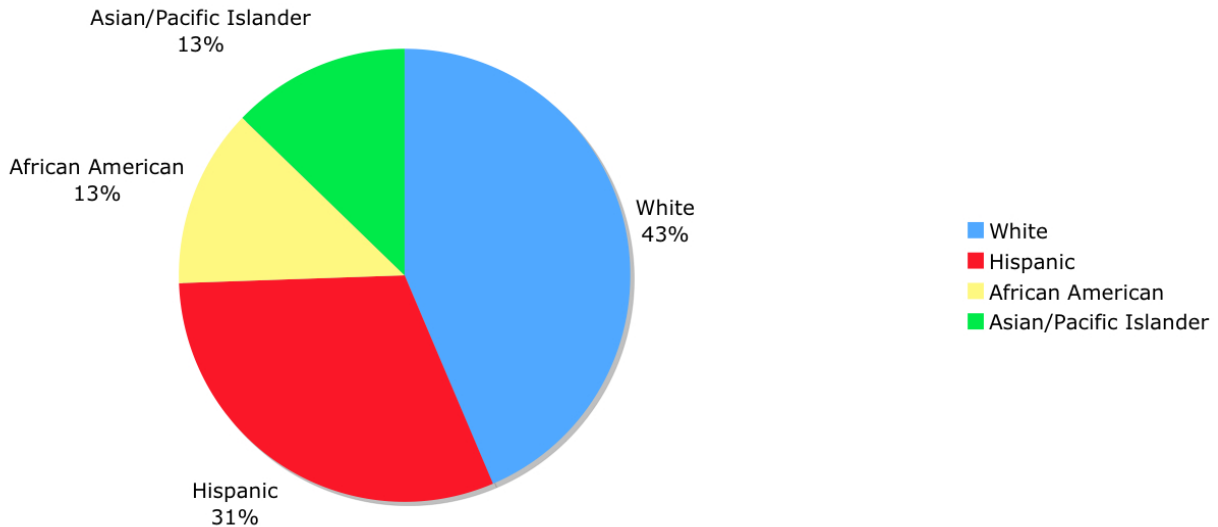


Figure 2: Student diversity at the Museum School.

First, students gathered information on Balinese music from their own music classes, via the Internet, and through materials provided by the researcher. The latter consisted of pictures, videos, and actual sample instruments. The students identified several important types of ensemble, including *gamelan gong kebyar*, *gamelan gong angklung*, *gamelan semar pagulingan*, and *joged*.ⁱⁱⁱ Then they were asked to list all of the instruments in each ensemble, explain how they were used, describe what they were made of, and, when possible, explain how they were made.

Second, the students were asked to describe the music. How was it arranged? Were there multiple parts, or just one? Did people play in groups or alone? If the former, how were the groups organized? What did the music sound like? Having played this music, many of the students were able to give very specific and insightful answers. For example, one student explained the organization of the *gamelan* ensemble, as the Balinese themselves do, through the metaphor of a tree in which the *pokok*, or “trunk,” is at the center, below are the roots, and above are the *cengkok*, or flowers. Each of these parts is played by a different type, or, actually, group, of instruments.^{iv} Another student pointed out that the entire ensemble is directed by the drummer. Since most—but not all—of the cues given by the leader are aural, it is of utmost importance that *gamelan* players focus on listening rather than watching (as do members of western orchestras, maintaining at least a peripheral view of the conductor at all times).

Inquiry II: Exploring *through* Music

The second inquiry phase involved the exploration of environmental and social contexts through the careful study of musical instruments. The first topic was geography. Students in a group discussion setting were asked what could be learned about Bali, its landscape, climate, and environment, from the musical instruments created by its people.

The students’ answers were varied and insightful. They initially focused on the ornate carvings that adorn most Balinese instruments. “You can tell that Bali is a beautiful place, because the instruments are carved with beautiful plants and flowers,” observed one student. “Bali must be warm and tropical, because the plants that you see on the instruments could only grow in the tropics,” observed another. The carvings to which they referred featured complex

floral patterns, as well as occasional animals, both mythical and common. Students argued that Bali must be in the tropics, because the flora and fauna featured on the instruments reminded them of jungle scenes. Further, the students suggested that Bali must be warm, because of the “warm colors” used to paint the instruments.



Figure 3: Carving on an instrument featuring floral patterns, a mythical animal, and warm, bright colors.

The researcher responded by pointing out, that although these observations were insightful, the students were overlooking an important possibility. Perhaps, suggested the researcher, the Balinese inhabited a frigid, treeless island, and, because of the harshness and cold of their environment, they idolized the tropics as a sort of mythical paradise. “How can we know whether this is the case?” queried the researcher.

In response, the students shifted their attention to the materials from which the instruments were made. They pointed out, that as their research in phase one had demonstrated, the Balinese instruments were all basically made from jackfruit wood, bamboo, and bronze. Although it would be possible to obtain bronze almost anywhere, jackfruit wood and bamboo were only available in the tropics. In this way, the students were able to provide strong evidence that the instruments came from a tropical place.

The second part of this inquiry examined how the environment might have shaped the music itself. A student suggested that the Balinese environment is probably full of the sounds of birds, monkeys, and insects, all producing near-constant noises. They were well aware, through practice in class, that Balinese music is quite loud and can carry a long way. From these observations, they deduced that the reason the music is so loud is that the Balinese environment

is rich in sound. At this point, the researcher again challenged the students, hypothesizing that the Balinese environment might be particularly quiet, with no loud animals or insects. Therefore, the Balinese felt as though they needed to fill this “empty space” with musical sounds.



Figure 4: Museum School students practice *kecak*.

The students responded that some *gamelan* music is really meant to sound like particular animals. So the Balinese must have heard them. They cited *kecak* or “monkey chant” as an example. In the *kecak*, people gathered into a large chorus to imitate the sounds of monkeys, sometimes in an abstract way and sometimes more explicitly. It would be difficult for a people unfamiliar with such animals to be able to reproduce their sounds so well.

Having come to these conclusions, the class used Google Earth to explore Bali together. They noted the shape of the island, observed the volcanoes that formed the island and the rivers that carved steep valleys running down the slopes of these volcanoes. Zooming in closer, the students saw villages, and in the mountainous area around the village of Bangli, they noticed fields of terraced rice paddies. The researcher also showed the students slides of Bali, taken by the researcher on his many visits. From this, they could confirm their hypothesis that Bali was tropical, warm, and beautiful.

The students also listened to recordings of ambient sound collected in Bali. It is said among Balinese that their music in part originated from the “orchestras” of creatures - crickets, cicadas, and frogs that chirp in the rice paddies at night. Through this constructivist, inquiry-based approach, the exploration of Bali’s geography became, rather than a colorful slideshow, a meaningful confirmation of the students’ ideas, engaging them deeply.

Inquiry III: Exploring Culture *through* Music

Having identified basic aspects of the Balinese environment, the class continued their inquiry by exploring Balinese culture. The initial questions in this new phase were related to values. The students were asked to determine--again based solely upon Balinese instruments, their craftsmanship, and their appearance--what they felt was important to the Balinese people. For this, the class focused specifically on *gamelan gong angklung*, the type of *gamelan* the students study in music class. Again, the students started with the ornate carvings, suggesting that “art” was important to the Balinese people, since carving even one such instrument must be quite difficult. The class also generally agreed that, based on the uniform appearance of the

instruments, the Balinese must value “working together in a large group” and “looking the same.”



Figure 5: Colotomic gongs arranged from large to small exemplify the uniform appearance of *gamelan* instruments.

The students were then asked to determine what values might be important in Balinese society based solely on the music and the way that it is played. Students answered that Balinese must value “teamwork,” as evidenced most strongly by *kotékan*, or interlocking parts, a staple of Balinese musical arts. A *kotékan* is a composite melody that is achieved when two players play complementary interlocking parts. Balinese *gamelan* music usually features a slow-moving structural melody called *pokok* or “tree trunk.” Above this structural layer (which moves not unlike the figured bass in Baroque music) is the elaborative figuration known as *kotékan*. It is this figuration that comes into being only through the combined effect of the interlocking parts that form the *kotékan*. Balinese have arguably refined this technique more than any other culture worldwide.

Transcribed excerpt from
 Capung Gantung
 “The Hovering Dragonfly”

♩ = 120 Traditional. Transcription: A. Khalil

Composite (Sangsi & Polos combined)

Sangsi

Polos

Pokok

Composite (Sangsi & Polos combined)

Sangsi

Polos

Pokok

Figure 6: Transcription of a small segment of the traditional piece *capung gantung*. This demonstrates the typical structure of Balinese *gamelan* music. Above the *pokok*, or structural melody, the *polos* (lit. straight) and *sangsi* (lit. crooked) parts interlock so as to produce the composite melody represented in the top line. It should be noted that no one actually plays the top line in its entirety. Rather, it is only apparent when both *polos* and *sangsi* interlock.

Taking up this point about teamwork, the researcher asked the students whether, in their experience, *gamelan* has soloists, as in rock music. They replied that it did not. He then asked them whether it featured conductors, as in Western classical music. They replied that it did not,

pointing out that ensembles are led by aural cues from a drummer, who in turn is often interacting with a dancer or a group of dancers.



Figure 7: Two students play interlocking *kotek* on the *reyong*.

Probing further, the researcher asked: “In rock music, when a guitarist does a solo, or in rap, when a rapper raps, what are they doing?” The students replied that they are “showing off.” “What are they showing off?” the researcher queried. Students replied that they are showing off their “skill.” The researcher probed further: “If this is the case, then what skill are Balinese people ‘showing off’ when they play *gamelan*? There is no one in front of the group playing a special part, or singing, or rapping. What is happening?” The students again concluded that the only thing Balinese *gamelan* ensembles could possibly be “showing off” when playing is “teamwork.”

Then the researcher introduced them to the Balinese concept of *gotong royong*, which roughly translates as “synergy through cooperation.” Having experienced this first hand as *gamelan* players, the students readily absorbed this idea, understanding that *gotong royong* referred to the feeling one has when the entire group is playing well.

Inquiry IV: Environmental connections

The class, thus far, had had little difficulty in connecting the musical instruments to the natural environment and the music to a society that valued teamwork and cooperation. The penultimate stage in this investigation was to gain an understanding of what it was, either within

the society or their environment, which caused the Balinese to focus on teamwork as possibly the most important feature of their music.

The researcher suggested that the class begin by exploring what kind of work most Balinese traditionally did. It was quickly discovered that they worked primarily as rice farmers. Guided by the researcher, the students learned how rice is farmed. Then they looked at the way the Balinese farm rice in particular. Balinese rice farmers, they learned, build extremely sophisticated irrigation systems that divert water from fast-moving streams into steep hillside terraces, then eventually onto more level ground. This system is in constant need of maintenance. Because aqueducts supply and transect each family's land, they must be maintained and regulated through carefully coordinated group effort.

When an entire village was not able to mobilize in a swift and highly organized way, some paddies would quickly flood, while others would receive no water. Villages are organized around the *banjar*, which is both a sort of democratic governing body and a place at the center of the village where people gather. It is at this place that most *gamelan* are kept and played. After this exploration, it was not difficult for the students to deduce that, since Balinese depended on their ability to work together, it would make sense for them to value this ability in their music as well.

Connections: Comparative Exploration

The final stage in this process of exploration focused on making connections. In this case, two possible types of connection were available to the class. First, the students could continue with an exploration of organology and musical technology, which would eventually lead them away from Bali. For example, traditional Balinese musical notation is called *haruf*. This word, meaning "letter" in Arabic, would have suggested a possible connection to the Middle East. Or perhaps the art of *wayang kulit*, or shadow puppetry, would connect Balinese culture to that of China or India. Instead of this type of connection, however, the class opted to pursue a second kind of connection, one that involved making connections (through comparison and contrast) with more familiar musical cultures.

Therefore, the students' final assignment was to compare and contrast what they had learned about Bali's environment and culture with what they knew of the environment and culture that had shaped the musical tradition of their choice (in many cases, the music they had first chosen to write about). At this point, the class, which had hitherto been focused on a common exploration, headed in 23 different directions. The students' independent findings pointed towards significant growth in their understanding of Bali, its music and culture. A student who compared Balinese music to mariachi suggested that the two musical traditions were quite similar, as both are usually played at community events. A student who contrasted Balinese *gamelan* and rap deduced that rap was an "individual" art form, whereas Balinese was "communal." Another student wrote about how jazz reflected the sounds of city life in the same way that Balinese music reflected natural sounds.

These comparative studies demonstrated that students had not only amassed a large number of facts about Balinese geography, culture, and music, but had gained a fluency and familiarity with them that allowed creative application of this knowledge to new cultures.

Discussion

Through this research project, students came to understand the relationship between physical and cultural geography in a nuanced way. As an example, students found that cultures in hot and

humid environments generally produce drums that have thick skins and some form of tuning apparatus; this is because the humidity tends to constantly loosen the drum skins. (Examining Balinese drums confirmed the students' hypothesis.) In contrast, cultures in arid climates often developed frame drums on which the skin was permanently affixed. (The dryness of the air tended to keep the skins tight.) Having discovered this, students who were studying Sumatran music were surprised by the *rebana*, a frame drum that is commonly used by various cultures in Sumatra. They wondered: Why did these instruments feature a design that is not consistent with local environmental factors?

To understand this finding, the students had to tackle another question: Where did these drums come from? Under the guidance of the teacher, students re-examined the history of Sumatran culture, looking for connections with other cultures or places. Eventually, the existence of the *rebana* in Sumatra was explained by the 14th century arrival in Sumatra of the Arabs who brought Islam to the island. The continuing use of this instrument in Sumatran Muslim communities indicated the significance of this connection.

Educational Importance of the Study

As Elliot Eisner (2004) has pointed out, the word "culture" has two meanings. In the anthropological sense, a culture is a shared way of life. In the biological sense, a culture is a medium for growing things. Both definitions are of importance for educators. Schools are set up to pass on specific knowledge and skills associated with a shared way of life. Less apparent to the casual onlooker is the fact that schools also serve as cultures for growing things. What schools grow (or at least aspire to grow) are minds. They do so through a designed environment that includes, but is not exhausted by, the curriculum. The school curriculum defines the content—ideas, values, skills—that becomes a significant part of a child's cognitive repertoire.

In our era of high-stakes standardized testing, a single-minded focus on language arts and math has led to a significant narrowing of the K-6 curriculum. The danger is that the cognitive repertoires of children will be similarly narrowed. Through combining a) hands-on examination of musical instruments associated with a specific world music tradition, b) disciplined inquiry, and c) expository writing, the organology workshops offer children an opportunity to expand their understanding in many directions at once. Research skills and writing are at the core of the organology workshops. Seeing and handling the instruments gives students a more immediate connection with world cultures than would be possible through studying textbooks alone. All that is needed is a teacher or parent with access to the required musical instruments.

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Endnotes

ⁱ <http://www.music.vt.edu/musicdictionary/text/Hornbostel-Sachs.html>

ⁱⁱ The Sachs-Hornbostel system categorizes instruments first by how sound is produced. Thus, the five first-level categories are idiophones, or self-sounding instruments. In the case of the idiophone the entire instrument is sounding, claves are a good example of this. Membranophones are instruments whose sound is produced by a vibrating membrane. Most drums would fall into this category. Aerophones are instruments whose sound is produced by a vibrating column of air. Flutes and pipes would exemplify this category. Cordophones are instruments whose sound is produced by strings, plucked or bowed. Finally, electrophones are instruments whose sounds are produced electronically.

ⁱⁱⁱ *Gamelan gong kebyar*, developed in Bali in the 1920s, is today the most common style of *gamelan* ensemble found in Bali. It features a large ensemble of 10-keyed bronze metallophones tuned to pentatonic scales, and is known for its flashy and flamboyant style featuring extremely fast and explosive playing. The term *kebyar* literally means “to burst open.” *Gamelan gong angklung* is a smaller ensemble, traditionally thought of as a “village *gamelan*.” It features a large ensemble of 4-keyed bronze metallophones tuned to tetratonic scales. It is the type of ensemble currently in use at the Museum School. *Gamelan semar pagulingan* is a court music ensemble, featuring a large ensemble of diverse kinds of bronze metallophones tuned to pentatonic scales. *Joged bumbung* is an ensemble that accompanies the *joged* dance, a Balinese social dance form. It features an ensemble of very large-keyed bamboo xylophones.

^{iv} Balinese *gamelan angklung* can be divided into two main sections: keyed instruments and colotomic gongs. The gongs range in size from four to thirty inches in diameter. The keyed instruments can be further divided into those that play the *pokok*, or the structural melody, and those which play *cengkok* or elaborative figuration. The larger gongs punctuate the structural melody while the smaller gongs are played in sets and play *cengkok*.