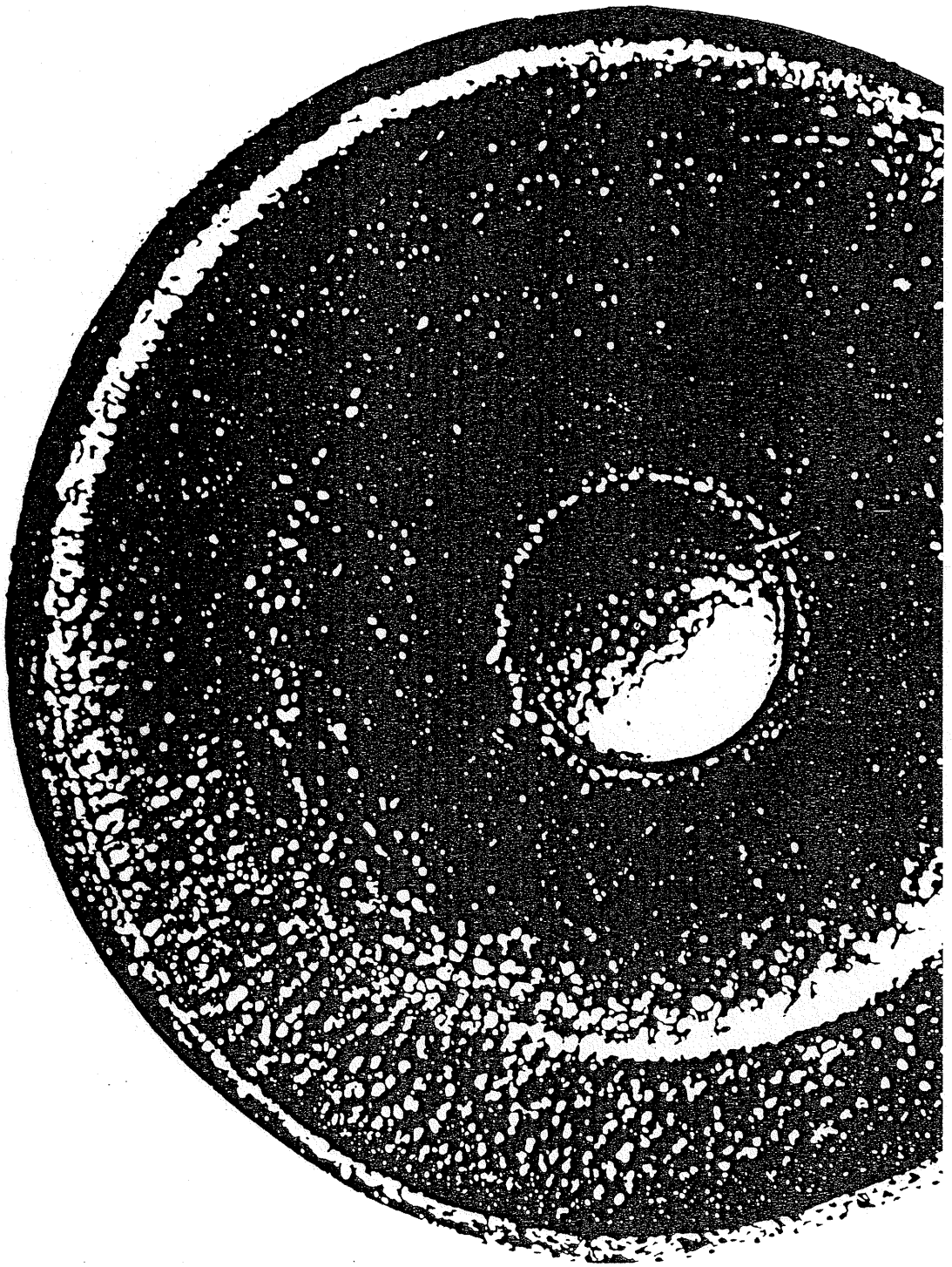
BALUNGAN

A Publication of the American Gamelan Institute



Volume I, No. 2 February 1985

EDITORIAL

Balungan is intended to facilitate a dialogue between scholars and artists, in Indonesia and the West, who share a love for gamelan and a desire to understand it. The research and knowledge of scholars can and should be an important resource for artists wishing to be inspired by the deeper and more interesting aspects of gamelan and related arts; innovation based on awareness of the tradition will be, perhaps, more intelligent, and more respectful of the source of its inspiration.

We must continue to study the traditions, and the new innovations, of our Indonesian teachers; they have been developing the gamelan form far longer than we, and know the depth and complexity of its full character. Yet we can also respect those artists in our own culture who have been moved to create new forms; it is part of our character to experiment and innovate, and great satisfaction comes from creative endeavors with sounds and instruments that one loves.

The function of **Balungan** is to support both the academic and artistic approaches to gamelan and related arts. Both perspectives are a vital part of every musical tradition. In future issues, we can anticipate learning more about the music, dance, and theatre of **all** the Indonesian islands, and perhaps other areas of Southeast Asia, as well as exploring the new forms being created throughout the world.

The term "American gamelan" has been used to make a clear separation between Indonesian traditions and new forms of music created by members of other cultures. It should be clear that our innovations, no matter how much they resemble their Indonesian counterparts, are an entirely separate genre. If this premise is accepted, and gamelan music or instruments made in other countries are not presented as being Indonesian, then both traditions can be viewed with respect.

But since America is not the only home to developments in new art forms related to those in Indonesia, we might search for another term under which to collect the efforts of composers, choreographers, and other artists in England, Holland, Germany, Canada, New Zealand, Australia, Japan and the Phillipines. Meanwhile, we are looking forward to everyone's contribution, as subscribers and writers, to the continued publication of **Balungan**.

Dengan hormat,

Jody diamond.

Jody Diamond
Editor

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Balungan is a Javanese word meaning bones or skeleton; in music it refers to a melodic framework that guides and connects all the diverse instruments of the gamelan.

LETTERS

Gamelan in England is beginning to take off in quite a big way. Last year there was a tour by a Sundanese dance group in the Autumn and at Easter Sasono Mulyo sent a group of dancers and musicians to tour England culminating in a puppet festival at which they presented short shows of wayang kulit and wayang golek.

In England we have both slendro and pelog [Javanese] gamelan in York, Cambridge and at the Embassy in London, although we are not allowed to use the latter at present. There is also a slendro gamelan in Durham and a Balinese gamelan at Dartington Hall in Devon. There are active gamelan societies in York and Cambridge and the English Gamelan Orchestra is hoping to get going again.

We are somewhat handicapped at the moment by having very few people who have studied in Indonesia to teach us, but an exchange programme with A.S.K.I. [Akademi Seni Karawitan Indonesia] is at present being set up to improve the situation.

The publication of a regular magazine such as Balungan will be particularly welcome here as it will help to relieve the isolation of gamelan in England.

Lindsay Dodsworth
Cambridge, England

Thank you for the copy of **Balungan.** I have a few comments which I hope will go toward improvement of this new and exciting publication.

On the film review "the five faces of Panji," it should be noted that Panji is an indigenous, Javanese mythological character and not a "Hindu" one. While one could argue that in the days of Panji, Hindu religion was prominent, the use of the term "Hindu" suggests to most readers that he, like Arjuna and Rama from the Mahabharata and Ramayana, was originally an Indian character, borrowed by early Javanese along with Hindu religion. This is not the case.

We have another Fulbrighter in residence for the Fall term, from ASKI Solo, named Suratno. He is accompanied by his wife Sutano. a pesindhen and dancer, and their daughter Ika Nurini (14 months). In January they will be in San Diego for a two or three week short course, move to Oberlin for February through May, and to Ann Arbor (Univ. of Michigan) for the Southeast Asian Summer Studies Institute May through August 1985.

We are trying to incorporate various regional styles, such as Semarangan style and Surabayan (east Javanese) style, as well as good old Yogya and Solo styles, into our concert repertory. This December (1984) we are presenting a concert consisting of gendhing bonangan, dances (gambyongan and topeng Gunungsari) as well as a short wayang lakon ("Anoman Obong"). The dhalang will be Suratno.

Andy Sutton
Madison, Wisconsin

I'd like to congratulate you on the first issue of **Balungan** — I especially appreciate the scores and transcriptions, and am hopeful that the publication will succeed as a network for all of us involved in gamelan. Add my new gamelan to the directory, and I'd like to say that building these instruments over the last year and a half has been fascinating. I'd [also] like to acknowledge the tremendous help and assistance from Bill Colvig and Lou Harrison, [as well as] Daniel Schmidt.

Joan Bell Cowan
San Francisco, California

I've been "on the road" for quite a while now, slowly infiltrating the Balinese gamelan scene in Germany. Thus far, the "scene" consists of only 2 groups -- one in Freiburg and one in Munich. (There is a new Javanese group in Bremen.)

I'm going to Indonesia as part of a study project organized by a Dutch anthropologist named Danker Schaareman, from Basel, Switzerland; his studies on Balinese culture focus on ritual adat-law and tradition. The project will run from Dec. 84 to April 86, and deals with the relationship between music and ritual in Bali. Danker will be concentrating on the Selunding, Gambang, and Luang orchestras in East Bali and their relationships — both underlying and overt -- to the ritual cycle. I will investigate similar issues for Semar Pegulingan and Gong Gde, as well as study kebyar music. We'd love to receive **Balungan** while we're in Bali!

Wayne Vitale
Den Pasar, Bali

My particular interest is in Balinese music and dance. I spent two years doing research in Bali (1981-83) and and writing on the role of music and dance in Singapadu and Pejeng. I [am] a lecturer in ethnomusiclolgy at Queen's University. We have a full **gamelan gong kebyar.** I would be most interested in any scores and transcriptions that could be used for teaching Balinese gamelan to Westerners. Also experiences and advice from others who have done it would be appreciated!

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INTERVIEW

Daniel Schmidt: composition and the design of American gamelan

by Peter Adler and Jody Diamond

Daniel W. Schmidt is a composer and an instrument builder who has been involved in gamelan since 1970. He lives and works in Berkeley, California, and is the director of The Berkeley Gamelan. His innovative instruments are found across the country. He has taught at several universities and colleges, including U.C. Berkeley, and is presently an instructor at Sonoma State University, where he is building his first complete brass gamelan.

This interview was conducted on several dates during the Fall of 1984, in Berkeley and Oakland, California. Daniel Schmidt describes his compositional history, his self-devised tuning system, and his views on the character and future of new gamelan outside of Indonesia.

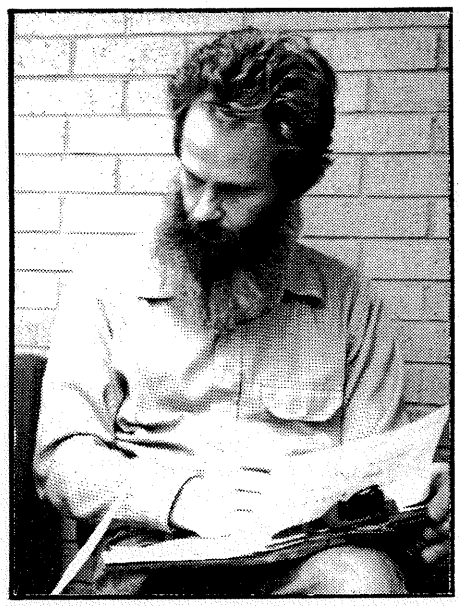
Balungan: What got you interested in gamelan?

Daniel Schmidt: I admired the integration of all facets of Javanese art, what I call the musicosocial interface of music, dance and drama, as opposed to the separation of these arts we have in the west.

After I received my degree in electronic composition from California Institute of the Arts, where I'd studied with Morton Subotnick, I moved to Berkeley and started a three year compositional program. I had enough money to work on my own producing essentially tape pieces using techniques such as musique concrete, live electronics; basically a series of studies defining myself as a composer.

I met Lou Harrison at the Center for World Music in 1975 in Berkeley. He was holding a seminar in tunings at the Center and out of that we organized a concert of new compositions for gamelan. Simultaneously I was designing and building my first gamelan instruments. The local community was really supportive of our endeavor at the time, and the concert was very well received.

Within six months I saw that I was in the right place at the right time. I had written several gamelan pieces by this time and I could see that I was well suited both as a composer and instrument builder to integrate these two arts into a cohesive unit, thereby focusing my resources. It was a difficult decision to discontinue all of the work on the tape pieces, but I ceased work in that genre.

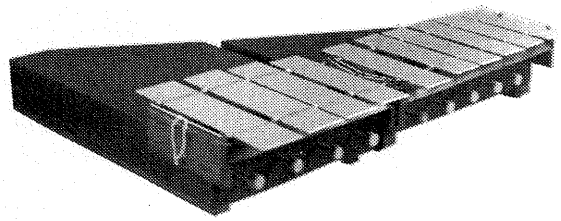


B: Did you manage to integrate your previous experience into your new music?

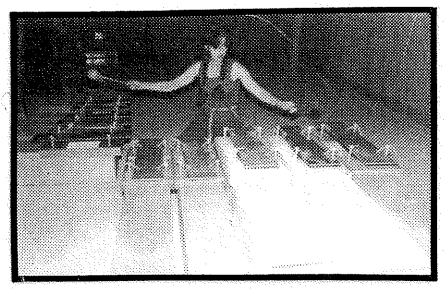
DS: Yes, I see everything I've done since 1973 as part of the same process. What I did was to apply the techniques I'd used in the earlier tape pieces -- compositional elements such as overdubbing, phasing, accumulation, and proceduralism. These have become important elements in my compositions for gamelan.

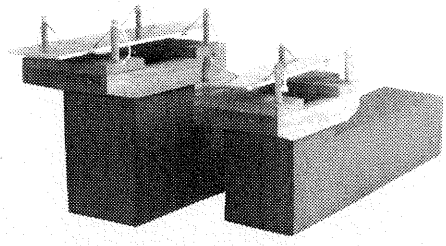
Some conceptual art and related music tries to make the process obvious to the audience, but I wanted to be more subtle. Incidentally, I want to point out that , compositionally, I have no interest in minimalism. I can't draw directly from Reich or Glass. What made more sense to me was to find a middle ground between my compositional world -- aleatoric, pointillist, minimalist, procedural -- and the Javanese traditions. I thought of it as embarking on a private approach to gamelan writing.

B: Which of your pieces do you think stand as good examples of American gamelan?



1. slentem





2. resonated key-gongs

DS: Two pieces: **Ghosts** (1981), and **Faint Impressions** (1982). **Ghosts** was was one of my first successful integrations of my newer forms into older Western approaches. It has melodic development, classical structural elements like statement and recapitualtion, theme and countertheme, solos and duets; the finale combines the elements in a sort of Romantic flourish. On top of that, it uses structural proceduralism. Like that method of accumulation; a traditional composer might state a melody and break it into motives, but I build fragments into a melody.

Faint Impressions I mention because it's entirely mine. There are musical gestures in there I have yet to figure out how to duplicate. I turn back to study the score, and its like looking at someone else's music. It's not derivative from either East or West.

B: Do you think its possible to create a "non-rhythmic" gamelan piece?

DS: Oh, yes; **Faint Impressions** for instance. Gamelan doesn't have to be bound by that strict four-beat structure. It's possible to have slow melodic gestures that aren't perceivable as rhythmic gestures. I liken it to a tapestry. You don't notice a tapestry being made of threads. **Abies Magnifica** (1984) accellerates the rhythm using techniques related to kotekan and imbal until it's imperceivable as a rhythm; you can have slow sweeping events that are apparently unrelated to the fact that the musicians are playing as fast as hell.

You can liberate yourself from the automatic suggestions of the tradition. I might see it differently if I were working with Javanese instruments and not my own. As a composer, I hear a sound while I'm writing; as a builder, I make an instrument to produce that sound. I can look at a seemingly infinite sound spectrum, so I need have no constraints connected with the Indonesian tradition. On the other hand, my compositional elements come out of existing traditions, East and West. One of the most important factors in my decision-making process is a retention of gamelan as a musicosocial phenomenon. Regardless of how infinite I see the musical possibilities to be, I want it to function as a gamelan [group].

By the way, I've never been to Java, although I'd like to go. But I'm not trying to imitate the Javanese social structure. When we play gamelan in America, there's more going on than just music. The physical structure of the instruments makes us sit on the floor. It's ensemble music, it requires cooperation; there's no room for the superstar musician. I had to go through a lot of soul-searching before I decided to keep those features. Playing on the floor also affected my instrument development.

B: What is the relationship between your instruments and the Indonesian instruments?

DS: My instruments have no tradition behind them. They're the product of one creative mind integrating composition and instrument building. But because I desire to retain certain aspects of gamelan, certain of my decisions are affected.

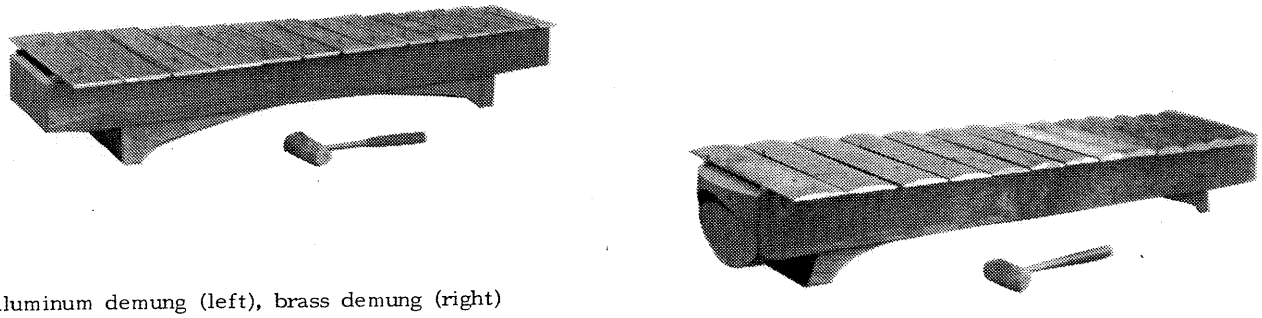
Pitched percussion, ensemble playing, and sitting on the floor, as well as certain playing techniques like damping, are the ways that I have tried to be like the traditional gamelan. After that point I venture forth into my own choices of timbre, broadening the possiblities beyond what is normally found in an Indonesian ensemble.

The first American gamelan instruments were made of aluminum. I'm now exploring the sound of different metals, such as brass and bronze alloys, and the timbral qualities of differnt thicknesses of those metals. I'm trying to reconsider and reconstruct the timbral relationships of the instruments across the whole range of the gamelan.

My current challenge is to build instruments that can fulfill Indonesian roles, since there is a need and an interest in playing gamelan that way. Yet my real interest is in developing extensions outside of those roles.

B: What instruments are the result of these new extensions?

DS: The tubes, because they are of thick-walled aluminum tubing, which has a timbre that is new to gamelan. The gong system that I've designed, which is virtually



3. aluminum demung (left), brass demung (right)

"chromatic", spanning several octaves, enables me to combine tones that create new timbres in the lower range. Certain combinations can approximate the sound of Javanese gongs, but there is a range of sounds beyond that as well. The key to this is the tuning system: I am precisely tuning low pitches to adjacent harmonics.

B: Tell me about your tuning system.

DS: I wanted to use just intonation, but it was also important to keep the character of the Javanese slendro and pelog tunings. I examined many Javanese tunings and discovered that the structure of the scales closely matched adjacent tones in the harmonic series.

I chose the lowest note of the gamelan to be the lowest gong tone, and drew the rest of the pitches from the harmonic series of that tone. By octave displacement, I gained a scalar system that spans six octaves.

Pelog, the Javanese name for the seven tone tuning, is drawn from a 60 Hz gong, and consists of the following harmonics: 10, 11, 12, 14, 15, 16, 18. These become the pelog pitches 1, 2, 3, 4, 5, 6, and 7, with the gong at pitch 6. The five tone slendro tuning, which the Javanese number 1 2 3 5 6, is based on a pitch 2 gong that is 40 Hz; the harmonics are 14, 16, 18, 21, and 24. (When divided by 2, these are sequential tones in the harmonic series.)

The two scales overlap so that pitches 6 and 3 are the same, and slendro 5 equals pelog 4. I've replicated the Javanese tunings, but at the same time created a system with eleven tones in the octave which gives great compositional freedom. The completed system consists of harmonics 10, 11, 12, 13, 14, 15, 16, 17, 18 in pelog (60 Hz), and the remaining slendro pitches are harmonics 14 and 16 of the other gong (40 Hz).

B: Why have you written for only a very small range of instruments, never voice or winds, and only a few pieces for rebab (Javanese bowed lute)?

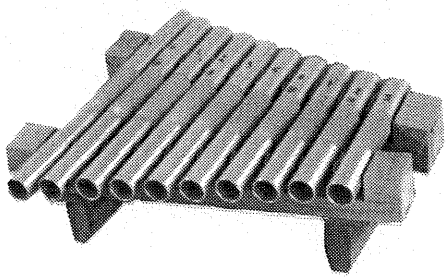
DS: At this point, strings are not that important to my compositions. My occasional use of rebab is, again, not an effort to imitate the Javanese tradition. A Western singer is of no value to me now; I'm not interested in text. If I were to use a vocalist, I'd need an extended vocal technique like Kathy Berberian's. I've made some experiments with unusual bowing techniques, but I'm not satisfied yet. I still have a long way to go in exploring the dynamic and timbral range I have now.

I haven't found the meeting point between Javanese, Western, and New Music yet, so I'm limiting myself to my chosen artistic realm. I'm not comfortable drawing from exisiting trends, and all these alternate directions look to me as if they would change the social relationship of gamelan. I'm not a virtuoso of Javanese musicianship by any means; I'm capable, but I've never reached the position of specialist. I'm still experiencing the communal element of the music. While I was at the Center for World Music, I was involved with Karnatak (South Indian) music, in which a premium was put on personal expression; so the gestalt of my experience with these two idioms is that of polar opposites yielding the same awareness.

Morton Subotnick once said in a lecture, "If you really love your endeavor, it will be a piece of art." Underlying my work is the desire to bring a musical experience to people — or, rather, to set up a context in which such an experience is possible. If I try to guide people to a specific end, I'd be limiting myself. If I love my endeavor, the depth of that endeavor will touch people.

B: What is the potential for new gamelan composers?

DS: I think American-built gamelan are ideal vehicles for composers -- they have to consider the alternatives to the traditional musical organizations. It is so hard now



4. aluminum tubes

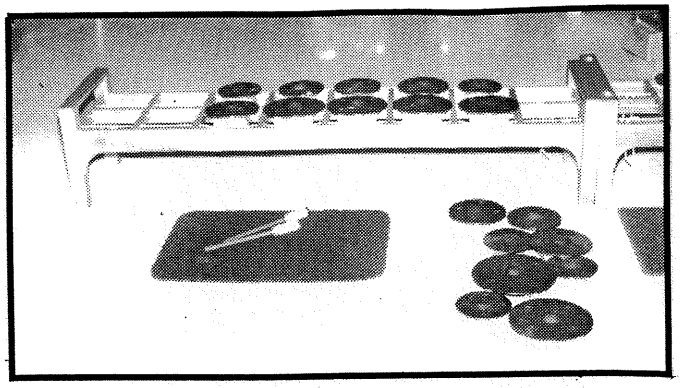
to gain access to any of the traditional groups; the role of composer/builder/leader becomes a really attractive alternative.

B: What is your view of gamelan in the new music community?

DS: There hasn't been enough growth yet of gamelan outside Indonesia. We're just now starting to develop the kind of international communications network we need.

Five years ago, I was invited to a festival in West Berlin, with all my instruments and some members of my performing group **The Berkeley Gamelan.** It was really too early in the developmental process. We are only now beginning to develop artistic merit. We've got to allow time for development and forego the instant gratification of "making it." We have to be allies rather than scramble over each other to be the first cult star.

Our common goal will be the development of American gamelan. I'd prefer to be known a contributor to a large movement. The future of new gamelan outside of Indonesia will depend on the number of participants and the quality of their work.



5. brass bonang

Peter Adler graduated from the composition program at U.C. Berkeley, and is a member of The Berkeley Gamelan.

ABOUT THE INSTRUMENTS

In gamelan built in the West, several instruments are referred to by the names of the Javanese instruments that were the builder's inspiration. Since the American-built gamelan also functions as a traditional ensemble at times, this has been a convenient link between the tradition of Java and the innovation of the West.

The Javanese gamelan is a closely related group of instruments with a wide range of timbres: drums, flutes, bowed strings, plucked strings, voices, trough- and individually- resonated metallophones, and suspended gongs of various sizes. Gamelan built by Western designers have included different combinations of these timbral groups. The classic Javanese gamelan is usually made of bronze or iron with wood cases; there are other gamelan, in Bali and elsewhere, of wood and of bamboo. American builders have concentrated largely on aluminum, partly due to the easy and economical avalability of aluminum in the west, as well as iron.

The first gamelan built outside of Indonesia have tended to focus on a particular family of gamelan instruments: the resonated bars. (Another article could explore the reasons for this emphasis.) In the Javanese gamelan, there are four of these instruments, covering as many octaves, that carry the melodic framework known as **balungan.** The lowest is the **slentem**, which has individually resonated keys, like the gender. The next higher is the **demung**, then the **saron;** the highest pitched of these three trough-resonated instruments is called **peking** or **saron panerus.**

Another Javanese name that has transferred to American gamelan is that of the **bonang** and **bonang panerus.** In Java these are small bronze or iron gongs suspended horizontally on stretched cords; American gamelan tend to have circular, rectangular, or octagonal plates of aluminum, or iron plates with a raised boss; these are suspended either on short wooden pegs or on strings.

There are several terms in Indonesia for the various sizes of gongs, but the single word **gong,** being already familiar to Westerners, has come to be used collectively for all resonated-key instruments that are intended to fill the function of, or approximate the timbre of, actual gongs as they would be found in the Indonesian gamelan.

Daniel Schmidt is one of the most active builders of American gamelan; the photographs in this article show some, but not all, of instruments that he has built. His other instruments include a **gender** with brass keys, drums of various material including PVC plastic pipe of large diameter, key-gongs with very large, tall resonators, and several designs of stringed instruments.

The two octave aluminum slentem (photo 1), played with yarn-over-handball mallets, has an individual tunable resonator for each key. The round knob below each key is attached to a stopper that can be moved to change the length of the resonator so it can be matched to the particular pitched bar placed over it. This allows individual keys to be converted for different tunings.

The resonated key gongs are from a two octave set (photo 2) containing the pitches of both the slendro and pelog tunings, and are one of Schmidt's most acoustically innovative designs. They are constructed of aluminum bars, with pine cradles and particle board resonators, although the latter are currently being made of Finnish birch plywood. This original design uses rectangular quarter-wave resonators, which also have movable stoppers. The tone produced by these gongs is a sine wave; the strong, pure tones can be combined to produce rich and unusual timbres.

The two octave aluminum demung (photo 3, left), in convertible tuning, has an alder case, and is played with balsa or yarn-wound mallets. The keys are all 1/4 inch thick, which reflects the earlier American approach of uniform thickness in all keys. Schmidt has since built instruments in which the higher keys are thicker, which gives a greater evenness of sound across the range of the instrument.

The two-octave brass demung (photo 3, right) in convertible tuning, has a hand-carved alder case, and is played with basswood mallets. This is the first two-octave instrument Schmidt built by machining brass. Probably the first of its kind, it significantly broadens the sound spectrum of new gamelan instruments.

The two octave tuned aluminum tubes (photo 4), have an alder frame, and are played with yarn-over-wood mallets. The center of each tube is rough-brushed to provide more friction for the mallets. This design was one of Schmidt's first experiments, and it is a timbre unique to his gamelan instruments. The Berkeley Gamelan has a set of four, two pair that are one octave apart.

One of Schmidt's newer instruments is the two octave bonang with brass discs (photo 5) suspended on cords in a wooden frame. Each disc is individually suspended to accomodate the convertible tuning; the instrument is played with two cylindrical rope-wound mallets. Earlier bonang were made from aluminum discs mounted on three pegs; the brass instrument is far more resonant, and the aesthetics of the wood working have developed considerably.

Interval Sizes in Javanese Slendro

by Larry Polansky

This is the first in a series of three articles which will in some way constitute a prolegomenon to the discussion of tuning systems in American gamelan. This examination will cover: 1) tuning ideas in Java, and the underlying notions of rational tunings in the west, 2) a discussion and documentation of some of the seminal tuning systems implemented so far, and 3) a speculative look at the next stage of intonational ideas for instrument builders, including some proposals for new tunings that might serve as a basis of experimentation for those who have not yet built

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There has been considerable discussion among those interested in the music of Indonesia about the appropriateness of rational tunings in that music, and in its hybrids. Indeed, both sides of this issue seem to me to represent one of the more common dilemnas in the hybridisation of musical styles, namely, how much and what (if anything) about the "parent" music is in any way sacrosanct. My own answer to this question notwithstanding (namely, that nothing is inviolate if done in the spirit of art), this problem has become crucial in the construction of gamelan instruments on American soil, with American materials, and within, no matter how much incense one burns, the particular network of music, education and experience that is American (and European) culture.

The point is often raised that the Javanese do not use rational tunings, but rather tune "by ear" and often from what might only be called a mystical foundation. Whether or not this commits western builders to the same process is a question left to the individual instrument designer — but what is more significant is that there are indeed formal and historical bases for the Javanese tunings themselves. All of the published pitch studies, like Kunst, and the Gadja Mada study, (see references at end of article), as well as the plain aural evidence of hearing many gamelans suggests strongly that what some may consider the Javanese mystical and apparently non-theoretical tuning tradition has in fact certain canonic, or what might be called "ur" intervallic forms. By taking a look at these we might gain a greater understanding of the character and definition of slendro and pelog (and the patet), and perhaps use that as a basis for tuning experimentation of our own.

The following ideas are based on a rather small statistical sample, that of the slendro tunings from the Gadja Mada (**GM**) University study, and the same gamelan measured by Kunst (**K**) in his earlier work. I do not intend to prove conclusively, from this tiny sample, that Javanese slendro tunings obey any specific canon. However, I do think these results show definite **tendencies** towards tuning and intervallic structures that are directly relevant to western builders. Although **GM** and **K** name their gamelans differently, the former by name, the latter by location, these charts correspond exactly line by line.

Examples **1** and **2** are the cents values of the pitches measured in the Gadja Mada and Kunst studies of 8 different slendro tunings. I have rounded them off to the nearest half-cent, and though cents values are not computed in the later Gadja Mada measurements, my own measurements for the frequency intervals are within a cent of Kunst's in all cases. It is significant that Kunst, unlike the Gadja Mada team, seems to assume an octave based tuning (I refer the reader to his frequency measurements themselves for this), and the (high) I' in general (barang alit) is simply doubled in frequency from I (barang). There has been a great deal of speculation about this particular aspect of this study, centering on the now rather common assumption that many instruments utilize an octave spiral tuning as a matter of course. In this respect, intervals from VI to I' (nem - barang-alit) in **K** are suspect, but since no American builder that I know of has designed a gamelan with a systematic spiral tuning (and of course this may very well be related to the particular spectral characteristics of aluminum), ignoring this further complexity in the Javanese tradition will, in some cases, simplify matters for us at this time.

The **GM** octaves are on the average about 10 cents wide, mainly, I believe to preserve certain inner patet-related qualities of the slendro, and to achieve certain implicit and explicit multiple intervallic relationships. For example, what very quickly defines part of the character of a particular slendro is the relationship between the intervals VI-II and V-I, which in several of the tunings is nearly equal, like Rarasrum (P.A. Jogja) and Kraton Sala (Manisrenga) (or in fact, in any slendro when VI-V is the same as II-I). Another important factor is that though I' and I are not octaves, the ear very strongly perceives the octave of I, and the relationship of the intervals to this "phantom pitch" becomes important and interesting. In fact, one of the most important "embat" is this interval, I' to (2*I), or I' to the octave of I. The effect of these variant tunings on the character of the patet (manyuro and sanga) remains an important area for study, for whether or not to keep these two intervals roughly equal seems to be one of the essential decisions in constructing a tuning.

At first glance there are some striking aspects to these two charts, especially to the student of intonation. First is the predominance of intervals extremely close to the 8/7, especially between II and I (gulu and barang). Six of the **GM** and two of the **K** intervals in this position are within 8 cents of the 231 for the 8/7. The predominance of this interval in the world's music (some have called it the world's major second) leads one to expect that it will arise as a canonic ratio. The acoustic reasons for this, and for the related prevalance of intervals close to 7/6

	II-I	III-II	V-III	VI-V	I'-VI
1. Manisrenga	219.5	266.5	227	233.5	258.5
2. Kanjutmesem	224	253.5	237.5	232.5	264
3. Udanriris	255.5	256.5	223.5	235.5	234
4. Pengawesari	251.5	233.5	233.5	236	250
5. Rarasrum	229.5	227.5	253	232	261.5
6. Hardjanagara	216	249.5	216	262	261.5
7. Madukentir	268.5	242	243	230	221
8. Surak	206	231.5	238.5	265	264.5

example 1: **Kunst selected slendro tunings**

	II-I	III-II	V-III	VI-V	I'-V
1.	237	251	248	242	258
2.	252	239	242	236.5	253.5
3.	237	238.5	232.5	262	238
4.	226	252	260	234	256
5.	232	239	248	232	259.5
6.	218	238.5	244.5	244.5	260
7.	238	230	257	243	250.5
8.	232	234	249	251	257

example 2: **Gadja Mada slendro tunings**

(about 266.9 cents) derives mainly, I think, from the harmonic series, and the high energy concentration in that part of the spectra of so many sounds. Whatever the reason, those two intervals are extremely common as a major second and minor third in many of the world's cultures (including, incidentally our own — as in the blues scale). In **K**, 5 of 8 of the intervals I' to VI (nem to barang alit) are within 8 cents of the 7/6. However, this is precisely the interval in which **K** may be based on a mistaken assumption. In **GM** the 7/6 is not suggested as strongly, with 3 of 8 being within 8 cents, and 5 of 8 within ten cents. However, in the M.N. Sala tuning, I'-VI is not a "large" interval at all (I will explain this below), so a more interesting formulation might be to say that of all the "large" intervals in this scalar position, only two are outside a 10 cent radius of the 7/6. I think that like the 8/7 between II and I, the 7/6 between I' and VI is a kind of underlying tendency, though in the latter case it tends to be shaved a bit to allow for raising the mid-scale intervals (III-II and VI-V).

The averages for the intervals in both studies are:

	II-I	III-II	V-III	VI-V	I'-VI
K:	233.81	245.06	242.75	240.8	251.875
GM:	234	240.25	247.625	243.125	254

In all the intervals except I' - VI, the Kunst study is likely to be more representative of the original intent of the gamelan builders, for it is an earlier study (though Kunst is not, admittedly, nearly as clear about his measurement techniques as are the authors of the later study). These averages are a rather gross statistical measure, and interpretation of their meaning is certainly subjective, but one conclusion we might draw from them is a kind of statistical tendency for the relative tunings of the slendro measured.

In both tunings we find the first interval significantly smaller than the others, and the last significantly larger, with the three middle ones roughly equivalent. Drawing my cue from my colleague Lou Harrison, we might discuss these tunings as combinations of three **types** of intervals: Small, Equal, and Large. In this case, Small is a "major second" smaller than 240 cents; the three most likely just candidates are the 8/7 (231 cents), the 9/8 (204 cents), and the 10/9 (186 cents). Equal are those intervals between 240 and 250 cents, and the predominance of these is perhaps what prompts Raden Lurah Martopangrawit to state (see notes, **Karawitan, Volume 1**):

> "In the slendro tuning system, there are five tones in one gembyangan with [relatively] equal intervals between tones"

Were it five tone equal temperament, the interval would be 240 cents. There are two main reasons why I feel the idea of five equal tones can be a rather misleading way to think about slendro construction.

1. The slendro notion of gembyangan does not coincide with the notion of octave. This does not simply concern the difference between 8 and five tones (as the translator's (?) notes to Martopangrawit's work suggests (page 40, note)). The main differences I feel lie in the octave's definition as a doubling of frequency, and as a pitch equivalency class, since Javanese patet and melodic configuration are in no way registrally transposable in the way that octave equivalence implies. Therefore, the concept of equal division is somewhat innapropriate when one asks: "Division of what?"

2. The tuning measurements we have seen point more clearly to a system of arrangements of at least three and probably four (that is Small, Equal, (Large-Equal), and Large) distinct interval types, decidedly unequal in both size and affect.

Large intervals are those greater than 250 cents, in fact closer to what we might think of as a "minor third". The following tables (Examples **3** and **4**) show the configurations of the **GM** and **K** measurements solely in terms of these interval classes, with the averages on the bottom line. In certain cases, for example when the interval is 238 cents, I have indicated S-L to show how it is a large version of the Small class.

In the following examples, it is important to keep in mind that Kunst measured one saron only, and according to the **GM** team Kunst's "measurements might have been displaced and moved one wilahan upward, since with only one datum from the pitches of one piece of saron the possiblitiy of misplacing the results is not remote." Thus, in the Kunst tables we may be in some cases looking at shifted slendro. Ironically, there are historical examples of whole gamelans being "renumbered" by one pitch to accomodate vocal range, and because of many of the symmetric qualities of the following tables, this not only seems reasonable but quite interesting musically.

	II-I	III-II	V-III	VI-V	I'-VI
1.	S	L	S	S	L
2.	S	L	S	S	L
3.	L	L	S	S	S
4.	L	S	S	S	L
5.	S	S	L	S	L
6.	S	E-L	S	L	L
7.	L	E	E	S	S
8.	S	S	S-E	L	L
Average:	S	E	E	E	L

example 3: **Kunst interval sizes**

I think it is here that we see a more accurate representation of the kinds of slendro intonation variation possible, at least, as Lou Harrison points out, within the context of Jogja style. I think also that the two most common ways of thinking about slendro — as a five tone equal scale with certain "embat" or variations for each interval, or as a kind of simple pentatonic (which some Western builders have adopted) — are not as useful as the notion of intervallic size configuration. The 8/7 and 7/6 intervals which seem to proliferate at the extremities of these slendro are radically different from the 9/8 and 10/9 major seconds and the 6/5 minor thirds that western tuning might suggest for a pentatonic. By the same token, those two intervals would, I think, never be confused by a listener with the Equal intervals which tend to occupy the center positions.

Note also that V-III is often a bit larger than III-II and VI-V, but not as large as I'-VI (usually), and perhaps justifies the addition of a fourth interval class to this schema, E(L). Also, it might be shown that builders using a particular slendro which do not obey the S-E-E(L)-E-L formula may indeed have historical and/or stylistic reasons for reconfiguring it, but my limited knowledge of the intricacies of Javanese style preclude any suggestions

on my part about this.

As an experiment in speculation, but, I think, a rather illustrative one, we might construct a rational tuning method for the **GM** average (234, 240.25, 247.625, 243.125, 254). We could just as well pick any of the slendro in **GM** or **K**, and I think that the same mode of thought would be useful, but I choose **GM** because of its stretched octaves, and the average because in picking a slendro which does not actually exist (at least in the sample) we are in a sense constructing a new tuning which to a great extent respects the various slendro measured. Note that I am ignoring at least one very important aspect of constructing such a tuning: that the relationship between laras pelog and laras slendro is often a crucial and complex one, both in Java and in America, the latter evidenced (as we shall see in Part II) by Daniel Schmidt's intricate tunings.

	II-I	III-II	V-III	VI-V	I'-VI
1.	S	L	E-L	E	L
2.	L	S-E	E	S	L
3.	S	S	S	L	S
4.	S	L	L	S	L
5.	S	S	E	E-L	L
6.	S	S-E	E	E	L
7.	S	S	L	E	L
8.	S	S	L	L	L
Average:	S	E	E-L	E	L

example 4: **Gadja Mada interval sizes**

In the following description, I will make use of two types of interval description. The first ascribes a ratio to a pitch relative to a given 1/1. In this case pitch I is assumed, though that by no means implies that barang is in any way a "tonic" or central pitch. The second way is to describe the interval "consecutively", as a ratio above its nearest neighbor. Thus, pitch VI might be a 7/4 to pitch I, and an 8/7 to pitch V. I have tried to make it clear in all cases which type of interval I am talking about.

The first interval is so close to 8/7, that we can assign it as such. For pitch VI, we can start out with 7/6 (or about 967 cents), but I think that pitch VI exists in two incarnations, one in relation to V, II and to low I (and implicitly to I doubled in pitch, but not I'), and one in relation to I'. If I' is taken sharp of low I's octave, say around 10 or 12 cents as is common, 7/6 below that gives us what is more easily seen as 7/4 above I, and consequently 8/7 below I's phantom octave. In fact the 7/4 (about 969 cents) is more coincident with the average cents value for that interval from I itself, which is 965. This also creates a 49/32 to II. The other way to think about VI is as a 7/6 below I doubled in pitch, and this yields the interval 12/7 (about 933 cents). This way of thinking of it becomes interesting when we try to generate V (below).

The average cents value for III is about 474, and this points squarely at the 21/16, making a just fourth to the 7/4 VI. The interval created in this way between III and II is an 8/7 below a 21/16, or 147/128, which is approximately 240 cents. This is almost exactly the average.

The interval that remains is V-III. The natural assumption for V would be the common fifth from I, 3/2, but this (702 cents as compared to the average of 721.875 = II/I + III/II + V/III) does not correspond in any way I can tell with what we actually observe. For example, if we begin with this and tune **down** an 8/7 to obtain III, we get the interval III = 9/7 (435 cents) from I, and thus 9/8 from II (204 cents). These intervals (III/II and III/I) are so narrow as to be almost out of the question in the tunings we see (the only example of anything close is **K** Surak II/I). In fact the derivation of V seems to come from VI (7/4 down a 147/128) or from the octave of I (down a 21/16), the latter making it a 32/21 up from I for a fifth of 729 cents. If we assume VI to be 12/7 (933 cents), relating primarily to I, then V (down a 147/128) down becomes 729 cents (the ratio for V in relation to I, however, becomes unwieldy, stressing the importance in this case of the relative importance of stepwise motion from VI to V compared to the relationship from V to I), or a bit wide of the average (about 722). This is, I think significant, for one way to view slendro tuning is not as a stretching of octaves, but as a stretching of V. In other words, V is tuned from VI, and then I' is tuned from V! In this way, a complex and beautiful schema of multiple and paratactical relationships is created among the six tones. Ironically, it is this kind of dynamic and flexible intonation system that has become of great interest in contemporary western music, especially in the use of high technology to rapidly tune and retune intervals depending on their harmonic and melodic context.

To summarize (and also simplify) the above tuning, it might be done in the following way (starting arbitrarily on I):
Tune II an 8/7 above I.
Tune VI a 12/7 above I (or a 7/6 down from I's octave)
Tune III a 21/16 above I, or a 147/128 above II.
Tune V a 147/128 down from VI.
Tune I' to V (in any of a number of ways), possibly a 21/16, or the same as III to I.

I should repeat that the above is just one experimental postulation, and there are (as we shall see later on) many others. Also, I do not claim the Javanese tunings were in themselves arrived at this way (in fact I'm fairly sure they weren't), but I present this as a parallel language for the kinds of aural decisions a Javanese tuner must make. These manipulations are not intellectual excercises any more than the intervals 8/7 and 7/6 are abstract notions — rather they are real and musically meaningful psychoacoustical and musical phenomena that are partially responsible for the richness of a musical culture.

The main point of all this is to give us something to go on, a reference perhaps, when we next consider the tunings of western builders. For example, though most of the builders we will consider have pretty much standardized in just tunings (which tends to blunt a bit the notion of those large, "equal" major seconds), several are now reconsidering that position, and are working on "shaving" and "expanding" certain intervals (like Lou Harrison's recent work with VI-V) to get more of slendro's equality characteristic while still preserving the skewed pentatonic aspect. In fact, Javanese teachers in this country have been enthusiastic about certain just slendro which seem to approximate very closely important Javanese tunings. I think we will see that these builders have in most cases (but not all) been extraordinarily sensitive to the more subtle notions of slendro (and pelog later on), and have also made some radical and interesting experiments to suit their own musical needs.

I am grateful to those who have been generous enough to share their ideas and tunings with me — namely Lou Harrison, Daniel Schmidt, William Colvig, Henry Rosenthal and David Doty of Other Music, Joan Bell and Kent Devereux.

[see glossary and references, page 23]

Larry Polansky is a composer and theorist, currently on the Music Department faculty and research staff at the Center for Contemporary Music at Mills College. Among his interests are intonation and computer music system design.

Notes for **Extractions** by Jeff Morris, 1984

This piece makes use of material generated by extracting pitches and resulting rhythms (or rhythms and resulting pitches) from a repeating five-beat motive. Most melodic/rhythmic phrases, and also larger gestures, are derivitives of, or directly extracted from, the unchanging saron I pattern, excepting ostinatos such as the bonang barung part. The smallest continuous pulse groupings are of five and are almost constantly crossed by ostinatos of smaller, changing pulse groupings of four, three and two.

The following instruments will need two mallets: bonang barung, peking I, peking II, saron II, demung II and slentem.

Opening and Section 1:

Play the Opening through as written. Do not be confused when the notation expands to accomodate the faster moving bonang part; the tempo remains the same. Continue on, playing Section 1 four times.

Saron I and demung I: damp in the traditional manner (i.e., let each pitch ring until the next pitch is played.)

Saron II: let each pitch ring for one pulse only.

Pekings and demung II: let all pitches ring (no damping).

Slentem: damp single notes in the traditional manner and let diads ring.

Section 2:

Play four times. First time, pekings and saron II tacit. Second time, play saron imbal as written (i.e., add saron II and both sarons damp in imbal style). Third time, play peking imbal as written. Fourth time, play peking imbal and saron imbal simultaneously.

Saron I: damp in imbal style second and fourth time.

Pekings and saron II: damp in imbal style.

Section 3 and Closing:

Play Section 3 three times and continue on through the Closing to the end.

Peking I: Section 3; damp in the traditional manner. Closing; let all pitches ring.

Saron II: Section 3; let all pitches ring. Closing; damp as in Section I.

Jeff Morris is a composer/performer who received his BFA from Cornish Institute in Seattle and an MFA from Mills College in Oakland. He has studied composition with Janice Giteck, Paul Dresher, Terry Riley, David Rosenboom and Lou Harrison. Jeff Morris has written for a variety of instruments and ensembles including several pieces for gamelan and also works for tape, electronics and computer controlled synthesis. He is a member of Gamelan Pacifica, Diamond Bridge and the Mills Gamelan.

If you do perform **Extractions** or have any questions please write: **5149 Miles Avenue Oakland, California 94618.**

BOOK REVIEW

by Kent Devereaux

Karawitan: source readings in Javanese gamelan and vocal music
Judith Becker, editor; Alan H. Feinstein, assistant editor
Michigan Papers on South and Southeast Asia,
Number 23, 1984

This is the first volume to appear in a series of three volumes of translations of Javanese and Indonesian texts being published by the Center for South and Southeast Asian Studies at the University of Michigan at Ann Arbor.

The editor, Judith Becker and her assistant, Alan Feinstein, have done an excellent job selecting, compiling, and in some cases translating the seven texts that make up this first volume. The schorlarly approach to the preparation of the work should please even the most particular ethnomusicologist, while at the same time, providing both accessible and practically oriented information for all serious gamelan enthusiasts from beginning to advanced students.

The articles and monographs that comprise volume 1 span the years from 1930 to 1975. At least one of the articles, Sumarsam's "Inner Melody in Javanese Gamelan" has been generally available in the United States since it first appeared in 1975. The remaining works were all translated specifically for this volume from their original Javanese or Indonesian texts. Four of the articles, those of Martopangrawit, Sastrapustaka, Gitosaprodjo, and Poerbapangrawit, deal with general summaries of the gamelan and taken as a whole provide a clearer introduction to central Javanese gamelan performance practices than any other single extant English work on gamelan. Two other articles deal with specific aspects of gamelan--Sumarsam's on the role of inner melody in Javanese gamelan, and Sindoesawarno's on the function of wilet and cengkok. Finally, Probohardjono's article provides a very useful summary of the various sulukan and their alternate texts employed in wayang kulit.

The bulk of the volume, some 244 pages worth, is taken up by Martopangrawit's two-part monograph "notes on Knowledge of Gamelan Music". This text alone makes this first volume of translations a valuable reference guide. Martopangrawit provides a concise summary of the general background of gamelan that, although he assumes some knowledge of gamelan, is primarily introductory in tone. The opening discussion of irama and lagu is quite good, as well as subsequent topics, gendhing form, cengkok, and pathet. A separate section deals specifically with the inter-relationship between balungan types, pathet, and cengkok.

In the second half of the paper Martopangrawit introduces pelog, and specifically a discussion relating to the performance practices appropriate to the tuning system. But, whereas the first half of the paper employs the gender almost exclusively to demonstrate appropriate cengkok in slendro, in his discussion of pelog he introduces the rebab as well. Finally, an interesting discussion on variation in balungan concludes the paper.

Among the several appendices accompanying the text, one on vocal music, another on creating gendhing compositions, and another on "barang miring" are particularly interesting.

Whereas Martopangrawit takes an almost empirical approach to the understanding of karawitan, Sastrapustaka, in his article "Knowledge of Gamelan Revisited", outlines the function of gamelan in purely social and metaphysical terms. While his discussions on the symbolic and metaphysical characteristics of the specific tones of the pelog and slendro tuning systems and the delineation of various pathet may not provide the hard and fast rules that western students of gamelan so desire, it does provide one with a broader understanding on the whole role of pathet in gamelan music as well as make interesting reading.

The concluding two survey articles, "summary of the Theory of Karawitan and the technique of playing the Gamelan" by Gitosaprodjo and "Javanese Gamelan Music" by Poerbapangrawit, each at approximately one tenth the length of Martopangrawit's paper, tend to be less complete general introductions to the practice of karawitan. Gitosaprodjo's article covers the instruments of the gamelan, Laras, Pathet, Notation, Irama, and gendhing form and function. Poerbapangrawit's article is even more terse.

Two other articles, "an Important Factor in Gamelan" by Ki Sindoesawarno--a very specific discussion on the role of wilet and cengkok and their relationship to gamelan practice--and "Inner Melody in Javanese Music" by Sumarsam, which analyzes the role of the " nuclear theme" or "balungan" in terms of the implied melody, should be of interest to all those wanting to develop a more elaborate panerusan than the standard "college" style of elaboration employed presently throughout the U.S. Both articles shed light on the inter-relationship of pathet, irama, and balungan and the determination of proper panerusan.

Finally, "A Complete Manual of the Sulukan used in a Wayang Kulit Performance" by Probohardjono is a valuable reference for those interested in the function of sulukan in the shadow play. Probohardjono lists all the sulukan commonly employed in the slendro pathet along with a variety of alternate texts and additional directions.

On the whole this first volume of **Karawitan: Source Readings in Javanese Gamelan and Vocal Music** is a well balanced, scholarly piece of work. In its entirety, **Karawitan** will help to fill a wide gap in gamelan literature in English pertaining to the understanding of the performance practices of central Javanese gamelan. I would recommend that anyone seriously interested in gamelan consider purchasing this work for their library. Although the $36.50 price tag for volume 1 alone may be a bit steep for some, one may be in some way minutely consoled by a quick comparison with the current proce for a copy of Kunst's classic Music in Java. I hope that the future volumes, available next year--volume 2 with articles by Warsodiningrat, Sumarsam, Gitosaprodjo, Purbodiningrat, Poerbatjaraka, Sindoesawarno, and Paku Buwana X, and volume 3 containing a glossary, gendhing notation, and bibliographies--will be equally as valuable.

Kent Devereaux, a composer and performance artist, first studied gamelan at U.C. Santa Cruz with Undang Sumarna, and was later assistant director of Gamelan Pacifica at Cornish Institute in Seattle, Washington. He is currently a Mellon Fellow at the school of the Art Institute of Chicago.

NETWORK

MUSIC INSTITUTE AND INSTRUMENT IMPORTS

The Indonesian archipelago is known for the richness and diversity of its traditional and ethnic arts, including music. The **Lembaga Musik Indonesia (LMI)** is dedicated to the preservation and public presentation of music from all 27 provinces of Nusantara. LMI was founded in 1977, and has sponsored festivals, concerts, and educational programs of both traditional and new Indonesian music. In 1983, LMI staged an exhibition of over 100 musical instruments, the first of its kind in Indonesia.

LMI is now able to offer to interested musicians and collectors fine, hand-crafted gamelan instruments from Central Java. Both Yogyakarta and Solo styles are available and may be purchased individually or as a complete orchestra. We will also search for any of Indonesia's approximately 500 other musical instruments as well as instrument supplies.

Please write to us indicating the name and number of instruments you wish to order, plus any other specifications which will help us to select the best instrument(s) for your needs. We will then send you specific information about prices, ordering, and shipping.

LMI can offer sponsorship, as well as expert information on teachers, schools, and lodging to people planning to study or do research in Indonesia. If you would like to receive announcements about performances, music study in Indonesia, and other Lembaga activities, please write to: **R. E. Didied Herwani, Director, Lembaga Musik Indonesia, Jl. Kolonel Soetarto 144, Solo, Jawa Tengah, Indonesia.**

In his book, **Legacy of the Roaring Sea, v.2, Mantle Hood** begins with the thesis that in Java the musical arts lit the fuse of revolution, consummated in the birth of the Republic of Indonesia. As a foundation for understanding the essential role of the arts in Javanese society a clear distinction is drawn between epic and non-epic societies. Within this purview highlights of the past 2,000 years are reassessed from the viewpoint afforded through knowledge of the arts. Evidence that the musical arts provided a crucial rallying point in the late 19th century to restore the lost prestige of the priyayi is given throughout the text and especially in six appendices. Five of the latter are excerpts translated **in extenso** from the Kraton manuscript of the palace of the Sultan of Yogyakarta, available for the first time outside the royal court. The book may be ordered from **C.F. Peters in New York.**

The film **Shadow Master** is a journey into traditional and modern Balinese life, seen through the eyes of two brothers caught in the crosscurrents of ancient and modern ways. One boy is a student of the traditional Balinese art of shadow puppets, apprentice to the village "shadow master", a combination priest/comedian/puppeteer. The other boy has been seduced by Western values -- motorcycles and gambling -- which cost his family precious farmland. For information on purchase and rental of film or videotape, contact **Larry Reed** at **Foundry Films, 654 A Natoma, San Francisco, California, 94103.** The phone is 415/621-4385.

FESTIVAL OF GAMELAN AND NEW MUSIC

an invitation for proposals, papers, and scores

A company of over sixty performing artists from throughout Indonesia will be in residence at the 1986 World Exposition in Vancouver, from May to September, 1986. The group will be under the direction of Sardono Kusumo, an internationally known choreographer and performance artist, and will present gamelan, dance, and other arts in the pavillion sponsored by the Indonesian government.

A conference and festival of contemporary Indonesian performing arts and their influence on modern forms in the West will take place during this time. Activities will include papers by Indonesian and Western composers and ethnomusicologists, workshops and demonstrations allowing for participant interaction, and a series of concerts representing traditional and contemporary music from both culture areas. The projected dates of the festival are August 15-22, 1986.

This festival will be of major significance to everyone involved. Western composers and musicians, particularly those involved in gamelan, will have a chance to meet their Indonesian counterparts, and the Indonesian artists will gain an international audience for their contemporary innovations in music, dance and theatre. Following their stay in Vancouver, the group will be touring various areas of North America; sponsors and contacts are being sought.

A committee of Indonesian and Western scholars and artists will be reviewing and selecting papers, workshops, scores and performing ensembles to be presented at the festival. Anyone interested in participating may contact this editor, or write directly to the major coordinator: **Amna S. Kusumo; Jl. Gandaria VII/9; Jakarta, 12130, Indonesia.**

Scores should be sent c/o **Balungan:** they will housed in the Archive, and duplicates sent to ASKI, a conservatory of music and dance in Surakarta, Java, where preliminary rehearsals will take place. A five-page prospectus for the conference, written by I Made Bandem, is available from Jody Diamond, box 9911, Oakland, California, 94613.

Gamelan Sekar Jaya, which has performed Balinese music and dance in California for the past five years, has been invited by the governor of Bali to tour Indonesia this summer. This is a significant honor and achievement for this dedicated group of Americans. In a sense, they will be representing all of us Westerners who share their committment to exellence in the performing and study of Indonesian arts. The expenses for the 25 member company of musicians and dancers has been only partly covered by recent fundraising; donations of any size will be of valuable assistance. Contact **Michael Tenzer, 1730 10th St.; Oakland, California, 94606.**

The School for International Training has a new **semester abroad in Bali** program starting in Fall of 1985. The fifteen week program includes language instruction, training in field techniques, and an independent research project. Scholarships and financial aid are available; there are also openings for qualified instructors. Contact **Eloise Biscoe, Admissions (ASA); School for International Training; Brattleboro, Vermont, 05030;** or call toll-free before 4:30 EST at 1-800-451-4465.

SCORE

MAIN BERSAMA-SAMA [Playing Together]

for Sundanese gamelan degung and French horn

Lou Harrison, 1978

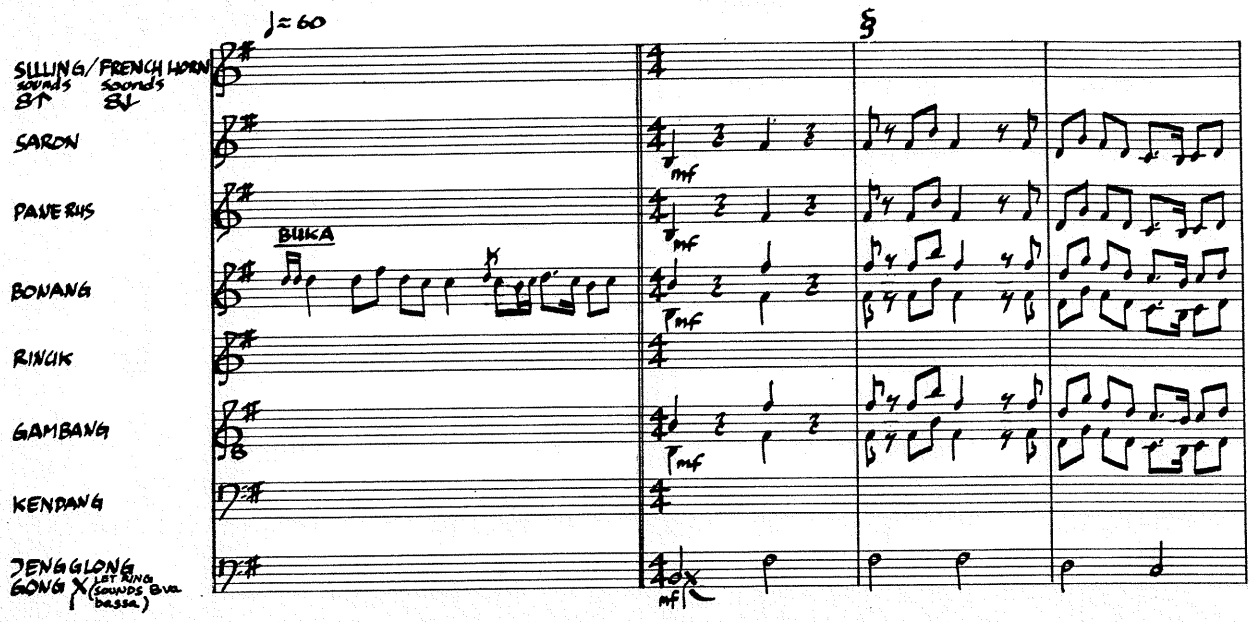
This piece was written for gamelan degung and French horn, although it has recently been successfully performed with a saxophone. "Main Bersama-sama" is one of Lou Harrison's three pieces for gamelan with soloists; there is an excellent recording of it on CRI SD 445, played by Gamelan Sekar Kembar, with Scott L. Hartman on French horn. Those wishing more detailed performance information may contact Trish Neilson, who has directed several performances, at: 9012 Soquel Drive, #1; Aptos, California, 95003.

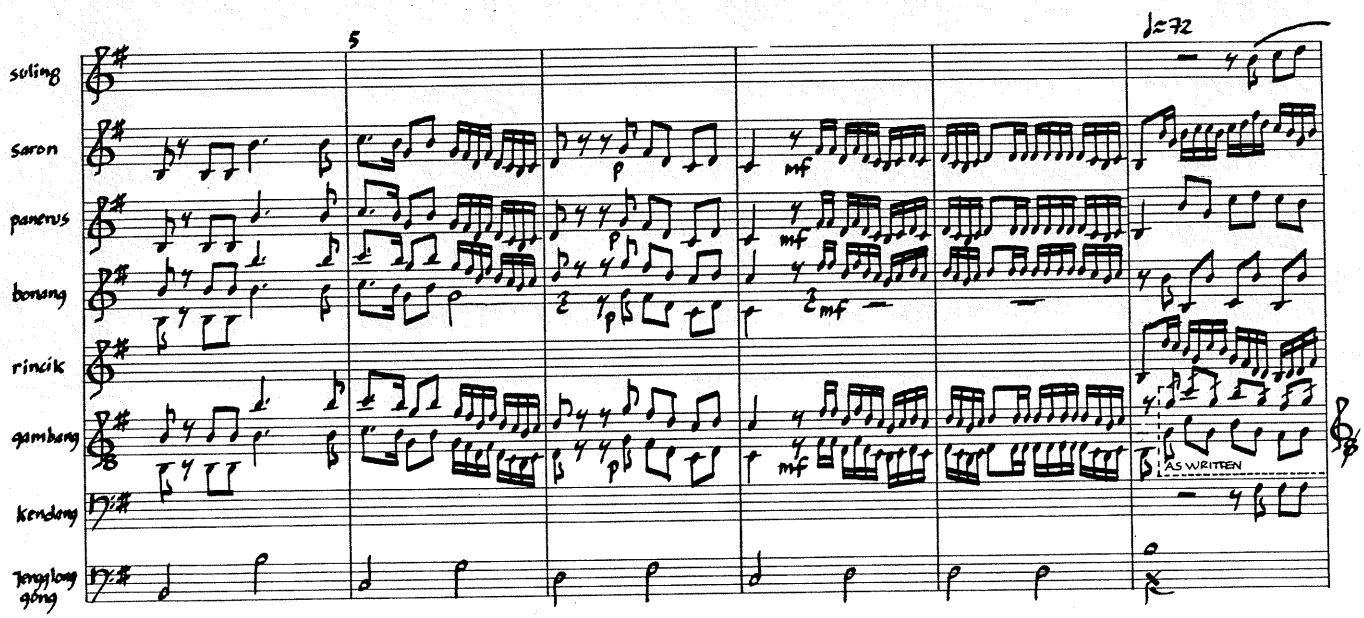
Lou Harrison is a well known composer and humanist who has played an important role in new gamelan through both composition and instrument design. He is presently a professor of music at Mills College in Oakland,

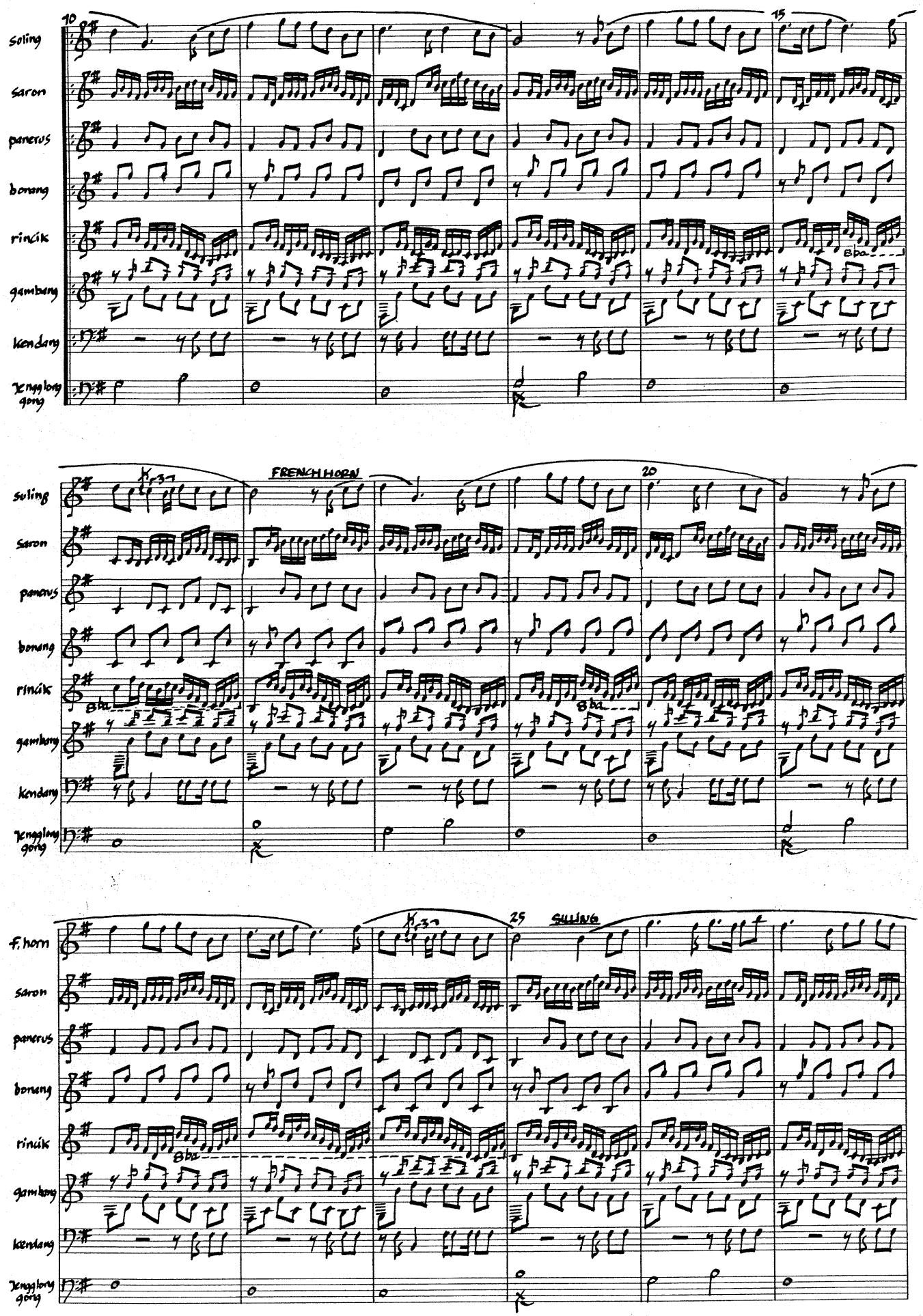
A few words to horn players
by Scott L. Hartman

The two basic differences berween **Main Bersama-sama** and typical Western horn parts are intonation and phrasing. The intonation is determined solely by the tuning of the gamelan being used. A short period of trial and error adjusting or switching slides and fingerings should solve any tuning problems fairly easily, especially with a double Bb-f horn.

The phrases should be very broad, without sudden changes in dynamics or color. The toungeing and ending of phrases may be slightly quieter, but obvious crescendi should be avoided. The final note of each section should be held until the suling part begins, or until the return to measure 1.



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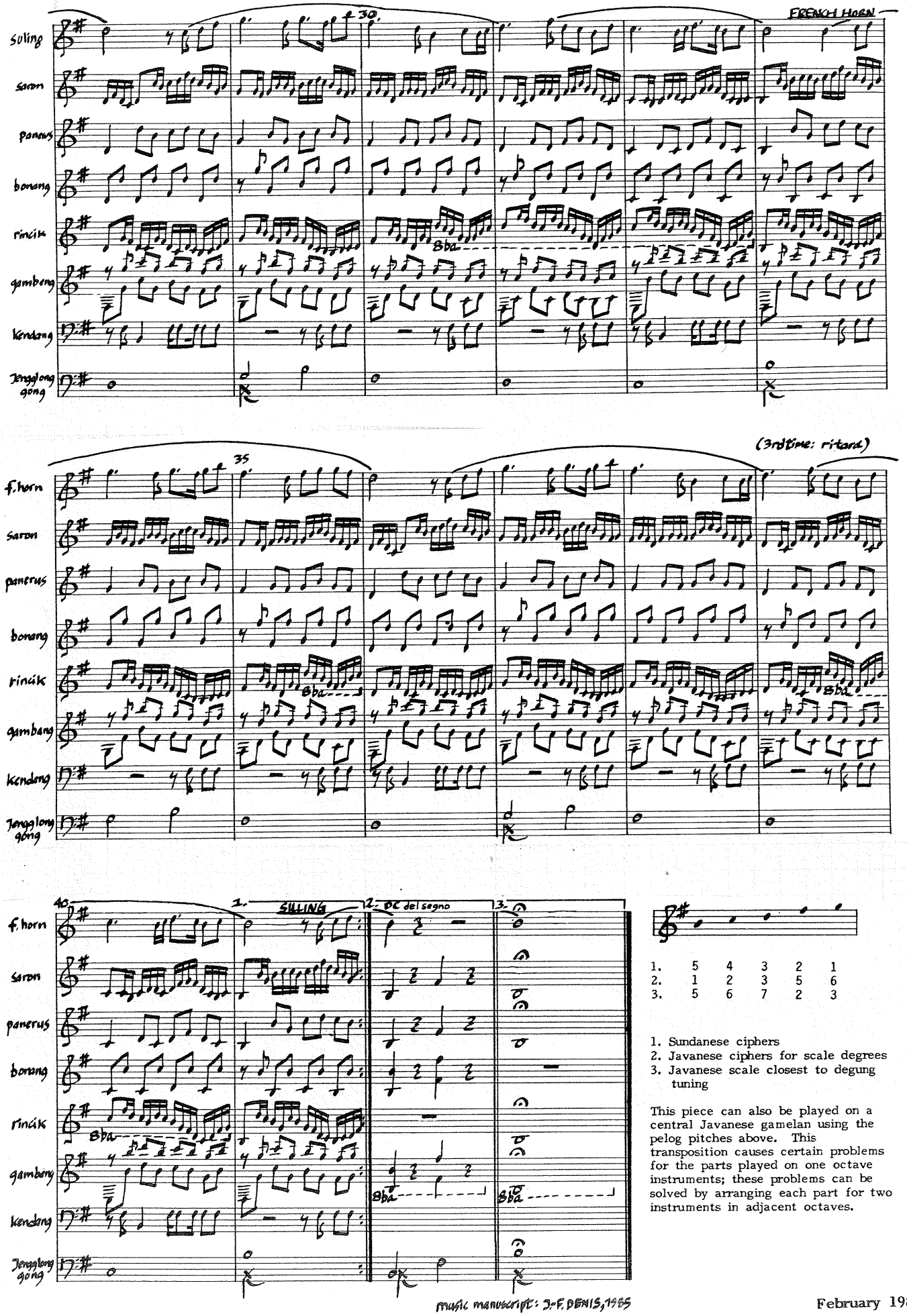

1.	5	4	3	2	1
2.	1	2	3	5	6
3.	5	6	7	2	3

1. Sundanese ciphers
2. Javanese ciphers for scale degrees
3. Javanese scale closest to degung tuning

This piece can also be played on a central Javanese gamelan using the pelog pitches above. This transposition causes certain problems for the parts played on one octave instruments; these problems can be solved by arranging each part for two instruments in adjacent octaves.

Music manuscript: J-F. DENIS, 1985

INSTRUMENTATION

Cengkok for the Gender

by Ben Brinner

The primary method of learning to play the **gender** in Java was and still is direct imitation of other musicians. With the establishment of state-run conservatories and academies in the fifties and sixties, however, gamelan instruction was institutionalized and rationalized, sometimes following European and American conservatory methods. The notated exercises and gender part to Ketawang Puspowarna presented here are representative of the results of these processes.

The gender notation is adapted from a final exam paper written by Suprapto, a student at **Sekolah Menengah Karawitan Indonesia (SMKI)**, a high school level music and dance conservatory in Surakarta, Central Java. It was published in a collection of similar papers by other graduating students (Daladi, et.al., 1982:69-70). In actual practice the rhythm is more complex than indicated in the notation, but these patterns can be of use to Western students of gamelan if their relationship to actual performance is understood. [1]

Gender melodies are highly patterned. The term used to denote these patterns is **cenkok.** [2] Some musicans refer to particular cengkok by name, others do not. With the exception of a few common names such as "Putut Gelut" and "Ayu Kuning", there is little consensus about the names of particular patterns; most names derive from associated vocal melodies as shown in Martopangrawit 1975 (vol.1:70-80). These names are significant mainly as a means of communication and quick reference; the really important aspects of a cengkok are its musical characteristics.

The only way to learn to play gender properly is to study the performance of competent Javanese musicans, preferably through personal contact. There is no adequate substitute for this exposure. Gender notation cannot be correctly interpreted without it, but notation can augment such exposure if one keeps the following points in mind.

The skeletal representations of gender patterns shown here should not be learned or applied in a mechanical fashion. Rather they should be regarded as road maps or guides. They should be treated with as much flexibility as a figured bass is interpreted by a good harpsichordist, with the additional awareness that a particular sequence of patterns such as those presented in the collection mentioned above is merely one musican's way of playing a piece; it is not invested with the exclusive authority that resides in a composer's figured bass indications.

In order to play the gender well it is necessary to be familiar with the **lagu,** the melody, of the particular piece (see Sumarsam 1984). A gender player follows the rebab and vocal melodies and is not tied too closely to the balungan of the particular piece. The gender is not as well suited to indicating register as the rebab and gambang, but it is still possible and necessary to differentiate between high and low portions of a piece, as in the high and low versions of the pattern "Dua Lolo" used in Puspawarna.

Ketawang Puspawarna laras slendro, patet manyuro

balungan

	-+- -+-	-+- -+-
umpak:	.2.3 .2.1)	.3.2 .1.(6)
	.2.3 .2.1)	.3.2 .1.(6)
ngelik:	..6. 2321)	3265 165(3)
	..32 5321)	.3.2 .1.(6)
	.2.3 .2.1)	.3.2 .1.(6)

\+ = ketuk
\- = kempyang
) = kenong
( ) = gong

gender part

irama I:	. 2 . 3	. 2 . 1	. 3 . 2	. 1 . 6
	1/2 Gt3	1/2 DLB		
irama II:	1/2 Gt2, 1/2 Gt3	DLB	JK	Tum
	. 2 . 3	. 2 . 1	. 3 . 2	. 1 . 6
	1/2 Gt2, 1/2 Gt3	DLB	JK	NDk
	. . 6 .	2 3 2 1	3 2 6 5	1 6 5 3
	Gt6	Dlk	K a c a r y a n	
	. . 3 2	5 3 2 1	. 3 . 2	. 1 . 6
	A y u	K u n i n g	JK	Tum
	. 2 . 3	. 2 . 1	. 3 . 2	. 1 . 6
	1/2 Gt2, 1/2 Gt3	DLB	JK	Tum

Ben Brinner is a doctoral candidate at U.C. Berkeley, where he leads a performing gamelan group, and is currently completing his dissertation on the performance of pathetan in Central Java. He has studied with K.R.T. Wasitodipuro, R.Ng. Martopangrawit, R.Ng. Mloyowidodo, and I.M. Harjito, among others.

A good player usually does not play a piece twice in exactly the same way. Variation ranges from slight differences of damping and rhythmic nuance to replacement of a cengkok with another cengkok that is also suitable for that particular point in the course of the piece. Between these two extremes the musician may change several pitches of either the upper or lower part, performing a different variation of the cengkok. [3]

1. The gender part is clearly audible in the recording of this piece on **Javanese Court Gamelan, Vol. II,** Nonesuch H-72074. Also see Vetter 1981 for a comparison of three performances of Ketawang Puspawarna.

2. See Sumarsam 1975, Sutton and Forrest 1980 for discussion of gender playing and cengkok.

3. See Sindoesawarno 1955 for a discussion of wiled and cengkok, and see Sutton and Forrest, in particular, for further discussion of variation in gender cengkok.

CENGKOK CHART

symbol		full name	cengkok
1/2 DLB	=	1/2 Dua Lolo Besar (low Dua Lolo)	6563 656i 6i3. 6121
1/2 Gt2	=	1/2 Gantungan 2	3.3. 3.56 .2.2 .612
1/2 Gt3	=	1/2 Gantungan 3	5.i. 6.6i .3.1 .123
DLB	=	Dua Lolo Besar	565. 5653 565i 656i ..61 2.2. .535 6121
DLK	=	Dua Lolo Kecil (high Dua Lolo)	2126 2121 6562 6121 .12. 5323 212. 321.
JK	=	Jarik Kawung	656i 5616 1213 1216 .263 2126 .161 2352
Tum	=	Tumurun	5353 565i 565i 5616 ..16 5653 .535 6126
Gt6	=	Gantungan 6	535. 5.56 5.5. 5.56 ...2 16.. .3.2 16..
NDk	=	Nduduk	6666 1612 3.23 .216 6... 1612 3.23 .216
Kacaryan			656i 5612 .132 6532 565. 5653 2125 2353 .263 2352 .132 6535 ..23 5.5. 323. 653.
Ayu Kuning			...6 ...1 656i 5616 565. 5653 6563 6561 .216 .561 .263 2352 ..61 2.2. 653. 6121

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1955 Ilmu Karawitan. Surakarta:Konservatori Karawitan. In Indonesian; English translation in Becker and Feinstein 1984.

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1981 "Flexibility in the performance practice of Central Javanese music," Ethnomusicology 25(2):199-214.

Beginning Gender Technique

by Soedarsono Wignyosaputro
collected by Jody Diamond

These exercises were written by S. Wignyosaputro, a former government worker who lives in Surakarta and specializes in teaching beginning gamelan. He has several prize-winning "ibu-ibu" groups — women's social organizations that meet regularly to play gamelan and which participate in many festivals and national competitions. He also teaches beginning gamelan to other organizations, such as a group of telephone company employees that meets one afternoon a week.

Pak Wignyo has several distinctive elements in his teaching style. He places great emphasis on all students singing the balungan, both before and during the actual playing of the instruments. He has also developed an approach to the technically more demanding instruments that begins with a series of exercises and then moves to the actual patterns that are used in playing pieces. Many students can be overwhelmed by the effort to achieve both technical ability and musical understanding at the same time; Pak Wignyo found that separating these efforts into two steps made the initial challenge easier for many students. (For proof of his method, Pak Wignyo explains that his son, who had no other training that his father's teaching, is now a junior instructor at ASKI, the highest ranking conservatory in Solo.) The exercises themselves are not used in actual performance, but they incorporate many of the techniques and hand motions that are involved in actual **cengkok.**

Damping of keys is an extremely important aspect of gender playing. The exercises presented here can serve as a vehicle for practicing the different types of hand motion necessary when damping keys while moving to the right and to the left. These exercises also reflect the fact that most most melodic activity on the gender is executed by the left hand.

In the following exercises, the right hand (R) is on the top line, and the part played by the left hand (L) is one the bottom. The dots (.) indicate a rest, and the lines above two notes ($\overline{65}$, $\overline{.2}$) indicate subdivisions of the beat. The photographs show the hand positions; each note is damped by the heel of the same hand that played it. Tones should be damped at the same time as, or immediately after, the next note is played. If the note following a rest is a repeated tone, however, that note should be damped on the intervening rest (1 $\overline{23}$.3.).

The slendro gender usually has 13 or 14 keys, with tones that fall in three different octaves, indicated by dots:

6 1 2 3 5 6 1 2 3 5 6 1 2 3

Since the musical challenge of the gender is even more formidable for Western students who do not have the advantage of a lifetime of exposure to the sounds of gamelan, perhaps these exercises may serve as an introduction to the instrument whose sound has been described as "the blood pulsing through the veins" of the music. It is too often the case, particularly in the situation where no Javanese teacher is regularly available, that the more difficult instruments are left unexplored. Unfortunately, this is synonymous with ignoring some of the most complex and beautiful, as well as essential, elements of Javanese music.

I. Cadence on gembyang (octave)
From high to low, from right to left.

A. R: . 3 . 2 . 1 . 6 . 5 . 3 . 2 . 1 . 6
L: 6 3 5 2 3 1 2 6 1 5 6 3 5 2 3 1 2 6

B: R: . 3 . 2 . 1 . 6 . 5 . 3 . 2 . 1 . 6
L: $\overline{653}$ $\overline{532}$ $\overline{321}$ $\overline{216}$ $\overline{165}$ $\overline{653}$ $\overline{532}$ $\overline{321}$ $\overline{216}$

From low to high , from left to right.

C. R: . 2 . 3 . 5 . 6 . 1 . 2 . 3
L: $\overline{612}$ $\overline{123}$ $\overline{235}$ $\overline{356}$ $\overline{561}$ $\overline{612}$ $\overline{123}$

From high to low, from right to left.

D. R: . 2 3 2 . 1 2 1 . 6 1 6 . 5 6 5 . 3 5 3 . 2 3 2 . 1 2 1. 6 1 6
L: .$\overline{53232}$. .$\overline{32121}$. .$\overline{21616}$. .$\overline{16565}$. .$\overline{65353}$. .$\overline{53232}$. .$\overline{32121}$. .$\overline{21616}$

II. Beginning patterns to cadence tones. From high to low.

A. R: 1 2 1 3 6 1 6 2 5 6 5 1 3 5 3 6 2 3 2 5 1 2 1 3 6 1 6 2
L: 1 2 3 . 6 1 2 . 5 6 1 . 3 5 6 . 2 3 5 . 1 2 3 . 6 1 2 .

B. R: 3 2 3 1 2 1 2 6 1 6 1 5 6 5 6 3 5 3 5 2 3 2 3 1 2 1 2 6
L: 3 2 1 . 2 1 6 . 1 6 5 . 6 5 3 . 5 3 2 . 3 2 1 . 2 1 6 .

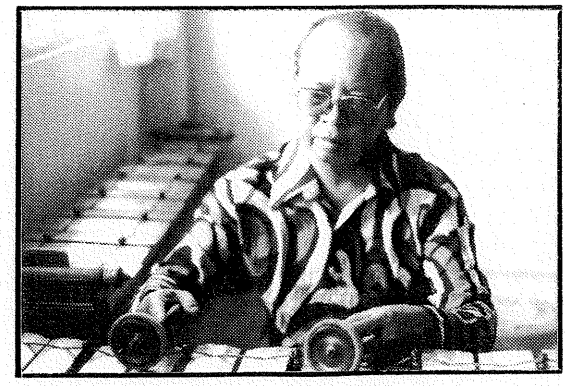
III. Further development of the beginning pattern

A. R: 1 2 1 3 6 1 6 2 5 6 5 1 3 5 3 6 2 3 2 5 1 2 1 3 6 1 6 2
L: 1 $\overline{23}$.3. 6 $\overline{12}$.2. 5 $\overline{61}$.1. 3 $\overline{56}$.6. 2 $\overline{35}$.5. 1 $\overline{23}$.3. 6 $\overline{12}$.2.

IV. An actual pattern (to pitch 6) and variation
This would be used in irama II.

A. R: 5 6 5 . 5 6 5 1 5 6 5 1 5 6 1 6
L: . . 5 6 1 . 1 . . 5 . 3 . 5 . 6

B. R: 5 6 5 . 5 6 5 1 5 6 5 1 5 6 1 6
L: . . .$\overline{56}$ 1.1$\overline{61}$.1 . 5 6 3 . $\overline{56}$.6.



GAMELAN DIRECTORY

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b) Type of Ensemble and Repertoire
c) Material of Construction
d) Tuning (Number of Pitches, Tuning Characteristics)
e) Name of Gamelan (or Ensemble)

Contact Address: Director/Owner
(owner if other than above)

---

106 SAN FRANCISCO
a) America (Joan Bell Cowan, Don Cowan, Daniel Schmidt)
b) Javanese style, new music
c) aluminum
d) slendro, just intonation
e) Gamelan Range of Light

Joan Bell Cowan
2445 Union St. #203
San Francisco, CA 94123

107 APTOS
a) Yogyakarta (Daliyo)
b) traditional Javanese and new music
c) iron and brass
d) slendro
e) Si Aptos

Lou Harrison and William Colvig
7121 Viewpoint Road
Aptos, CA 95003

Correction
64 DE KALB
Han Kuo-Huang, director (correct spelling)

NEXT ISSUE

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Kent Devereaux	book review of Roger Long's **Wayang Kulit;** guest editor for special "midwest" issue
Ben Brinner	Innovations in Gamelan Music for Wayang Kulit
Ernst Heins	Gamelan Activities in Europe

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Interviews with:
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I Wayan Sinti on Balinese scholarship and composition
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Tuning Systems in American Gamelan, Part I.

References

Martopangrawit, Raden Lurah, **Catatan-Catatan Pengetahuan Karawitan** (Notes on Knowledge of Gamelan Music), translated by Martin Hatch, in **Karawitan: Source Readings in Javanese Gamelan and Vocal Music, Vol. 1,** [Ann Arbor]:Center for South and Southeast Asian Studies, 1984

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Harrison, Lou, "ITEM: Five-Tone, Six-Tone, and Seven-Tone Modal Forms within the Traditional Matrix of Two Tetrachords separated by a Nine to Eight", in **XenHarmonikon 4,** Fall 1975, John Chalmers, publisher

Glossary
contributed by Daniel Kelley

rational interval -- an interval defined by two pitches whose frequencies are related by whole numbers. Rational intervals are designated as ratios of their frequencies written as a fraction. Some commonly known intervals would be expressed thusly: unison, 1/1; octave, 2/1; a just fifth, 3/2; a just major third, 5/4; a just major second 9/8; a just harmonic minor seventh, 7/4. A series of pitches tuned in this kind of relationship is said to be in just intonation.
rational tuning -- a tuning system utilizing the rational intervals
spiral tuning -- a tuning system in which octaves are made wider or narrower than 2/1
cent -- a unit representing 1/1200 of an octave, or 1/100 of an equal tempered semi-tone
harmonic series -- a sequence of frequencies that are exact integer multiples of a fundamental frequency, ie., F, 2F, 3F, 4F, ...
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