AMath 390 Lecture:
Tuning of Balinese Gamelan Instruments

Prof. Maisie Sum, Department of Music
Conrad Grebel University College, University of Waterloo

1. Two Gamelan Tuning Systems

slendro: 5-tone system
- smoother pentatonic subdivision of the octave
- intervals ~ 200–300 cents
- few Balinese gamelan tuned to *slendro* system

pélog: 7-tone system
- traditional Balinese repertoire makes use of 5 tones
- three small intervals (80–200 cents) + two large intervals (350–450) → distinctive tonal character

2. *Pélog* Tuning System and Modes

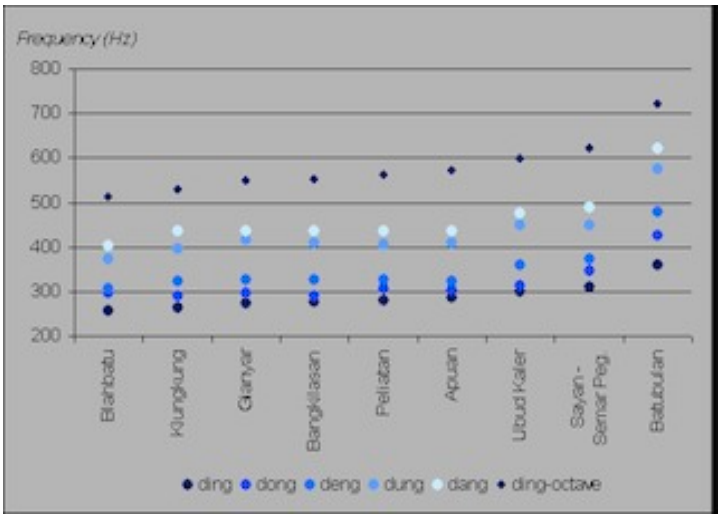
Parent pélog tones:	1	2	3	4	5	6	7
*selisir mode:	ding	dong	deng	(—)	dung	dang	(—)
tembung mode:	dung	dang	(—)	ding	dong	deng	(—)
sunaren mode:	(—)	dung	dang	(—)	ding	dong	deng

Reproduced from Tenzer (2011: 37)

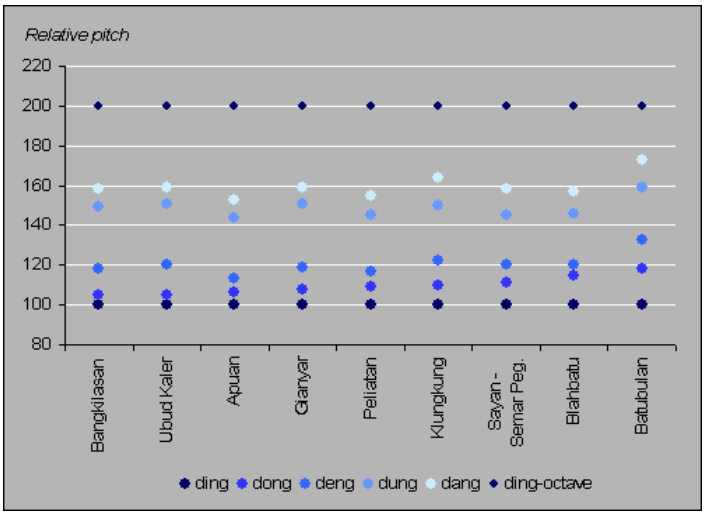
3. Variation in Tuning: Pitch and Intervals

- pitches vary within a range of 300 cents

E.g., *ding* is most often close to C4 or C#4, but may extend to D#4



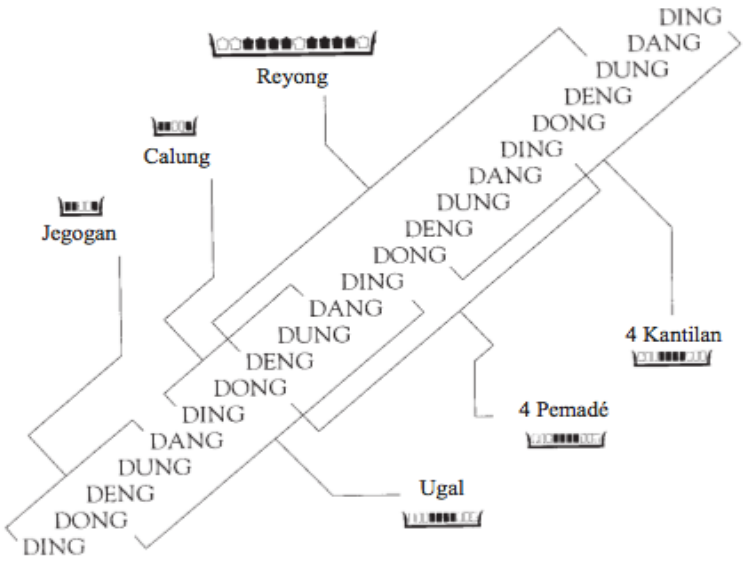
a) Actual Pitch



b) Relative Pitch

(from Duimelaar, Pieter. *Gamelan Bali*. http://www.gamelan-bali.eu/pitch_and_tuning.html)

5. The Range of Gamelan Gong Kebyar Instruments



(from Tenzer 2011: 70)

6. Paired Tuning: Shimmering Quality (*ombak*)

	Lower Pitch (Hz)	Higher Pitch (Hz)	Beating Rate (Hz)	Frequency ratio (H/L)	Cents
First octave	130	138	8	1.061538…	~103.39
Second octave	260	276	16	Same as above	Same as above
Second octave	268	276	8	1.0298507…	~30.92
Second octave	260	268	8	1.0307692…	~52.47
Second octave	Both altered		8		

References

Tenzer, Michael. 2011[1998]. *Balinese Gamelan Music*, Third Edition. Vermont: Tuttle Publishing.
Tenzer, Michael. 2000. *Gamelan Gong Kebyar: The Art of Twentieth Century Balinese Music*. Chicago: The University of Chicago Press.