

Experimentalism

The years of World War II marked a general hiatus in European music. For American composers the period was hardly better, even though the fighting was overseas. In their state of war-aroused patriotism, American audiences were uncomfortable about enjoying music by Germans and Italians. And yet, rather than program more American music as might have been expected, orchestras turned toward the repertoire of non-Germanic Europe, increasing their proportion of Norwegian, French, and English works. During World War I, the presence of American music (measured as percentage of the total number of works performed) on the programs of the New York Philharmonic and Boston Symphony Orchestras had risen slightly as German offerings dipped, then returned after the war to approximately the original levels:¹

	AMERICAN		GERMAN/AUSTRIAN	
	NYPO	BSO	NYPO	BSO
1916-17	3.2%	9.8%	60%	62%
1917-18	8.7%	4.8%	47%	42.6%
1918-19	10.5%	7.9%	32%	29.7%
1919-20	4.2%	7.2%	51%	43.3%
1920-21	4.4%	12%	67%	44%
1921-22	5.5%	6.3%	65%	49.5%

(So popular was Wagner that his participation in the revolution of 1848-1849 was widely adduced to prove that, were he still alive, he would have been as opposed to the Kaiser as the Americans were; therefore it was all right to listen to his music.) World War II evinced a similar pattern: patriotic interest in home-grown art did not survive the cessation of hostilities. Despite attempts by American composers throughout the thirties to reach out to a wider public, they found that neither the patriotism of the war years nor their own simplification of their language led to increased opportunities. In the long run, in fact, the effect was quite opposite, and not only because of the termination of the WPA.

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Hundreds of European musicians as well as untold thousands of European music-lovers found themselves exiled to America (including Europe's greatest composers, who will be discussed in chapter 5). With their presence, the classical music establishment veered drastically away from American music. In the prewar period, conductors had felt some obligation to program American works. Under the American conductor Frederick Stock, for example, the Chicago Symphony, which he directed until 1942, normally performed one American work per concert, except for the occasional all-Beethoven or all-Wagner program. After World War II, partly because of the influx of Europeans (especially conductors) who had no faith or interest in American composers, that rate dropped down to about two or three American works per orchestra per year. From the standpoint of American music's presence in classical music programs, the influx of European émigrés was a disaster.

Naturally, the war interrupted all but a few musical careers. Some composers, such as Ben Johnston and Ulysses Kay, played in the Navy band. Blitzstein, fighting in the 8th Army Air Force in England, took the opportunity to collect songs of the French resistance. Barber was drafted into the Army Air Force, which commissioned him to write his Second Symphony on the base at Fort Worth; he later withdrew the work. Milton Babbitt, with his mathematical expertise, did military research on code-breaking. Piston was a civilian air raid warden. Ross Lee Finney served for the American Office of Strategic Services, stepped on a land mine, and survived to receive a Purple Heart. Roger Sessions left Europe and found a teaching job because he saw the war coming. Even Colin McPhee in Bali could not escape the war; he beat a hasty retreat to America in 1939 partly because the Japanese were scrutinizing Bali for strategic military purposes (also because the hard-pressed Dutch were beginning to crack down on homosexual activity in their island territories). Once home, composers encountered a scene in which there was little further interest in their music, nor any way to get it performed. No American composers of any reputation died fighting, but one, Charles Naginski (1909–1940), committed suicide at Yaddo in his depression over the dearth of professional opportunities.²

Depending on how you look at it, America's disenfranchisement of its composers has been a freeing influence as well as an alienating one. A statement by Henry David Thoreau could be taken as the philosophic basis of American music. After Thoreau published *Walden*, the great majority of the copies, unsold, were returned to him by the publisher; Thoreau put them in a coffin and mused, "It makes me feel so good that no one is interested in my work, because it leaves me free to go in any direction that is necessary." The composers in this chapter are not really associated with each other, nor with the war years (although the careers of Partch, Nancarrow, Brant, and Harrison did begin more or less in war time, and each was forced by the absence of societal support to find a

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new way to make music). What they have in common is that they all worked outside the mainstream of American musical life. By not providing what a composer needs to have a rewarding career, America has turned many of its best musical minds into experimentalists. Each composer here followed his own course and created his own tradition.

Harry Partch

Of all America's nonconformist composers, none has valued independence more than Harry Partch (1901–1974). From the first moment of his musical life, he growled in a late interview, "I was not going to be straitjacketed by anyone. I was going to be completely free."³ He achieved that aim to an astonishing extent. He invented new, whimsical instruments. He abandoned Europe's twelve-pitch scale and devised a new one with forty-three pitches to the octave. From the surviving shards of ancient Greek drama, Chinese theater, and American Indian ritual, he forged his own style of performance, incorporating dance, costumes, and theater. If originality is the essence of American music, Partch was the most American composer of all.

Born in Oakland, California, on June 24, 1901, Partch was the son of Presbyterian missionaries who fled China after the Boxer Rebellion. The family later moved to Tucson, Arizona, and then Albuquerque. The boy's early impressions, then, were a mixture of Chinese (including his mother's lullabies), Mexican, and Yaqui Indian influences. In his teens he became proficient on the piano, wrote piano music, and made money by providing musical accompaniment at silent movie theaters. Partch dated the beginning of his apostasy from European music to 1923, the year in which he ran across Hermann Helmholtz's classic volume on acoustics, *On the Sensations of Tone*.

What Partch found in Helmholtz convinced him that European music had been based on, as he called it, an acoustic lie. He began experimenting with stringed instruments, tuning them differently, and in 1930, living in New Orleans, he made his break vividly symbolic: he burned all the music he had written up to that point, including a piano concerto, in a big, pot-bellied stove. He invented his first instrument, the adapted viola, and began performing by himself. Traveling to New York, he met Copland, Harris, Cowell, Seeger, Hanson, Piston, and Otto Luening, interesting them in his work.⁴ In 1934, he received a \$1,500 grant from the Carnegie Corporation that allowed him to visit the British Museum to research the history and theory of tuning. On a side trip to Dublin he also visited the poet W. B. Yeats (1865–1939), to play him sketches he had made for an opera based on Yeats's *Oedipus*. The great man gave Partch some much-needed encouragement.

When the grant ran out, Partch returned to an America in the grip of Depression. For the next eight years, he lived as a hobo: stealing rides

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Harry Partch performing on two of his instruments: the gourd tree and the cone gongs. *Courtesy BMI Archives.*

in train boxcars, living in transient shelters and hobo camps, picking grapes, cleaning latrines, and—as an absolute last resort—begging for food. As he lived this way, he transcribed the speech patterns of the bums he lived among, recording them in a diary later published under the title *Bitter Music*. Because of this experience, and his ear for speech patterns, Partch in his later theater works became the voice of the highway in art music, our operatic Jack Kerouac.

What was the “acoustic lie” that Partch rebelled against? He inherited, as we all have, an octave containing twelve equally spaced pitches. An octave is defined as the pitch space between two pitches, one of which vibrates twice as fast as the other. If, for example, an A vibrates at 440 cycles per second, the A an octave higher vibrates at 880 cycles per second. Therefore, the ratio of an octave is 2:1. Any musical interval that can be expressed by a ratio between small whole numbers is, by definition, considered consonant—that is, simple and intelligible to the ear. A. J. Ellis (Helmholtz’s translator) established a perceptual unit for measuring the size of intervals: the cent. By definition, an octave is 1,200 cents large.



EXAMPLE 4.1 A just-intonation scale in ratios, cents, and frequencies.

4.2

Most pianos are tuned today by a system known as equal temperament, wherein the twelve pitches divide the octave into twelve equal steps:

	C	C#	D	E♭	E	F	F#	G	A♭	A	B♭	B	C
CENTS:	0	100	200	300	400	500	600	700	800	900	1000	1100	1200

However, equal temperament contains only one pure consonance: the 2:1 octave. Other pure consonances are shown in example 4.1. The approximate sizes of these pure intervals in cents are as follows: octave (2/1), 1,200; fifth (3/2), 702; fourth (4/3), 498; major third (5/4), 386.3; major sixth (5/3), 884.4; minor third (6/5), 315.6; and minor sixth (8/5), 813.7. As you can see, apart from the octave, none of these pure consonances can be found in the equal-tempered scale of the modern piano.

The pure tuning of intervals according to their mathematical ratios is called "just intonation." For example, a twelve-pitch keyboard might be tuned as in example 4.2 (ratios and cents given with reference to C as a starting point). The tuning given here will be perfect if one wants to play in the key of C. The moment one wants to play in the key of D, however, the perfect fifth on D (D to A) is only 680 cents instead of 702, a dissonant, unusable interval with a ratio of 40:27. Equal temperament shifts all of the intervals a little out of tune to make all keys equally viable.

Partch, however, insisted on having his musical intervals perfectly consonant and also on having access to consonances that European

PITCH:	C	C#	D	E♭	E	F	F#
RATIO:	1/1	16/15	8/8	6/5	5/4	4/3	45/32
CENTS:	0	112	204	316	386	498	590
CPS:	264	281	297	316.8	330	352	371.25

PITCH:	G	A♭	A	B♭	B	C
RATIO:	3/2	8/5	5/3	9/5	15/8	2/1
CENTS:	702	814	884	1018	1088	1200
CPS:	396	422.4	440	475.2	495	528

EXAMPLE 4.2 Ratios of common intervals, tuned in just intonation.

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music had never used, intervals that slipped between the keys of the piano, such as 7:4 (969 cents) and 11:8 (551 cents). He developed a scale of forty-three pitches to the octave, given in example 4.3, with G as its tonic. Ratios of small numbers are consonances; those of larger numbers (such as 40:27 or 160:81) are dissonant over the tonic G but allow consonance over other steps of the scale for purposes of modulation to different keys. There is nothing acoustically sacred about the number forty-three; Partch often used scales of fewer pitches and arrived at forty-three by aiming for a fairly even distribution across the octave.

Clearly, to play this forty-three-pitch scale, Partch had to invent new instruments. His first, the "adapted viola," is a viola with a fingerboard extended six inches longer than normal, which is held between the knees while playing and has tiny brads nailed into the fingerboard as frets. The Chromelodeon I is a harmonium, or reed organ, with its reeds tuned to the forty-three-tone scale. The keys are painted with blocks of different colors, so that the eye can quickly recognize which tonality each pitch is consonant in. Partch's kithara, based on the ancient Greek instrument of the same name, is a tall, harplike instrument with seventy-two strings grouped in twelve vertical rows of six each. The strings are plucked with a plectrum, and smooth glissandos are made possible by sliding Pyrex glass rods that act as movable bridges. The Surrogate Kithara has sixteen horizontal strings. The diamond marimba places thirty-six wooden marimba blocks over resonators in a diagonal, diamond-shaped pattern. The pitches are arranged in a criss-cross pattern so that a sweep in either diagonal direction remains within a single tonality. The most heavenly timbre in many of Partch's compositions comes from the cloud-chamber bowls, which are sawed-off sections of twelve-gallon Pyrex glass bottles, played—lightly, lest breakage occur—with a mallet.

The Partch instruments, over two dozen in all, are beautiful to look at as well as to hear, for he felt that music should be not only an aural but also a visual and theatrical experience. His performers wear costumes, and playing his instruments requires dancing.

Partch's hobo years ended when a friend offered him a place to live and work in Chicago; he immortalized the freight-train trip to Chicago in his music-theater piece *The Wayward*. The next thirty years saw him establish and abandon a series of studios in Wisconsin, California, Illinois, and Ohio. Despite continuing hostility from several university music departments, he presented his music at Bennington and Eastman, enjoyed a three-year residency at the University of Wisconsin, performed *Oedipus* at Mills College, and started an ensemble at the University of Illinois. In Sausalito he recorded his works on a private record label called Gate 5.

During these years Partch wrote several major theater works, including the dance-drama *The Wayward* (1941–1943), *Oedipus* (1951), *The Bewitched* (1955), *Revelation at the Courthouse Park* (1960, an adapta-

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RATIO	CENTS	INTERVAL NAME
1/1	0.0	
81/80	21.5	syntonic comma
33/32	53.3	
21/20	84.5	
16/15	111.7	half-tone
12/11	150.6	undecimal "median" second (1.5 half-steps)
11/10	165.0	
10/9	182.4	minor whole-tone
9/8	203.9	major whole-tone
8/7	231.2	septimal whole-tone
7/6	266.9	septimal minor third
32/27	294.1	Pythagorean minor third
6/5	315.6	minor third
11/9	347.4	undecimal "median" third
5/4	386.3	major third
14/11	417.5	
9/7	435.1	septimal major third
21/16	470.8	septimal fourth
4/3	498.0	perfect fourth
27/20	519.6	
11/8	551.3	undecimal tritone
7/5	582.5	septimal tritone
10/7	617.5	septimal tritone
16/11	648.7	
40/27	680.4	
3/2	702.0	perfect fifth
32/21	729.2	
14/9	764.9	septimal minor sixth
11/7	782.5	undecimal minor sixth
8/5	813.7	minor sixth
18/11	852.6	undecimal "median" sixth
5/3	884.4	major sixth
27/16	905.9	Pythagorean major sixth
12/7	933.1	septimal major sixth
7/4	968.8	septimal minor seventh
16/9	996.1	minor seventh
9/5	1017.6	minor seventh
20/11	1035.0	
11/6	1049.4	undecimal "median" seventh
15/8	1088.3	major seventh
40/21	1115.5	
64/33	1146.7	
160/81	1178.5	
2/1	1200	octave

EXAMPLE 4.3 Harry Partch's 43-tone scale.

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tion of Euripides's *The Bacchae*), *Delusion of the Fury* (1965–1966), and *The Dreamer that Remains* (1972, a mini-opera protesting the proliferation of “No Loitering” signs). Instrumental works, usually for dance, include *Castor and Pollux* (1952), *Daphne of the Dunes* (1958), and *And on the Seventh Day Petals Fell in Petaluma* (1963–1966). Partch's ensemble style is based in percussion, and his music is propulsively rhythmic, often dividing the beat into five quick pulsations and grouping beats into meters of five, seven, or nine.

The infectious rhythms and exotic timbres of this music are matched by its wisdom and humor. *The Bewitched* contains scene titles such as Scene 1: “Three Undergrads become Transfigured in a Hong Kong Music Hall”; Scene 4: “A Soul Tormented by Contemporary Music Finds a Humanizing Alchemy”; and Scene 9: “A Lost Political Soul Finds Himself Among the Voteless Women of Paradise.” At the end of *Delusion of the Fury*, a mime opera based on the Japanese Noh theater, a deaf hobo gets in an argument with an old woman over a goat. At the trial, the superbly near-sighted judge says to the hobo (as the old woman holds the goat), “Young man, take your beautiful young wife and your charming child and go home, and never let me see you in this court again!” The chorus responds with a joyous refrain: “Oh how would we ever get by without justice!”

Like so many radical American experimentalists, Partch has often been dismissed as an amateur. He was not. His major book, *Genesis of a Music* (1949), its delightful vernacular tone notwithstanding, remains the best, most insightful one-volume history of tuning available. Many of Partch's instruments have been duplicated (the originals are at the Smithsonian Museum), and performances of his music, usually under the direction of people who performed with him, are becoming fairly common. The composer Dean Drummond, whose Newband ensemble uses Partch instruments, has commissioned new works from other composers for those instruments. The music Partch created from scratch has become a continuing tradition.

Listening Example: Barstow

“It's a mighty long stretch,” wrote Partch, “to Needles, or to Las Vegas. . . . Barstow from the west is easy. But east it turns into a hitchhiker's bottleneck.” This explains why, on the highway railing of U.S. 66 at Barstow, as he headed toward Chicago and a place to live, Partch found such (comparatively) long and elaborate hitchhiker inscriptions:

It's January 26. I'm freezing.
Ed Fitzgerald. Age 19. Five feet, ten inches.
Black hair, brown eyes.
Going home to Boston, Massachusetts.

It's 4:00, and I'm hungry and broke.
 I wish I was dead.
 But today I am a man.

Fascinated, Partch set eight such inscriptions to music in 1941, revising them with an expanded instrumentation in 1954. *Barstow*, a section of *The Wayward*, is scored for "Speaking and/or Singing Voice," "Chorus Voice," surrogate kithara, chromelodeon I, diamond marimba, and boo. Each inscription begins with the same introduction. That introduction is given in example 4.4, first in Partch's notation (indicating what notes to play to get the required pitches), then in Ben Johnston's microtonal notation (explained below), which, if one ignores the unfamiliar accidentals, will give an approximate idea of the pitches intended. The numbers in the Diamond Marimba part show what row to play the notes on, and one can get a sense of how physical Partch's writing is.

The image displays two staves of musical notation for the piece 'Barstow' by Harry Partch. The top staff is labeled 'Chromelodeon I' and shows Partch's original notation with various accidentals and note heads. The bottom staff is labeled 'Diamond Marimba' and shows Partch's original notation with numbers (3, 5, 2, 3, 5, 2, 3, 2) indicating the rows to be played. Below these is a section labeled 'Actual pitches:' which shows the transcribed notation by Ben Johnston, using standard musical notation with various accidentals to represent the microtonal pitches.

EXAMPLE 4.4 Harry Partch, *Barstow*, in original and transcribed notations.

Ben Johnston

Ben Johnston (b. 1926) has been a seminal compositional figure in the American Midwest, less well-known on the coasts. Most of his music, despite its wide variety of idioms, is united by its use of just intonation. Johnston is particularly important for his ten (so far) string quartets, the most thoroughgoing and beautiful exploration of that genre since Schoenberg and Bartók. Though he belongs to a later generation than the other composers in this chapter, he was for years Partch's only pro-

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tégé to develop his own brand of just intonation, and his work in this area is so closely related to Partch's that they are more easily discussed side by side. In addition, although Johnston was central to the exciting scene that occupied the midwestern universities in the 1960s and 1970s, his music is not typical of that scene. He is a loner whose path lies far away from the trends of recent decades.

Born March 15, 1926, in Macon, Georgia, Johnston heard, at age 11, a lecture about Helmholtz's influence on Debussy, giving him his first taste of the acoustical truths he would pursue for the rest of his life. As early as 1944, following a recital of his compositions, an interview with Johnston in the *Richmond Times-Dispatch* referred to his view "that with the clarification of the scale which physics has given to music there will be new instruments with new tones and overtones."⁵ Graduating from the College of William and Mary, Johnston attended graduate school at Cincinnati Conservatory, where, in 1949, a musicologist who knew of his interest in acoustics gave him a copy of Partch's *Genesis of a Music* hot off the press. Johnston wrote to Partch, who invited him to come live and work at his studio at Gualala. Johnston and his wife stayed for six months of 1950.

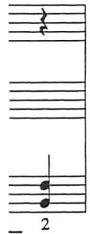
Though not handy with tools, Johnston possessed from the beginning a remarkable ear. As he later wrote, Partch

could have wished for a carpenter or for a percussionist. . . . But he had one thing he had not counted on: someone who understood his theory without explanation, and who could hear and reproduce the pitch relations accurately.⁶

Johnston and his wife appear as performers on Partch's early recordings of his music. He wanted to study composition further, though, and Partch, who refused to teach, suggested he study at Mills with Darius Milhaud. Upon finishing his master's at Mills, Johnston was soon hired by the University of Illinois at Urbana, where he taught until his retirement in 1983.

From the outset, Johnston used tuning differently from Partch. For one thing, being neither a carpenter nor inclined to build his own instruments, he waited until 1960 to write in just intonation. (His first such piece was *Five Fragments*, a vocal piece based on texts from Thoreau.) Under Milhaud's influence he first went through a brief neoclassic phase, typified by his rather Stravinskian Septet (1956–1958). When the iconoclastic John Cage gave an inflammatory performance in Urbana at a 1952 Contemporary Arts Festival, Johnston was the only music faculty member who would talk to him afterward, and he later studied with him briefly in New York. Cagean elements such as chance and quotation appeared in Johnston's *Gambit* of 1959, along with neoclassic and jazz elements. However, he had already used a twelve-tone row in his *Etude-*

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Toccata for piano of 1949, and twelve-tone technique would appear intermittently in his music all his life, even in his just-intonation works.

Theoretically, just intonation and twelve-tone music are diametrically opposed. Just intonation implies a central, tonic pitch, while twelve-tone music explodes pitch hierarchy. Johnston, however, wanted his chromaticism purely tuned and came up with several different solutions to well-tuned atonality. His *Sonata for Microtonal Piano* (1964) expressed a crisis both personal and creative. (Johnston has suffered mental health difficulties following a period spent in the cult around Gurdjieff in the early 1960s.) The work's tuning involves purely tuned fifths and triads radiating out from the center of the keyboard, a complex plan in which there are virtually no purely tuned octaves; chords within any small register will be purely consonant, but anything involving different registers is dissonant in the extreme. The *Sonata* is a complex, fragmented piece based on twelve-tone rows abstracted from pop tunes ("I'm in the Mood for Love" and "What Is this Thing Called Love?"). A later, calmer work is Johnston's *Suite for Microtonal Piano* (1978), in which the piano is tuned to the 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 24th, 26th, 27th, 28th, and 30th harmonics above C. The outer movements, in the key of C, contain a strong sense of tonic. One movement is twelve-tone, however, and the remaining two are in D and E, respectively, in which the C overtones create a strangely exotic scale.

One thing Johnston had inherited from Partch was a concern for both overtones and "undertones," the latter being the overtone series inverted; in Johnston's usage, overtones suggest a major tonality, undertones a minor one. His rows often consist of six overtones of one pitch combined with six undertones of another, with perhaps a seventh overtone as their common pivot note. For example, the row of his Sixth String Quartet (1980) consists of an overtone series on D and an undertone series below D \sharp (given in Johnston's notation, explained below):

	OVERTONES	UNDERTONES
1	D	D \sharp
3	A	G \sharp
5	F \sharp	B
7	C7+	E \sharp L
9	E+	C \sharp
11	G7+	A \sharp L

Rather than being limited to a forty-three-pitch scale like Partch's music, Johnston's works may potentially include hundreds of distinct pitches. To negotiate this sea of endless pitches, Johnston invented an elegantly specific notation of new accidentals, as follows:

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+	raises a pitch 81:80, or 21 cents
-	lowers " " 80:81 or -21 cents
#	raises " " 25:24, or 71 cents
♭	lowers " " 24:25, or -71 cents
7	lowers " " 35:36, or -49 cents
♭	raises " " 36:35, or 49 cents
↑	raises " " 33:32, or 53 cents
↓	lowers " " 32:33, or -53 cents
13	raises " " 65:64, or 27 cents
13	lowers " " 64:65, or -27 cents
and so on.	

The # and ♭ change major thirds into minor ones and vice versa. The 7 indicates a seventh harmonic, the ♭ (7 upside-down) a seventh undertone. The arrows denote either the 11th harmonic- or undertone, and the 13 a 13th over- or undertone. In addition, for consistency's sake, the major triads on F, C, and G are purely tuned, in a 4:5:6 pitch ratio:

F	A	C	E	G	B	D
16	20	24	30	36	45	54
				4	5	6
		4	5	6		
4	5	6				

Further in the circle of fifths in either direction, plus (+) and minus (-) are necessary to compensate for the syntonic comma; for example, D- to A is a perfect fifth (3:2), as is D to A+, but D to A is 40:27, a bad perfect fifth 21 cents flat. With such a system, Johnston has been able to notate any overtone of any pitch up to the 31st harmonic (which appears in his String Quartet No. 9).

In 1988, Johnston left Illinois to live in North Carolina.

Listening Example: String Quartet No. 4, "Amazing Grace"

Only part of Johnston's output is twelve-tone. Much of it is tonal, based in folk song and Southern hymnody. The extreme consonance (though in a twelve-tone context) of his Second and Third Quartets led back to tonality, and his String Quartet No. 4 (1973) was one of the first works to return to a new, non-European tonality after the years of twelve-tone hegemony. The Quartet is a set of variations on the popular hymn "Amazing Grace," in the key of G minus.

The theme is first stated sweetly in a purely tuned pentatonic (five-pitch) scale. The scale's tuning is Pythagorean, meaning that all the intervals are based on perfect 3:2 fifths: G- D- A E B. The interval G- B

in this tuning is not 5:4 but 81:64, a sonority dating from the medieval era that has a rustic, folk-fiddler's quality (example 4.5). Each successive variation expands both the number of pitches used and the rhythmic complexity, treating pitch and rhythm in an analogous manner. In variation 1 the first violin states the melody using the entire G-major scale. Variation 2 adds seventh harmonics and triplet and quintuplet rhythms. Variation 3 is horrendously complex in its rhythmic notation (see example 4.6), with a rhythm of 35-against-36 running between the viola and cello and with crashing chords for all four players providing an overriding articulative pattern. The difficulty, however, is only for the performers, as the listener's ear never loses the relationship of the melody to the original theme. Variation 4 plays with the inversion of the theme as an excuse to introduce the seventh undertone.



EXAMPLE 4.5 Ben Johnston, theme from String Quartet No. 4, "Amazing Grace," in Pythagorean tuning.

EXAMPLE 4.6 Ben Johnston, String Quartet No. 4, variation 3.

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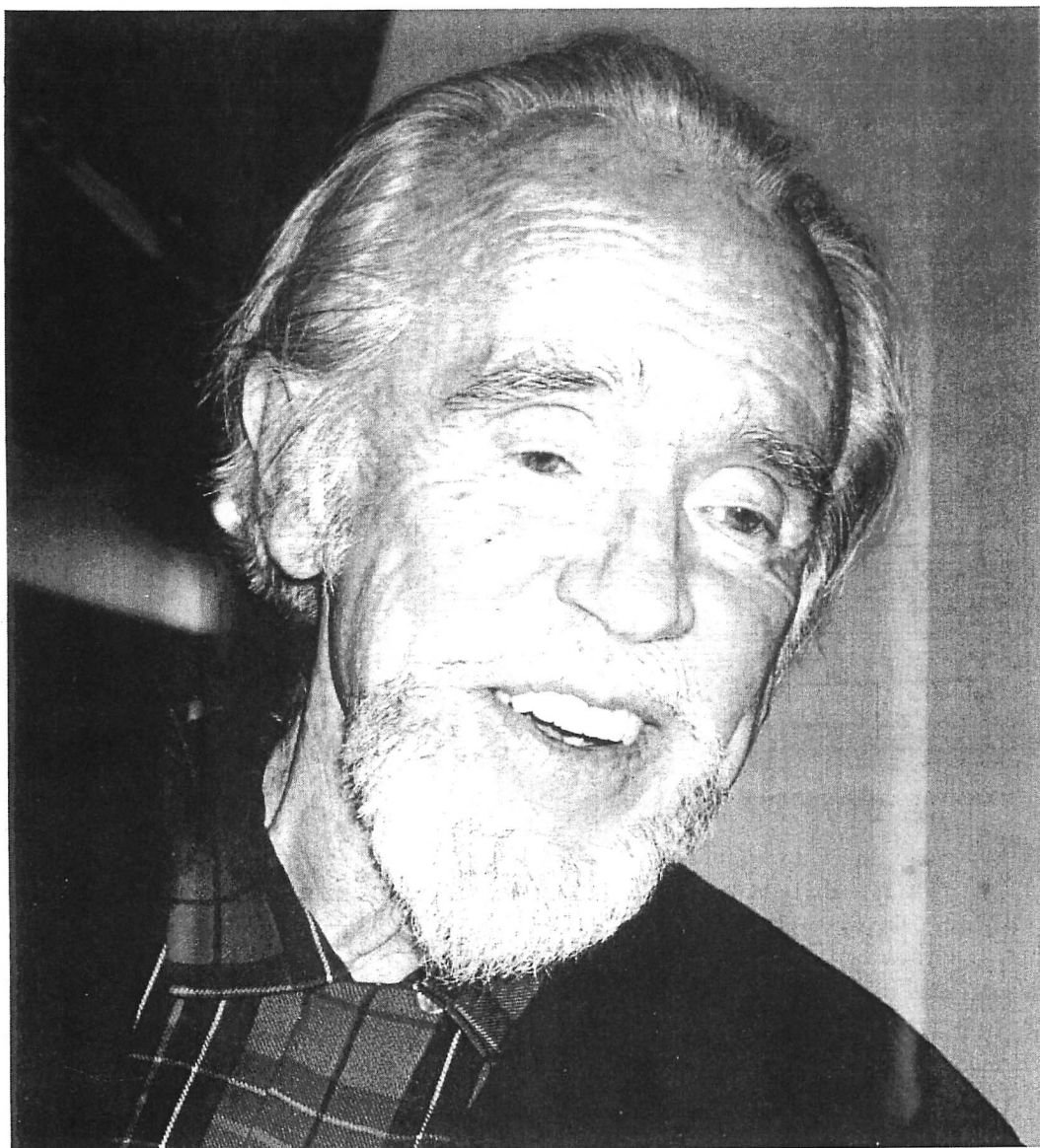
EXAMPLE 4.6 (continued)

Variation 5 is a ghostly continuum of minimalist repetitions, the quartet playing rhythms such as 7 to 8 to 9 to 10 in scale patterns derived from the ancient Greek modes Partch also used. In the middle, "Amazing Grace" can be clearly heard in cello harmonics. The passionate final variation expands the language to both major and minor microtonal scales, twenty-two pitches in all. *Amazing Grace* is one of the most difficult string quartet scores in the repertoire, yet despite its complexity, the theme is never far from the surface, and its development is emotionally satisfying even on first listening. Few works of the so-called "avant-garde" have been so warmly embraced by general audiences.

Conlon Nancarrow

Conlon Nancarrow (1912–1997) is one of the strangest cases in the entire history of music. A recluse, he lived in Mexico City from 1940 on, and the world began discovering his music only in 1977. Over three-fourths of it is written for one instrument, and that an eccentric one: the player piano, which he has used to produce the most rhythmically complex body of music ever written. Yet his roots are in jazz and blues, and his music, its complexity notwithstanding, is joyous, bracing, and thrillingly tumultuous.

continued)



Conlon Nancarrow. Photo by Sabine Matthes.

Nancarrow was born in 1912, in Texarkana, Arkansas. A fiery and rebellious teenager, he played trumpet and went into music against his father's wishes. He moved to Boston after an abortive period of study at Cincinnati Conservatory, and studied privately with Slonimsky, Walter Piston, and Roger Sessions.

A communist, Nancarrow went to Spain in 1937 to fight the fascists as a member of the Abraham Lincoln Brigade. Upon Nancarrow's return, he found that the U.S. government was denying passports to those with communist affiliations. He moved in 1940 to Mexico City. Just before he left, he picked up a copy of Cowell's *New Musical Resources*.

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In his section on rhythm, Cowell admitted that the rhythms he notated were too complex for human performance, but suggested that a player piano could achieve them easily. In 1948, receiving a small inheritance, Nancarrow traveled to New York and bought a player piano; then located a roll-punching machine, and found an instrument maker who would build one for him to the same specifications. Long interested in complex rhythmic techniques, he let his rhythmic imagination run wild in a series of about fifty Studies for Player Piano. Study No. 1, which shows the influences of both Bartók and jazz, uses two basic tempos of 4 against 7. Study No. 3, a Blues Suite, is based on jazz riffs strung across a series of lightning-fast ostinatos. Other early Studies (Nos. 7 and 11) revived the medieval practice of isorhythm, a technique wherein a rhythm of several notes is repeated over and over, going out of phase with a repeating pitch series with a different number of notes.

Starting with Studies Nos. 14 through 19, Nancarrow revived another technique with ancient roots: the tempo canon. A tempo canon takes a line or section of material and plays it against another version of itself at a different tempo. For instance, in the greatly simplified example 4.7 (using the pitch row from Study No. 21), the higher voice moves 4:3 as fast as the lower one. Nancarrow based the early canons on the tempo ratios 4:5:6. Study No. 37 is a masterpiece, a huge twelve-voice canon. Study No. 48 is perhaps Nancarrow's magnum opus, a massive canon in three movements at a tempo ratio of 60:61. At the beginning of each movement the canonic voices are only 6 seconds apart, and the slower one catches up with an extreme gradualness that brings a fantastic tension to the final climax.



EXAMPLE 4.7 Tempo canon technique.

The tremendous variety of form in Nancarrow's Studies comes partly from the deployment of convergence points, whose placement is as structurally inventive as that of the cadences in the Beethoven sonatas. The most famous convergence point is that of Study No. 36, in which the voices ripple on a diminishing series of chromatic runs before plunging down the keyboard (see example 4.8).

(Continued)

EXAMPLE 4.8 Conlon Nancarrow, Study #36, climax.

Yet another device Nancarrow experimented with is perfectly gradual acceleration. Studies Nos. 21, 22, 23, 25, 27, 28, and 29 explore every possible permutation: acceleration against a steady beat, deceleration against a steady beat, acceleration and deceleration at the same time, all three at once. Study No. 21 is subtitled "Canon X" because as one voice gradually speeds up, the other, playing the same notes (transposed), slows down.

Peter Garland began publishing Nancarrow's scores in his *Soundings* journal in 1977, the same year Charles Amirkhanian began making them available on record. Aside from his fifty-odd player piano studies, Nancarrow wrote a handful of works for human players in the 1930s and 1940s, and wrote a few more in the eighties after performers began expressing interest in his work. After decades of isolation, Nancarrow became much in demand for festivals in Europe and the West Coast after receiving the MacArthur "genius" award in 1983.

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EXAMPLE 4.8 (continued)

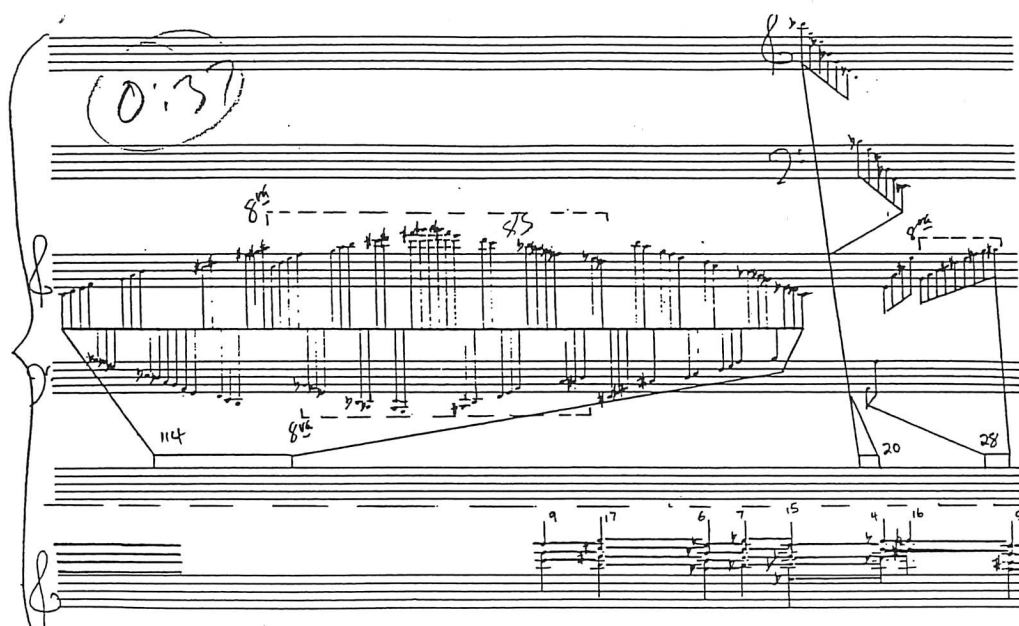
Listening Example: Study #25

Study No. 25, written sometime in the late 1950s (Nancarrow has never dated his Studies), is one of his most popular works. This is the Study in which he first discovered how to write idiomatically for the player piano.

Though many of the studies contain thousands of notes each, making them seem like huge, substantial works, only seven of them run over seven minutes. No. 25 lasts under six minutes, yet is divided into eight sections:

Section 1: Glissandos and arpeggios, ripping by at about 175 notes per second, are laid over a single line, then over a series of chords. One remarkable eighty-five-note figure (at 0:37, shown in example 4.9) alternates glissandos in both directions at once.

Section 2: This section contains three layers. The first to appear is a feathery series of four-note arpeggios marking a steady beat. Above it floats a series of longer arpeggios, sustained rather than staccato.



EXAMPLE 4.9 Conlon Nancarrow, Study #25.

Section 3: Next comes a rhythm canon at a tempo ratio of 7 against 10, but while one voice is a series of widely-spaced ten-note chords, the slower is a series of down-up arpeggios.

Section 4: The next part is a tempo canon at ratio 21:25. Each voice of the canon actually consists of two contrapuntal lines.

Section 5: Use of the sustaining pedal is very rare in Nancarrow's canons, but here he uses it to let ring the notes of complex glissando and arpeggio patterns. Each is cut off by a big seven-note chord.

Section 6: Section 6 returns to the feathery arpeggios of section 2, superimposing four layers of them in a tempo canon.

Section 7: The texture here consists of two layers, one of seven-note chords (grouped in phrases with the last chord staccato), and one of arpeggios. Halfway through, an acceleration canon begins, with the chords accelerating twice as fast as the arpeggios.

Section 8: The final explosion is a maelstrom of figures, 1,028 notes within 12 seconds (88 per second), blurred into a swirl of noise by the sustaining pedal. There is nothing analyzable about this arpeggiated cacophony: major triad arpeggios, scales, broken octaves, sudden leaps in register, twistings and turnings of key, every quick note figuration used up until now combined in one blitzkrieg climax.

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Study No. 25, incidentally, is Nancarrow's only work to use a twelve-tone row, which governs the succession of harmonies throughout. (He frequently used rows of more than thirty notes.) Nancarrow claims he never met Schoenberg, whose year in Boston coincided with Nancarrow's stay there, but Nancarrow's first wife remembers them attending a party at Schoenberg's apartment. Otherwise, this is one of Nancarrow's freest studies in terms of technical controls, a chaotic climax to his middle period. In the way it brings together, for the first time, all the techniques he had used in previous studies—isorhythm, canon, acceleration—it anticipates his great, massive Studies of the 1970s and '80s, Nos. 40, 41, 45, 47, and 48.

Lou Harrison

Composers born on the West Coast have often felt less compelled to follow European models than their East Coast colleagues. Cowell, growing up, heard more Chinese, Japanese, and Indian music than European, and never became conversant with the European repertoire. Partch felt free to throw the entire baggage of European culture overboard. Lou Harrison (b. May 14, 1917) came from Portland, Oregon, and he, too, more often looked to Asia than to Europe for his inspiration. While Colin McPhee was the first to transcribe Balinese gamelan patterns for the European orchestra, Harrison has become the leading American composer for the Balinese gamelan itself.

Harrison studied with Cowell in 1934–1935, and also with Schoenberg in Los Angeles. In the forties he worked as a florist, a records clerk, a dancer, a dance critic, and a music copyist (his elegant calligraphy is famous), and he also organized, with John Cage, some of the first concerts of percussion music. He also became close to Ives, deciphered several of Ives's illegible pencil scores, edited the score of Ives's Third Symphony, and conducted its world premiere with the New York Little Symphony in 1946. Ives showed his gratitude by assigning the royalties of some of his works to Harrison; these eventually amounted to a significant financial help. At last Harrison found a niche as a music critic, and, under Virgil Thomson's patronage, wrote reviews for the *New York Herald-Tribune* in 1945–1948. He subsequently suffered a nervous breakdown, but thereafter held several teaching positions, at Black Mountain College (1951–1952), San Jose State University (1967–1980), and Mills College (1980–1985).

A prolific composer of exceptional versatility, Harrison has written in many styles, partly because his work as a composer for dance in the forties required diverse techniques. Some of his early music has the craggy ferocity and dissonance of Ives's piano music. His *Symphony on G* (1948–1961) is largely written in twelve-tone technique, though with G as a consistently

central note, and uses a subsidiary ensemble of piano, harp, and tack piano, an instrument he invented by placing tacks in the hammers of a piano for a Nancarrowian, brittle sound. Harrison is a staunch advocate of the invented language Esperanto, using it for many of his titles and texts. His *Koncherto por la Violono Kun Perkuta Orkestra*—"concerto for violin with percussion orchestra" (1940)—includes flower pots, wind bells, brake drums, coffee cans, and washtubs in its ensemble. The violin part exhibits an interesting technique, an alternative to the twelve-tone system, of using only three possible intervals: a minor second, a major third, and a major sixth. Dance forms of the Middle Ages and Renaissance appear in Harrison's music; the String Quartet Set (1978–1979) and Piano Concerto (1985) each contain a medieval dance, the *estampie*.

When he writes for European orchestra, Harrison says, his model is Brahms; one can hear echoes of the Brahms D-minor Piano Concerto in the dramatic opening trills of Harrison's own Piano Concerto. In studying Balinese music, however, (and also Korean court music, which he did in Korea in 1961–1962), Harrison became interested in pure tunings; his Piano Concerto is written for a keyboard tuned eighteenth-century style, with pure perfect fifths on the black keys and sweeter major thirds on the white keys. Some of his music for Western instruments uses Balinese tuning, such as the *Concerto in Slendro* (1961) for violin, tack pianos, celesta, and percussion, which uses the Balinese *slendro* scale (requiring a retuned celesta). Beginning in 1972, he collaborated with William Colvig on building the bronze and wood metallophones (something like oversized xylophones) and nipple gongs of the Balinese gamelan; they created the gamelan *si darius* (named after French composer Darius Milhaud) at Mills College. Several of his works combine a Western solo instrument with gamelan, such as the *Double Concerto for Violin and Cello with Javanese Gamelan* (1981–1982). *La Koro Sutro* (1972) is an ecstatic 100-voice choral setting, with gamelan, harp, and organ, of the *Heart Sutra* from the Buddhist scriptures, translated into Esperanto.

Harrison's style ranges from the high Romanticism of the *Symphony on G* and Piano Concerto to the folklike joie de vivre of his chamber music to the imperturbable stasis of his percussion and gamelan works. His larger works (for example *Symphony on G* and *Symphony No. 4*, "Last") sometimes threaten to become disunified because of the extreme heterogeneity of ensembles used from movement to movement. But all of his music is marked by accessibility, humor, and inspired experimentation.

Henry Brant

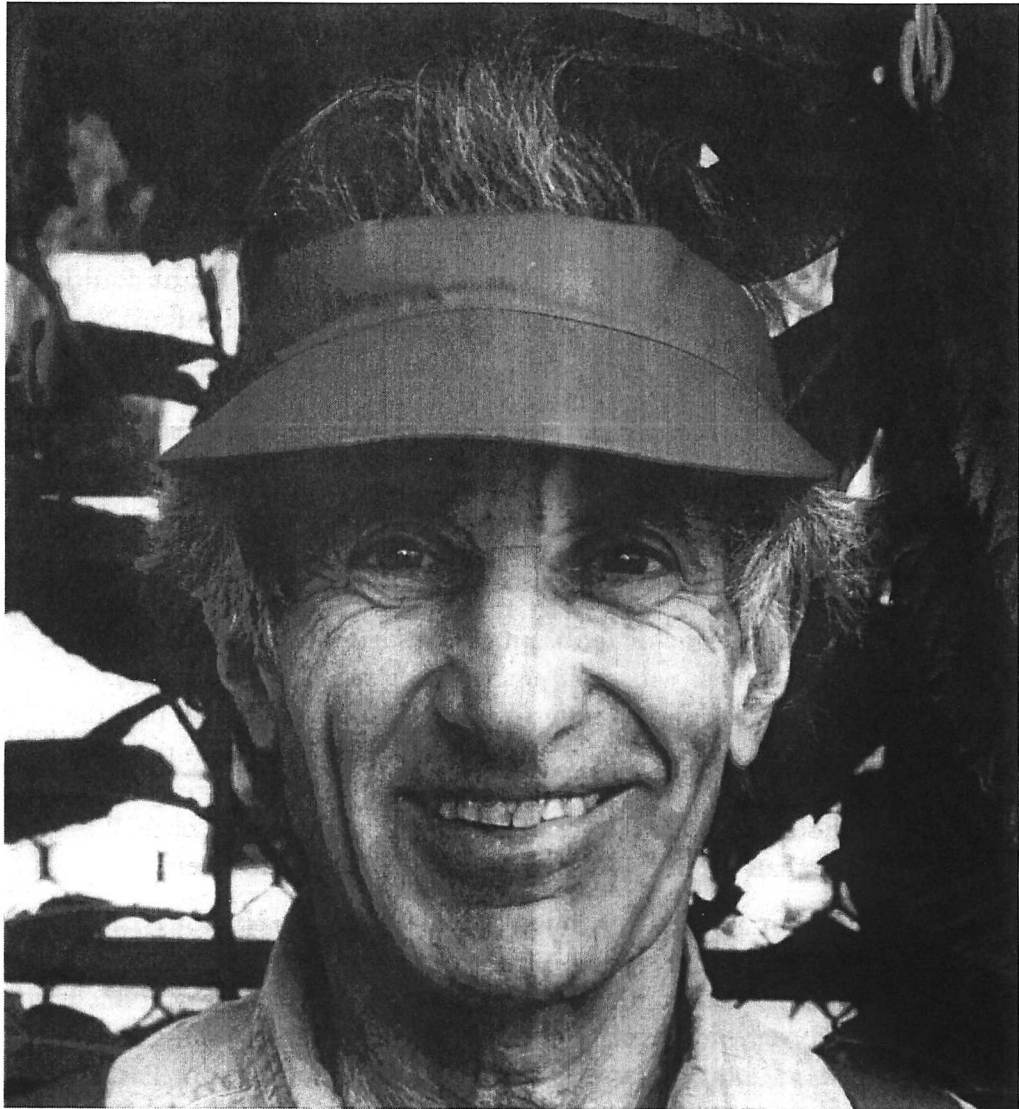
Henry Brant (b. 1913), a visionary of Ivesian imagination, is the leading pioneer of spatial music, music played by ensembles separated by wide distances. If he remains a rather obscure name, it is only because his



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Henry Brant.

music, for huge ensembles placed at wide distances, is so difficult to organize and record that few have a chance to experience it.

Born September 15, 1913, in Montreal, Brant moved with his family to New York in 1929. Though he studied at the Institute of Musical Art (later renamed Juilliard), his primary composition teaching came from private lessons with Riegger and Antheil, and he also learned conducting from Gustav Mahler's nephew, Fritz Mahler. He received considerable practical experience writing popular music for radio and films, which imparted fluency to his compositional technique. He later taught at Columbia University from 1945 to 1952, at Juilliard 1947–1954, and at Bennington 1957–1982.

From the beginning, Brant demonstrated an unusual sensitivity to acoustic sound. His early works use nonmusical objects to create sound; for example, *Music for a Five and Dime* (1932), scored for E-flat clarinet, piano, and kitchen hardware. *The Marx Brothers* (1938, three portraits titled "Chico," "Groucho," and "Harpo") accompanies Brant's own instrument, the tin whistle, with chamber ensemble. In 1938 he had an opportunity to perform with Partch's ensemble. Accordingly, Partch included tin whistle and double flageolet, instruments Brant could play, in his *Yankee Doodle Fantasy*.

Brant has frequently written for multiples of one instrument, and when he does so, he tries to vary the range in size smoothly; thus, his delightful 1931 flute concerto, *Angels and Devils*, uses as its orchestra three piccolos, five normal flutes, and two alto flutes. Despite such monolithic instrumental groups, heterogeneity and contrast are the keys to Brant's style. He turned to spatial music because of the perceptual problems of trying to hear so many contrapuntal lines at once. As he later said,

I tried writing eight or ten simultaneous, contrasted, contrapuntal lines, still in bars or with the musicians all placed together, as usual. I found that I was running into trouble: The musicians could play the notes all right, but you really couldn't identify the details in the compound result. . . . But there didn't seem to be a necessary reason why music should be limited to even twelve horizontal events at once. Why not more than twelve? The ear never said, "I refuse to listen."

Looking for an answer, he studied Ives's *The Unanswered Question* and found that Ives had solved his contrapuntal problems by widely separating the performing groups. (Brant's long-lined, dissonant conception of melody was also influenced by Ruggles.) In 1953, Brant wrote *Rural Antiphonies*, his first antiphonal (spatial) composition. Pointing out that "all music is spatial music," Brant insists that the physical position of the players is an unavoidable compositional decision. "Spatial separation is essentially a contrapuntal device," he says. "It makes counterpoint more distinct."⁸

His *Orbits* (1979) is scored for eighty trombones (including not only tenor and bass trombones but the much rarer soprano, alto, and contrabass kind), organ, and "sopranino" voice. The piece uses quarter tones, common in Brant's music, and the trombones sometimes play eighty different lines, creating eighty-note chords with clusters of twenty-four pitches per octave. *Fire on the Amstel* uses four boatloads of twenty-five flutes each, four jazz drummers, four church carillons, three brass bands, three choruses, and four street organs. Brant's performances, which often take place outside from necessity, sometimes run up against irrevocable forces. In 1972 his *The Immortal Combat* for different instrumental groups, performed on the outdoor plazas and balconies of Lincoln

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Center, was totally drowned out by traffic noise, a fountain, and a thunderstorm. A 1992 performance of *500: Hidden Hemisphere*, written for the Columbus quincentennial, combined three military bands and steel band outside Lincoln Center with much better results. Nevertheless, Brant has worked to develop acoustic instruments with the power of tugboat whistles, loud enough to drown out even an urban environment.

The ultimate generalist, Brant envisions musical universes even vaster than Ives's, incorporating music of different national styles. His *Meteor Farm* (1982) combines orchestra, jazz band, Indonesian gamelan ensemble, African drummers, and Indian soloists. One of his pet projects of recent years is a concert hall with movable plywood walls, which can be moved during a performance to make the acoustics of the room one of the changing components of the composition; in his *Voyage 4* of 1963, performers occupy not only the floor but the vertical wall space as well.

Brant's legacy has been carried on in New York by Wendy Mae Chambers (b. 1953), who has written a Mass for seventy-seven trombones, *Ten Grand* (1983) for ten grand pianos and laser lights, *The Grand Harp Event* (1984) for thirty harps, *Marimba!* (1986) for twenty-six marimbas, and *Music for Choreographed Rowboats* (1979) for twenty-three musicians in rowboats. In her *Symphony of the Universe* (1989) for choir, organ, jazz band, digital tape, and 100 timpani, rhythmic motives rip up and down the entire length of a cathedral with tremendous effect.

Alan Hovhaness

Like McPhee and Harrison, Alan Hovhaness (born March 8, 1911, in Somerville, Massachusetts) is one of the Americans who took his inspiration from cultures other than that of Western Europe. He is also one of the most prolific of American composers, with more than 400 compositions to his credit, including more than sixty symphonies. His music—simple, melodic, and inspired by ancient church hymns—is pervaded by an air of mysticism. It went utterly against the flow of the complexity of forties and fifties music but gained considerable audience following.

Hovhaness's interest in mysticism was evident early in life. He studied with Frederick Converse at New England Conservatory in the early thirties and with Bohuslav Martinů at Tanglewood. In 1936 he discovered Indian music, when several Indian virtuosi performed in Boston. Under the criticism of Bernstein and Copland at Tanglewood, Hovhaness destroyed many of his early works, which had been influenced by Renaissance music, and studied the music of his ancestral Armenian heritage. Lou Harrison was present at the New York premiere of Hovhaness's *Lousadzak* (1945), a piano concerto. Harrison's recollection provides a vivid snapshot of the American scene of the 1940s:

The intermission that followed was the closest I've ever been to one of those renowned artistic riots. In the lobby, the Chromaticists and the Americanists were carrying on at high decibels. What had touched it off, of course, was the fact that here was a man from Boston whose obviously beautiful and fine music had nothing to do with either camp and was in fact its own very wonderful thing to begin with. My guest John Cage and I were very excited, and I dashed off to the lamented *Herald Tribune* [lamented because by the time Harrison was speaking the paper had ceased to exist] and wrote a rave review while John went back to the Green Room to meet Alan.⁹

In 1959 Hovhaness traveled to India and Japan on a Fulbright fellowship, collecting folk songs for future use. He became the first Western composer invited to participate in the music festival at Madras, where he played his *Madras Sonata* for piano.

Hovhaness developed a style of modal, exotically inflected melody, with an impressionistically static harmony sometimes colored with ultra-modernist touches such as tone clusters. In some works (for example, Symphony No. 46, *To the Green Mountains*, of 1980) performers in an ensemble play at independent, unsynchronized speeds. Of his sixty-plus symphonies, the Second, subtitled *Magic Mountain* (1955), became quite popular, at least in part for its vigorous double fugue in the second movement, also because it was championed by conductor Fritz Reiner. Further celebrity came with *And God Created Great Whales* (1969), an orchestral essay that included the taped songs of humpback whales. As one would expect of so prolific an output, Hovhaness's music varies considerably in quality, though the amount of work he's destroyed shows that he does not lack self-criticism. The best of his music, however, is deeply inspired and rooted in ancient traditions, with a deliberate naïveté propelled by an ecumenical spirituality.

Notes

1. Barbara Tischler, *An American Music* (Oxford and New York: Oxford University Press, 1986), pp. 74 and 85.
2. Carol Oja, *Colin McPhee: Composer in Two Worlds* (Washington and London: Smithsonian Institution Press, 1990), p. 176.
3. Harry Partch in *The Dreamer that Remains* (Eugene, Ore.: New Dimension Media, 1974).
4. Harry Partch, *Bitter Music: Collected Journals, Essays, Introductions, and Librettos*, Thomas McCreary, ed. (Urbana and Chicago: University of Illinois Press, 1991), p. xix.
5. Heidi von Gunden, *The Music of Ben Johnston* (Metuchen, N.J., and London: Scarecrow Press, Inc., 1986), p. 5.

6. Ibid.
7. Col
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8. Ibid
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6. Ibid., pp. 11-12.
7. Cole Gagne and Tracy Caras, *Soundpieces: Interviews with American Composers* (Metuchen, N.J., and London: Scarecrow Press, 1982), p. 57.
8. Ibid., p. 60.
9. Quoted in liner notes, *Mysterious Mountain*, Music Masters MMD 60204.

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