



James Tenney *Changes*: 64 Studies for 6 Harps

JAMES TENNEY (1934–2006)

***Changes: 64 Studies for 6 Harps* (1985) for Udo Kasemets**

Alison Bjorkedal, Ellie Choate, Elizabeth Huston, Catherine Litaker,
Amy Shulman, Ruriko Terada, harps; Nicholas Deyoe, conductor

80810-2 [2 CDs]

DISC 1 [TT: 71:04]

1. Study #1 2:14
2. Study #2 1:56
3. Study #3 2:29
4. Study #4 2:20
5. Study #5 2:44
6. Study #6 2:15
7. Study #7 2:05
8. Study #8 2:48
9. Study #9 2:09
10. Study #10 2:06
11. Study #11 2:00
12. Study #12 2:29

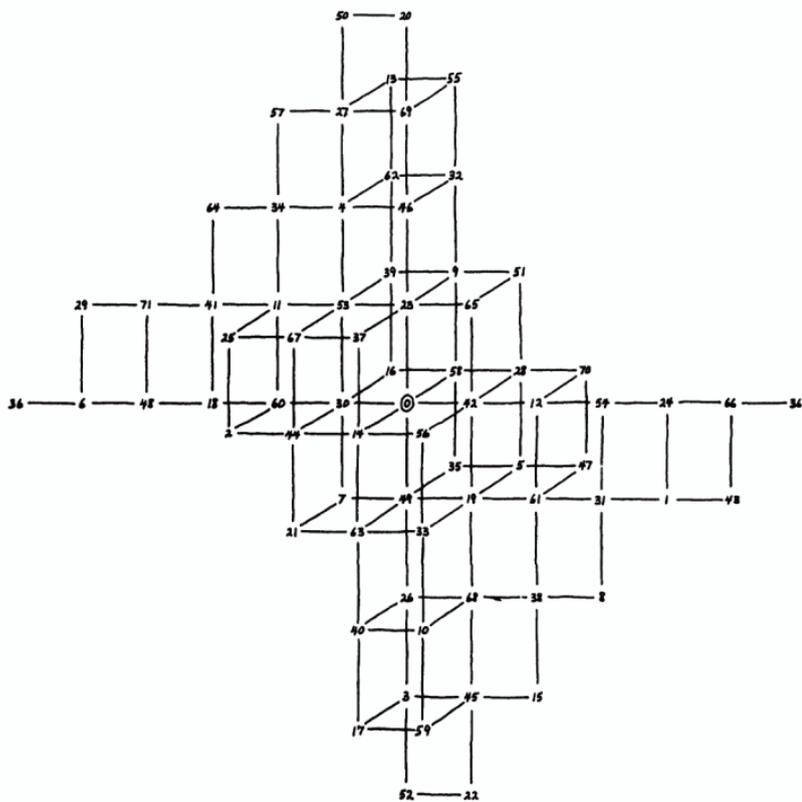
13. Study #13 2:07
14. Study #14 2:06
15. Study #15 1:52
16. Study #16 2:14
17. Study #17 2:00
18. Study #18 2:19
19. Study #19 2:42
20. Study #20 2:11
21. Study #21 3:09
22. Study #22 1:33
23. Study #23 2:35
24. Study #24 2:43
25. Study #25 1:44
26. Study #26 1:57

27. Study #27 2:06
28. Study #28 2:27
29. Study #29 1:28
30. Study #30 2:26
31. Study #31 1:58
32. Study #32 1:54

DISC 2 [TT: 70:59]

1. Study #33 2:21
2. Study #34 1:59
3. Study #35 2:10
4. Study #36 2:35
5. Study #37 1:46
6. Study #38 2:04
7. Study #39 1:53
8. Study #40 2:29
9. Study #41 2:14
10. Study #42 2:01
11. Study #43 2:18
12. Study #44 2:14

13. Study #45 2:29
14. Study #46 2:00
15. Study #47 1:58
16. Study #48 2:24
17. Study #49 1:56
18. Study #50 1:55
19. Study #51 2:17
20. Study #52 2:21
21. Study #53 1:28
22. Study #54 2:05
23. Study #55 1:52
24. Study #56 2:20
25. Study #57 2:07
26. Study #58 2:17
27. Study #59 2:42
28. Study #60 3:00
29. Study #61 2:59
30. Study #62 1:48
31. Study #63 2:26
32. Study #64 2:33



The 72-set in 3,5,7-space

CHANGES: 64 STUDIES FOR 6 HARPS, FROM 1985, IS A LARGE-SCALE WORK that combines and connects many of James Tenney's most important theoretical and musical ideas, including gestalt segregation principles and complex intonation systems. Composed with the aid of a mainframe computer at York University, the piece also marks a return to computer-aided, algorithmic composition after a long hiatus. It was one of the first pieces Tenney composed with a computer after he left New York City in the late 1960s to teach at the California Institute of the Arts. After *Changes*, the majority of Tenney's works involved computer software and formal, algorithmic processes.

Tenney was both a prolific composer and theorist but rarely wrote in detail about his own pieces even though his music consistently implemented his theoretical ideas. One exception is his article, "About *Changes*," originally published in the journal *Perspectives of New Music* and recently reprinted in *From Scratch*, a collection of Tenney's theoretical writings and an extraordinary resource for a complete understanding of these studies and Tenney's theoretical ideas in general. "About *Changes*" is a detailed and exhaustive theoretical companion to and description of the piece that carefully documents his compositional procedures, many of which are highly technical and/or mathematical. We will offer a more generalized, less technical description of the work using the following quotation from the beginning of the article as a guide.

My intentions in this work were both exploratory and didactic. That is, I wanted to investigate the new harmonic resources that have become available through the concept of "harmonic space" much more thoroughly than I had in any earlier work. At the same time I wanted to explore these harmonic resources within a formal context that would clearly demonstrate certain theoretical ideas and compositional methods already developed in my computer music of the early 1960s,

including the use of stochastic (or constrained-random) processes applied to several holarchical perceptual levels, both monophonically and polyphonically. The references to the *I Ching*, or *Book of Changes*, in the titles of the individual studies derive from correlations that were made partly for poetic/philosophical reasons but also—and perhaps more importantly—as a means of ensuring that all possible combinations of parametric states would be included in the work as a whole. I must confess that I frequently thought of the twenty-four preludes and fugues of J.S. Bach's *Well-Tempered Clavier* as a kind of model for what I wanted to do with the work, although it seems highly unlikely that these studies themselves will ever betray that fact to the listener.

The six harps are tuned a 6th tone apart to form a kind of 72-tone-per-octave megaharp. The studies' melodic lines are distributed among the harp ensemble in a complex hoquet, weaving through the ensemble (a difficult task beautifully accomplished by the ensemble on this recording). Each study has a unique trajectory which may take a number of forms. Some go from soft to loud. Others begin in a higher pitch range which then descends. Still others start sparsely and get denser, or vice versa. Several trajectory forms can occur simultaneously as well.

Each study is composed of one or two “voices”; Tenney calls each study either *monophonic* or *polyphonic*, respectively. A monophonic study generally sounds like a single, continuous melodic line. While monophonic studies can have multiple, simultaneously sounding pitches, they are strictly chordal/homophonic and contain no polyrhythms. Polyphonic studies are more rhythmically complex. Sometimes the melodies are heard independently, and at other times, harmonies are articulated by a polyrhythmic duet woven between the two voices.

Study #1 (“Modesty”)

4/4 $\text{♩} = 60$

Study #2 ("Treasuring")

Handwritten musical score for Study #2, "Treasuring". The score consists of six staves of polyphonic music. The tempo is marked as quarter note = 60. The score includes dynamic markings such as *mp*, *f*, and *pp*. A tuning diagram at the top shows a 72-tone scale with a 3:2 ratio indicated between two notes.

- 1 -

Study 2, page 1, polyphonic.

In his article on *Changes*, Tenney points to three fundamental compositional ideas:

1. a thorough investigation of harmonic space
2. stochastic processes applied to several holarchical levels
3. an exploration of the combinations of parametric profiles.

Investigation of harmonic space

The first point refers to Bach's *Well-Tempered Clavier*, which explored the new harmonic resources that became available with the advent of sophisticated well-temperaments, which allowed for acceptable, though distinct, tunings in every key. In similar fashion, the studies of *Changes* cycle through different harmonic modes, exploring the new harmonic resources of extended rational tunings. In Tenney's formulation of harmonic space, intervals (and thus pitches) are represented by rational frequency ratios, whose simplicity/complexity (more loosely: consonance/dissonance) is the result of the size of the prime numbers, the number of different primes, and the exponents of those primes needed to express the relationship. For example, the ratio 3/2 is simple because the primes are small (as small as they can be), there are only two of them (the minimum possible), and both their exponents are 1 ($2^1 = 2$). In contradistinction, the ratio 45/28 is relatively complex, involving the primes 3 and 5 to express the numerator, and 7 and 2 to express the denominator. Additionally, since $28 = 7 * 4$, a higher power of 2 is included as well ($28 = 7 * 4 = 7 * 2^2$). Tenney is exploring the idea, one that is shared by many other theorists and composers, that our subjective sensation and judgment of consonance and dissonance is reflected by the numerical complexity of the relationship between the frequencies of the tones.

In other words, Tenney's use of the 72-tone pitch set is not intended so much as an exploration of microtonal chromaticism resulting from higher, equal divisions of the

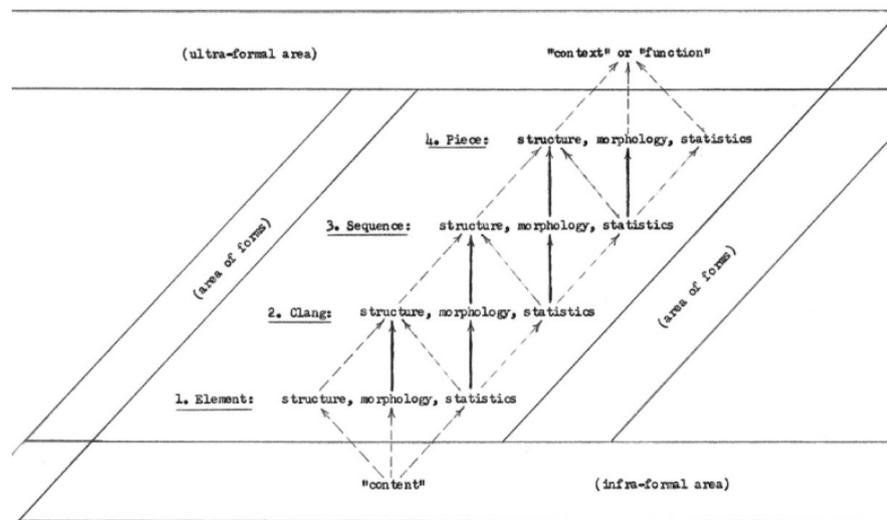
octave, as in, for example, much of the music of 20th-century composers such as Julián Carrillo, Alois Hába, Adrian Fokker, Ivan Wyschnegradsky, and even Charles Ives. Tenney's 72-set gamut is used to approximate, both melodically and harmonically, what Tenney refers to as "compact sets in harmonic space." In *Changes*, pitch gamuts always favor different types of consonant 3rds, 5ths, 7ths, 9ths, 11ths, and 13ths. Though Tenney restricts the intervallic content, the number and variety of intervals far exceed the resources of 12-tone equal temperament. For example, instead of two types of 3rds, major and minor, Tenney's system allows for five different types of 3rds. The number of aggregates/modes created from combinations of allowed intervals is quite large. Still, for any given short time period within a study, the result is a limited, relatively consonant pitch gamut.

Like *The Well-Tempered Clavier*, *Changes* also employs large-scale harmonic movement among and within the individual studies. Each study has a unique "key," based on a *tonic pitch* from the 72-tone set, which it modulates to and from through a cycle of intermediary modes. The tonic of the penultimate mode is a perfect 5th from the tonic of the study. Occasionally, Tenney had to rerun the generating program to achieve this "V/I" cadence. His wife, Lauren Pratt, used to joke with him that the stochastic police would be after him for doing so!

Stochastic processes applied to several holarchical levels

This aspect of *Changes* is a direct compositional application of the ideas of *hierarchical temporal gestalt perception* described by Tenney in *Meta + Hodos* and applied to the two types of studies: monophonic and polyphonic. The fundamental idea of Tenney's phenomenological theory, which borrows from Gestalt Psychology with an aim to aesthetic neutrality, is that atomic musical units (Tenney: *elements*) aggregate hierarchically into perceptual gestalts (*clangs*), and progressively into still larger groupings (*phrases*, *sequences*, *sections*, and at some point, the "piece itself").

Illustration for article on FORM IN 20th CENTURY MUSIC by James Tenney October 3, 1969
(schematic diagram of relations between the three aspects of form at four hierarchical levels)



In *Changes*, Tenney used these ideas to generate the piece, essentially inventing a phenomenological approach to composition (a compositional method that he had used in previous pieces as well, dating back to his early computer music works at Bell Telephone Laboratories). The musical data for *Changes* was generated hierarchically from the top down. Each study is a series of sections, each divided at the next lower, hierarchical level into sequences of clangs. Elements within clangs were determined stochastically by the computer program to be within harmonic and parametric boundaries (*states*) defined

by and particular to the parent clang. Two different computer programs generated *Changes*. One determined the boundaries of each clang. Another, subordinate program, determined the elements of each clang, “filling in the details.”

An exploration of the combinations of parametric profiles

The superordinate program determined the boundaries of each clang by establishing the temporal start- and end-points for the trajectories of three parameters: dynamics, temporal density (Tenney’s general term for something like “tempo”), and pitch range. *I Ching* hexagrams were used to determine these parameters’ trajectories, hence the title of the piece and its dedication to Udo Kasemets, a friend of Tenney’s in Toronto who often composed using the *I Ching*. Each study is assigned a unique combination of two of the 64 hexagrams: one for the beginning parametric states and one for the end states. The name of the first hexagram becomes the title of the study. The hexagrams are divided into three digrams, one for each of the aforementioned parameters from top to bottom, respectively. The four possible digrams of the each hexagram correspond to the parametric states:

- = low – dynamically soft / low pitch range / sparse,
- = high – dynamically loud / high pitch range / dense,
- = medium – dynamically between soft and loud / middle pitch range / between sparse and dense, and
- = full – utilizing the total dynamic range, the entire pitch range, and all temporal densities.

For example, Study #1, which has the start hexagram ☳ (#15) and end hexagram ☱ (#4) has the following parametric trajectories:

dynamics:	medium (==) to high (==),
temporal density:	low (==) to medium (==), and
pitch range:	medium (==) to high (==).

(The table following these notes shows the start and end hexagrams, which can be used to extrapolate the parametric profiles of each study.)

The *I Ching* provides an elegant way to create variety among the studies. It is a nice nod to Kasemets, and more obviously, an homage to Cage’s work. Though *Changes* could be listened to in its entirety as one long piece, the extremes and focus (pitch range, density, dynamics) of the studies’ parametric profiles are often easily discernible.

The “dissonant counterpoint algorithm”

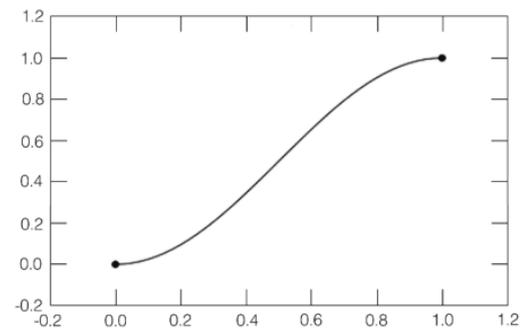
Another technique, called (by later writers) the “dissonant counterpoint algorithm,” adds another type of variety to the composition. The algorithm may be simply stated: The less frequently something has occurred, the more likely it is to occur. Tenney’s first use of this idea seems to occur in his computer pieces from the early 1960s, when he noticed that the computer’s pseudo-random number generator seemed to yield results with a degree of predictability. Given a relatively small number of trials, most computer-generated random numbers may have strings of repetition, or produce, over short runs, an unevenly weighted result. In other words, using a random number generator does not guarantee a statistically random result. By adding a measure of *statistical feedback*, the random number generator can, in effect, evaluate its own output, and weight the subsequent selection of elements based on how long it has been since a given element last occurred, thus favoring elements (for example, notes in a clang) that have been depauperate for some period of time. In other words, the algorithm monitors its own success and adjusts its behavior accordingly.

Tenney developed this idea as a way of making the *results* of random element selection “more random.” Given a specific pitch gamut (set of choices) for a clang, individual pitches are selected by the dissonant counterpoint algorithm so as to ensure a relatively equal distribution of pitches in the clang. In *Changes*, however, Tenney augments the algorithm to favor *more consonant intervals* relative to their distance in *harmonic space* from the clang’s *tonic*. While all pitches of the given mode will most likely occur within a clang as a result of the dissonant counterpoint algorithm, pitches with simpler frequency ratios to the tonic of the mode (consonant) will occur more often than those with more complex frequency ratios (dissonant) to the tonic.

The half-cosine curve interpolation

Another technique used by Tenney is a method for smoothly moving, or *interpolating*, from one state (start) to another (end). The transitions in *Changes* follow a *half-cosine curve*, often called a *sigmoid function*, in which the rate of change is more or less “s-shaped”: departing slowly from the start, quickly ascending, and slowly arriving at the destination state. Like an airplane taking off, there is a gradual rise at first, followed by a rapid ascent, and lastly a gradual slowing of the ascent to the final value (altitude). This assures that movement between clangs and sequences is smooth. As a result, clang boundaries are not always sonically apparent because the difference between mean values of parameters between clangs can be small.

This recording of *Changes* comes some thirty years after its composition. The task to bring the piece to fruition was daunting: Much of the data still needed to be generated, transcribed, engraved, and edited. The 1985-era mainframe computer at York University in Toronto was, by today’s standards, extremely slow and intransigent to program. Each study took a long time to compute. The output consisted of raw data printouts of musical



Half-cosine curve example

information: pitch, the unquantized start time of a note, and the deviation from quantizing the start time to either the nearest 16th-note or 8th-note triplet. Choosing the best quantization scheme was complex, and Tenney wisely left that process to the transcriber rather than trying to program this procedure. In order to create the scores, the data needed to be transcribed by hand, note by note—an extremely laborious, time-consuming task. Tenney transcribed the first sixteen studies, and some ten years later, a student volunteered to transcribe the second set of sixteen. The last thirty-two studies were transcribed after Tenney’s death.

Even without a detailed understanding of *Changes*’ compositional processes, it is clear that some very deliberate processes are being sonified and illuminated. Though it might be difficult to articulate those processes without studying the piece, the abiding sensation and experience is: Whatever is happening was meant to happen. As is the case with so

Study #1: M	Study #17: M	Study #33: P	Study #49: M
Study #2: P	Study #18: M	Study #34: P	Study #50: M
Study #3: M	Study #19: M	Study #35: P	Study #51: M
Study #4: M	Study #20: P	Study #36: P	Study #52: P
Study #5: M	Study #21: M	Study #37: P	Study #53: P
Study #6: P	Study #22: P	Study #38: M	Study #54: P
Study #7: P	Study #23: M	Study #39: M	Study #55: P
Study #8: M	Study #24: M	Study #40: P	Study #56: M
Study #9: M	Study #25: P	Study #41: M	Study #57: P
Study #10: M	Study #26: P	Study #42: P	Study #58: P
Study #11: P	Study #27: M	Study #43: P	Study #59: M
Study #12: M	Study #28: P	Study #44: M	Study #60: M
Study #13: M	Study #29: P	Study #45: M	Study #61: P
Study #14: P	Study #30: P	Study #46: M	Study #62: M
Study #15: P	Study #31: P	Study #47: M	Study #63: P
Study #16: P	Study #32: M	Study #48: P	Study #64: M

Table of start and end hexagrams, with designation of study as monophonic (M) or polyphonic (P).

much of Tenney’s music, each detail, even if determined by stochastic processes, is meant to exist exactly how and when it exists. Every aspect of this piece, from the integration of different processes used to generate the musical data to the final transcription and subsequent performance, reflects Tenney’s dedication to exploring ideas in a profound way that results in wonderfully complex music of clear and elegant design.

—Michael Winter and Larry Polansky

Michael Winter is a composer and amateur epistemologist.

Larry Polansky (b. 1954) is a composer, theorist, teacher, writer, performer, programmer, editor, and publisher. He lives in Santa Cruz, California, teaching at UC Santa Cruz. He is also the Emeritus Strauss Professor of Music at Dartmouth College, and co-director and co-founder of Frog Peak Music.

• • •

A History of *Changes* by Daniel Corral

The journey of James Tenney’s *Changes: 64 Studies for 6 Harps*, from composition to recording, spans 32 years and involves a number of people. Dedicated to Udo Kasemets, Studies 1–16 were premiered by the New Music Concerts Ensemble conducted by Robert Aitken, on December 15, 1985, at Premiere Dance Theatre in Toronto.

The notation for each of the 64 studies began as a printout of data from programs Tenney wrote in the computer language Fortran IV, which ran on the York University mainframe computer. The output data were then translated into conventional music notation, and at the time of the premiere, the printouts of Studies 17–64 had not been transcribed. Tenney documented his compositional process in the article “About *Changes*,” published in *Perspectives of New Music* in 1987, and *Changes* then was not worked on until 1999, when James Hullick entered Tenney’s handwritten scores into

notation software. At the time Tenney retired from York University and moved to California to teach at CalArts in 2000, the task remained unfinished.

In the spring of 2006, Tenney's health was deteriorating. His wife Lauren Pratt hired Cassia Streb to help organize Tenney's archives under his direction. After Tenney died in August 2006, Pratt decided to have the remaining studies posthumously notated for performance. Streb consulted Susan Allen and Michael Winter about how to complete the piece. However, work on *Changes* didn't resume until 2009, when Larry Polansky introduced Winter to Ezequiel Menalled and Juan Sebastián Llach Lau, and plans were made to complete the notation of *Changes* so that it could be premiered in the Netherlands. Robert Wannamaker assisted by helping decipher the printouts, and Casey Anderson was hired to help Winter with the work. Anderson recopied Studies 17–32 and digitized the musical data of Studies 33–64 for a computer program written by Winter to automate the transcription process.

A few years later, Jon Myers and I began simultaneous paths towards *Changes*. I took over Streb's work in the Tenney archives for Pratt in 2012. In 2013, Myers first read "About *Changes*" and tracked down a copy of the scores for Studies 1–16. That same year, I became Associate Director of the Society for the Activation of Social Space through Art and Sound (SASSAS), and in 2015 I proposed to Founding Director Cindy Bernard that SASSAS present the world premiere of the complete *Changes*. In 2016, Myers proposed to Polansky that he re-program *Changes* from scratch, using the article "About *Changes*" as a guide. Instead, Polansky put Myers in touch with Winter, who invited Myers to complete the scores and parts for Studies 33–64.

In 2017, SASSAS received funding from the Mike Kelley Foundation to premiere the complete *Changes: 64 Studies for 6 Harps* at The Box Gallery in Los Angeles on November 11, featuring the ensemble on this recording, which was assembled by Alison Bjorkedal. Pratt and Tenney's daughter Adrian Tenney launched a crowdfunding

campaign to fund a studio recording with John Baffa as the engineer. The studies were recorded at CalArts over Thanksgiving weekend, and edited at Baffa's studio in Ojai, California, the following year.

Each time the *I Ching* is consulted, two hexagrams are received, the second hexagram determined by the values of the first. The history of *Changes* follows a similar path, with Tenney's own work as the first hexagram and the following work of others as the second hexagram. Without both of these hexagrams, the music of *Changes* would not be complete.

• • •

Nicholas Deyoe is a Los Angeles-based composer, conductor, and guitarist, and the co-founder and Artistic Director of the wasteLAND concert series. As a conductor, Deyoe specializes in contemporary music and has given many world and U.S. premieres. He holds a Ph.D. in composition from UC San Diego, where he studied with Roger Reynolds. He has studied conducting with Russell Guyver, Harvey Sollberger, Rand Steiger, Steven Schick, and Lucas Vis. Deyoe is currently on faculty at California Institute of the Arts, where he conducts The Ensemble, teaches composition and conducting, and is the chair of the instrumental arts specialization. www.nicholasdeyoe.com

Alison Bjorkedal is a GRAMMY Award®-winning harpist based in Los Angeles. An avid proponent of contemporary music, her premieres include works by William Kraft, Anne LeBaron, Unsuk Chin, Wadada Leo Smith, and James Tenney. Notable recordings include *Harry Partch: Plectra and Percussion Dances*, *Complete Chamber Music of Carlos Chávez*, William Kraft's *Encounters*, and *Lou Harrison: Works for Harp, Guitar and Percussion*. She records for the motion picture and television industry, and with such artists as Sia, Madonna, and Kid Cudi. Ms. Bjorkedal earned degrees at University of Southern California and University of Oregon, and is on faculty at California Institute of the Arts (CalArts).

Ellie Choate's versatility affords her the opportunity to touch every area of music-making, including opera, orchestra, musical theater, on and off screen in motion pictures and television, and on the scores of major motion pictures and recordings. Her experience in new music includes membership in the CalArts New Century Players, performing with composer and conductor Pierre Boulez in 2005 and 2011, recording with renowned harpist Susan Allen, and ongoing promotion and performance of new works with harp. She has produced five CDs of her pop/jazz and chamber arrangements, and teaches at CSU Long Beach Bob Cole Conservatory, CSU Fullerton, and UC Irvine.

Elizabeth Huston has been a contemporary music fanatic for as long as she can remember. During her time living in Philadelphia, Huston founded and co-founded several organizations and ensembles devoted to promoting new music in unconventional ways, including A Change of Harp and Arcana New Music Ensemble. Since moving to Los Angeles in 2017, Ms. Huston has immersed herself in the new-music scene, and has worked to promote contemporary music organizations such as the Kaleidoscope Chamber Orchestra and the Now Hear Ensemble. She currently serves as Executive Director of Synchrony, a composers' collective and presenting organization.

Catherine Yom Litaker is an avid soloist, chamber musician, and orchestral harpist. She has performed on stages across the globe including Western Europe, South America, North America, and Asia. She has performed with such orchestras as the Chicago Symphony Orchestra, Lyric Opera of Chicago, and the San Diego Symphony. She actively performs chamber music and is a founding member of the Chicago Harp Quartet, a dynamic group aiming to expand the repertoire and exposure of the harp. In addition, she regularly works on special television and recording projects and has a private teaching studio in Los Angeles.

Amy Shulman received her Bachelor's and Master's degrees from The Juilliard School of Music. She has performed as a soloist throughout Europe and the United States, including live broadcasts in Paris, New York, and Los Angeles. Ms. Shulman toured nationally on the Columbia Artists CAMI Recital Series for several seasons with violinist Peter Kent. She has performed with several orchestral, chamber, opera, and contemporary groups, including the LA Chamber Orchestra and the LA Opera. She is active as a recording harpist in the motion picture, television and record industries, and has been on the music faculty of Occidental College since 2003.

Ruriko Terada received her Bachelor's and Master's degrees in Music, and an Artist Diploma from the Colburn Conservatory of Music. She is a frequent guest principal harpist at the Los Angeles Chamber Orchestra and Los Angeles Opera. Ms. Terada has been appointed as a principal harpist for numerous festival orchestras, including Music Academy of the West, Spoleto International Festival USA, and Festival Napa Valley. Internationally recognized as a soloist, Ms. Terada received 4th prize at the 24th Japan International Harp Competition, and top prizes at the 20th American Harp Society National Competition, Advanced Division, and the 21st American Harp Society National Competition, Young Professional Division.

SELECTED DISCOGRAPHY

- Cognate Canons*. William Winant, percussion; Eclipse Quartet. New World Records 80740.
Forms 1–4. MusikFabrik. hat[now]ART 2-127.
Harmonium. Scordatura Ensemble. New World Records 80803.
Harmonium No. 3. Ellie Choate, Susan Allen, Marilu Donovan, harps. Included on *Postcard From Heaven*. New World Records 80763.
Melody, Ergodicity and Indeterminacy. The Barton Workshop. Mode 185.
Music for Violin and Piano. M. Sabat, violin; S. Clarke, piano. hat[now]ART 120.

Postal Pieces. The Barton Workshop, James Fulkerson, music director. New World Records 80612 [2CDs].

Seeger song #2. Margaret Lancaster, flute. Included on *Io*. New World Records 80665.

Selected Works 1961–1969. New World Records 80570.

Spectral CANON for CONLON Nancarrow. On *Cold Blue*. Cold Blue CB0008.

The Spectrum Pieces. The Barton Workshop, James Fulkerson, music director. New World Records 80692 [2 CDs]

SELECTED BIBLIOGRAPHY

Garland, Peter (ed.). *Soundings Vol. 13: The Music of James Tenney*. Santa Fe, New Mexico: Soundings Press, 1984.

Gilmore, Bob. “Changing the Metaphor: Ratio Models of Musical Pitch in the Work of Harry Partch, Ben Johnston, and James Tenney,” *Perspectives of New Music* 33, nos. 1 & 2 (Winter–Summer 1995): 458–503.

Hasegawa, Robert (ed.). “*The Music of James Tenney*.” *Contemporary Music Review* 27, no. 1 (February 2008). Routledge.

Polansky, Larry. *The Early Works of James Tenney*. Available online at Frog Peak Music, www.frogpeak.org/unbound/.

Polansky, Larry, and David Rosenboom (eds.). “A Tribute to James Tenney.” *Perspectives of New Music* 25, nos. 1 & 2 (Fall–Winter & Spring–Summer, 1987): 434–591.

Tenney, James. *From Scratch: Writings in Music Theory*. Edited by Larry Polansky, Lauren Pratt, Robert Wannamaker, and Michael Winter. Urbana, IL: University of Illinois Press. 2015.

———. *A History of ‘Consonance’ and ‘Dissonance’*. New York: Excelsior Music Publishing Co., 1988.

Executive Producer: Lauren Pratt

Producer: Daniel Corral

Engineer: John Baffa, TV Tray Studio

Recorded November 24–26, 2017, California Institute of the Arts (CalArts), Valencia, CA. Digital mastering: Paul Zinman, SoundByte Productions Inc., NYC

Cover art: Cindy Bernard: *Manassas to Culpeper, Img_5692 to Img_5683*, 2014 (10 of 98 images). Copyright Cindy Bernard. Used by permission.

Design: Jim Fox

Changes: 64 Studies for 6 Harps (for Udo Kasemets) is published by Smith Publications/Sonic Art Editions.

This recording was made possible by a grant from the Francis Goelet Charitable Lead Trust.

FOR NEW WORLD RECORDS:

Lisa Kahlden, President; Paul M. Tai, Vice-President, Director of Artists and Repertory; Paul Herzman, Production Associate.

ANTHOLOGY OF RECORDED MUSIC, INC., BOARD OF TRUSTEES:

Amy Beal, Thomas Teige Carroll, Robert Clarida, Emanuel Gerard, Lisa Kahlden, Herman Krawitz, Fred Lerdahl, Larry Polansky, Paul M. Tai.

Francis Goelet (1926–1998), *In Memoriam*

For a complete catalog, including liner notes, visit our Website:
www.newworldrecords.org.

New World Records, 20 Jay Street, Suite 1001, Brooklyn, NY 11201

Tel (212) 290-1680 Fax (646) 224-9638

E-mail: info@newworldrecords.org

© & © 2019 Anthology of Recorded Music, Inc. All rights reserved. Printed in U.S.A.

JAMES TENNEY (1934–2006)

CHANGES: 64 STUDIES FOR 6 HARPS (1985)
FOR UDO KASEMETS

ALISON BJORKEDAL, ELLIE CHOATE, ELIZABETH HUSTON, CATHERINE LITAKER, AMY SHULMAN,
RURIKO TERADA, HARPS; NICHOLAS DEYOE, CONDUCTOR

80810-2 (2 CDs)

Disc 1 [TT: 71:04]

Studies 1–32

Disc 2 [TT: 70:59]

Studies 33–64

New World Records, 20 Jay Street, Suite 1001, Brooklyn, NY 11201
Tel (212) 290-1680 Fax (646) 224-9638
info@newworldrecords.org www.newworldrecords.org
© & © 2018 Anthology of Recorded Music, Inc.
All rights reserved. Printed in U.S.A.



File Under: Classical/Contemporary/Tenney, James

