The Music of Conlon Nancarrow

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Preface

When I began researching this book, I was often called upon to explain to strangers, relatives, and Mexican cab drivers that I was writing about an eccentric Mexico City composer who wrote music for player piano. That's one way to look at Conlon Nancarrow. Another is that his name must be placed next to those of Ockeghem, Josquin, Bach, Haydn, Webern, and Babbitt as composers who redefined in a technical sense what the act of musical composition can be. Yet another is that he can be counted with Ives, Ruggles, Cowell, Cage, Partch, Harrison, Feldman, Oliveros, Ashley, and Young as one of those outrageously original, challenging minds with which the brief history of American music already seems overly blessed.

In the current, still nascent state of Nancarrow scholarship, it seemed urgent to make this book serve primarily as a groundwork for analysis of Nancarrow's music, and only secondarily as an introduction to his work for the general contemporary music lover. Chapters 1 and 2 should prove of general interest, accessible to anyone curious about this composer with the exorbitant underground reputation. The core of the book, the analyses of the Player Piano Studies, will be most helpful to those who have access to either the recordings or the scores. Those who have the scores may want to number the systems, since system length is the only dependable time unit in many of Nancarrow's studies. In the case of works issued on compact disc, notably Wergo's recording of the complete player piano studies, I have indicated timings of musical events according to the second-counter, in hope that a reader without the scores will get an aural sense of the analysis.

My primary aim has been to give, as much as possible, an account of the complete rhythmic skeleton and form of every piece Nancarrow has written. Many of the later player piano studies are too complex to succumb to a general treatise, and it was all I could do to sketch an outline. I have said less than I would have liked about Nancarrow's contrapuntal criteria, his structural use of register, or his pitch usage in general, especially in the later studies. Tempo structure in Nancarrow's music is systematically developed from study to study, and forms the primary interest; pitch manipulation is largely intuitive and ad hoc, and would require more space to examine work by work.

My first thanks must go to Stuart Smith, who got me started on this project and spent tremendous unrecompensed time reading and offering suggestions. I profusely thank H. Wiley Hitchcock for his help, advice, and encouragement in this project as in so many others. Trimpin became my comrade in Nancarrow scholarship, giving me pages and pages of helpful computerized charts over steins of rich German beer. Peter Garland, Sylvia Smith, and Don Gillespie provided me with scores, James Tenney with the unpublished works and some helpful analytical advice. Charles Amirkhanian smoothed my way to a composer reputed to be difficult to approach. Eva Soltes, Helen Zimbler, William Duckworth, and Carlos Sandoval contributed valuable information. Doug Simmons provided expert editing advice. Penny Souster made the book possible. My wife Nancy Cook, who became a "Nancarrow widow" the way some women become football widows, accepted my *idée fixe* with humor and love. Yoko Seguira, Mrs Nancarrow, was a warm, funny, and helpful informant, and a gracious hostess. And Charles Nancarrow, since departed, treated me to a delightful evening of reminiscence.

Most of all I thank Conlon Nancarrow for cooperating in every possible respect, for his hospitality in Mexico City, for becoming a warm friend, for enduring dozens of answerless questions about music he had written decades earlier, for spending years of his life punching piano rolls with no guarantee that anyone would ever care about their contents, and for having the phenomenal imagination to create a body of music the likes of which no other individual could have ever dreamed up.

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The music: general considerations

Compared to the musical traditions of Africa, India, and Indonesia, European classical music has always been rhythmically limited. As soon as American composers broke away from Europe following World War I, they made an aggressive attempt to remedy this deficiency. They found themselves thwarted, however, first by the difficulty of notating extreme rhythmic complexity, then by the greater obstacle of getting performers to execute their rhythms accurately. Henry Cowell (1897–1965), an early ethnomusicologist and the twentieth century's first great theorist of rhythm, invented a new rhythmic notation in an aesthetically revolutionary treatise titled *New Musical Resources*, published in 1930 though written some dozen years earlier. He was interested in superimposing rhythms derived from equal divisions of a common beat: for example, dividing a whole note into five, six, and seven equal parts, and playing the different beats all at once. This exercise would effectively layer three tempos simultaneously, in ratios of 5:6:7. Addressing the problem of execution, he wrote,

> An argument against the development of more diversified rhythms might be their difficulty of performance . . . Some of the rhythms developed through the present acoustical investigation could not be played by any living performer; but these highly engrossing rhythmical complexes could easily be cut on a player-piano roll. This would give a real reason for writing music specially for player-piano, such as music written for it at present does not seem to have.[1]

Later, in a record review, he repeated his suggestion even more forcefully:

> To hear a harmony of several different rhythms played together is fascinating, and gives a curious esthetic pleasure unobtainable from any other source. Such rhythms are played by primitives at times, but our musicians find them almost if not entirely impossible to perform well. Why not hear music from player piano rolls on which have been punched holes giving the ratios of rhythms of the most exquisite subtlety?[2]

Cowell's idea was prophetic, but for once in his life, he left an experiment untried. That task fell to another composer: Conlon Nancarrow from Texarkana, Arkansas.

Nancarrow read *New Musical Resources* in 1939 in New York, as he was preparing to leave for Mexico City to avoid harassment by the American government

for his Communist Party connections. Cowell's words fused with a childhood memory – Nancarrow had grown up with a player piano in the home – and sparked one of the strangest careers in the history of music. Like so many other American composers in the 1930s, Nancarrow had been working to extend music's rhythmic vocabulary. Like others, he quickly came to the point at which classical musicians refused to play his music, or at least to play it well. But Nancarrow, self-exiled in Mexico City far from the musical mainstream, took a step few other composers would or could take: he learned to produce his music independently of performers. In 1948, he bought a player piano and embarked on an amazing series of now more than fifty Studies for Player Piano, exploring more aspects of rhythmic superimposition and tempo clash than any other composer had dreamed of doing.

The name Conlon Nancarrow has entered music dictionaries only recently, though he had gained an underground reputation in America by the early sixties. Many contemporary music enthusiasts are unaware of him, let alone general audiences. Where his name *is* found, regularly, is on radical young composers' lists of the musicians who influenced them most. In Europe he is regarded as one of the greatest living composers. In 1981, after finding his recordings in a Paris record store, seminal Hungarian avant-garde composer György Ligeti wrote of Nancarrow, "This music is the greatest discovery since Webern and Ives . . . something great and important for all music history! His music is so utterly original, enjoyable, perfectly constructed, but at the same time emotional . . . for me it's the best music of any composer living today."[3] An obvious part of Nancarrow's obscurity stems from his medium: only those who visit his Mexico City studio have heard the works in their "live" form. Too, printed dissemination of his music has been slow. Between 1977 and 1985, thirty-one of the Studies were published by Peter Garland in his *Soundings* journal from Santa Fe. So far only a handful of analyses have been printed, and those not always accurate. Even musicians aware of Nancarrow by reputation and the few out-of-print recordings do not nearly realize the extent of his compositional achievement. Exploring that achievement will be the purpose of this book.

Overview

Although seventy-five percent of Nancarrow's works are for one instrument, and that an eccentric one, his output is as varied in style, form, and weight as that of any other major composer. He has written light-hearted blues numbers like the Studies for Player Piano Nos. 3, 10, and 45; perfect miniatures like Nos. 4, 6, and 32; contrapuntal tours de force like Nos. 7 and 37; works that independently articulate the concerns of the European avant-garde, like Nos. 20, 23, and 29; formal jewels like Nos. 11, 24, and 36; abstract structuralist sound-patterns like Nos. 5 and 28; virtuoso spectaculars like No. 25; experiments in temporal irrationality like Nos. 33, 40, and 41; one chance piece, No. 44; and, in Nos. 24, 32, 33, 36, 37, 40, 41, 43, and 48, a string of essays exploring different aspects of canon

with a thoroughness that rivals Bach's *The Art of Fugue*. Is Nancarrow, like Webern, a painstaking craftsman of elegantly-wrought structures? Yes: listen to Studies Nos. 20, 24, 32, 36. Or is he, like Ives, a wild-eyed eclectic tossing jazz and modernist gestures into crashing cacophonies? Yes again: listen to Studies Nos. 25, 35, 41, 48. One must return to the piano music of Liszt and Busoni to find so many diverse strategies brought to one medium by a single composer.

Although most of Nancarrow's works are very brief (only seven of the Studies run over seven minutes), they do not *sound* brief, largely because of their sheer speed. Within a three-minute study Nancarrow often fits a mass of notes that would have sufficed Liszt for a twenty-five minute sonata. Study No. 36, for example, is under five minutes, but its score is fifty-two pages black with ink. Consequently, the music demands unusually intense listening, not, as in Webern's music, because events are extremely localized, but because so much happens, so many sections go by so quickly. Nancarrow's complete works could be heard in seven hours, but within half that time the listener would be as exhausted as though he had consumed Mahler's ten symphonies in a gulp.

Despite his miniaturization, however, Nancarrow's sense of structure is invariably large-scale. He rarely works as Webern does, mirroring one motive with another (Nos. 7, 35, and 41 are exceptions); instead he is like Stravinsky, with great blocks of material that resist deconstruction. Whereas Beethoven composed long works from short motives, Nancarrow has made brief works from large chunks of melody or rhythm. The fifty-four note melody of the Canon X (Study No. 21), the 120-chord progression of No. 11, the four-page isorhythmic tune of No. 12, the interminably nonrepeating duration-series of No. 20, the twenty chromatic segments of No. 41, the long rhythmic row of No. 45c – these are the irreducible data of Nancarrow analysis; sometimes they can be broken down into subsidiary patterns, elsewhere they seem to have sprung from his head in a protracted flash of inspiration. In fact, his blocks of material are often larger than Stravinsky's, but they do not lead to longer works because they are juxtaposed *simultaneously*, not successively as in *Le sacre du printemps* – a pivotal work, one should keep in mind, in Nancarrow's development as a musician.

Experimentalism

Experimental is a word popularized by John Cage for the new music of the 1950s, though it was used by Nancarrow as early as 1940. Cage's definition of an experimental work was "an act the outcome of which is unknown." The idea of a piece of music being experimental is perhaps drawn from an analogy with science: something never done before is tried in order to gain new knowledge or test a hypothesis. So defined, the term has been controversial, not always welcomed by the composers to whom it has been applied (Varèse and Ashley, for example).

Some of Nancarrow's studies fit the experimental definition better than most of Cage's music does, since outside Nancarrow's work the sheer physical effects of

the subtle time relationships he has worked with are completely unknown. Nancarrow often gives the impression that once *he* has heard what an experiment sounds like, there is little need for further attention to it; he has avoided repeating himself to an extent almost unknown among other major figures. With the arguable exception of Study No. 49, there is not a piece in Nancarrow's mature output that does not contain some new idea or twist he had never tried before. The number of compositional ideas he has used only once or twice is astounding. For example (unfamiliar terms on the following list will be fully explained in later chapters):

1. A pitch row split into discrete segments (Study No. 1)
2. A pitch row using internal repetitions of a pitch cell (No. 4)
3. A texture built up from motives that repeat nonsynchronously, i.e., out of phase (also involving every note on the piano without duplication) (No. 5)
4. An isorhythm (repeating rhythmic series) altered by systematic changes of tempo (No. 6)
5. Different isorhythms played at once (No. 7)
6. A piece divided simultaneously into equal-length sections by texture changes, and into a *different* number of equal sections by melodic structure (No. 11)
7. Polyphonic use of isorhythm in which the *color* (pitch row) and *talea* (rhythmic row) are associated differently in each contrapuntal line (No. 20)
8. A canon in which the voices gradually reverse roles (No. 21)
9. A palindromic canon (No. 22)
10. A correspondence between tempo and register (Nos. 23, 37)
11. Rhythmic canon in which the canonic voices have wildly disparate textures (No. 25)
12. Use of a 12-tone row as harmonic determinant for triadic music (No. 25)
13. Accelerating isorhythmic canon (No. 25)
14. A steady beat as a perceptual yardstick for changing tempos (Nos. 27, 28)
15. A "scale" of tempos proportional to a pitch scale (Nos. 28, 37)
16. Interrupted (and resumed) acceleration (No. 29)
17. A tempo canon whose voices theoretically converge *outside* the canon's time frame (No. 31)
18. Isomorphic transformation of a duration pattern to simulate a tempo canon (No. 33, *Two Canons for Ursula*)
19. Tempo changes within layered tempo contrasts (No. 34)
20. An entire movement played at the same time with itself at a different speed (No. 40)
21. An isorhythm accelerated by subtracting from the individual durations (No. 42)
22. Aleatory tempo canon (No. 44)
23. Use of Fibonacci durations to create the same rhythmic motive at different tempos (No. 45)

24 Irrational, unnotatable isorhythm (Nos. 45, 46, 47 – originally one work)
25 Structural acceleration within a tempo canon (No. 48)
26 Tempo canon in which voices are timed to converge *not* all at the same time (String Quartet No. 3)

The list could go on, and it does not even touch the innovations he has returned to repeatedly: irrational tempo relationships, glissandos with selected notes sustained, or the idea of tempo clashes at ratios of 4:5, 24:25, 60:61, and so on. Perhaps it is exactly because Nancarrow was not running around writing orchestra pieces, violin sonatas, song cycles, and commissions like most successful composers that his invariant medium forced so much variety from him. If so, it is a good argument for limitation of medium. Any four of these ideas might have sustained another composer's entire technical vocabulary. Aside from Cage and Stockhausen, what other twentieth-century musical minds have been so fertile?

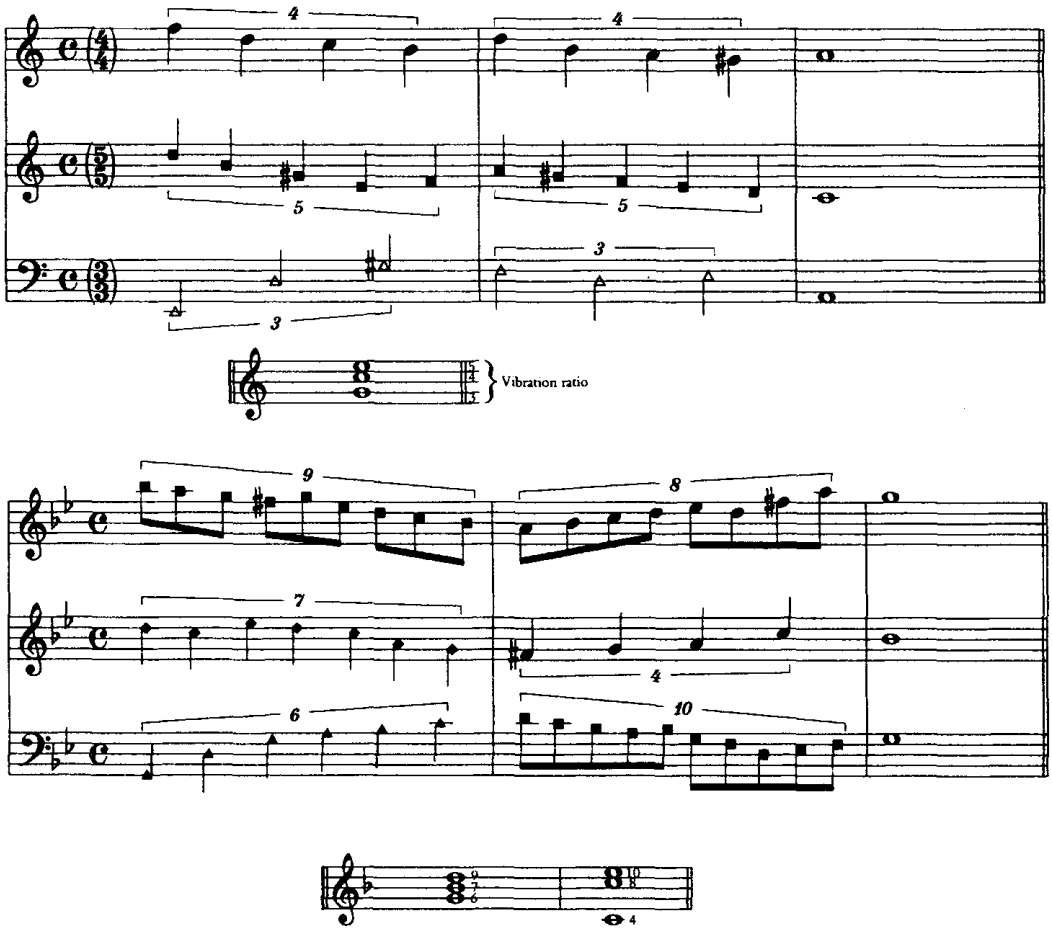
Nietzsche remarked that Schopenhauer's philosophy was the conception of a young man of twenty-six, and that it forever partook of that period of life's specific qualities. Nancarrow arrived at the preconditions of his music at thirty-five, not twenty-six, but similarly his music has always evoked the young rebel. At eighty-two, he has yet to reach sedate elegance or avuncular predictability. This is partly because of his music's harsh, bristling timbre, in conjunction with the methodical rhythmic wildness that makes his most disciplined structures sound ferocious, untamed. But it is also because of Nancarrow's unremitting experimentalism, his refusal to repeat himself. He is the eternal revolutionary.

Tempos, rhythmic ratios, and the harmonic series

One of Cowell's aims in *New Musical Resources* was to bring to rhythm the same structuring possibilities that had already been applied to pitch, in fact, to draw an analogy between the two (a procedure that Babbitt, Boulez, and Stockhausen would later apply in deriving serialism from twelve-tone technique). The rhythmic theory of Cowell's book was fueled by the insight that pitch intervals and cross-rhythms are manifestations of the same phenomenon, differentiated only by speed. That is, the higher pitch in a purely-tuned interval of a perfect fifth vibrates at a rate one and a half times that of the lower pitch, illustrating a ratio of 3:2. A triplet rhythm over a duple accompaniment, then – three against two – is simply the transfer of the "perfect fifth" idea from the sphere of pitch to that of rhythm.

As the vibrations of a tone are slowed down, the pitch becomes lower, and if the frequency descends lower than a threshold of about sixteen cycles per second, the vibrations are no longer heard as pitch, but as a steady beat. Cowell had a machine invented for him that would keep two sirens tuned at a constant ratio as he slowed them down and sped them up, and he was delighted to hear proof that, as a perfect fifth became slow enough, it turned into a rhythm of three against two. The idea inspired Cowell to hypothesize a system of rhythmic divisions in which each duration is a division of a fundamental duration. *New Musical Resources*

Example 1.1 Diagrams from Henry Cowell's *New Musical Resources*



included diagrams relating simultaneous tempos to triads, based on a fundamental "C-tempo" symbolized by four or eight notes per measure (Example 1.1). Always quick to follow speculation with practice, Cowell wrote a piece, *Quartet Romantic*, about the same time as *New Musical Resources*, in which the four performers play their lines in diverse and ever-changing tempos determined by the pitch ratios in a simple tonal chorale. Unplayable for six decades after its composition, *Quartet Romantic* was first recorded in 1978 by players listening through headphones to a computer clicktrack that provided their tempos.[4]

This was all the theoretical background Nancarrow needed to start experimenting. His first work not written for human hands, the Rhythm Study No. 1, relates all of its rhythms to two different simultaneous tempos, 120 and 210, related by a 4:7 ratio. Four to seven is the ratio of a purely-tuned minor seventh interval, C to a slightly flat B♭. The next explorations were among tempos related by ratios of three, four, and five. From here the chronological progression of Nancarrow's tempo ratios creeps up the harmonic series. The group of seven canonic studies, Nos. 13 through 19, use ratios related to the major or minor triad: expressed as pitch, 3:4 gives the perfect fourth, 4:5 the major third, 3:5 the major

sixth, and 12:15:20 a first-inversion minor triad, i.e., G B E. The 5:6:7:8 ratio of Study No. 32 is analogous to an E G B♭ C seventh chord, the 17:18:19:20 of No. 36 to a cluster, C♯ D D♯ E. The 24:25 and 60:61 ratios of Studies Nos. 43 and 48, respectively, represent closely spaced harmonics in the higher octaves. Study No. 33 uses the irrational $\sqrt{2}$:2 ratio of the equal-tempered tritone; Nos. 5 and 50 use the 5:7 ratio that is the smallest integral approximation of a tritone. And in Studies Nos. 40 and 41 Nancarrow went beyond algebraic square roots to the transcendental numbers e and π, whose pitch analogue is irreducible dissonance. In the more recent Study No. 49 Nancarrow has returned to the 4:5:6 ratio of the root-position major triad.

It is worth comment that, although so much of Nancarrow's conception of compositional technique derives from his early contact with *Le sacre du printemps*, the rhythm problems suggested by Cowell pointed to a direction of rhythmic development opposite to that of Stravinsky. One of Stravinsky's feats in *Le sacre* was the extenuation of *additive* rhythm, the grouping of small durational units into irregular meter progressions such as 6/8, 5/8, 9/8, 7/8, 3/8, and so on. Cowell's harmonic-series idea comes from the opposite method of *divisive* rhythm, taking a larger unit (e.g., a whole note) and dividing it simultaneously or successively into equal parts of various lengths. In the middle decades of this century, divisive rhythm was associated with Schoenberg and his followers, additive rhythm with Stravinsky and the neoclassicists. The pairing was somewhat paradoxical: Schoenberg clung to more traditional rhythms partly because his pitch usage was counterintuitive. (This is what Boulez and Stockhausen objected to: they felt a systematic pitch language demanded a systematic rhythmic language.) Stravinsky, on the other hand, stayed closer to the harmonic series in his often-pentatonic melodic language and used rhythm as the radical, counterintuitive element.

The Schoenberg/Stravinsky controversy was one of music's most bitter feuds, and it was raging when Nancarrow began the early studies. Nancarrow has always professed solidarity with the Stravinsky camp, and by the time Schoenberg's followers succeeded in expunging Stravinsky's influence from American compositional practice, Nancarrow had retired to his Mexican isolation. Yet both types of rhythm are found in Nancarrow's music, and it is a kind of watershed in his development when, *notationally*, divisive rhythm wins out over additive, between Studies Nos. 5 and 6. More importantly, however, Nancarrow was the only composer to thoroughly synthesize the two opposing conceptions of rhythm. (Other Americans, notably Roger Sessions and Arthur Berger, wrestled with the contradiction on the pitch front.)

In that respect, Nancarrow's Study No. 1 is prophetic. Paying homage to Cowell's divisive rhythm, Nancarrow notated 4/4 meter in one staff as equal to another's 7/8. His rhythmic groupings within those meters, however, are largely additive, changing between articulations of 3, 4, and 5 beats. Study No. 5, a textbook case, shows how the two rhythmic types intersect. Here the ostinatos group sixteenth notes into repeating duration patterns of 14 7 14 21 7 14 and 15 5

10 5 10 10 20. Nominally these rhythms are additive, but the meter, 35/16, is chosen to integrate beats of 5/16 and 7/16 durations; in short, a 35/16 "hypermeasure" is divided into five equal beats in one voice, seven in another. Like No. 5, Studies 3, 4, 7, 10, 11, and 12 are notated with all voices in the same tempo, organized around an eighth- or sixteenth-note subdivision acting as a common denominator. In No. 6 Nancarrow returns to a large measure divided into three, four, and five in the respective voices. As his tempo ratios increase, notation with a common sixteenth note denominator quickly becomes unwieldy, and he later unites voices via common *multiples*, or hypermeasures,[5] wherever necessary and possible.

Cowell's rhythmic system, especially in his *New Musical Resources* examples and less so in the *Quartet Romantic*, had the limitation of its *periodicity*, the fact that after every few beats all voices re-convene in a simultaneous attack. By retaining additive rhythm within each voice, Nancarrow circumvented that limitation. Once he had marked off tempos across manuscript paper with a template, he no longer needed to draw common barlines to keep voices together, and began to change meters within each tempo. In Study No. 14, the first such instance, the meters fit the accentuation pattern resulting quasi-randomly from a rhythmic process. Starting with No. 24 (one of his most original works on many counts and still his most rhythmically elegant solution), Nancarrow returns to truly additive rhythms occurring in different voices whose tempos effectively divide large hypermeasures into varying numbers of equal beats. Each line considered in itself uses additive rhythm, but the various lines are integrated by an overall divisive rhythmic structure.

The problem with divisive rhythm was its dependence on a too-predictable periodicity. The charge made against additive rhythm was that it had no analogy in pitch, that its use relegated pitch and rhythm to separate structural worlds. (In search of an analogy, Babbitt attempted to bypass additive rhythm in serialism by serializing rhythmic positions within a 6/8 or 12/16 metric grid.) Nancarrow combined the best of both worlds. Beginning with Study No. 24 and continuing with increasing freedom through his most recent studies, he has preserved the energetic, unpredictable feel of additive rhythms within the context of a tempo system related to the pitch relationships of the harmonic series. Inspired by Stravinsky, challenged by Cowell, he is the only composer who completely integrated the microrhythms of one with the macrorhythms of the other, the only one to *solve*, rather than bypass, the Schoenberg/Stravinsky rhythmic dilemma. Nancarrow achieved this feat, of course, at a price few composers would have been willing to pay: he sacrificed the possibility of performance by humans.

Mechanical rhythm

The rhythmic problems broached in Nancarrow's player piano music anticipated many that have arisen in computer music (as well as many more that computer

composers have *not* yet worked with). So much has been done now with the electronic sequencing of rhythm that we know much more about mechanically precise rhythm than was known when Nancarrow began punching rolls. Recent studies suggest that absolutely metronomic rhythm is not only humanly impossible, but undesirable from a listening standpoint. The relevant research has been summarized by Jonathan D. Kramer:

> Performers do not render even the simplest of rhythms exactly as notated. For example, we should expect a half note followed by a quarter note to be played in the ratio 2:1 . . . But in fact, the 2:1 ratio is virtually never heard, except when electronically produced. Psychologists Ingmar Bengtsson and Alf Gabrielsson found that, in 38 performances of a Swedish folksong in 3/4 time with most measures containing the half/quarter rhythm, the actual ratio averaged about 1.75:1.[6]

Music meant to be performed, Kramer goes on to say, sounds stiff when mechanically sequenced by a computer, because the ear perceives absolute regularity as awkward and artificial.

What implications do such studies hold for the mechanical perfection of Nancarrow's rhythms? It is true that, in the more "abstract" studies (Nos. 25, 33, 35, 41, and 48, for example), there is little sense of beats falling with the intuitive predictability of a physical gesture. However, in a way Nancarrow's entire output has been a response to that challenge. Like the computer researchers who develop "random deviation" programs to give computerized rhythms a more lifelike feel, Nancarrow has from the very beginning used the player piano to *recreate* rhythmic liberties taken in performance that no notation could convey. In the studies based on the stride piano rhythms of blues (Nos. 3, 4, 10, 45), he has implicitly acknowledged that jazz pianists hardly ever play a dotted rhythm in a 3:1 ratio; instead, Nancarrow often divides his beats into ratios of 3:2, 5:3, or 8:5, all divisions based on the Fibonacci series, related to the intuitively pleasing Golden Section as well as closer to live performance practice. The 4:5 alternation of tempo in the ostinato of Study No. 6, the unevenly divided isorhythms of Nos. 7 and 11, the notes bouncing between tempos in No. 45b, are brilliant models for creating the *appearance* of performance irregularity within regular systems. The player piano has always been for Nancarrow an opportunity to achieve rhythmic deviations Western notation does not easily acknowledge.

Still, as irregularly as Nancarrow may *subdivide* his beats, the beats themselves remain more regular than any pianist would try to play them, and this is a central fact of Nancarrow's tempo conception. Once one has committed himself to working with simultaneous tempos in ratios as close as 14:15:16 (Study No. 24), any interpretive deviation from strictness is out of the question. The slightest *tenuto* or *rubato* in one voice has to be also reflected in the others if the integrity of their relationships is to be maintained; as soon as one robs a note in the 14 tempo of even 1/15th of its value (far less than the 1.75:1 ratio cited by Kramer), it becomes identical to the notes in the 15 tempo, and the point of the exercise has vanished.

What happens, any lover of this music feels, is that the complexity of Nancarrow's tempo relationships compensates for the subconscious, note-to-note complexity lost in the act of mechanical reproduction. (Nancarrow does not even see it as compensation: "When romantic music is played in straight quarter notes and eighth notes," he says, "I find that kind of music boring even *with* the human performance. That's why I don't like romantic music."[7]) Any attempt to hear three lines of contrasting tempo as each keeping its own steady beat focuses the attention so keenly that other perceptual concerns, even those one is more accustomed to, fall by the wayside. As for the desirable ebb and flow of tempo that takes place in performance, this may have been the subconscious motivation behind Nancarrow's acceleration studies (Nos. 8, 21, 22, 23, and 27, plus the finale of the String Quartet No. 3), in which different lines accelerate and ritard not only together, but independently of each other. And the late, unmetered Studies Nos. 41, 45, and 48 approach a chaotic rhythmic energy close to that of free improvisation, as though Nancarrow were still searching to incorporate some kind of "body rhythm" into his mechanical music. As Kramer notes,

> a human performance of one of Nancarrow's more complex studies (if we can imagine the incredible pianist needed to accomplish such a feat) might well be less thrilling than the normal player-piano rendition. The effect of Nancarrow's music thrives not on performance mastery, but on the mechanistic precision of, for example, simultaneous tempos in the ratio of $\sqrt{2}$:2 [Study No. 33]. With such a complex ratio, there is no room for performer nuance. Any deviation from exactitude would sound like an error, not like an expressive interpretation.[8]

Nancarrow also faces the complaint heard by many composers of tape music, that there is no interpretive variety, that the music sounds the same at every performance. As he once put it,

> I am amazed that most people who object to the nonhuman element in computer music or in the player piano have no objection to a Shakespeare sonnet, for example. That sonnet has always remained the same over the centuries. No one suggests it should be changed by a new performance. A painting stays the same forever. The same is true of other works of art. But somehow music is supposed to be different all the time.[9]

The Studies for Player Piano constitute a grab-bag of experiments that perceptual psychologists should have fun with for decades. Nevertheless, in his most recent works for live performers, such as the String Quartet No. 3 and the *Two Canons for Ursula*, Nancarrow (with the help of the Arditti Quartet and Ursula Oppens) has shown that tempo relationships as simple as 3:4:5:6 do leave room for expressive interpretation. Who knows how far future composers and performers will dare to adventure toward even more distant relationships?

Pitch

In 1987 the author interviewed Pierre Boulez, who had only recently been introduced to Nancarrow's music by Elliott Carter and was still excited about the

discovery. "For me it was very interesting," Boulez said, "because the rhythmical structure is really very well thought out. Unfortunately, the pitch vocabulary does not follow."

Is Boulez's complaint legitimate? There is a temptation to think of Nancarrow what was once thought of Charles Ives, that he is a revolutionary *naif*, innovative in certain areas, but unsophisticated in respects necessary for greatness. Part of this impression comes, no doubt, from Nancarrow's self-imposed isolation, so parallel to that of Ives. But one must keep in mind that Nancarrow was twenty-eight when he moved to Mexico, and that he had already spent considerable time with some of the best, most advanced musical minds of his era: Henry Cowell (through his book), Nicolas Slonimsky, Roger Sessions, Walter Piston (perhaps even Schoenberg). Traces of twelve-tone thinking crop up in Nancarrow's music from time to time (Study No. 25 uses a twelve-tone row), and the early studies in particular show a sophisticated manipulation of pitch rows. If Nancarrow departed from the chromatic, systemic pitch usage of his contemporaries, it was not because he lacked the technique to manage them, but because he eventually found them inappropriate to what he was doing. One could hardly charge that he found complex pitch systems too much trouble to invent: any composer who would balk at a sizeable expenditure of effort would never have finished punching out even the first five piano rolls.

Whether Nancarrow's pitch thinking has been on the same level as his rhythmic thinking is not a question that can be answered in generalities, because he has made pitch serve so many different purposes. There are studies in which, by Nancarrow's own admission, pitches are little more than an arbitrary string with which to manifest the tempo structure. The fifty-four-note row of Study No. 21 seems makeshift, No. 15 is melodic without being memorable, pitch in No. 22 is a blur, and the recurring seventh chords in No. 33 are far from subtle. One of Nancarrow's departures from the rest of the century's music is his resuscitation of materials that romanticism had rendered banal, such as triads and scales. Always intended to render some rhythmic point more easily audible, they lend an unnerving freshness to his music, though an ear trained to subtle Boulezian sonorities might find them simply awkward.

However, had Nancarrow tried to construct tempo canons from the pitch systems typical of Boulez's *Le marteau sans maître*, he would have defeated his own purposes and become incomprehensible. In the Sonatina and Study No. 1 he goes to ingenious lengths to make inversions and retrogrades invoke the bittersweet intervals of blues. In the other early studies his harmonies authentically recapture a blues style of piano playing. Nancarrow has written catchy, even hummable tunes in Studies Nos. 6, 7, 11, and even 41. The offbeat, never-quite-repeating pitch sequence of No. 4 was a brilliant inspiration. One test of masterful counterpoint should be that no line draws undue attention from the others, and the echoing lines in the softer canons of No. 24 blend as well as anything in Palestrina or Bach. If the purpose of pitch in a canon is to make the canonic structure clear, one could