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"Not Exact, but Near Enough": Complexity and Playfulness in Nancarrow's Study No. 41

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Editors Note: As mentioned in our piece "Reading Cage," 2012 marks the centenary of Cage's birth. Some American music historians may not be aware that the year is also the 100th birthday of the more reclusive composer Conlon Nancarrow. Nancarrow is best known as a composer of pieces for player piano, an instrument where mechanical reproduction of a keyboard work is achieved by a pneumatic device and punched paper rolls. A fixture of musical life in the early decades of the 20th century, the "performer-less" aspect of the player piano, and the fact it could provide performances physically impossible for a human musician, intrigued many art music composers, including Igor Stravinsky. In the following piece, Margaret Thomas pays tribute to this fascinating (and still widely unknown) American composer with a look at one of his most complex player piano studies.

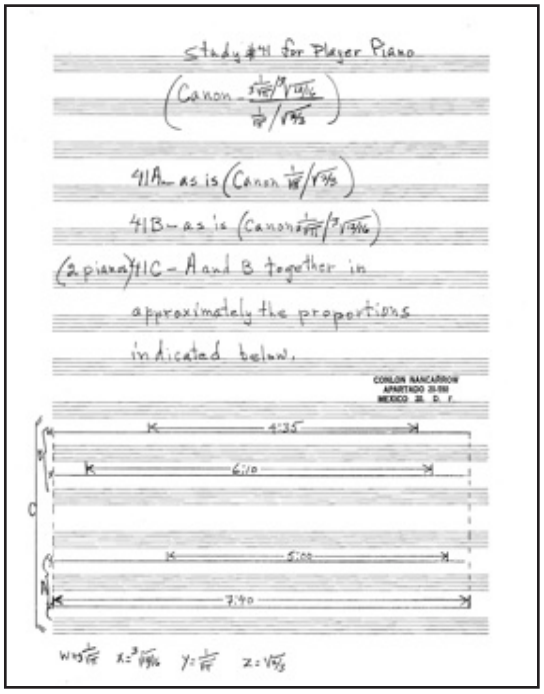
A wise teacher once advised me that an analysis is not complete without examining a piece from a distance, and she intended a literal distance: one should step several feet back from the score, squint, and take in the broad shape. It struck me as silly at the time, concerned as I was then with every notated detail of a score. But I now realize that there are many things that can lead us to miss the forest for the trees, not least of which are the mesmerizing details on the page. *The Studies for Player Piano by Conlon Nancarrow* (1912-1997) frequently utilize tempo proportions, realized by simultaneous voices; when they are enacted as tempo canons, the proportions are stated on the title page of the score. They range in complexity, and include such declared proportions as:

3:4 (*Studies Nos. 15* and *18*)
12:15:20 (*Studies Nos. 17* and *19*)
150:160 5/7:168 ¾:180: 187 ½:200:210:225: 240:250:262 ½:281 ¼ (*Study No. 37*)
*2:2 (*Study No. 33*)
e:π (*Study No. 40*)

It is a provocative set of possibilities, to be sure. The question is: might the stated proportions distract us from taking in other critical features of the studies, from examining the studies from a distance?

Perhaps Nancarrow's pinnacle of proportional complexity appears in the *Study No. 41* (composed 1969-1977), whose title page is reproduced in Example 1.

The page presents a compelling puzzle: what do the numbers mean, and how can they be formed by a musical piece? Understanding the basic structure of the piece may help. *Study No. 41* is a three-movement work; the A, B, and C shown in Example 1 represent the movements. First, *41A* (which includes two voices, *y* and *z*) is played on a single piano, after which *41B* (containing voices *w* and *x*) is also played on a single piano. The third movement, *41C*, features A and B played on two pianos at once, with their alignment as shown in the diagram on the title page.



Example 1:
Title page for Conlon Nancarrow's Study No. 41

Basing the work's tempos on such complicated ratios is immediately intriguing, and raises important questions about compositional intention and accuracy. In addition, while most of Nancarrow's studies are single movements just a few minutes in length, *Study No. 41* contains three movements, and lasts approximately twenty minutes. It thus stands out rather obviously among Nancarrow's works not only in proportional complexity but scope. Both features, along with the *Study*'s motivic intricacy and textural density, have made it one of the most admired of Nancarrow's works. James Tenney describes it as "surely one of the most astonishing pieces in the entire literature of 20th-century music," praising its complexity and intensity.[1] Kyle Gann, in his notable monograph on Nancarrow's music, devotes no less than eleven pages to his detailed analysis of the *Study*, which he describes as one of Nancarrow's "magna opera."[2]

For some time I believed that the starting point for an analysis of *Study No. 41* must surely be its wonderfully baffling tempo proportions, and I felt compelled to consider whether we are truly meant to perceive them, whether they have specific surface, rhythmic, or large-scale implications, or whether they are merely gimmicks. But when I revisited the piece recently after not having listened to it for several years I found that the distance I gained provided just the big picture I had missed earlier: the study is considerably more playful than I realized when I was distracted by the proportions, and it is a strikingly compelling piece of music whether or not one contemplates the proportions.

A few words about the work's structure are in order. The first and second movements (*Nos. 41A* and *41B*) are tempo canons based on different proportions (the denominator and numerator of the overall proportion shown in Example 1, respectively: the tempos of A form the proportion $1/\sqrt{\pi} : \sqrt{2}/3$ and those of B project $1/\sqrt[3]{\pi} : \sqrt[3]{13}/16$). For ease of comprehensibility, it may be useful to think of these proportions as calculated at approximately 0.691 and 0.732, or relatively close to the superparticular ratios 2:3 and 3:4. In *41C* the first two movements are played simultaneously on two pianos, completing the full proportion complex:

$$\frac{1/\sqrt[3]{\pi} : \sqrt[3]{13}/16}{1/\sqrt{\pi} : \sqrt{2}/3}$$

Although *41A* and *41B* have similar formal shapes they differ significantly in their style and temporal effect; as a result, *41C* is a dense and complicated composite. Movements A and B are designed as converging-diverging tempo-proportion canons. In other words, they both contain two canonic voices that proceed at different speeds. The slower voice (*z* in A, *x* in B) enters first, followed by the faster voice (*y* in A, *w* in B). The voices eventually converge upon the same point within the canonic line, and then diverge, so that the faster voice completes the canonic line first, leaving the slower voice to complete the material alone.

Along with their canonic processes, each of the movements displays a compelling superimposition of surface complexity (fragmented motivic construction) upon a relatively simple large-scale arch form. The arch form is defined by the converging-diverging canonic process, with the central convergence of the voices representing the peak of the arch. The arch form is also supported by parallel increases and decreases in rhythmic activity, texture, and the density of musical events.

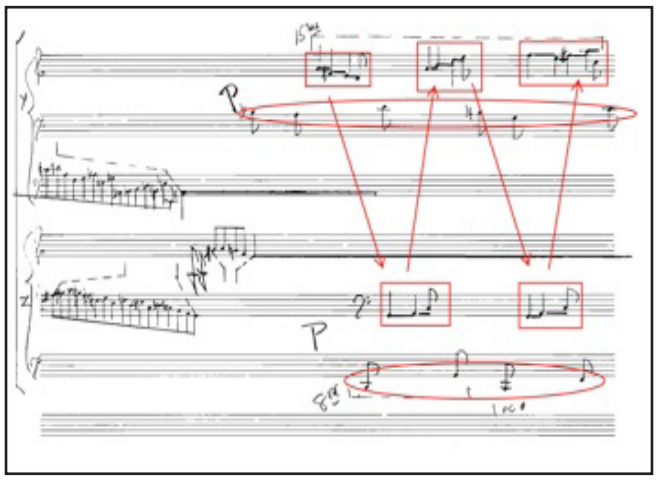
So where do, or should, the proportions figure into our hearing of the *Study*? Nancarrow's discussion of the proportions is quite suggestive:

> At that time [of the composition of *Study No. 41*], I was looking for some irrational relationships. I had this book of engineering, and I looked up some relations that were roughly what I wanted. I didn't want something that was so separated they didn't even relate, or too close that you couldn't hear it. I found that those particular numbers, transferred into simple numbers, gave the proportion more or less that I wanted. Not exact, but near enough. This was before I had written a note.[3]

This is startling. Despite their implied specificity, it seems the precise ratios were not so important to Nancarrow as their function in forming tempos unreconcilable to a simple proportion. Indeed, Nancarrow described the appeal irrational proportions had for him as follows: "There's no common denominator for an irrational number like the square root of two (in combination with a rational number) [like that] possible within rational numbers."[4] Nancarrow's use of the proportion reflects the wonderfully paradoxical combination of complexity and simplicity that is so characteristic of his music overall: an intricate proportion is transformed into "simple numbers." Of course, by their very definition, irrational numbers cannot be specified; in order to have produced the *Study* Nancarrow had to approximate the proportions. Why not, then, simply use the rational equivalents? Part of the

attraction must have been the gorgeous complexity of the original proportional structure. For a lover of numbers like Nancarrow, the proportion is a thing of beauty. And, of course, π means something even to a lay person: it is the ratio of the circumference of a circle to its diameter. Nancarrow gives no indication, however, that he had anything grander in mind than simply finding "some relations that were roughly what I wanted."

In fact, there is something playful about the idea of choosing thorny proportions such as these but then approximating them in their implementation. "Playful" is perhaps too gentle a descriptor; "teasing" might be more appropriate, since the idea of tempo proportions is elusive in a piece that does not project time signatures or tempos clearly. The score is written in proportional, non-metric notation (see Example 2).



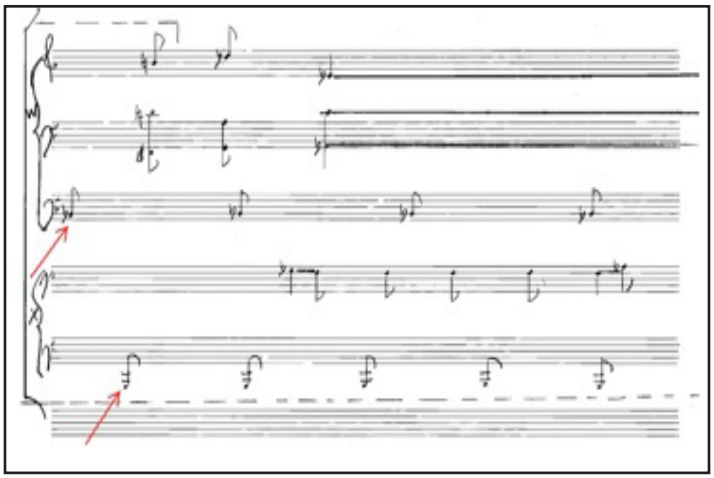
Example 2: Nancarrow, Study No. 41A, *annotated score excerpt, page A14, system 2*

Under this notational system, conventional rhythmic durations do not carry their normative associations; instead, the distance between noteheads reflects the time separating their articulations, with eighth notes representing staccato articulations, and quarter notes followed by horizontal lines depicting sustained notes whose sounding duration is reflected by the length of the horizontal line. Quick flourishes are represented by "exploded drawing," whereby the notes are written legibly outside of the staff to which they belong, with lines connected to that staff showing the time span in which the notes occur. Some gestures do suggest conventional rhythmic relationships, with noteheads spaced at distances that form simple multiples, implying something like durational eighth notes and quarter notes. For the most part, however, the idea of tempo simply does not apply to the way the *Study* sounds.

And yet Nancarrow provides those proportions in the score. Now that I have achieved a figurative distance from the study, I can hear that this contradiction between seriousness (the stated, complicated proportion) and playfulness (its seemingly frivolous application) is projected by—and may, in fact, be one of the most salient points of—the piece. The first movement, *41A*, achieves a jazzy, improvisatory feel by virtue of its irregularly-spaced gestures, many of which mimic jazz gestures. Once both the canonic voices are in motion the effect is something like free jazz; each voice is compound, frequently suggesting three or more simultaneous component parts (set apart registrally) that cycle through a limited set of gestures. The canon, combined with the recurring gestures, produces the effect of up to six parts that respond to one another, something like sensitive players in a jazz combo. Consider the brief score excerpt shown in Example 2. The short legato figures that conclude with a staccato note (boxed in the example), and which feature major seconds and minor thirds, could derive from a jazz standard (consider: "I Got Rhythm"). Meanwhile, there are jagged bass lines (enclosed in ovals) and glissandi-like flourishes. This comparison to a jazz combo may be unexpected, but given the stylistic evocation of jazz by the various gestures, and the sense of dialog (follow the arrows on the example), it is apt. Indeed, Gann mentions Ornette Coleman and Thelonious Monk in his discussion of the study; I would add Earl Hines and Louis Armstrong, two of Nancarrow's favorite jazz musicians. Nancarrow praised Hines and Armstrong for their use of "collective improvisation," in which "the kind of counterpoint achieved in their type of playing violates almost every academic canon except that of individuality of line and unity of feeling. Ignoring accepted precepts …they have built up their own system of unorthodox counterpoint … a counterpoint of phrase against phrase."[5] Mapping this description onto *Study No. 41A* is remarkably effective.[6]

On the heels of *41A* comes *41B*, which presents a serious counterpart to the playful first movement. The jazzy motives are replaced by a pulsation that incrementally accelerates to the central canonic convergence point, and then decelerates to the end, along with sustained notes and other figures. With its use of recurring and varied musical gestures, *41B* has some of the fragmented quality of *41A*, but overall it has a much greater sense of continuity. This is due in large measure to the pulsations. Even though the rate of pulsation changes, its near-constant presence serves as an underpinning for the movement, compensating in

part for the disjointed other appearances of the gestures. See Example 3, which shows the w layer's repeating Bb2 and the x layer's repeating B0 (indicated by arrows).



Example 3: Nancarrow, Study No. 41B*, score excerpt, page B8, system 2*

Both movements have a clear arch form created not only by the canonic process but also the increases and decreases in the activity rate, texture, and dynamics. The form of *41B*, however, achieves an even greater sense of direction as a result of the processes of acceleration and deceleration the pulsations undergo. Indeed, the weightiness of the pulsations generate *41B*'s more serious character, hinting as they do at an elusive, ever-changing sense of tempo.

When movements *A* and *B* are combined to form movement *C*, the result is astonishing, and, at times, overwhelming in the sheer amount of music that sounds at the same time. The playful movement *A* opens the finale with its free and improvisatory character; because it proceeds by itself for about a minute and a half,[7] the initial impression is that the *Study* is overall a ternary piece, with the third movement constituting the return of *A*. But then the more serious movement *B* joins in, and *A* and *B* together pursue an increase in texture and activity, driving toward an approximately coordinated climax and relaxation. The resulting composite displays a magnification of the interaction characteristic of much of Nancarrow's music, between local, or surface, temporal dissonance and large-scale formal and processive coordination. As a whole, the *Study* presents a fascinating combination of specificity (the intricate yet unatainable proportions) and approximation (a human margin of error), in that Nancarrow ultimately had to estimate durations in order to position the holes on the player-piano rolls, which he punched by hand. This interaction seems to embody the essence of *Study No. 41*, a work that teases us with moments that nearly achieve coordination, and with tempo and rhythmic relationships we can almost discern but that change before we are able to figure them out. In the end the *Study* meaningfully reflects Nancarrow's rich statement presented earlier, a statement that may initially have seemed disingenuous. It bears repeating. Regarding the proportions he said, "I didn't want something that was so separated they didn't even relate, or too close that you couldn't hear it. I found that those particular numbers, transferred into simple numbers, gave the proportion more or less that I wanted. Not exact, but near enough." To focus in on the proportions—which are provocative but can never be precisely determined—is tempting, but causes us to miss the forest of this delightful and challenging music. To squint, that is, to acknowledge the faster and slower movement of the canonic voices but not worry about specifying them, allows us to take in the broad strokes of the *Study* and recognize its playfulness.

So the question remains: why did Nancarrow turn to this set of irrational proportions and include them on the title page of a score that is not, in fact, even necessary, since Nancarrow realized the piece by punching the piano rolls himself? By embracing and publicizing complex proportions while at the same time relinquishing their precise enactment, it may well be that Nancarrow has invited us to share in his fascination with what Edward Rothstein describes as the mathematical and musical sublime:

> The search for the sublime links music and mathematics. Both arts seek something which combined with the beautiful provokes both contemplation and restlessness, awe and comprehension, certainty and doubt. The sublime in mathematics and music sets the mind in motion, causes it to reflect upon itself. We become aware first, in humility, of the immensity of the tasks of understanding before us and the inabilities of human imagination to encompass them. The sublime inspires an almost infinite desire, a yearning for completion which is always beyond our reach. But we are then comforted by the achievements of reason in having brought us so close to comprehending a mystery fated to remain unsolved.[8]

“Not Exact, but Near Enough” (cont.)

Notes:

[1] James Tenney, “Studies for Player Piano, Vol. I,” liner notes to *Conlon Nancarrow: Studies for Player Piano, Vol. I and II* (Wergo: compact discs WER 6168-2, 1991), 8.

[2] Kyle Gann, *The Music of Conlon Nancarrow* (Cambridge: Cambridge University Press, 1995), 207-218.

[3] Nancarrow, as quoted in Gann, 208.

[4] Nancarrow, as quoted in Roger Reynolds, “‘Inexorable Continuities . . .’: A Commentary on the Music of Conlon Nancarrow,” in *Conlon Nancarrow: Selected Studies for Player Piano, Sounding Book 4* (Spring-Summer 1977), 34.

[5] Conlon Nancarrow, “Over the Air: Swing, Jazz, Boogie-Woogie.” *Modern Music* 17/4 (1940): 263-265.

[6] For a fuller discussion of elements of collective improvisation in Nancarrow’s music see Margaret Thomas, “Conlon Nancarrow, ‘Hot’ Jazz, and the Principle of Collective Improvisation,” in *Online Symposium: Conlon Nancarrow, Life and Music* (October 2012), http://conlonnancarrow.org/symposium/papers/thomas/thomas.htm.

[7] In the Wergo recording, *Complete Studies for Player Piano, Vols. 1 and 2* (Wergo WER 60166/67-50, 1991).

[8] Edward Rothstein, *Emblems of Mind* (New York: Times Books, 1995), 189.