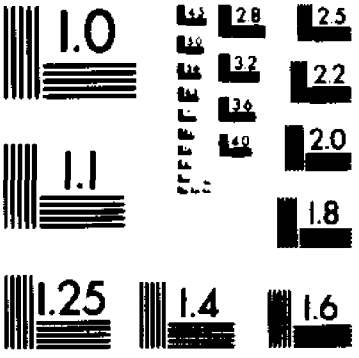

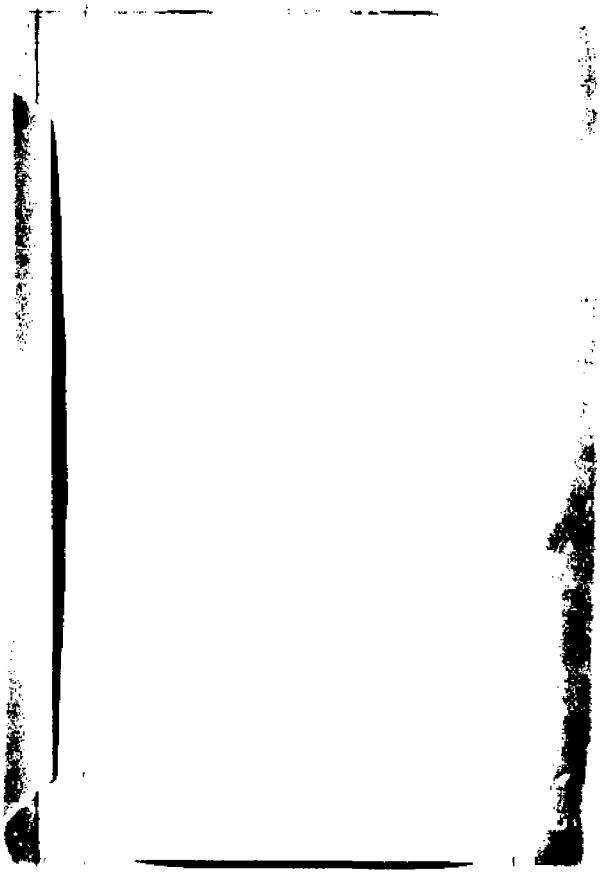

Carlsen, Philip Caldwell

THE PLAYER PIANO MUSIC OF CONLON NANCARROW: AN ANALYSIS OF SELECTED STUDIES (AND) "FAIR SEED-TIME" FOR TENOR AND ORCHESTRA (SELECTIONS FROM WILLIAM WORDSWORTH"S "PRELUDE"). (ORIGINAL COMPOSITION)

City University of New York PH.D. 1986

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T H E P L A Y E R P I A N O M U S I C O F

C O N L O N N A N C A R R O W

AN ANALYSIS OF SELECTED STUDIES

by

PHILIP CARLSEN

A dissertation submitted to the Graduate Faculty
in Music in partial fulfillment of the requirements
for the degree of Doctor of Philosophy,
City University of New York.

1986

This manuscript has been read and accepted for the Graduate Faculty in Music in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy. There is also a composition entitled Fair Seed-time for tenor and orchestra.

13 January 1986
date

H. Wiley Hitchcock
Professor H. Wiley Hitchcock
Chairman of Examining Committee

14 January 1986
date

Barry S Brook
Professor Barry S. Brook
Executive Officer

Professor Charles Dodge (adviser)
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Professor Bruce Saylor
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The City University of New York

To my parents,

James and Mary Carlsen

P R E F A C E

With the ongoing publication of his scores in Peter Garland's Soundings Press, the release on 1750 Arch Records of nearly all of his music for player piano, the receipt in 1982 of a $300,000 "genius" award from the Chicago-based MacArthur Foundation, and the enthusiastic admiration of Gyorgy Ligeti and other composers, Conlon Nancarrow has finally--after years of isolation in Mexico City--gained well-deserved recognition as a significant figure of 20th century music. Still, the critical literature on his work remains very small. In 1977, James Tenney wrote, "The list of books on 20th-century music and its composers which have not one single mention of Nancarrow in their texts is virtually the whole list of such books now or until recently in print."[1] The situation has not changed much. Tenney himself is the only one so far to have attempted a general overview of all of Nancarrow's music; in the article quoted above, he manages to say at least something about each work, but, for the most part, without going into any depth. Most of the rest of the literature consists of transcribed interviews, tributes, reviews, or general descriptions of Nancarrow's studio and his

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1. James Tenney, "Conlon Nancarrow's Studies for Player Piano," Conlon Nancarrow: Selected Studies for Player Piano, ed. Peter Garland (Berkeley: Soundings Press, 1977), 41.

working method. So far, only one other analytical article has appeared: a brief examination of Study No. 27 in Perspectives of New Music.[2]

With this essay, I hope to fill in some of the gaps in our knowledge of Nancarrow's music for player piano. The scores of the principal works I have chosen to examine--Studies No. 19, 36, 8, 23, and 35--are all contained in the first volume of Nancarrow's complete collected studies;[3] they may be heard in the recordings put out by 1750 Arch Records under the title Complete Studies for Player Piano: Study No. 35 on Volume 2 (1750 Arch S-1777), Studies No. 8 and 23 on Volume 3 (1750 Arch S-1786) and Studies No. 19 and 36 on Volume 4 (1750 Arch S-1798). My analyses are based on the scores and recordings. In certain instances where it seemed important to study the piano rolls themselves, I reconstructed them on graph paper from the scores (which are extremely accurate in their spatial representation of rhythm and tempo).

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2. Jan Jarvlepp, "Conlon Nancarrow's Study No. 27 for Player Piano viewed analytically," Perspectives of New Music XXIII/1-2 (Fall-Winter 1983/Spring-Summer 1984), 218-22. Despite some worthwhile insights, Jarvlepp's article is marred by several misreadings of the score. For example, he writes of "imitation at the major second" (Ibid., 220) when it is actually at the minor seventh; he ignores the marking sim. (page 53 in the score) to incorrectly state, "The main pitches disappear from the ostinato on pages 53-55 but are heard one octave below and two octaves above their original level" (Ibid., 219); and he describes another passage as containing eight separate canonic voices, accelerating or ritarding independently (Ibid., 221), when in fact there are only four voices, each of whose lines is doubled at the interval of three octaves.

3. Garland, op. cit.

The completion of this dissertation owes much to many people. In particular, I would like to thank my advisers, Wiley Hitchcock and Charles Dodge, and the members of my committee, Joel Lester, Sherman Van Solkema, Bruce Saylor, and Hugo Weisgall; their comments, suggestions, and encouragement were tremendously helpful. I am indebted to the University of Maine at Farmington for the use of the word processor on which this essay was written. And, for their bounteous love and support through the long months of writing, I am deeply grateful to my wife, Mary Jo, and my children, Melissa and Eric.

C O N T E N T S

Chapter I

I N T R O D U C T I O N

From the perspective of the 1980s, the player piano seems a quaint instrument. Invented in the late 19th century, it provided the middle class with a way of bringing accomplished performances into the home. "In its heyday in the early 1920s when nearly half a million player pianos were manufactured in two years, it was a focal point for music-making in the home, where families would gather round to sing popular songs to its accompaniment."[1] The player piano was originally conceived as a recording and playback device. Rolls for the instrument were recorded by company hacks and concert artists alike. As they sat at the keyboard in a piano-roll factory playing through a piece of music, the striking of the keys made ink marks on a moving paper roll. Afterwards, holes were punched wherever there were marks; from this master copy, thousands of rolls could be duplicated and marketed to the public.

With the advent of radio and the phonograph, the player piano understandably faded in popularity. Nowadays, it is essentially a conversation piece, sold in antique stores rather than through the Sears catalog. But in at least one place--the studio of Conlon Nancarrow in

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1. Frank W. Holland, "Player Piano," The New Grove Dictionary of Music and Musicians, ed. Stanley Sadie (London: Macmillan Publishers, 1980).

his home in Mexico City--it has never been an object of nostalgia. Since the late 1940s, Nancarrow has composed exclusively for the player piano. His nearly fifty studies for the instrument testify to his stature as a remarkable musical innovator, especially in the realms of rhythm and tempo. At the same time, the studies are showpieces of virtuosity far beyond the capabilities of human performers.

Nancarrow was born on October 27, 1912, in Texarkana, Arkansas. In his early years, he was quite active as a trumpeter, playing jazz and other types of popular and classical music. He attended the Cincinnati College-Conservatory of Music (1929-32) and later studied composition and counterpoint in Boston with Nicolas Slonimsky, Walter Piston, and Roger Sessions (1933-36). He values most his work with Sessions:

> The only formal studies that I did that were important were the studies I had in strict counterpoint with Roger Sessions. That was the only formal training I ever had. And they were rigid! I'd do this strict counterpoint exercise, and then I'd take a piece of my music and say to him, "What do you think of this?" "Very interesting; where's your counterpoint exercise?"[2]

The counterpoint study with Sessions served Nancarrow well considering the prevalence of canon in his compositions.

Nancarrow's works also frequently reflect his jazz background. There are many explicit jazz references, ranging from subtle uses of blue notes to the driving boogie-woogie of his Study No. 3. Roger Reynolds speculates that "it is perhaps in [his early experience as a jazz trumpet player] that the origins of his fascination with the

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2. Cole Gagne and Tracy Caras, "Conlon Nancarrow," Soundpieces: Interviews with American Composers (Metuchen, New Jersey: Scarecrow Press, 1982), 283.

clashing of multiple, simultaneous tempos might be sought."[3] Nancarrow cites Bach and Stravinsky as major influences; in describing his encounter with The Rite of Spring at the age of seventeen, he enthuses:

> At that time I'd heard practically no contemporary music, and suddenly The Rite of Spring was thrown at me, and it just bowled me over. This was when I was in Cincinnati. I heard it at a concert there, and it just opened up a new world to me...It's one of my favorite pieces of music, and Stravinsky is one of my favorite composers. Not only The Rite of Spring, but The History of a Soldier, Les Noces, and several others. He's my favorite composer. He and Bach.[4]

In 1937 he enlisted in the Abraham Lincoln Brigade to fight against Franco in the Spanish Civil War. On his return to the United States in 1939, he became involved in the New York new music scene, contributing several reviews to Modern Music,[5] and interacting with other composers such as Elliott Carter and Aaron Copland. Nancarrow had always been a dedicated socialist; that, combined with his Spanish experience, made him politically unacceptable to the United States government. This was brought plainly home to him when he applied for a passport: the government would not give him one. Fed up with such treatment, Nancarrow moved in the early 1940s to Mexico City. He has lived there ever since, becoming a Mexican citizen in 1956.

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3. Roger Reynolds, "Conlon Nancarrow: Interviews in Mexico City and San Francisco," American Music II/2 (Summer 1984), 1.

4. Gagne and Caras, 282-83.

5. Conlon Nancarrow, "Mexican Music: A Developing Nationalism," Modern Music XIX/1 (November-December 1941), 67-69. "Over the Air" [column], Modern Music XVII/1 (November-December 1939), 55; XVII/2 (January-February 1940), 115-16; XVII/3 (March-April 1940), 191-93; XVII/4 (May-June 1940), 263-65. Minna Lederman briefly discusses Nancarrow as a writer and reprints one of his "Over the Air" columns in The Life and Death of a Small Magazine (Modern Music, 1924-1946), I.S.A.M. Monograph No. 18 (Brooklyn: Institute for Studies in American Music, 1983), 103-106.

Nancarrow turned to the player piano partly because of Mexico's extreme musical isolation. Another reason, more compelling, was his long-standing frustration at the inability of musicians to deal with even moderately difficult rhythms. He goes so far as to say "ever since I'd been writing music I was dreaming of getting rid of the performers."[6] Only a handful of his early pieces for live performers had even been played and, without exception, the results had been disappointing, if not disastrous. There was, for example, the performance of his septet in New York in 1941:

> Actually, [the septet] wasn't very complicated. It had a conductor. The League of Composers had very good musicians. They got them from studios there, from the radio. There were two rehearsals. For one rehearsal, four came. The second rehearsal, three, and one of the original four. So there wasn't one session with the whole group. And when they played it, a couple of instruments lost their place right at the beginning. All through the piece, they were playing in some other place.[7]

With a player piano, such nightmares are banished. One can realize almost any degree of rhythmic complexity just by drawing it on a blank paper roll and then punching it out. But no one before Nancarrow had systematically used the instrument to explore rhythm. For some reason, serious composers did not grasp the player piano's potential as a creative tool. Perhaps they were put off by its plebeian associations (the same fate that has plagued the accordion and harmonica). Robert Craft's incomprehension at Stravinsky's dalliance with the player piano

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6. Charles Amirkhanian, "Interview with Composer Conlon Nancarrow," Conlon Nancarrow: Selected Studies for Player Piano, ed. Peter Garland (Berkeley: Soundings Press, 1977), 15.

7. Reynolds, "Interviews," 4.

is representative of an all-too-common condescension towards the instrument:

> ...Stravinsky's continuing infatuation with the [player piano] is one of the inexplicable eccentricities of his career--not the delight in the novelty of the machine reflected in the Etude (which he claimed was the first piece written especially for the instrument), nor even his profligate expenditures of time and labor in transcribing his music for this dodo (since he earned substantial sums of money thereby), but in his musical enthusiasm for it.[8]

To be sure, Stravinsky, Hindemith, and some others wrote a few pieces specifically for the player piano, but their works did not even begin to exploit the instrument's unique capabilities--they were still essentially piano pieces. Henry Cowell seems to have been the first person to envision some of the remarkable things that could be done with the player piano. In his New Musical Resources, during a discussion of complex polyrhythms as possible expressions of the overtone series, he writes:

> 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, because almost any of it could be played instead by two good pianists at the keyboard.[9]

Inexplicably, Cowell never pursued his own suggestion; that task was taken up by Nancarrow, although his idea of turning to the player piano probably dates back before 1939 or 1940 when he first read

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8. Vera Stravinsky and Robert Craft, Stravinsky in Pictures and Documents (New York: Simon and Schuster, 1978), 164-65.

9. Henry Cowell, New Musical Resources (New York: Alfred A. Knopf, 1930), new ed. with a preface and notes by Joscelyn Godwin (New York: Something Else Press, 1969), 64-65.

Cowell's book: "We had a player piano in the house when I was a child, and I was fascinated by this thing that would play all of these fantastic things by itself. And so from then I had this way in the back of my mind--I wasn't thinking of composing at that age, of course, but it fascinated me."[10]

All of Nancarrow's works for player piano are entitled Studies. Like traditional studies, they are usually based on the exhaustive exploration of a restricted number of musical ideas. Each study has its own strong personality and its own repertoire of tempo relationships and rhythmic durations. There is tremendous variety from one work to the next, but a single overriding concern runs like a stylistic thread through nearly all of them: it is what Nancarrow refers to as "temporal dissonance," or the clash of several different tempos going on simultaneously. Nancarrow's preoccupation with rhythm is reflected in the title of his first numbered work for player piano, Rhythm Study No. 1, although he dropped the word "rhythm" from his titles after that. The reason, as James Tenney has written, "...would appear to have more to do with a wish to avoid redundancy than with any lessening of the relevance of this term to the character of the pieces, since virtually every one of the Studies for Player Piano is, first of all, an essay in one or more aspects of rhythm."[11]

When he started composing for the player piano, Nancarrow did all of his punching by hand. That extremely laborious way of working

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10. Gagne and Caras, 292.

11. James Tenney, "Conlon Nancarrow's Studies for Player Piano," Conlon Nancarrow: Selected Studies, 46.

impelled him to return briefly to New York in 1947 in search of a punching machine. Having located one, he hired a Greenwich Village machinist to duplicate it for him. The machine originally advanced the paper roll with a notched mechanism, much like the platen advance on a typewriter. This feature meant that all the durations in Nancarrow's music had to be integer multiples of a particular small unit, the one corresponding to the advance from one notch to the next. By the time of his twentieth study, however, Nancarrow found this to be too much of a limitation, so he had the machine altered to advance the paper continously. From Study No. 21 on, nearly any combination of rhythms and tempos was possible.[12]

Nancarrow's compositional process involves, first of all, plotting out tempo relationships on both the paper roll and music manuscript paper:

> I mark out on a blank roll of paper all of the proportional relationships of tempo, using what I think is going to be the smallest (fastest) note value as the unit of measure. Of course, occasionally, if I have to use something even faster, I just go over the roll and put in the smaller values, showing the relations to the basic scale in the score. I mark the whole thing out from beginning to end on the blank player piano roll...Then I take the marked proportions from the roll onto the music paper. It is not as exact as the roll, but it's fairly accurate so that the vertical relationships of tempo units will be more or less what I see graphically on the paper. I establish the pattern of temporal relationships before the pitches. The marked out roll has no rhythms, only a series of sixteenth notes, or whatever. When I start to write the piece, the melody and rhythm--the harmonic connotation--are all done together.[13]

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12. Much of the information about the pianos and the punching machine is derived from Gordon Mumma, "Briefly About Nancarrow," Conlon Nancarrow: Selected Studies, 1-5.

13. Reynolds, "Interviews," 10.

Thus, throughout a study, a certain amount of space on the page represents a specific amount of time, and the spaces between notes in the score are the same as those on the roll. In Study No. 19, for example, a horizontal space of approximately one-and-a-half inches on the page always represents one second of music.[14] This exact relationship between space and time is present even in those studies which are notated with time signatures, barlines, and the standard symbols for durations and rests.

In a player-piano mechanism, the perforated paper roll passes at a steady speed over a horizontal metal bar that has a line of holes in it, each corresponding to a specific note on the keyboard.[15] When a hole in the paper lines up with a hole in the aperture bar, compressed air is allowed to pass through, activating that particular key. In addition, there are extra holes at the side for controlling dynamics. It is possible on instruments like Nancarrow's to achieve a gradual

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14. Where the piano roll itself is concerned, the normal musical concepts of horizontal and vertical are reversed. When a player piano is in operation, the paper unrolls from top to bottom, meaning that a vertical line of closely spaced holes will produce a single sustained tone, and holes that line up horizontally will produce several simultaneous tones. Throughout this paper, however, whenever the terms are used, "vertical" will refer to simultaneous events and "horizontal" to successive ones.

15. It should be pointed out that the player piano introduces a gradual accelerando to any study as it is being played; to quote Mumma: "As the speed of the roll is dependent on the rotation of the take-up roll (rather than a capstan and idler mechanism as on a tape recorder), there is a slight increase in the speed of a roll from start to finish, due to the slight increase in diameter of the take-up roll as it gathers the paper. . . . Nancarrow has explained that [this slight accelerando] doesn't really bother him because it is probably a natural phenomena [sic] in all performed rhythmic music, and refers to the same thing occurring in long, rhythmic African drum performances" (Mumma, 4).

crescendo or diminuendo, but he prefers using terraced dynamics. Nancarrow has two pianos, each fitted with Ampico reproducing mechanisms. They sound quite different from one another because of differences in the way Nancarrow altered their hammers: on one instrument, the hammers are of wood covered with metal straps; on the other, the standard felt hammers are covered with leather to which metal tacks have been affixed. Nancarrow's purpose in modifying the hammers is to achieve greater rhythmic clarity and more incisive attacks.[16] Many of his works appear to have been written specifically for one piano or the other. Several of the later works involve both (Nos. 39, 40, and 41), but Nancarrow has expressed some dissatisfaction with the results because of the great difficulties in exactly synchronizing the two instruments.

Nancarrow's scores reveal that the ranges of his pianos are slightly smaller than normal--from B_0 to A_7.[17] It is significant that the exact midpoint on Nancarrow's instruments is the note E_4; on a regular piano, the midpoint falls between E_4 and F_4. This of course has a direct bearing on the symmetrical structures Nancarrow sets up using every note on the instrument--in Studies No. 19, 27, and 36, for example.

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16. One of his earlier experiments in hardening the hammers even involved dipping them in lacquer.

17. The pitch classification system used in this paper is that adopted by the Acoustical Society of America. Subscript Arabic numerals designate the octave in which a note occurs, starting consecutively with 0 for the bottom three notes, 1 for the bottom octave beginning with C, and so on. Thus, "middle C" is C_4 and the highest C on the piano is C_8.

Within the scope of this paper, it is impossible to survey Nancarrow's entire output or, for that matter, to deal comprehensively with more that a handful of his compositions. Accordingly, a large portion of the analysis will be devoted to just one short work--Study No. 19. One may argue that it is not among the greatest of Nancarrow's compositions, but it provides many insights into his overall compositional style. Analysis of Study No. 19 will set the stage for examination, in slightly lesser detail, of several other works. The analyses of those works will concentrate on their unique features, relating them, however, to other studies. The ultimate goal is to demonstrate the imaginative variety displayed in the individual studies, while at the same time revealing the consistency that binds them together.

Chapter II

S T U D Y N O . 1 9

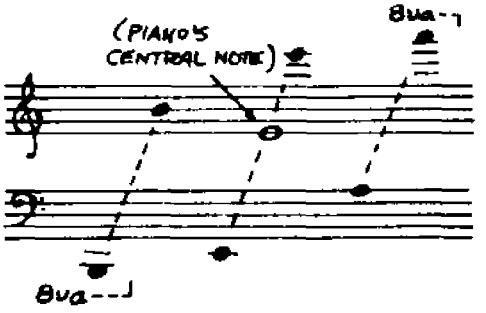
At seventy seconds, Study No. 19 is one of the shortest of Nancarrow's works. The printed score is only seven pages long. There are exactly 774 notes, each of which, being staccato, required the punching of only one hole in the paper roll, making this surely one of the least time-consuming of the studies for Nancarrow to produce. It is thus of very manageable length for an in-depth analysis. At the same time, it exhibits many of the features that are to be found again and again throughout the studies. For these reasons, it is an excellent starting place for a detailed examination of Nancarrow's music.

Study No. 19 is a strict three-voice canon at the eleventh. Exact imitation of both rhythm and pitch is maintained throughout, except at the very end where Nancarrow adjusts pitches to achieve a unison V-I cadence on F-sharp. As in Renaissance mensuration canons, each voice moves at a different speed, but the combination of tempos here is more complex than is typically found in the 14th or 15th centuries. The ratios of speeds of the three voices in Study No. 19 are represented by the study's subtitle, "Canon 12/15/20:" the first voice is marked M.M. = 144, the second M.M. = 180, and the third M.M. = 240. As the piece progresses, the faster voices, having entered later, gradually catch up to the slower ones, and in fact the entrances are

positioned to enable all three voices to arrive at their final beats simultaneously.

The registral placement of voices symmetrically partitions the piano's total range into overlapping four-octave segments: the range of the first voice is from the piano's lowest note, B_0, to B_4; that of the second is from E_2 to E_6 (making it symmetrical about the piano's central note, E_4); and that of the third is from A_3 to A_7, the latter being the piano's highest note:

Example II-1.



The specific interval of imitation in Study No. 19--an octave plus a fourth--was probably of less importance to Nancarrow than his desire to dispose the voices symmetrically and to make use of all the notes on the piano. And, as will be seen, his choice of a four-octave range for each voice was not arbitrary; it was a fundamental structural decision.

Before a consideration of the relationships between voices, the structure of the leading voice alone will be examined. As the lowest of the three voices, it has the unique function of providing the harmonic bass throughout the piece, but in all other respects, the features it exhibits are of course duplicated in the upper voices.

In the leading voice (as in the other two), an unharmonized melody unfolds whose pitches are nearly always doubled or repeated in different octaves before the next pitch is introduced. These repetitions and octave doublings appear to be random. Because pitch classes are never repeated immediately in the same octave, the line contains huge skips. A similar unpredictability is also characteristic of the rhythm: describing it is easy enough--single eighth-notes or groups of from two to five eighth-notes are separated by eighth, quarter, or dotted-quarter rests, but a casual search for recurring rhythmic patterns at the surface level reveals nothing.

Nevertheless, there is a consistency to the rhythm and texture that suggests a deeper level of organization. From beginning to end, notes are fairly evenly distributed both horizontally and vertically--much like molecules of gas in a closed container. There seem to be no long-range upward or downward motions, and no clusterings of notes in specific registers. For instance, notes in the lowest octave occur no more often than once every six eighth-notes, and no less often than once every eight eighth-notes. Similarly, notes in the highest octave occur once every three to five eighth-notes. These slightly different frequencies of occurrence further suggest that each octave has its own structure.

It is with observations such as these that a very striking rhythmic organization begins to reveal itself: the rhythm in the individual voice is found to be a composite of four separate isorhythmic patterns, one for each of the four octaves that constitute the voice's total range. (For convenience, the four octaves will be designated

soprano, alto, tenor, and bass.) Each isorhythmic pattern consists of four notes and each is based on the same simple principle: durations from note to note increase or decrease in single eighth-note increments. In the soprano pattern, for instance, the durations are successively three, four, five, and four eighth-notes long (3+4+5+4). (Duration is here taken to mean the amount of time from one note to the next, whether the notes are staccato--as in this study--or sustained.) The other three patterns, in eighth-note durations, are 5+6+5+4 in the alto, 5+6+7+6 in the tenor, and 6+7+8+7 in the bass (see Example II-2 below).[1] Following the four octaves of C-sharp sounded together at the very beginning, the patterns do not cycle around to sound four notes simultaneously again until after 336 eighth-note beats--the point at which the study ends. (It should be noted that the numbers of eighths in the soprano, tenor, and bass patterns--respectively, sixteen, twenty-four, and twenty-eight--are all factors of 336. The fact that the twenty beats of the alto pattern do not factor into 336 is compensated for by a discrepancy in its pattern; it does not begin with its shortest duration as do the soprano, alto, and bass.)

There is a kind of Chinese-nested-boxes aspect to this study, for in addition to the larger canon relating the three voices, there is also a special relationship among the soprano, alto, tenor, and bass strands of the single voice, since the four lines, in their own individual rhythmic ways, simultaneously express the same melody. The soprano octave, being the fastest moving, contains the complete melody.

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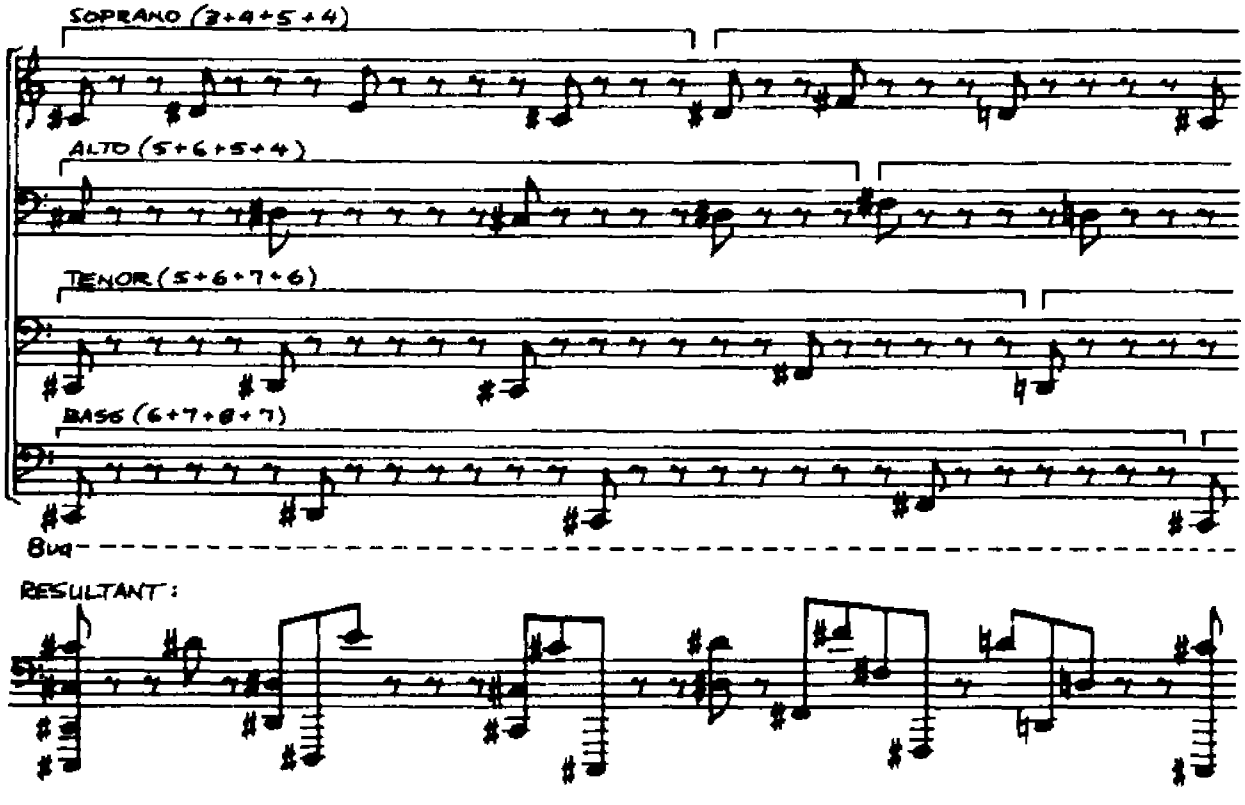
1. Incidentally, Tenney observes that Nancarrow employs exactly the same four isorhythmic patterns in Study No. 16 (Tenney, 52).

The other octaves, because of the nature of their predetermined isorhythmic patterns, cannot express as many notes as the soprano. Therefore, they must either fall further and further behind the soprano as the piece progresses, ending without completing the melody, or they must periodically drop notes along the way in order to keep up. Nancarrow chooses the latter option. In so doing, he also insures that all pitch classes in the lower octaves will be the same as simultaneous or proximate soprano notes; in other words, the combination of the four octaves will produce only one pitch class at any particular moment. His procedure for deriving the complete voice is illustrated in Example II-2. Aligned below the four individual octaves is the resultant as it appears in the score:

Example II-2.



The marvelous texture of Study No. 19--with its seemingly unpredictable repetitions and octave doublings of pitch classes--may have been one of Nancarrow's primary musical goals, but it can also be seen as the happy byproduct of an underlying set of precompositional rules for rhythmic organization. Here are those rules, as inferred from the foregoing analysis:

(1) Establish four closely-related isorhythmic patterns.

(2) Give a different pattern to each of four octaves constituting the range of a voice, assigning the fastest pattern to the highest octave, the next-fastest to the second octave down, and so on.

(3) Determine the length of the study by finding that point after the beginning at which notes in all four patterns coincide.

(4) Replicate the rhythmic patterns for two other voices after deciding on tempo ratios. Assign the fastest tempo to the highest voice, the next fastest to the middle voice, and the slowest to the lowest voice. Carefully measure and draw these patterns on a piano roll or on music manuscript paper, working backwards from a simultaneous ending. At this point, the specific number of notes in the study, the rhythms, and the relationships between voices are set--the only thing that remains is to choose pitches. (It is perhaps worth

reemphasizing that there are twelve lines of rhythmic activity--four for each voice.)

(5) Determine the interval of imitation by symmetrically partitioning the piano into overlapping four-octave segments, one for each voice.

(6) Write a melody for the soprano octave of the lowest voice. Fill in the pitches for the alto, tenor, and bass octaves by referring to the soprano line--notes in a lower octave must be of the same pitch class as simultaneous or proximate soprano notes.

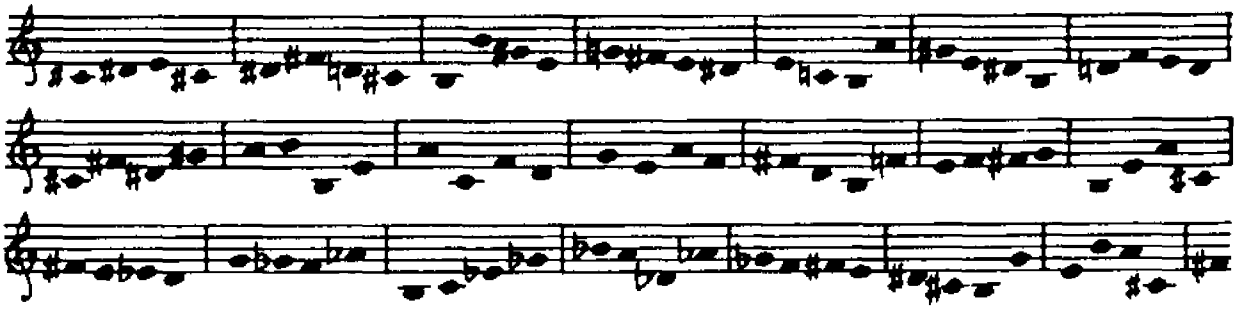
(7) Now that the pitches are all set for the lowest voice, use the interval of imitation (an octave plus a fourth) to derive all the pitches for the other two voices. Make a slight adjustment in notes at the very end to achieve a sort of V-I cadence (C-sharp to F-sharp) and the piece is finished.

That is probably a fairly accurate description of Nancarrow's compositional process here. The inference that he plots out all the rhythms first and then fills in pitches is a logical one: doing so provides him with the only way of examining and adjusting the harmonies that are generated by the working out of the canon. This is especially important in a work like Study No. 19 where each voice is in a different tempo. Only by first drawing all the rhythmic relationships can he

know, for example, that the first pitch in the top voice will line up with the 22nd pitch in the middle voice and the 35th in the bottom. Of course, this knowledge is only essential if Nancarrow is concerned with projecting specific harmonies and chord progressions; but he clearly is, since, as it turns out, most of the harmonies in Study No. 19 are major and minor triads or other traditional chords, connected moreover by quite elegant voice-leading (see Ex. II-11).

Given the overall context of triadic harmonies generated by the canon, it is not surprising that the basic melody itself exhibits many of the features of traditional tonality including diatonic pitch collections, arpeggiated triads, fifth relationships, and standard cadential figures. The complete melody appears in the soprano octave (notes in the example have been grouped in fours to correspond with the isorhythmic pattern):

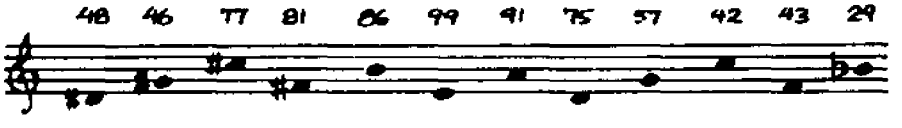
Example II-3.



Nearly the entire first half of the melody (up through the ninth isorhythmic pattern) is couched in the key of E major; except for a few chromatic alterations, all the notes in this section are taken from the E major scale. The note E is the most frequently occurring, usually in association with its dominant (B) or leading tone (D-sharp), or as part

of an E major triad. Even in the more chromatic second half of the melody, E continues to be emphasized as a tonal center, once again, because of its tonic-dominant association with the note B. The prominence of B as the lowest and highest note of the melody--the boundary tone, in other words--further reinforces this feeling. What is more, a purely statistical analysis of the melody reveals that the frequency of occurrence of any particular pitch class is almost directly related to its distance from E in the circle of fifths. B-flat, for example, the note farthest away from E in the circle, is also the note that occurs least frequently. In fact, if every one of the study's 774 notes is tabulated, the distribution of pitch classes is clearly weighted towards E. Example II-4 shows that distribution in the context of the circle of fifths with E placed at the center.

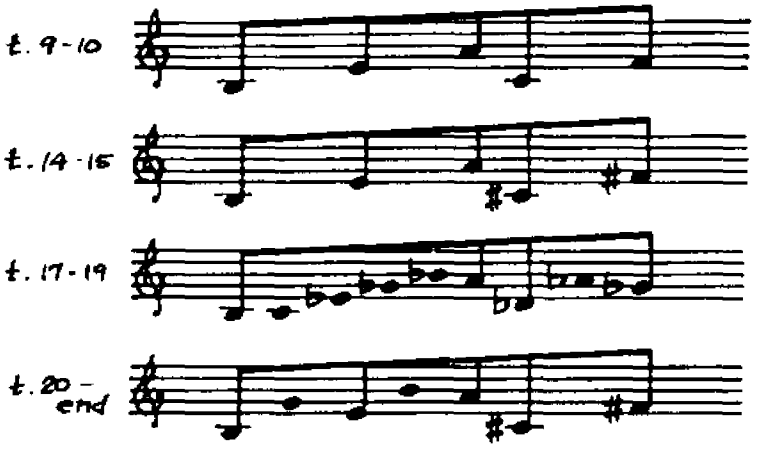
Example II-4.



The melody also exhibits several prominent motives, the most important of which is the interval of an ascending perfect fourth; it appears no less than twelve times. In fact, of all upward skips in this melody, those by fourth are the most common. (There are only eight ascending thirds, three fifths, one sixth, one seventh, and one octave.) In contrast, there are no descending fourths, meaning that it is not just the interval of a fourth that is important, but also the fact that it is ascending. The ascending fourth is treated sequentially in the middle of the melody; it is also prominent as part of a five-note motive

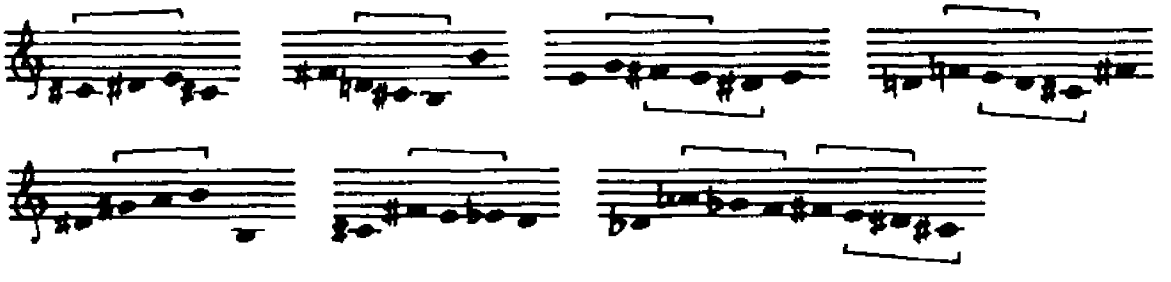
(B, E, A, C, F or B, E, A, C-sharp, F-sharp) that appears, sometimes with the interpolation of other notes, four times. Example II-5 shows the different forms of the motive; numbers at the side indicate in which taleae they occur (see Ex. II-3).

Example II-5.



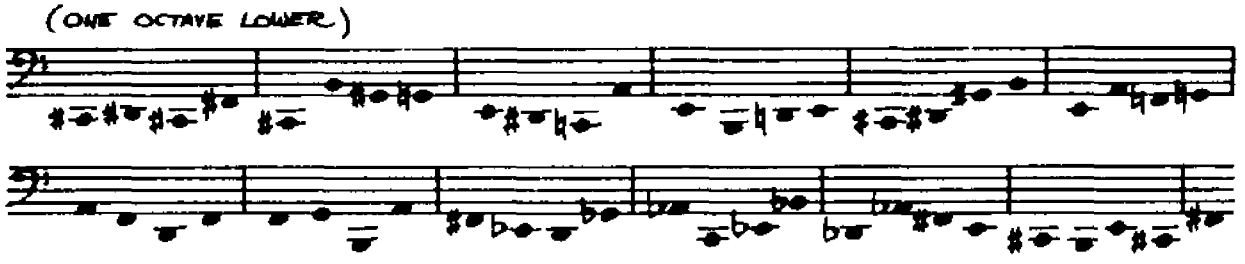
Another important motive is the interval of a minor third divided into a whole step plus a half step. The melody begins with it, and it appears ten more times before the end. At several of those appearances, it is set off from its surroundings by skips or changes in melodic direction:

Example II-6.



Despite the emphasis on E, another important note emerges in the tune: C-sharp. For one thing, it is the first note heard. As shown in Example 4, it is emphasized in three places because of a leap down to it from A. At each of those spots--as well as at several other points in the melody--the C-sharp functions as a sort of applied dominant to F-sharp, expressing at the local level the long-range motion towards the final note. Significantly, C-sharp is a featured note in the bass octave where, as the lowest note of the total texture, it can be heard most prominently and have the greatest harmonic impact. Nancarrow gives the low C-sharps a kind of rhythmic prominence by placing almost all of them at the beginnings of isorhythmic patterns: out of the twelve isorhythmic patterns in the bass octave, five of them--including the first two and the last two--begin with C-sharp. Example II-7 shows the complete bass melody, marked off into groups of four notes to correspond with the isorhythmic patterns.

Example II-7.

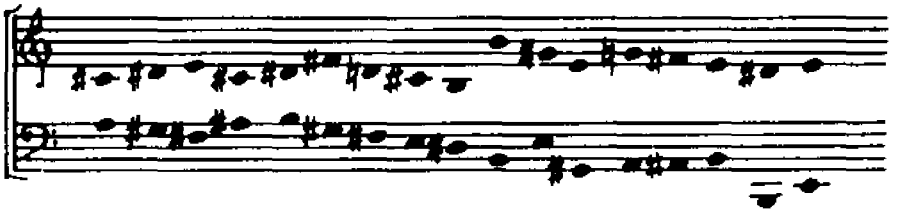


As suggested above, Nancarrow possibly conceived of the prominent C-sharps in the bass as a sort of long-range dominant preparation for the final cadence on F-sharp. But can one actually say that the work is in a "key"--F-sharp or any other? Does the ending have a sense of tonal close? What about the fact that, as the canon

proceeds, a C-sharp in the lowest voice generates an F-sharp in the middle voice and a B in the highest one--how does that affect any sense of tonality? In order to deal with these questions, it will obviously be necessary now to bring the other two voices into the discussion and examine the harmonies and voice-leading that result as all three voices work together through the canon.

It has been shown that the basic melody has strong tonal implications. Its inherent tonality can easily be highlighted by adding a hypothetical bass line to the beginning as in Example II-8 (an addition which also reveals the presence of blue notes--a typical jazz inflection for Nancarrow).

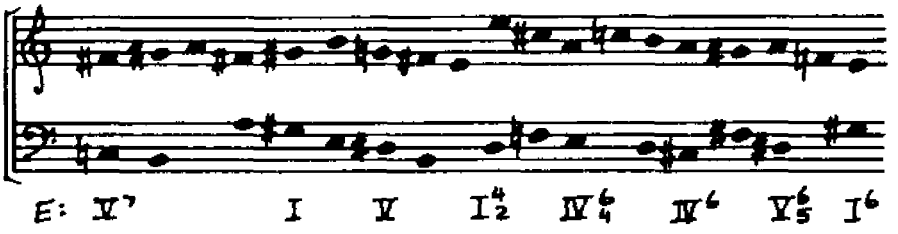
Example II-8.



It is of course unlikely that Nancarrow had this particular harmonization in mind. But is is clear that he was hearing some sort of tonal underpinning. For the proof of this, one need look no further than the entrance of the second voice; as it restates (an eleventh higher) the melody that has just been heard, it is accompanied in the first voice by a tonal countermelody that strongly suggests E major as the key of the moment. This passage is based on the tonic, dominant, and subdominant chords of the key of E; a traditional harmonic analysis using Roman numerals is not inappropriate (see Ex. II-9). (Notice that

even though the second voice is a transposition of the first, the combination of the two voices continues to reinforce E as a tonal center.)

Example II-9.



Once all three voices have entered, the tonal implications of the basic melody are confirmed again and again. The harmonies are primarily triadic, and the progressions from triad to triad are usually by way of common tones or traditional voice-leading. The excerpt in Example II-10, which starts in the middle of the seventh system, is typical.[2] (Dotted lines encircle the triadic configurations.) The passage begins with an unequivocal D major triad. It is stated vertically by all three voices, and further emphasized by the descending arpeggiation--A, F-sharp, D--in the top voice. As the top voice moves down through those notes, the harmonies quickly change. The F-sharp of the D triad becomes the fifth of a B-minor triad; in turn, the D becomes the fifth of a G chord. Then a G-sharp is introduced which immediately

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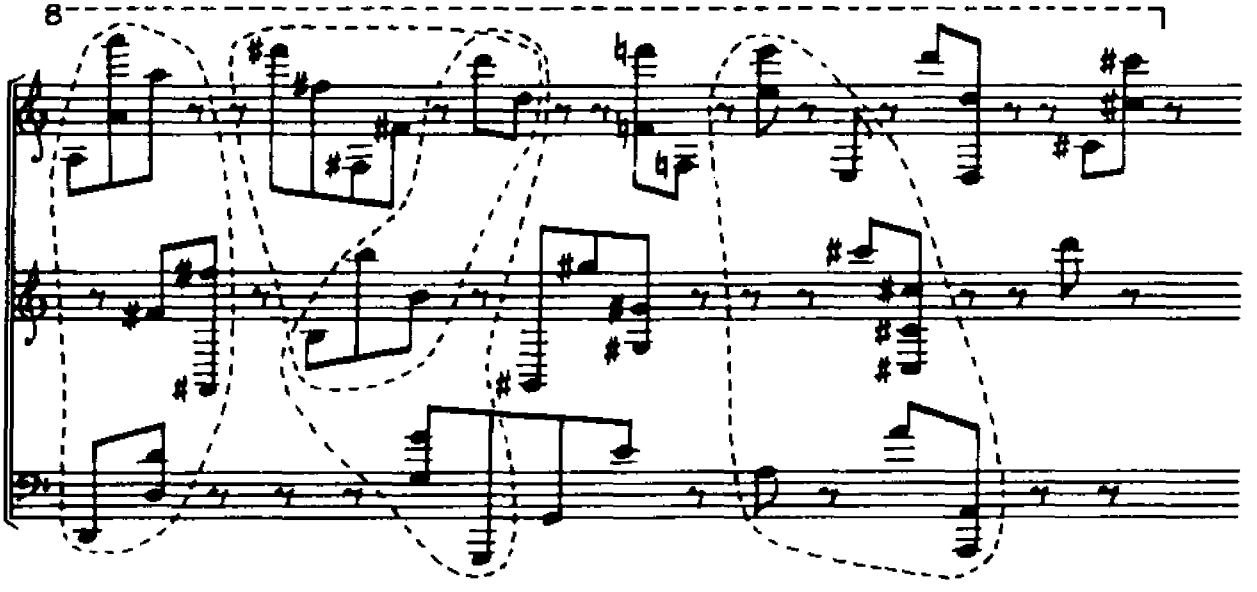
2. Passages in the scores will usually be identified by system number in this essay. The use of measure numbers is impractical since some studies do not have measures; in those that do, the measure number in one voice is usually different from that of a simultaneous measure in another voice. A major advantage of using system numbers is that all systems in a given study represent the same amount of time.

resolves, along with the F-natural in the top voice, to a strong A-major triad. This is not to suggest that these triads necessarily have any real structural significance; rather, the point is that two very important features of the work are illustrated here: the constant presence of major and minor triads, and the rapidity of change from one chord to the next. This kaleidoscope of shifting tonalities perfectly complements the rhythmic complexities; it is what makes Study No. 19 into much more than a mere rhythmic exercise.

Example II-10.



Beyond the fact that the three voices in this passage (Ex. II-10) join together to articulate a series of triads, there are other close connections between them. For example, the lower voices at this point are moving in parallel thirds. Note also the interplay between the upper voices on the notes D and C-sharp at the end of the passage. Such details reveal Nancarrow's skill as a contrapuntalist--his ability

to easily establish multiple relationships within the rigid framework of a strict and rhythmically complex canon.

Before concluding, some of the questions raised earlier about the ending of Study No. 19 should be considered. Does the final F-sharp sound arbitrary and unconvincing? Might not E have been a better note to end with, given its earlier prominence? How is the ending approached? A close examination of the voice-leading should help answer these questions. Example II-11 shows the final two-and-one-half systems of the work, with octave doublings and repetitions eliminated so that each of the three voices is reduced to a single line. A few pitches at the beginning have been respelled using sharps instead of flats.[3] The horizontal placement of noteheads in the example corresponds exactly to the initial occurrences of pitch-classes in the music (five-sixteenths of an inch in the example equals one inch in the score). Notes have been grouped together with beams to clarify important melodic motions. The beams also make it easier to see the points of imitation between voices. Unstemmed noteheads represent pitches of lesser importance--in the music, they sound only once before the next pitch class is heard. The harmonically important notes of the bass octave are given in the example as open noteheads. On a separate staff aligned below the main example, a further reduction shows the progression of harmonies.

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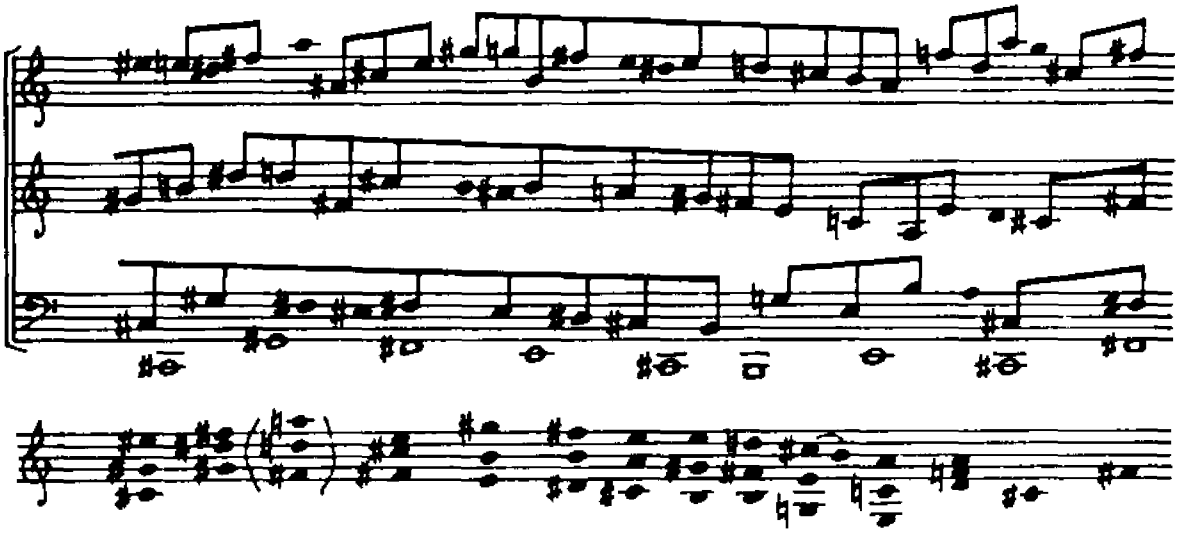
3. Spelling in Nancarrow's music, as in twelve-tone music, is frequently arbitrary; it tends to be based more on convenience and local context than on tonal function. This particular passage, containing simultaneous D-flats and C-sharps, is a case in point. The player-piano medium itself is conducive to an arbitrariness regarding spelling since the paper roll does not have the built-in diatonic associations of the traditional five-line staff. A hole in the paper corresponds only to a key on the piano, not necessarily to a specific line or space on the staff.

Example II-11.



The most striking thing about this ending is its powerful downward drive. Step by step, the bottom voice descends inexorably to the lowest note on the instrument, joined by the upper voices in parallel sixths and tenths. Arrival on the low B initiates an upward flourish of arpeggiated minor triads before the final C-sharp to F-sharp cadence. (By the way, this cadence is the point at which strict pitch imitation breaks off.) The harmonies--as they have been throughout the study--are almost exclusively triadic. The close connections between chords, achieved through relationships by fifths and traditional voice-leading, imbue the passage with a strong sense of functional tonality, even if of a very chromatic sort.

Is there a tonal center here? If so, F-sharp is not a likely candidate even though it is the final note. The root-position F-sharp harmony near the beginning, while somewhat prolonged, actually seems to function as a passing chord in the larger motion down to the low B. Its dominant chord, C-sharp, is heard shortly before, but is separated from

care with the construction of melody and harmony, he has made them equal to the ingenuity of his rhythmic construction. The rhythmic aspects and the pitch aspects reinforce and support one another, resulting in a piece of music that works successfully on several levels.

Chapter III

G E N E R A L O B S E R V A T I O N S

There is pleasant irony in the fact that Nancarrow's music, while being on the one hand tremendously innovative, also relies heavily on such ancient devices as isorhythm and canon. In fact, canon is the predominant structural device in his music. Nearly all of the studies employ imitation to a greater or lesser degree, and many of them, such as Study No. 19, are strictly canonic throughout. Nancarrow's canons almost always involve different simultaneous tempos. He feels that ". . . clashes of tempo carry my music, not the fact of canon, not pitch imitation."[1] By consistently using different tempos, Nancarrow opens up many new possibilities of canonic writing. For example, the points of imitation may be made to converge as in Study No. 19, with the faster voices gradually catching up to the slower ones and all arriving together on their final beats. It makes a spectacular effect, musically satisfying because it suggests--in the realm of tempo--the resolution of dissonance to consonance; and impressive because of the profound rhythmic difficulties it would pose for human performers. Obviously, however, coordinating the point of convergence is a simple task with a player piano roll, requiring only that the composer work backwards from the end. Converging canons are quite common in Nancarrow's music, also

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1. Reynolds, "Interviews," 6.

occurring, for example, in Studies No. 18, 27, 35, and 40. In those instances where the voices begin simultaneously and then diverge, Nancarrow usually has them exchange tempos at some point in the middle so that they can reconverge at the end. This type of structure can be found in Studies No. 15, 17, and 24. There are also arch-shaped canons like Studies No. 14 and 36 in which the voices converge in the first half and diverge in the second; multi-sectioned works like Studies No. 27 and 37 consisting of a series of canons involving different points of imitation; and a few canons--Studies No. 8, 20, and 26--in which the different voices are all in the same tempo. Study No. 21 is unique in Nancarrow's output as a two-voice canon in which, from beginning to end, one voice steadily speeds up while the other slows down.

The ultimate musical value of any canon depends on the extent to which its several voices are combined together into a unified and satisfying whole. Traditionally, this meant that the final product had to adhere to the standard principles of voice-leading and treatment of consonance and dissonance. The skilled composer of nontraditional canons does not follow the old rules, but nonetheless devotes much attention to establishing vertical relationships that go beyond mere imitation. Clearly, Nancarrow has done this in Study No. 19. The voices combine in such a way that triadic harmonies are consistently projected. There is also much motivic and pitch interplay. Close examination of other studies reveals the same concern with vertical relationships and a consistent melodic-harmonic language.

Surprisingly, the existing literature has virtually ignored such pitch aspects in Nancarrow's studies. One reason for this neglect

may be that Nancarrow himself diverts attention from his treatment of melody and harmony: "I don't think of a line, but of a collection of temporal relationships and, in fact, the melodic line is simply a crutch in order to realize certain temporal ideas . . . I don't write out a long melody and say, 'Well, now, I am going to make a canon out of it.' Every piece is different. As a matter of fact, one of the reasons I suppose that I concentrate more on tempo relationships is that I have little melodic or harmonic invention."[2] ". . . if it's the same melody going, it's easier for me. I just have to do it once!"[3] But these statements should not be taken at face value. Contrary to what Nancarrow may say, the studies provide ample evidence of his skill at handling melody and harmony. It is true that some of his melodies may not stand very well on their own, but, after all, that is not their function. Nancarrow's melodies, like Mozart's Alberti basses, have a value within the overall texture that transcends their individual musical interest. Roger Reynolds writes of this with deep insight:

> A more abstract use of pitch sequence and contour is in keeping with Nancarrow's intention to use pitch simply as a means of highlighting temporal factors. Yet it is important to observe that one never has the feeling in listening to his music--of whatever period--that the melodic invention is inappropriate. It is always bound to the bones of the music in a way that feels entirely right. The one Study done without melodic differentiation, for a prepared piano (in the Cageian sense of an instrument which has an ordered variety of preparations) was Number 30. It consists entirely of rhythmic relationships put in relief by timbric differentiation, and seems to me the palest of his works. In short, however he may wish to minimize its importance by procedural and formal means, his handling of pitch materials remains assiduous.[4]

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2. Reynolds, "Interviews," 6.

3. Amirkhanian, 13.

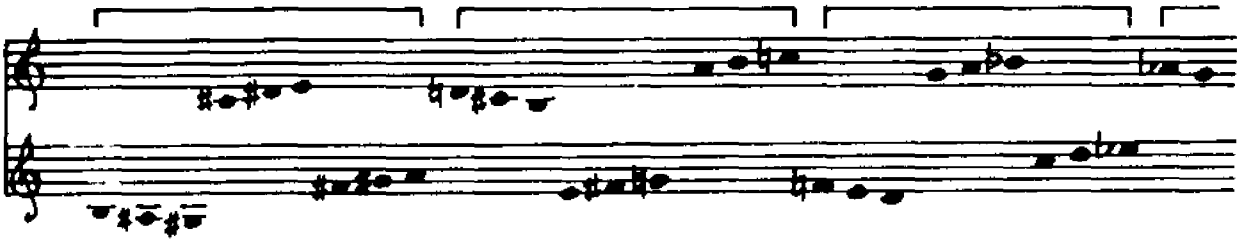
4. Roger Reynolds, "Inexorable Continuities . . .: A Commentary on the Music of Conlon Nancarrow," Conlon Nancarrow: Selected Studies, 28-29.

The pitch organization in much of Nancarrow's music--as in Study No. 19--is based on traditional tonality. This is the case even in the later studies which are generally more chromatic or freely atonal than the earlier ones. Tonal centers, if not explicit, are frequently implied. Close-spaced, root-position major triads are a ubiquitous sonority, and nearly all of the studies end with some sort of V-I cadence (usually in the form of an ascending fourth). The prevailing diatonic context makes a perfect foil for the rhythmic complexities, and has much to do with the music's visceral appeal and emotional impact. A work like Study No. 19 would be nothing more than an intriguing rhythmic exercise without the coherence and vitality provided by the harmonic and melodic structure.

There are several melodic motives that occur again and again in Nancarrow's music. Two of them have already been encountered in Study No. 19. The ascending fourth plays a major role in cadences and is also prominent in many longer motives and themes. But Nancarrow's favorite motive is probably the minor third, especially as partitioned into a whole step plus a half step. In several cases, it is the main theme of an entire study--Study No. 20, for example. For much of its length, Study No. 20 is a canon of duration in which each voice reiterates a single pitch at least twelve times before moving on to the next. The six voices are grouped into trios which each express the three-note collection of whole step plus half step. Thus, at the beginning, one trio has the notes D, E, F, and the other, G, A, and B-flat. As the piece progresses, the trios are alternately transposed, one voice at a time, to new pitch levels. The order of transpositions

is sequential, as shown in Example III-1, a reduction of pages 12 to 23 of the score (brackets mark off the sequential elements):

Example III-1.



Later on in Study No. 20, the voices stop repeating notes and join together to present a long melody heterophonically; its most prominent motive is, once again, the partitioned minor third. To suggest the frequent prominence of the minor-third motive in Nancarrow's works, Example III-2 assembles the important themes from a variety of studies, beginning with the melody from Study No. 20 that was just referred to. In some cases, the minor third stands alone. In others, it is wedded to the other recurrent motive that has already been cited, the ascending fourth. (Incidentally, it is significant that the ratio of tempos in Study No. 31--21:24:25--approximates the frequency ratios of a whole step and a half step.)[5]

In the studies before No. 21--those punched on the machine when it still had a notched advance--the relationships between tempos are relatively simple (Study No. 19's ratio of 12:15:20--a combination of 4:5 and 3:4--is typical). Once the punching machine was altered, Nancarrow began an exploration of much more complex relationships,

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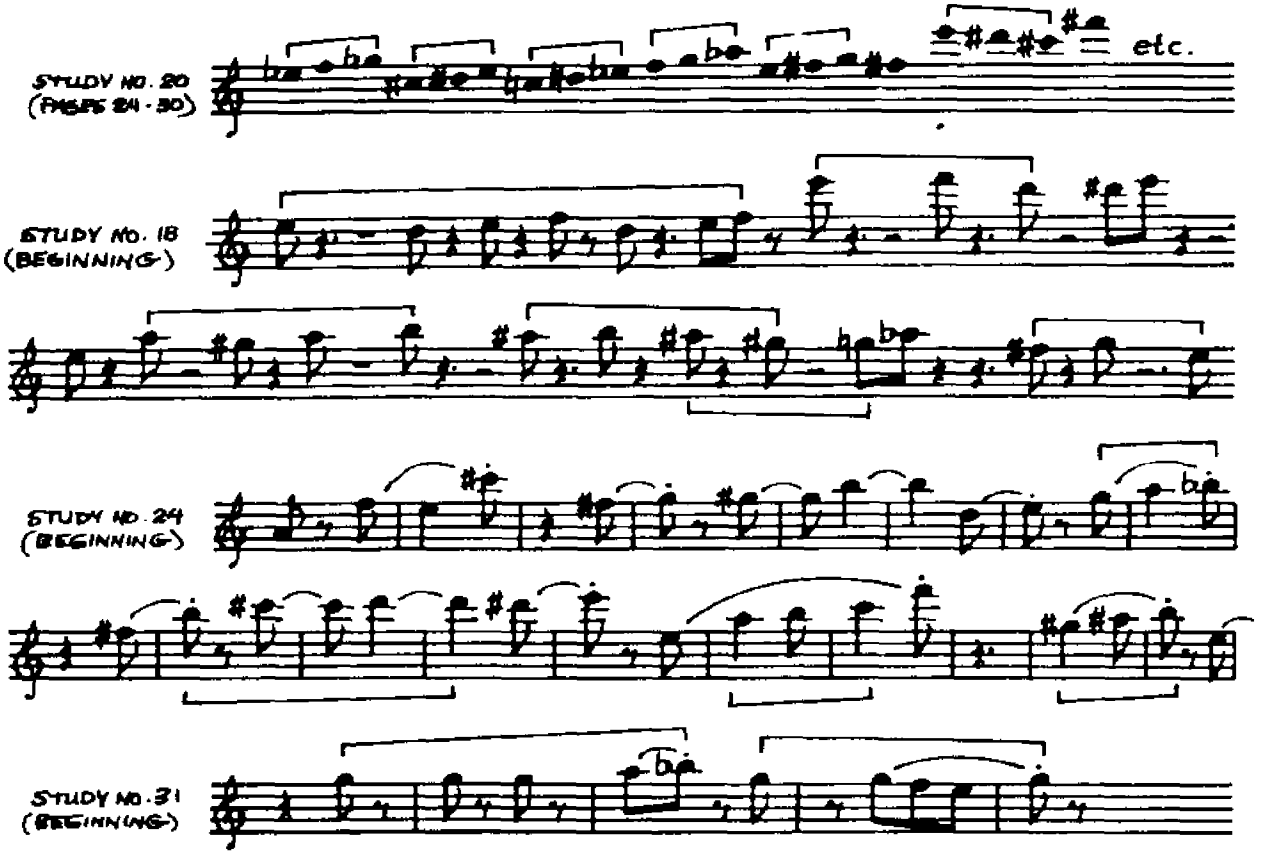
5. This was confirmed by Nancarrow in a letter to the author dated March 30, 1985.

Example III-2. The minor-third motive.



ranging from the ratios of 17:18:19:20 in Study No. 36 and 60:61 in Study No. 39 to such irrational relationships as $2:\sqrt{2}$ in Study No. 33 and e:pi in Study No. 40. In all cases, the tempos are defined in terms of specific mathematical equations. Fluctuations in tempo are generally not allowed, but, if present, are also mathematically governed; in Study No. 27, for example, the four canonic voices change speed by the fixed percentages of 5%, 6%, 8%, and 11%.[6] In some studies, changes of speed are effected through a collection of graded durations that have been derived from geometric or arithmetic progressions. (See the discussions

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6. Study No. 3d appears to be the only one in which Nancarrow actually writes the word ritardando. Presumably, the person operating the piano is to move the piano roll's speed control lever at that point.

below of Studies No. 8 and 23.) The isorhythmic patterns of Study No. 19 are good examples of arithmetic progressions being used to control events at the local level.

Certainly, this close involvement with numbers is not unusual for a composer. Among 20th-century composers, one recalls Bartok's use of the Fibonacci series, and Xenakis's of the laws of probability. Countless earlier composers--Bach and Obrecht are two prominent examples--also made use of numerology. The source of Nancarrow's preoccupation may lie in the medium itself, since the preparations for punching a roll involve a great deal of careful calculating and measuring. But another factor is the strong influence of Henry Cowell's New Musical Resources on Nancarrow's thinking. One of Cowell's most intriguing theories is that rhythm and tempo may be used to express the numerical relationships of the overtone series. One aspect of this theory is the concept of "temporal dissonance"--the notion that simultaneous tempos in the ratio of 2:3 are more "consonant" than, for example, those in the ratio of 8:9 since, by analogy to pitch, the interval of a fifth (2:3) is more consonant than that of a major second (8:9). Cowell thus attempted to relate pitch and rhythm in a meaningful acoustical way (much different the essentially arbitrary serialization of duration in the music of Boulez, for example). Direct evidence of Cowell's influence on Nancarrow can be seen in the tempos of the twelve voices in Study No. 37--they are based on the interval ratios of a justly-tuned chromatic scale that was proposed in New Musical Resources as a source for scales of rhythm, meter, and tempo.[7] Nancarrow explores

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7. Cowell, 98-108.

Cowell's theories for systematically relating rhythm and the overtone series in other, less obvious ways. One of the most striking is in Study No. 23 where each pitch is paired with a specific duration based on its frequency (see Chapter VI).

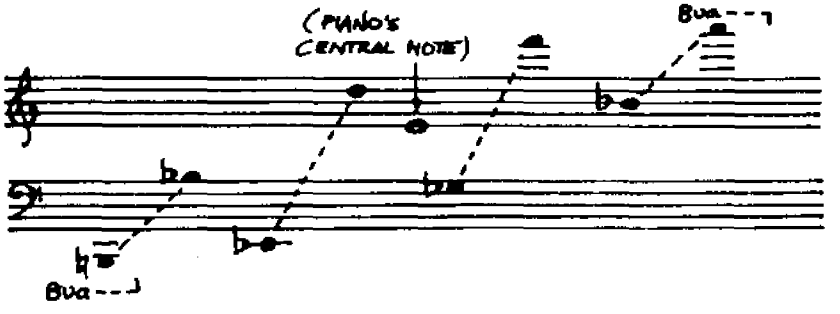
Two other features of Study No. 19 should be mentioned as representative of Nancarrow's overall style. One is the symmetrical disposition of voices about the piano's central note. Other kinds of vertical and horizontal symmetries can be found in many other studies, including melodic inversions, nonretrogradable rhythms, and arch-shaped formal structures. The other feature is the assignment, almost always, of faster tempos to higher voices. Compelling acoustical reasons have of course made this true of much other music. One could cite, as Cowell did, the model of the overtone series, where the higher notes vibrate at faster frequencies than the lower ones. But it is interesting that, in most cases, the only concession that Nancarrow makes to the differences in tone quality between high and low registers is to assign them different tempos. In other respects, high and low are treated equally; Nancarrow normally does not compensate for the quick decay and light sound of notes in the upper registers.

Chapter IV

S T U D Y N O . 3 6

In several obvious respects, Study No. 36 is structurally similar to Study No. 19: it is a strict canon (although in four voices instead of three); its slowest tempo is assigned to the lowest voice, the next fastest to the next higher, and so on; the voices are symmetrically deployed about the piano's central note (Ex. IV-1); and they enter one by one, beginning with the slowest, gradually converging as the faster voices catch up with the slower ones.

Example IV-1. Ranges of four voices in Study No. 36.



However, the canon in No. 36 continues beyond the point of convergence (which is almost exactly in the middle of the study); from there to the end, the voices diverge, finishing one at a time, ending finally with the slowest voice. The canonic midpoint--the place where all four voices come together--is one of the most arresting passages in a piece that is filled with surprises. Roger Reynolds, in conversation with

Nancarrow, comments on how the passage plays tricks with one's perceptions:

> In the later Studies, at least after [No.] 20, you have used more abstract effects: extreme speeds and large-scale pitch gestures--dense runs like glissandos over the entire keyboard--very rapid trill figures and ostinatos in extreme registers. There is a growth of exploration. In No. 36, for example, there is a passage of very rapidly repeating, interlocking ostinatos in the high register. They create low-register difference tones. Such textures result in timbric expansion, differences in sound quality through sheer speed and careful disposition.[1]

Nancarrow goes on to describe his own pleasurable surprise when he heard the passage for the first time:

> . . . with that particular point in No. 36 that you mentioned earlier, I got a shock. Really, I didn't expect it . . . This is the point . . . where the tempos of 17 against 18 against 19 against 20 come together. Here is where you begin to hear that strange effect, and especially on the next page with shorter motives offset in all four parts. I liked the result, but it wasn't what I was expecting.[2]

In this passage, the four voices sweep up to their point of convergence with rapid chromatic glissandos, arriving simultaneously on their highest notes--B-flat$_3$, D$_5$, F$_6$, and A$_7$. Each high note is then rapidly repeated at the speed of a quarter note in its own voice's particular tempo (as Nancarrow comments in the above quotation, the ratios of the four speeds are 17:18:19:20). Even in the slowest voice, the reiterated high notes fly by at a rate of over 340 per minute (five per second).[3] But that is not all--the spaces between high notes are

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1. Reynolds, "Interviews," 16.

2. Ibid., 18-19.

3. The metronome markings (85, 90, 95, and 100) are too slow: they appear to have been chosen purely because they are multiples of 17, 18, 19, and 20. If, as the score indicates, the whole-note in the slowest voice were equal to M.M. 85, then the study would last nearly five minutes. In actual fact, the recording, made under Nancarrow's supervision, is less than four minutes long. Of course, it is

filled in with ascending thirty-second-note glissandos. At such speeds, the perception of individual pitches is impossible. The thirty-second notes (which, in the bass voice, move at over 3000 per minute or 50 per second) are fast enough to start generating additional low pitches with frequencies in the range of approximately 50 to 60 Hz. Perhaps it is the combination of those low pitches that produces the "strange effect" to which Nancarrow and Reynolds refer. The music enters into a realm of pure texture and acoustical illusion.

Like many of the passages in this mercurial study, the moment is tantalizingly brief. The numbers of notes in the intervening chromatic glissandos gradually diminish so that the four high notes become more and more audible; it is as if a totally blurred image is slowly brought into sharp focus. Nancarrow brings about this note reduction arithmetically--the second high note in each voice is preceded by a seven-note glissando, the next two high notes by six-note glissandos, the next three by five-note glissandos, the next four by four-note glissandos, and so on until eight high notes stand alone. And, of course, the same arithmetical progression takes place simultaneously in each of the different tempos of the four voices. Example IV-2 shows the progression as it appears in the tenor voice (once again, the terms "soprano," "alto," "tenor," and "bass" are used, this time to refer to the voices themselves).

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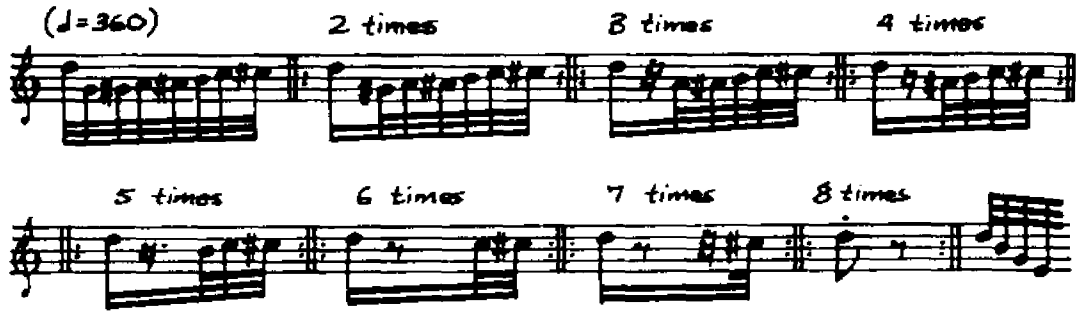
possible that Nancarrow originally intended the slower tempo but gradually, over the years, came to prefer hearing the piece at a faster speed.

Example IV-2.



In its displays of superhuman virtuosity, exemplified by the passage just discussed, Study No. 36 moves far beyond a work like Study No. 19 (which, despite its rhythmic difficulties, is still conceivably within the grasp of human performers). One senses here Nancarrow's great exhilaration at the possibilities of the player-piano medium. The rhythmic as well as technical aspects of this virtuosity are amply demonstrated in an earlier passage towards the end of the first half of the piece. At that point (58th system in the score), with the four voices still converging, Nancarrow initiates a series of ascending chromatic glissandos. The first one, presented by the bass voice, fills the minor tenth from B_1 to D_3. A few beats later, the bass states a second glissando (now A-sharp$_1$ to D_3) just before its first one is imitated by the tenor (D-sharp$_3$ to F-sharp$_4$); between the two voice's glissandos, there is a very brief gap. Then the bass presents its third glissando, which is almost immediately followed by the tenor's second and the alto's first; the gaps between the end of one glissando and the beginning of the next are now even smaller. The listener perhaps already senses the inevitability of what is coming--a fourth glissando in the bass sweeping upwards without any gap through all four voices; 67

notes from C_1 to C-sharp$_7$ in the time of approximately one second. The roll itself (an earlier version of it is reproduced on the cover of the Soundings Press publication of Study No. 41) probably gives a better visual representation of this effect than the score: four medium-length diagonal lines of holes coming together to form a single unbroken line of 67 holes. Example IV-3 is a reconstruction from the score of this passage's appearance on the roll; it should be read from left to right, and bass notes are at the top, treble notes at the bottom. (To visualize the roll on the piano itself, turn the example counterclockwise one-quarter turn and imagine the paper moving downward across the pneumatic aperture bar.) The groups of four parallel horizontal lines represent sustained major triads with arpeggiated (diagonal) beginnings. The beginning of the bass voice has been included so it can be compared with the corresponding place on the roll (upper left-hand corner). Apparently very pleased with this passage, Nancarrow repeats it in approximate inversion in the second half of the piece (beginning at the end of system 80).[4] Later on, he constructs yet another canon of glissandos that culminates in a complete 74-note ascending glissando (C_1 to C-sharp$_7$) followed without pause by an 80-note descending one (A_7 to D_1), passing up and down through all four voices in the process.

In each of these three glissando passages, Nancarrow brings the four voices together to express a single gesture, even when there

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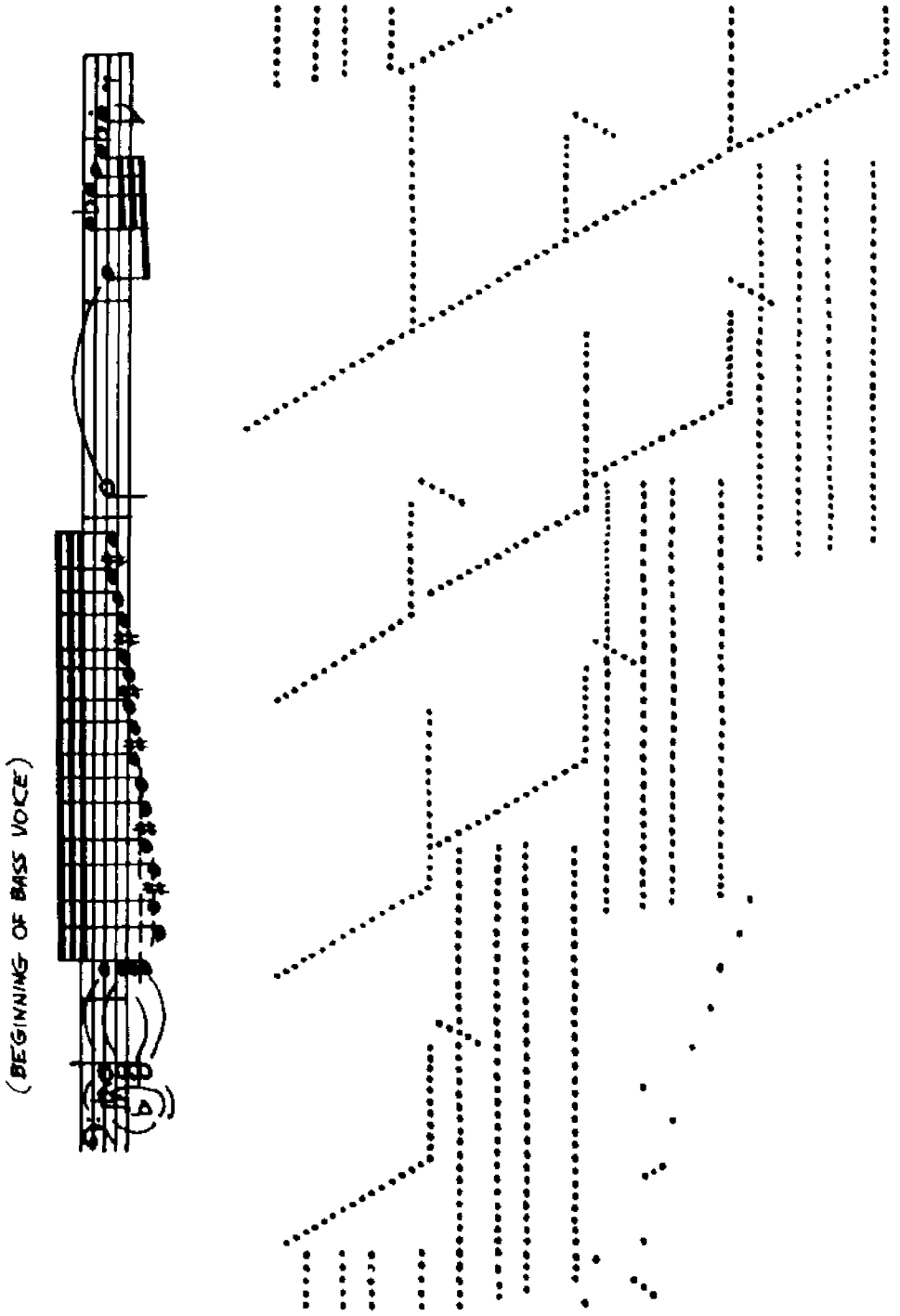
4. There is a significant rhythmic difference between the two glissando passages: since the second one occurs in the context of a diverging canon, its 67-note glissando is approached by way of a decreasing <u>overlap</u> of the ends and beginnings of the smaller glissandos, rather than by way of decreasing <u>gaps</u> between them.

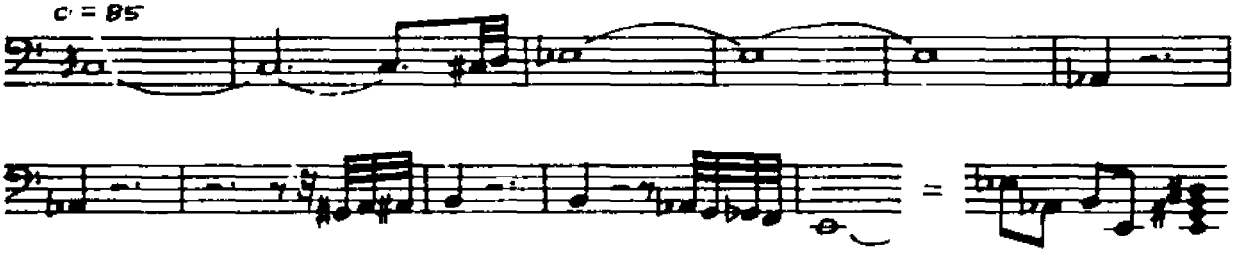
Example IV-3.



happens to be some distance between points of imitation. This means that the listener perceives convergence in places other than the point of canonic convergence at the center of the piece. The principle of continually unifying the voices has already been seen in the carefully controlled triadic harmonies of Study No. 19; here in Study No. 36, it takes on new dimensions.

In addition to such textural unification, there is some obvious motivic and thematic organization. The work begins with a simple and easily recognizable theme in the bass voice. Imitated in turn by each of the other three voices, the theme also recurs three more times (with imitations) before the end of the piece, giving Study No. 36 a rondo-like character. The theme's principal motive contains the interlocking fifths of a major-seventh chord, as Example IV-4 shows.

Example IV-4.



Besides being prominent in the rondo theme itself, the major-seventh chord also permeates many other aspects of Study No. 36.[5] For instance, it generates many of the work's melodies and thirty-second-note figures, with its component intervals expanded at times into large stacks of

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5. The term "rondo theme" is used here for purposes of identification and is not meant to suggest that Study No. 36 is necessarily constructed like a traditional rondo.

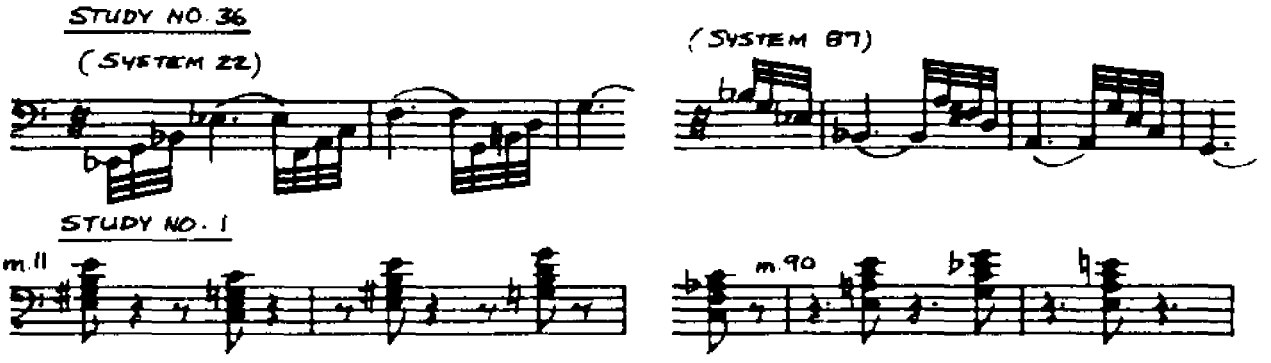
thirds or fifths. At a deeper level, the major-seventh chord is always present since it represents the intervals of imitation between the four voices.

The rondo theme's second appearance is twice as fast as the first; it occurs at a point exactly halfway from the beginning to the canonic midpoint (system 36 in the bass voice), providing an obvious parallel with the well-known acoustical fact that the halves of a string vibrate twice as fast as the whole. Once having made that particular reference, however, Nancarrow feels no need to repeat it--the theme does not return again until far beyond the middle of the study's second half. Nevertheless, the tempos of its two final appearances--first at the doubled speed, and then at the original tempo--do mirror those of the first half.

There are other symmetrical relationships. Before the canonic midpoint, imitations ascend through the voices from bass to soprano; after it, they descend from soprano to bass. These motions are reflected in some of the figures themselves. In particular, triads in the first half are arpeggiated upwards; those in the second half, downwards. Another difference is that triadic arpeggiations are in root position in the first half, beginning and ending on the root, and in second inversion in the second half, beginning and ending on the fifth. It is significant that Nancarrow inverts these triads in the traditional way, preserving the resonant sound of the major chord. (In strict twelve-tone composition, on the other hand, the inversion of a major triad is a minor triad.) It is instructive to compare this inversional relationship with a similar one in Nancarrow's Study No. 1 (see Ex.

IV-5). In the earlier work, he inverts intervals and chords in a strict twelve-tone manner; in his later works, he seems to become less rigid, abjuring consistency if his ear and intuition prefer otherwise.

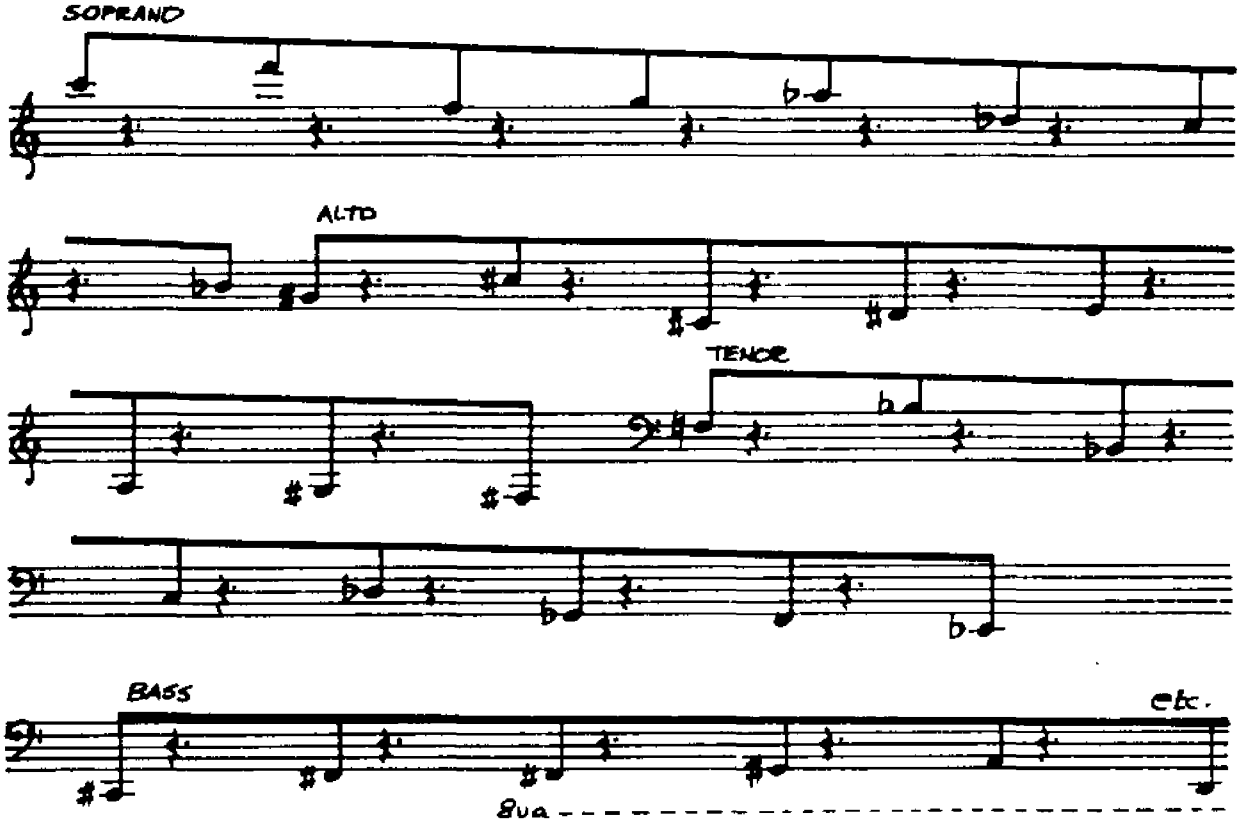
Example IV-5.



Even within the context of canon, where the constant overlap of imitating voices tends to produce a seamless flow, the form of Study No. 36 is quite clearly articulated. The development of the work proceeds in definite stages, punctuated by memorable climaxes and the recurrences of the rondo theme. This formal clarity is achieved partly through sharp contrasts from one figure to the next; at one point in the second half, for example (starting in system 89), sustained major triads are followed successively by a jagged melody in octaves, a glissando passage, and a series of six-note, staccato chords. Often, as one would expect, new figures begin while the previous ones are still being imitated. But just as often, the leading voice steps into the background after stating a figure, passing the time with innocuous material or resting until all the imitations have been completed, then coming forward again to initiate the next round of imitation. In a similar way, figures often end just as their imitations are beginning,

resulting in what sounds like a single line passing through all four voices. One example of this in the second half of the study consists of a melody in staccato octaves that cascades down from soprano to bass. It is one of the few instances in the study where the extremely subtle tempo differences between voices are actually audible: within each voice, the notes are evenly spaced, enabling one readily to hear the slight reductions in tempo as the line moves from one voice to the next. Also, the gaps gradually increase between the end of the figure in one voice and its beginning in the next, adding to the sense of ritard (see Ex. IV-6).

Example IV-6. Systems 92-96. (Octave doublings are eliminated in this example. The horizontal spacing between notes duplicates that of the score, accurately reflecting tempo and duration.)



Most of the time in this study, however, it is a formidable task for the listener to try to hear the minute differences in tempo, expecially at the beginning and the end, when the points of imitation are so widely spaced. Even in the middle of the work, one tends to be more aware of the gradually changing gap between points of imitation than of the four different speeds.

Study No. 36 is an extremely dynamic work, with nearly all aspects of the composition undergoing constant change. The work's rhythmic development grows out of a very simple but majestic beginning: with the exception of short, ornamenting thirty-second-note figures, all notes in the opening fall on the whole-note beat (see Ex. IV-4). As the piece proceeds, however, the basic unit of rhythmic activity doubles in speed several times. The second appearance of the rondo theme--twice as fast as the first--is one part of that development. The thirty-second-note figures, at first consisting of no more than four or five notes, gradually lengthen and assume ever greater importance, eventually overwhelming the texture with the huge glissandos that were described earlier. In conjunction with the accelerating rhythmic activity, sustained major triads are added in each voice. Thus, as Study No. 36 progresses, the horizontal and vertical density increases--horizontally, through faster and faster note values; vertically, through the change in each voice from single notes to chords.

The increasing levels of activity and textural density generate a tremendous momentum which continues--and even seems to build--far into the second half of the study. Nancarrow masterfully

transcends the canon's arch-shaped structure by saving some of his most climactic gestures until after the canonic midpoint, contradicting the dissipation of energy that would seem to be implied by the diverging voices. In the second half, Nancarrow further develops the glorious sound of superimposed major triads that was introduced in the first half. In fact, the basic chordal texture becomes even thicker, reaching a point in system 91 where sixteen notes are sustained at once.[6] Also in the second half, he introduces a striking new idea--widely-spaced six-note chords whose individual notes are selectively sustained out of a chromatic glissando--just as in Henry Cowell's 1923 piano piece, Aeolian Harp (Ex. IV-7).

Example IV-7.

But the work's most apocalyptic moment does not come until systems 102-103, thirty systems after the canonic midpoint: it is the huge

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6. This is probably the largest number of simultaneous sustained notes in any of the studies. (Study No. 25 has more, but only because--atypically--Nancarrow makes use of the damper pedal.) Nancarrow surely has to consider the limitations of the player-piano mechanism when he is composing; if he put in too many holes too close together, they might act like the perforations on a sheet of stamps, and the tension on the paper as it is unrolled might tear it apart. But, according to Nancarrow, the problem has more to do with the loss of air pressure: ". . . if I punched every note on the piano to play together with full volume in the same instant it would hardly sound. These pianos aren't built for playing eighty-five [sic] notes at a time" (Amirkhanian, 10)--or, it seems, for playing much more than sixteen at a time.

four-voice ascending and descending glissando described earlier, a gesture that seems to sum up the entire work's rising and falling shape. After that summarizing glissando, the music finally begins its descent to the end--still carried forward, however, by appearances of some very rapid figuration. The return of the rondo theme, first at the doubled speed, then at the original tempo, brings Study No. 36 to a close. But the theme's thirty-second-note figures, which functioned purely as ornamental grace notes in the opening, now take on a new meaning, recalling the work's glissandos and other powerful textures and helping to sustain the energy to the end. Even with decreasing rhythmic activity and the voices dropping out one by one, the ending does not sound like a clock winding down. On the contrary, it finishes with a grand flourish, with a descending two-octave diatonic glissando to the final note.

Nancarrow has said, "If you have traditional canon, the imitation is in exactly the same tempo, even if augmented, for example. If you carry that on too long, you reach a static situation."[7] Study No. 36 is a virtuosic showcase of what is possible when each voice moves at a different speed. It fully displays Nancarrow's mastery of canonic structure, his prolific invention, and his careful attention to even the smallest detail. And with its turbulent waves of sound, rushing by at superhuman speeds, it provides an exhilarating experience for the listener.

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7. Reynolds, "Interviews," 6.

Chapter V

S T U D Y N O . 8

Acceleration and deceleration is the omnipresent rhythmic theme of Study No. 8. Instead of employing several different but unchanging tempos, this work juxtaposes voices whose speeds constantly fluctuate. At a given moment, one voice may be fast and another slow; a short while later, their roles may reverse. The work begins, for example, with a single line that gradually speeds up from a relatively slow beginning. When that line reaches its fastest speed, a second voice enters two octaves higher in exact imitation (also beginning slowly). As the second voice accelerates, the first decelerates. To give the impression of gradually changing speeds, Nancarrow uses sets of stepped durations. Each duration is of course an integer multiple of the small unit corresponding to a single advance of the notched punching mechanism. Since, in this score, each notch is represented by one millimeter of space, any duration can be defined in terms of a specific number of millimeters, for example, at the beginning of the work, [27, 14, 26, 13, 25 . . .].[1] The notation of Study No. 8 is proportional; there are no barlines or time signatures, and the moment at which a note occurs is determined by its horizontal position on the page (which corresponds exactly with its position along the length of

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1. Numbers that represent durations will herein be enclosed in brackets.

the piano roll).[2] Two durational symbols are used in the score: eighth-notes, representing staccato notes, and quarter-notes followed by horizontal lines of appropriate lengths, representing sustained notes (see Example V-1 below).

Unlike Studies No. 19 and 36, Study No. 8 is not strictly canonic throughout, but it does employ extensive imitation. There are four voices, three of which are always related canonically. The fourth voice is for the most part independent of the other three in range, repertoire of durations, and melodic material. The study is in three large sections, a structure which is clearly defined by changes in the articulation patterns of the canonic trio. The fourth voice also helps to define the structure:

Section I

In the canonic trio, staccato and sustained notes alternate. The fourth voice is not present.

Section II

The fourth voice enters, presenting a legato melody against the dry accompaniment of the canonic trio, whose notes are now all staccato.

Section III

The articulation in the canonic trio is based entirely on a repeating pattern of one sustained note followed by two

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2. It should be reemphasized that the notation of all the studies is proportional, whether or not they use barlines, time signatures, and the traditional symbols for durations and rests.

staccato notes. The fourth voice recapitulates in order the important themes of the first two sections and concludes with a gradual accelerando.

The main note in Section I is G; that in Section III (and the final note of the entire work) is E. The long-range motion from G to E is reflected in the frequent juxtapositions of those two notes in the first section, usually in prominent places; and in the sequential movement of the trio's melody from G up to E in Section II. But pitch is only one unifying factor in this study; it is definitely not the most significant.

In millimeters, Study No. 8 begins with the following succession of durations (an indispensable tool here is a millimeter ruler): [27, 14, 26, 13, 25, 12, 24, 12, 23, 11, 22, 10, 21, 10 . . .]. The regular alternation of larger and smaller values corresponds to the alternation of staccato and sustained notes in this section: the initial staccato note lasts for 27 millimeters, the following sustained note for 14, the next staccato note for 26, the sustained one for 13, and so on.[3] A two-to-one relationship is maintained between adjacent large and small values throughout the first section, creating a consistent feeling of triple meter. Example V-1 (taken from system 2) illustrates this, showing the actual notation used by Nancarrow and, below it, the metrical implication.

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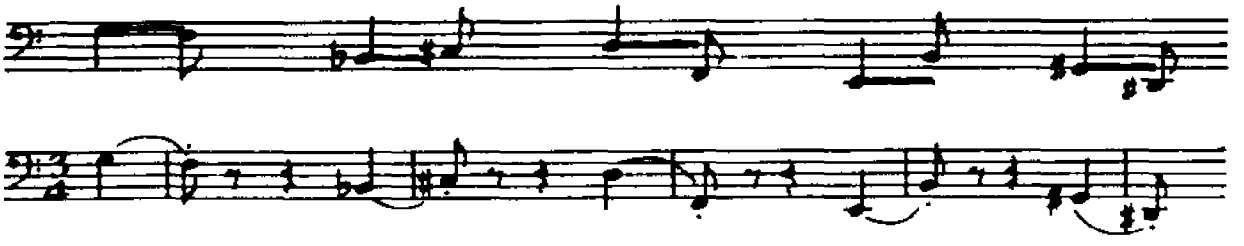
3. As was the case in the discussion of Study No. 19, duration is taken to mean the amount of time from one note to the next, whether staccato or sustained.

Example V-1.



The most fruitful approach to analyzing the rhythm of Study No. 8--as it is in much of Nancarrow's music--is to trace on a long strip of paper the spaces from note to note. This marked strip can then be held against other passages in the study to determine what kinds of relationships exist. Working in this way duplicates--in reverse--Nancarrow's own method of composition, as described by Reynolds: "Premarked reference strips of heavy paper are used in marking off a basic working grid on the paper roll that will later be punched, and on corresponding manuscript pages. There are separate strips for each of the proportional relationships of tempos and of accelerations or ritards."[4] Obviously, the same strip or template that is used for an accelerating passage can also be used for a decelerating one, simply by turning it around. One might assume that Nancarrow did so here. But a close examination shows that the ritard differs significantly from the reversed accelerando, ending, for example, with [. . . 12, 26, 12, 27, 13, 27] instead of [. . . 12, 25, 13, 26, 14, 27]. However, the template does reveal one sequence of durations that <u>is</u> exactly symmetrical: that between staccato notes. Evidently, Nancarrow plotted out the staccato notes first, basing their durations--whether

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4. Reynolds, "Interviews," 24 (footnote).

accelerating or decelerating--on a single series; only after that did he insert sustained notes into the spaces between staccato notes, making sure--in order to maintain the triplet feeling--that each sustained note always begins two-thirds of the way from one staccato note to the next. This procedure is used throughout the first section; thus, both directly and indirectly, all the rhythms in this section are derived from a single series of durations.[5]

As has been implied, the durations of the staccato-note series are ordered successively from longest to shortest. There are nineteen values altogether, beginning with [41] and ending with [10]. Whether the series is presented in its prime or retrograde form, the order of elements is always maintained, always producing a sense of continuous accelerando or ritardando. For purposes of analysis, the durations of the series can be numbered in the same way as the individual pitch-classes of a twelve-tone row: duration 1 is [41], 2 is [39], 3 is [38], and so on. At the outset, in the leading canonic voice, Nancarrow uses the complete series, proceeding from duration 1 to 19 and then back to 1. The next pass through the series gets only as far as duration 17 before reversing direction and retreating to a conclusion on 7. The other voices of the canonic trio imitate this rhythm only partially: the

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5. James Tenney, in his survey of the studies, uses the term "duration-series" to refer to an ordered set of durations that is repeated over and over (Tenney, 48-49). He detects such series in Studies No. 4, 5, 7, 11, and 16. But in those works, the sets of durations are not subjected to the kinds of permutations--e.g., segmentation and retrograde--that one expects to encounter in compositions that are called "serial." Instead, since their series are always presented complete and in the same order, those studies, like Study No. 19, should properly be called "isorhythmic". In Study No. 8, however, the term "duration-series" seems perfectly apt.

second voice begins like the first, but when it reaches duration 19, it abruptly jumps to duration 10 (instead of 18); the third voice begins with 19 at the same moment. For the rest of the passage, the second and third voices--in opposition to each other--move back and forth between 10 and 19, ending when the first voice reaches 7.

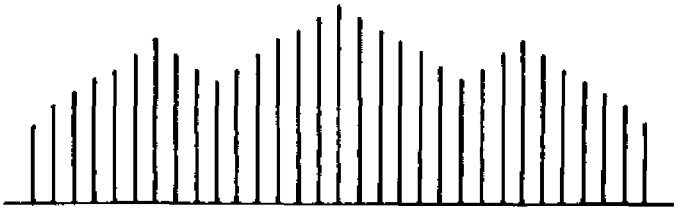
The next passage in this first section, unlike the opening, is a strict canon. Rhythmically, Nancarrow now restricts himself exclusively to the final half of the series: beginning with duration 19, he proceeds to duration 10 in a kind of two-steps-forward, one-step-back fashion, and then exactly retraces his steps to produce a rhythmic mirror. Here is the specific order of elements:

19 18 17 16 15 14 13 14 15 16 15 14 13 12 11 10

11 12 13 14 15 16 15 14 13 14 15 16 17 18 19

The pleasing symmetry of this rhythmic structure can be graphically illustrated by plotting its successive durations on a vertical axis:

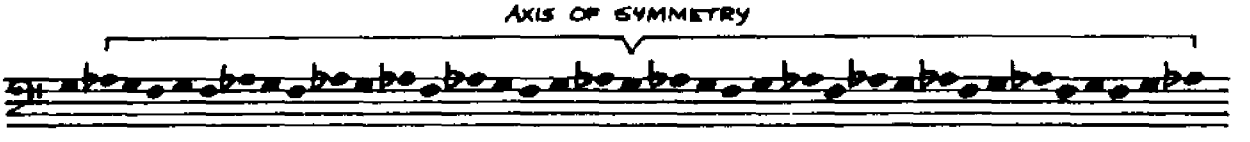
Example V-2.



As soon as the little canon generated by this rhythm plays itself out, it is repeated in exact melodic inversion, adding an element of vertical symmetry to the horizontal.[6]

In the work's second section, the staccato-note series controls all the notes--now exclusively staccato--of the canonic trio. As at the beginning of the study, the prime form of the series is immediately followed by its retrograde, creating a symmetrical rhythmic arch of acceleration and deceleration. Within this overall pattern, the pitch sequence is also symmetrical. Only three pitches are used--not surprisingly, they constitute the whole-step-plus-half-step minor-third motive that recurs so frequently in Nancarrow's music. Example V-3 shows the complete pitch sequence. It occurs--with the same rhythm--four times altogether, although transposed up a minor third at each successive appearance.

Example V-3.



Against the canonic trio's dry, staccato accompaniment, the fourth voice--the independent one--makes its initial appearance, presenting a legato melody with rhythms derived from a new, eight-element duration series: [54, 43, 33, 24, 17, 12, 9, 7]. The

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6. The player-piano medium would seem to make replications and symmetries of all kinds very easy. This is conjecture, but one can certainly imagine Nancarrow tracing a portion of the roll that has already been punched, then flipping the tracing over and transferring it--perhaps with the aid of carbon paper--to another portion of the roll, achieving thereby an exact inversion with all rhythms intact.

melody is split into alternating treble and bass strands whose rhythmic interrelationships clearly mark off a three-part structure for the section:

Part I

The treble strand presents a simple melody using the complete duration series followed by its retrograde form. This is immediately imitated by the bass strand in exact melodic inversion.

Part II

The rhythm here is based on the same kind of two-steps-forward, one-step-back accelerando that was encountered earlier with the staccato-note series; all the forward (accelerating) steps are taken by the treble strand and the backward (decelerating) steps by the bass, as shown below (numbers refer to the ordering of durations within the series, e.g., [54] is 1, [43] is 2, [33] is 3, etc.):

```
Treble: 1 2 3     2 3 4     3 4 5     4 5 6     5 6 7
Bass:         4 3       5 4       6 5       7 6

Treble:       5 6       4 5       3 4       2 3
Bass:  8 7 6     7 6 5     6 5 4     5 4 3     4 3 2
```

Part III

The treble and bass strands split off from one another and engage in a two-part canon to end the section (thus, strictly speaking,

the independent voice momentarily becomes two voices). The complete sequence of durations in each individual strand is the same as that just heard in Part II. But here, changes of direction in the duration series are marked off by rests (whose durations are represented below by numbers in parentheses):

1 2 3 4 (3) 2 3 4 5 (4) 3 4 5 6 (5) 4 5 6 7 (6)

5 6 7 8 7 6 5

(6) 7 6 5 4 (5) 6 5 4 3 (4) 5 4 3 2 (3) 4 3 2 1

The articulation of the independent voice in this section illustrates a principle that Nancarrow adheres to throughout Study No. 8 (as well as in most of his other studies): simply put, the ends of all sustained notes are marked by the beginning of a new note, and only staccato notes may precede a rest. For example, in Part III (described above), each group of four durations between rests is actually defined by five notes. The first four notes are sustained, and the note at the end of the group is staccato: it precisely marks the point at which the fourth sustained note ends--in the same way that the beginning of each new sustained note in the group precisely marks the end of the previous one.

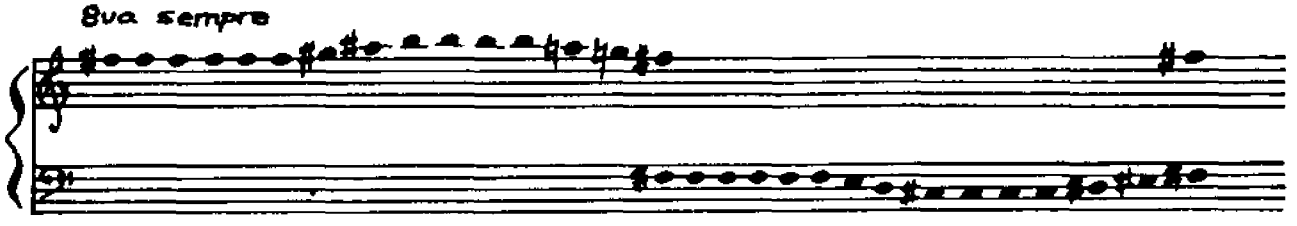
This second section demonstrates once again Nancarrow's desire to establish unifying interrelationships among all parts of a composition: the new duration series--[54, 43, 33, 24, 17, 12, 9, 7]--is systematically derived from the collection of durations between

sustained notes at the very beginning of the study; if those earlier durations are consecutively numbered, then:

Duration 8 + 9 = [54]
" 11 + 12 = [43]
" 14 + 15 = [33]
" 17 + 18 = [24]
" 19 + 20 = [17]
" 18 + 19 = [12 + 9]
" 20 = [7]

Part I of the independent voice's melody exhibits a motive that turns up fairly frequently in both early and late studies: a diatonic tetrachord bounded by a perfect fourth whose inner two notes are raised in the ascending form and lowered in the descending--the same as the upper half of the so-called "melodic-minor" scale. An important property of the motive is that its ascending and descending forms are intervallic inversions of one another--an appropriate feature in a study which exhibits so many other symmetries. Here is the pitch sequence of that melody:

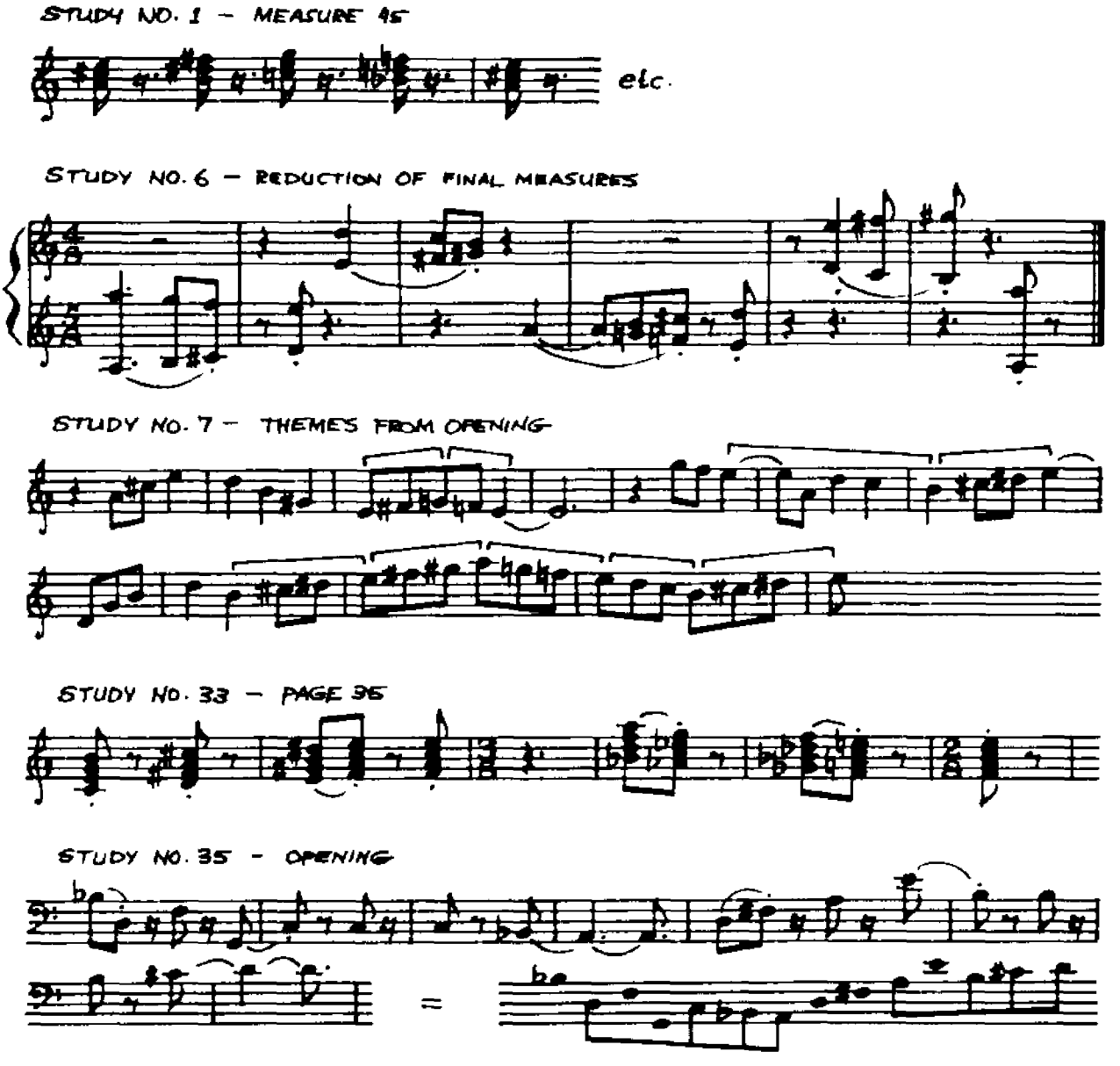
Example V-4.



At the end of Study No. 8, the independent voice's long acceleration is based exclusively on the "melodic-minor" motive. Many other studies feature the motive, sometimes truncated, but other times expanded into two tetrachords to fill the octave, resulting in the major scale

ascending and its inversion, the Phrygian, descending. Example V-5 shows how the motive appears in several different works.

Example V-5.



Perhaps the most intriguing aspect of Study No. 8 is the construction of the canonic trio in the third section. At the beginning of the section, the forte entrance of the lowest voice--flighty, unsettled, jumpy--contrasts sharply with the relative calm of the second

section. As the work drives toward its conclusion, the layering-on, one by one, of the other two canonic voices builds up a marvellous texture which, although complex, swings like good jazz. The rhythm here is based on a repeating isorhythmic pattern of 26 durations. Not surprisingly, the pattern is perfectly symmetrical, basically slowing down in its first half and speeding up in its second, although the movement from short to long durations is very irregular, beginning, for example, with [4, 5, 7, 8, 8, 5, 6, 9, 10 . . .].

After every three passes through the isorhythmic pattern, the entire pitch sequence repeats, a feature reminiscent of 14th-century isorhythmic motets with their separate patterns of talea (rhythm) and color (pitch). Here, in the bass voice, each of the three taleae within a complete color begins with a different transposition of the same pitch sequence (See Example V-8). The initial pitches of the three transposition levels are successively E_1, A_0, and B_0.[7] It is not surprising, given the tonal orientation of so much of Nancarrow's music, that the levels of transposition correspond with a I-IV-V harmonic progression.

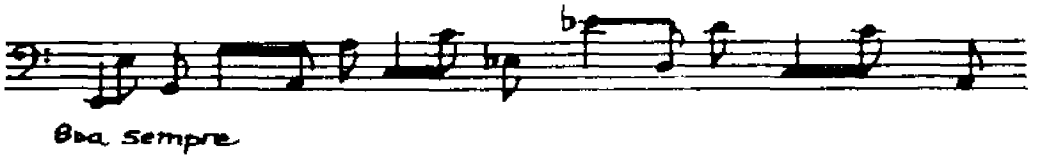
The isorhythmic pattern is combined with the three-note articulation pattern that was described above (sustained, staccato, ascending pairs--octaves in the lowest canonic voice, fifths in the

---

7. The sequence here requires a note below the range of the player piano; instead of substituting a note an octave higher--as a double bass player does when confronted with notes below E_1--Nancarrow replaces the desired A_0 with B_0, retaining the register rather than the pitch class. But the sequential pattern of the melody makes it obvious that the note in question is meant to be A_0 (See Example V-8 in which the A_0 is placed in parentheses).

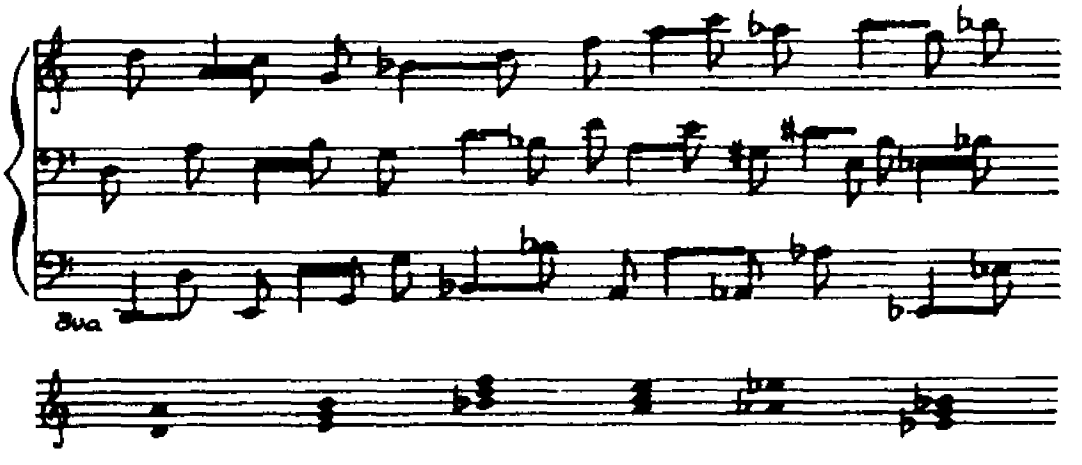
middle voice, and minor thirds in the highest. The beginnings of the three patterns (those of isorhythm, articulation, and melody) coincide only after three passes through the isorhythmic pattern, a fact which reinforces the subdivision of the complete melody into three taleae. Example V-6 shows how the different patterns combine at the beginning of the lowest canonic voice.

Example V-6.

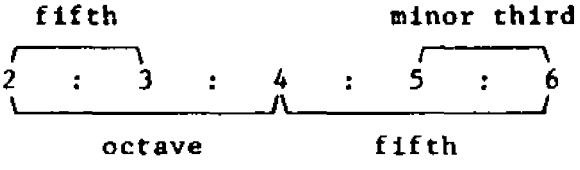


Rather than being imitative, the melodies of the canonic trio in this section are related heterophonically. That is, Nancarrow has chosen pitches for the upper voices on the basis of what is sounding in the bass at the same moment, his goal being to form root-position triads wherever possible. The rhythmic patterns, on the other hand, are overlapping and strictly canonic. The result is a texture that combines polyrhythmic differentiation with parallel melodic motion, complexity with clarity. The excerpt in Example V-7 illustrates this.

Example V-7.



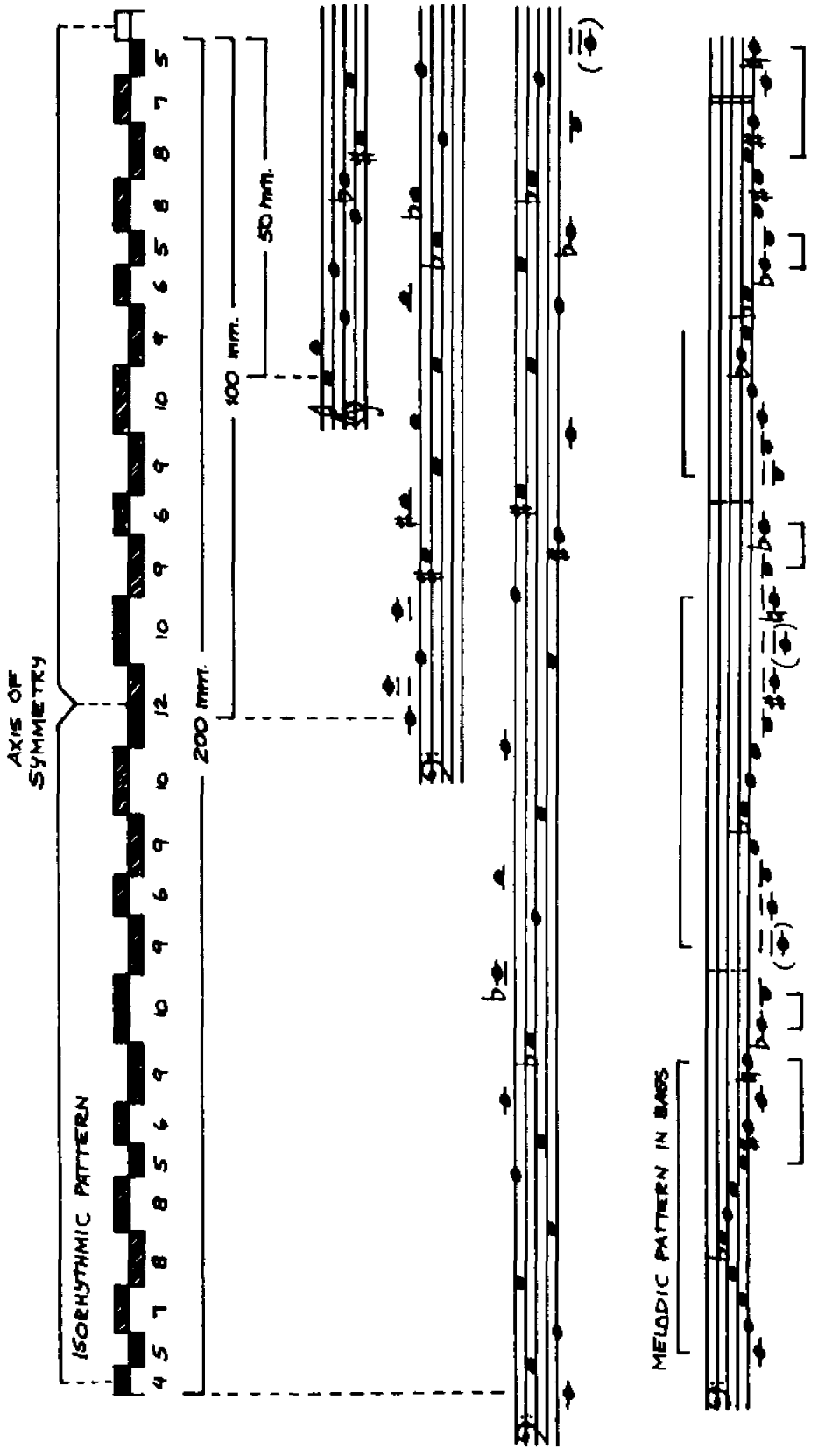
When the second voice enters, it does so at a point exactly halfway through the first voice's isorhythmic pattern; the third voice enters exactly three-quarters of the way through the pattern (see Ex. V-8). The positioning of these entrances is specifically related to the divisions of successive intervals in the overtone series. Thus, the entrance of the second voice exactly halfway through the pattern parallels, in the overtone series, the division of the octave (2:4) into fifth (2:3) and fourth (3:4); by the same token, the further subdivision of that half into quarters parallels the subdivision of the fifth (4:6) into major and minor thirds (4:5 and 5:6). It is obviously no coincidence that the bass voice is characterized by octaves, the next by fifths, and the highest by minor thirds:



These rhythmic references to interval ratios and the overtone series are among the most striking theoretical aspects of the study, foretelling some of Nancarrow's later investigations along the same lines in such studies as Nos. 23 and 37.

Example V-8 summarizes what has been said about the canonic trio in this section, showing the complete isorhythmic pattern, the points against the lowest voice's pattern at which the upper voices' patterns begin, and the complete melody--without octave repetitions--as it appears in the lowest voice. (The three parts of the melody--corresponding to its three talea--are separated in the example by dotted barlines, and brackets mark the important motives.)

Example V-8.


ISORHYTHMIC PATTERN
AXIS OF SYMMETRY
200 mm.
100 mm.
50 mm.
MELODIC PATTERN IN BASS

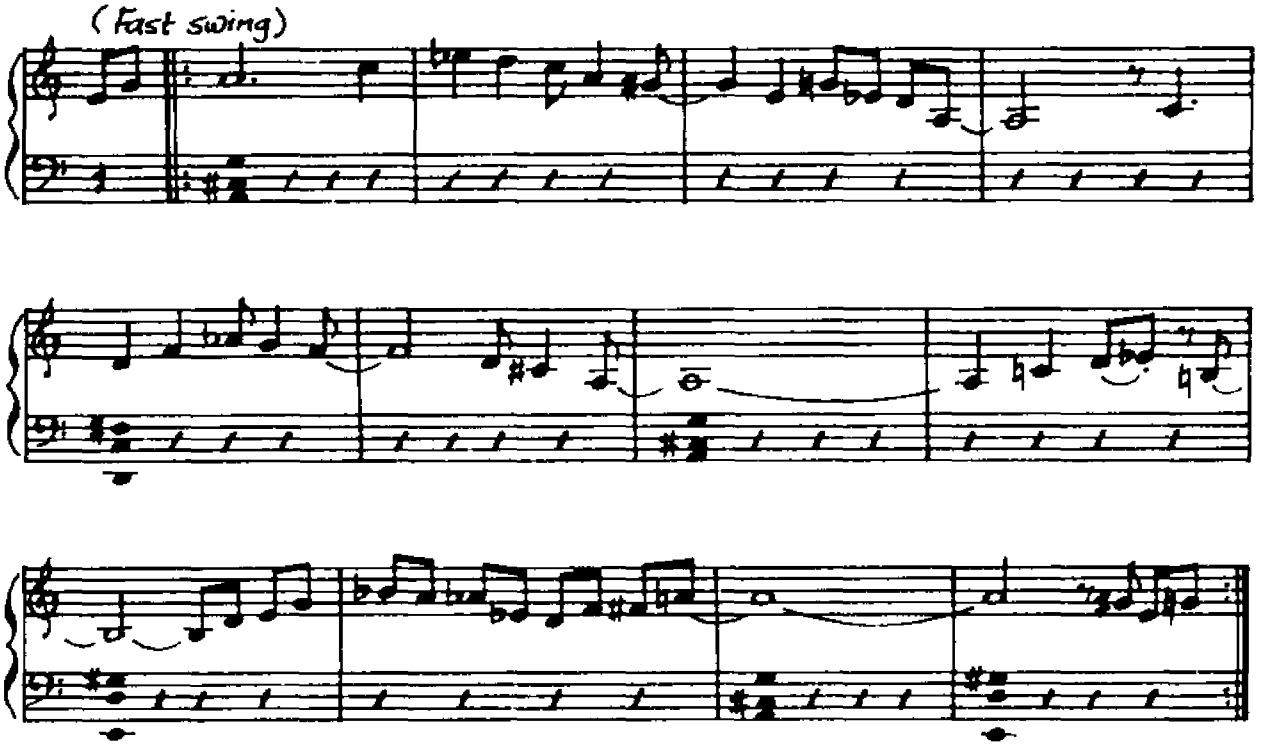
Several features of the melody should be noted. As mentioned above, the beginnings of each talea--in fact, the major portions thereof--are transpositions of the same series of pitches. That series, consisting of eleven notes, is presented complete in the first two taleae, but breaks off after six notes in the third. The end of each presentation, including the abbreviated third presentation, is marked by the same pair of notes, D and E-flat. They are like the connectors binding the whole melody together. Another aspect of the total coherence is the way the melodic descent at the end of each talea flows smoothly into the beginning of the next talea. Nancarrow also smooths over the transition from the end of the melody into its repetition by using a four-note figure (A, G-sharp, E, G) that will be repeated moments later in the first talea.

Most significantly, this melody is drenched with the blues. It can easily be heard as a blues in A with its prominent flatted fifth (E-flat) and unstable seventh (G-sharp alternating with G). The basic order of transpositions, as in the classic 12-bar blues, is I-IV-V. Example V-9 shows how naturally the melody can be fitted out with a set of blues chord changes.

This section was described earlier as having the driving swing of good jazz. Obviously, that was not just a metaphor. The unmistakeable presence of the blues scale contributes to the jazz feeling, and the striding octaves with which the melody is presented give it the power of a demonic boogie-woogie bass.

The exuberance of the ending is all the greater for its having followed the dry reserve of the preceding section. In fact, the ending

Example V-9.



is startlingly different from everything that has come before; it seems in some ways to have little connection with the earlier material. But Nancarrow ties things together by bringing back themes from the first two sections in the independent voice and juxtaposing them against the trio. In that way, he transforms their original meaning, calling attention to the jazz elements that were there right from the start; the implied triple meter in the opening section suggests jazz swing rhythm, and the treatment of the minor-third motive in the second section hints at the blues. The entire study, then, can be viewed as a personalized evocation of three different sides of jazz--rhapsodic swing, blues-like introspection, and boogie woogie.

Chapter VI

S T U D Y N O . 2 3

Study No. 23 stands apart from most of the other studies in its total lack of canonic imitation. Its two voices remain quite independent of one another from beginning to end, and it appears that one of Nancarrow's purposes here is simply to exploit the differences between them. Among their major differences, one voice is always staccato while the other is primarily sustained (a dichotomy already seen in Study No. 8), and there is at every moment a conflict of rhythm, usually expressed as a steady tempo in one voice against a wildly fluctuating one in the other. Tenney sees this rhythmic contrast as the work's major feature: "Most of Study No. 23 deals with the effects of combining a constant tempo in one voice with a gradually changing tempo in another."[1] But the work displays a richness of invention that goes far beyond the simple idea of rhythmic contrast.

Study No. 23 opens with a steadily accelerating sequence of seventy-one staccato notes in one voice while the other voice maintains a steady tempo. Within the accelerando, every pitch from B_0 to A_6 sounds exactly once.[2] This has several implications for the rest of the

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1. Tenney, 56.

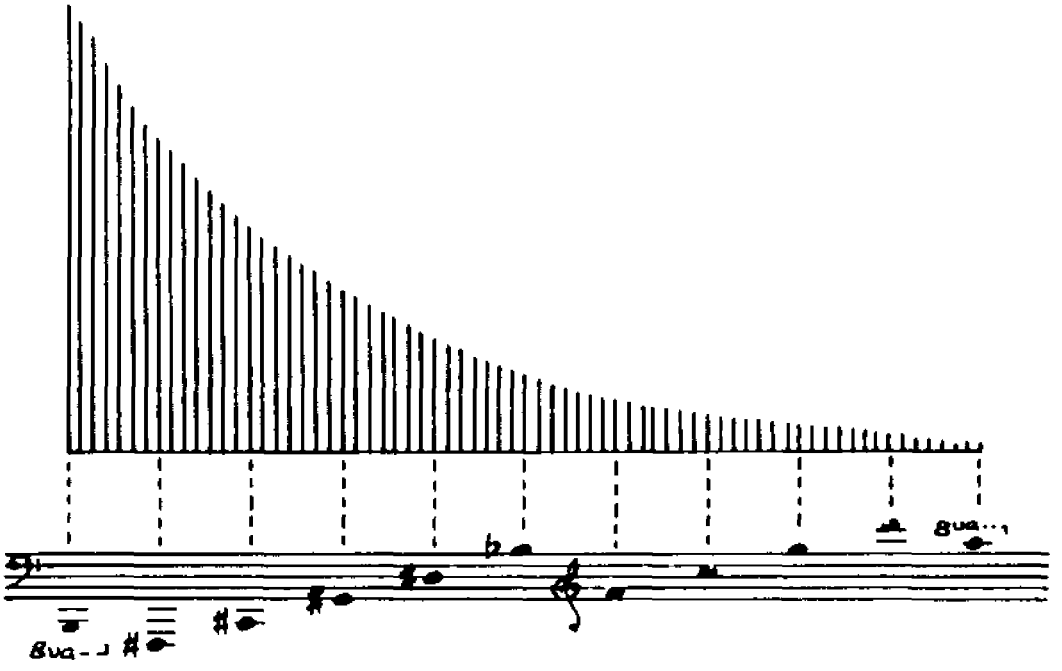
2. There are additional passages in the studies (other than chromatic glissandos) which present every pitch within a particular span just once, for example, the opening of Study No. 41.

study: it marks off the top octave of the piano--by avoiding it--as a separate pitch region, a partitioning that obtains in much of the study, especially towards the second half; it establishes the unique importance of each individual pitch (in a manner analogous to the twelve-tone principle of not repeating a pitch class until all the others have been heard); and, in the rhythmic realm, the accelerando introduces a collection of 71 separate durations, one for each of the pitches from B_0 to A_6.

The opening accelerando passage, while basically ascending, employs many skips and changes of direction (often even grouping notes together into arpeggiated triadic configurations). As a result, the durations of individual notes are generally but not specifically tied to their relative highness or lowness of pitch. But once the accelerando introduction is over (it takes up only seven systems in the score out of a total of nearly 86), pairings of duration and pitch based specifically on frequency are established and maintained in one of the two voices. Thus, the longest duration is assigned to B_0, the next longest to C_1, the next to C-sharp$_1$, and so on for all 71 notes from B_0 to A_6. It is quite a remarkable way of uniting pitch and rhythm. As mentioned in Chapter III above, Henry Cowell theorized about this idea in New Musical Resources, suggesting, for example, that a tempo ratio of 4:5:6 could be analogous to a justly-tuned major triad since the frequency ratios of the triad's three pitches are also 4:5:6. Interestingly, Nancarrow does not adhere rigidly to exact acoustical ratios in assigning durations--a note's duration is generally twice as fast as that of the note a major ninth lower rather than of that an octave lower (where the frequency

ratio of the pitches is 2:1). Example VI-1 shows the durations plotted on a graph above the notes with which they are associated. The durations in this first half of the study (systems 8 to 51) are in fact shorter than those that were established in the accelerando of the introduction, but Nancarrow does draw on the introduction for his duration/pitch pairings in the second half.

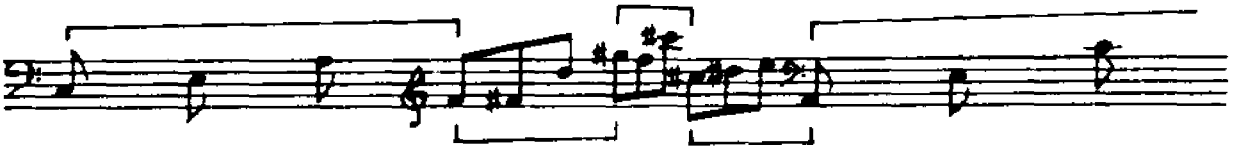
Example VI-1.



In the first half of the study (following the accelerando introduction), Nancarrow's treatment of the duration/pitch pairings is based on a systematic numerical plan. To begin with, notes are grouped in equal quintuplets whose durations are derived from that of the first pitch in the group. For example, the five pitches--all different--in a quintuplet beginning with G_1 are each assigned the duration that has been paired with G_1. By the same token, if G_1 appears in the group

beginning with B_0, it and the other members of the group then all take on the duration of B_0. Following 23 of such quintuplets, there are successively 28 similarly-constructed quadruplets, 44 triplets, and 71 duplets. As the numbers of notes in the groups change, the dynamic levels also change, going from piano to mezzo-forte to forte and finally back to piano again. One might expect each of the 71 pitches to appear at least once at the beginning of a group, contributing its own duration to the group, especially perhaps during the 71 duplets. But in fact there are 12 pitches which never initiate a group at all. By way of illustrating the process described above, a short passage from the triplet section is given in Example VI-2. The different spacings generated by the durations of the initial notes should be readily apparent. Brackets mark each of the equally-spaced triplets.

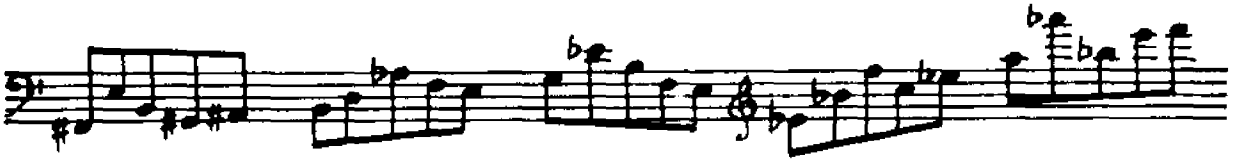
Example VI-2.



Any given initial pitch, no matter how many times it begins a group, is always followed by the same melodic fragment. As an example, the quintuplet beginning with G_1, which appears twice, consists both times of the notes G_1, A_2, C_2, A-flat$_2$, and F_2. When, later on, G_1 initiates a triplet, the pitches are the same three--in the same order--that began its quintuplet. In other words, each pitch is associated with a specific melodic fragment as well as with a specific duration. It is noteworthy that nearly all 59 melodic fragments begin

with an ascent to the second note. (There are only three exceptions, each of which descends a minor third, and two of those involve an A-flat descending to an F.) The fragments are also similar to one another in their basically angular contours, and in their complete avoidance of pitch repetition within the group. Example VI-3 shows a few of the quintuplet pitch groupings.

Example VI-3.

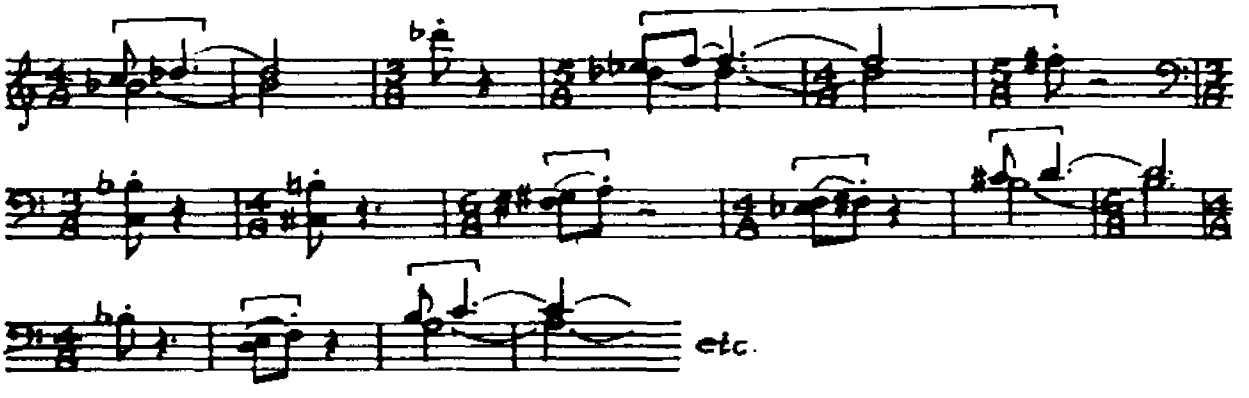


Through system 51, all the rhythms in the other voice are based on a steady eighth-note pulse. The part is notated metrically, but its time signatures change frequently, giving it a free and rhapsodic character. Even though rhythmically independent of the non-metrical voice, it is nevertheless tied in closely with that voice's progression from quintuplet to duplet figures: during the quintuplets, its only simultaneities are dyads; they are replaced with three-note chords during the quadruplets, four-note chords during the triplets, and dyads again during the duplets. Synchronized with those changes as well is a stepped acceleration of the steady pulse, progressing from quarter-note = M.M. 132 at the beginning to M.M. 141, 149, and 156, additionally speeding up to 162 in the middle of the duplets.

The harmonic materials in the metrical voice are derived primarily from seconds, thirds, and sevenths; the principal melodic figure is a rising half-step, often in connection with the ubiquitous

minor-third motive; the rhythms are restricted mainly to the staccato articulation of single notes, dyads, or chords, or their slurring together in short strings of eighth notes--usually pairs, which may or may not be sustained for several beats afterwards (See Ex. VI-4). This voice, while tied to a steady pulse, seems to be much less rigid in its structure than the non-metrical voice (with its unchanging groupings of pitch, duration, and melodic figure). The metrical voice sounds improvised. In it, Nancarrow demonstrates his marvellous ability to take a handful of figures and permute them in seemingly an endless variety of ways. He constantly succeeds in surprising the listener--in making repetition sound spontaneous and fresh. This approach--the somewhat cubistic idea of looking at a single object from all possible angles--is of course a fundamental principle of Nancarrow's "favorite composer," Stravinsky; the violin figuration in Histoire du Soldat, for example, rarely repeats itself even though based on just a few ideas. Example VI-4, an excerpt from systems 41 through 45, suggests the essence of the metrical voice. (Instances of the minor-third motive are bracketed.)

Example VI-4.



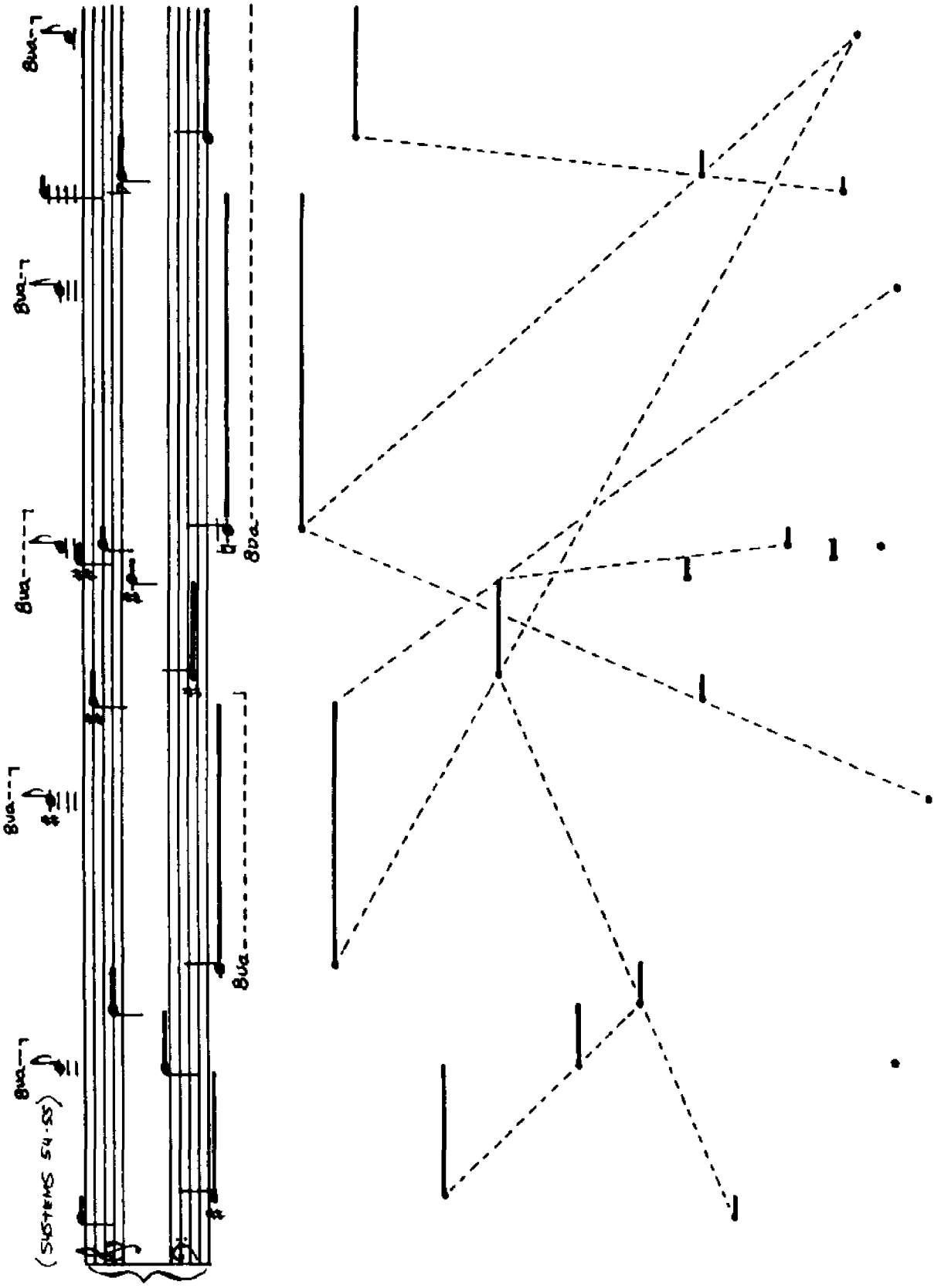
The second large section in Study No. 23 begins at the end of system 51. During this section, one of the voices, confined to the top octave of the piano, plays a very gradually accelerating sequence of staccato notes, culminating in the very fast high notes at the beginning of the coda (which come from the introduction's reversed accelerando). The other voice employs the 71 notes below the top octave, each paired with its own individual duration. (As in the first half of the study, the pairings are based specifically on pitch frequency.) The notes are always sustained, flowing from one to the next without pause, but the line is extremely jagged, leaping irregularly from very high to very low. There appears to be no underlying logic governing the sequence of pitches. Nevertheless, an organizing principle does exist--although inaudible and deeply buried--which relates the pitches to one another in a very unusual way.

Instead of determining the succession of pitches through various traditional "musical" means--serial, sequential, symmetrical, or otherwise--Nancarrow has gone back to the roll itself, to the purely graphic, visual aspect of it, to the geometric relationships between the various lines of punched holes. Each of the 71 pitches has its own individually fixed duration, which is of course represented on the roll by the length of a horizontal line of holes at the vertical position of that pitch (see footnote 14 in Chapter I regarding concepts of vertical and horizontal). Since there are no rests from one note to the next, the end of one line of holes corresponds exactly--and is thus aligned vertically--with the beginning of the next; in other words, the specific pitch of a note--because it is always paired with the same

duration--determines the temporal placement of the next note. This is the first step in establishing a near-total interdependence of pitch and rhythm. But it is not the final step because it does not provide a method for choosing successive pitches. Nancarrow takes that step with a brilliant flash of inspiration by drawing diagonal lines on the roll through the beginnings or ends of notes that have already been plotted, using the intersections of those diagonal lines with various other lines to determine the pitches of later notes. He thereby establishes a long chain of interrelationships which links the pitches and rhythmic placement of nearly all the notes in the passage, even including the staccato notes of the other voice's long accelerando. The beginning of that chain is depicted in Example VI-5, which shows a drawing of the roll aligned beneath the corresponding passage from the score. (As in Example IV-3, relating to Study No. 36, the picture of the roll has been reconstructed from the score, with pitches being plotted on a vertical axis of equally spaced semitones. Once again, the roll has been turned on its side to align with the score; low pitches appear at the top and high ones at the bottom. Sustained notes are represented in this example by solid lines of appropriate lengths rather than lines of holes.)

The organizing principle illustrated here can be clarified by closely examining the beginning of the example. An imaginary vertical line dropped from the end of the first note, G_5, marks the point at which the next note, F-sharp$_2$, begins. In turn, the end of that note marks the beginning of the next note, B_3, and so on. (To repeat what was said above, it is the pitch of a note, by way of its associated

Example VI-5.



duration, that determines the rhythmic placement of the succeeding note.) The choice of pitches for the first three sustained notes was probably arbitrary. However, as the example reveals, the pitch of the fourth note was determined by marking the intersection of the vertical line dropped from the end of B_3 with a diagonal line drawn through the beginnings of F-sharp$_2$ and B_3; a hole punched at that point on the roll produces G_4. The same basic procedure lies behind the rest of the passage as well. It is particularly noteworthy that diagonal lines also serve to bind together the two voices, in other respects seemingly unrelated to each other.

Thus, Study No. 23, far from being simply an exercise in contrasts, is in fact an expression of two very ingenious approaches to musical structure: the duration/pitch pairings derived from the overtone series; and the inaudible, almost mystical web of connections knitting together practically all of the notes in the work's second half. These conceptions fully exploit the unique possibilities inherent in the player piano medium, and are further evidence of Nancarrow's wide-ranging and adventurous creative spirit.

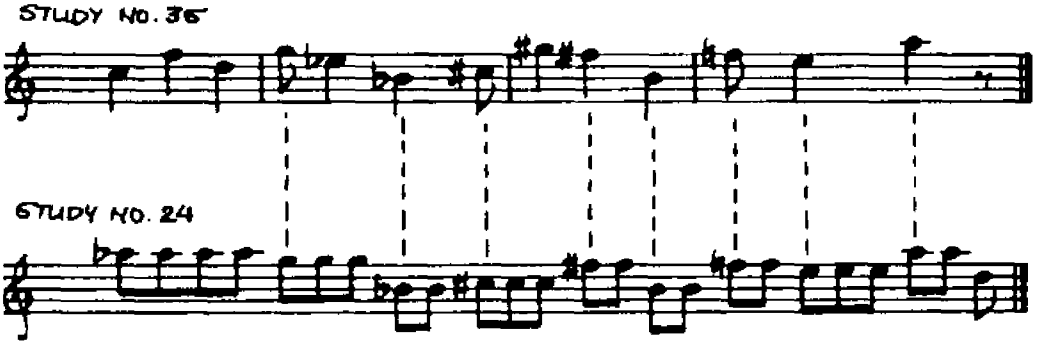
Chapter VII

S T U D Y N O . 3 5

Study No. 35 is a ruminative work. Unlike its neighbor, Study No. 36, it disdains flashy virtuosic display. It ebbs and flows, passing by at times almost like a dream. At least one critic, disturbed by what he felt was the machinelike precision of some of Nancarrow's music, specifically applauded Study No. 35 for its sense of freedom.[1] Filled with references to earlier studies, it is practically an encyclopedia of Nancarrow's compositional technique and, hence, a fitting choice as the final work to be considered in this paper.

Some of the references are quite explicit--the cadential pitch sequence, for example, is drawn from that of Study No. 24:

Example VII-1.



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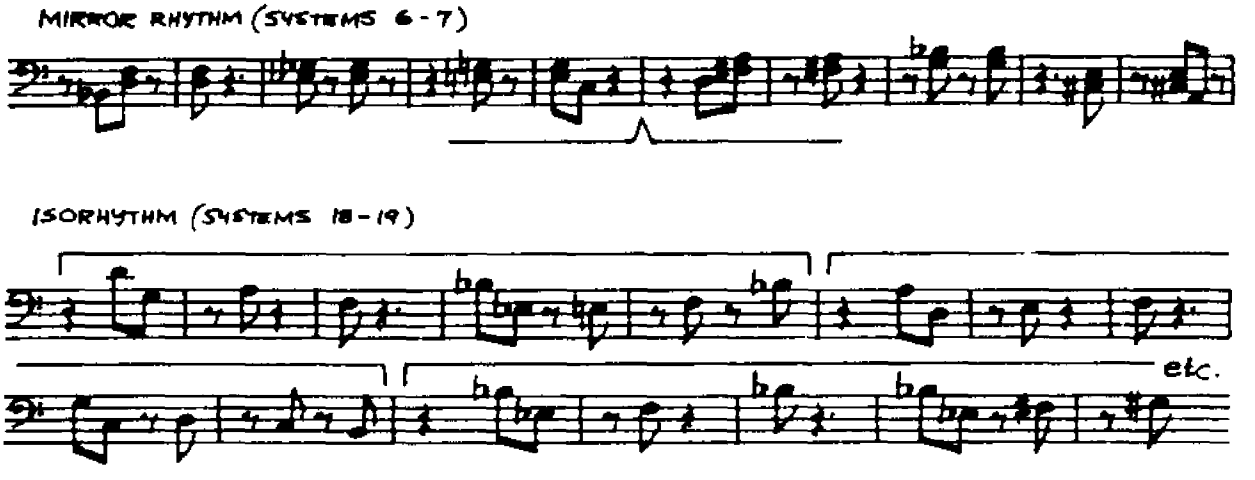
1. "Study No. 35, though quite complex, exhibits an apparent lack of premeditation that accounts for much of its charm ("Record Reviews: Conlon Nancarrow," Downbeat XLVII/7 (July 1980), 47)."

In a more general way, without referring so obviously to specific studies, Nancarrow catalogues in this work many of his important compositional procedures, almost as if he is writing an autobiography. For the most part, he cites each of the procedures only briefly, often embedding them within accompanimental voices, offering the listener little more than fleeting glimpses of scenes from his compositional life. The mirror (nonretrogradable) rhythm depicted in Example VII-2 is possibly the only one in the entire study, and the isorhythmic passage in the same example is excerpted from a five-voice texture in which none of the other voices has any kind of obvious structural organization (see Ex. VII-6). There is a certain witty capriciousness in the way Nancarrow hides these materials in unexpected places.

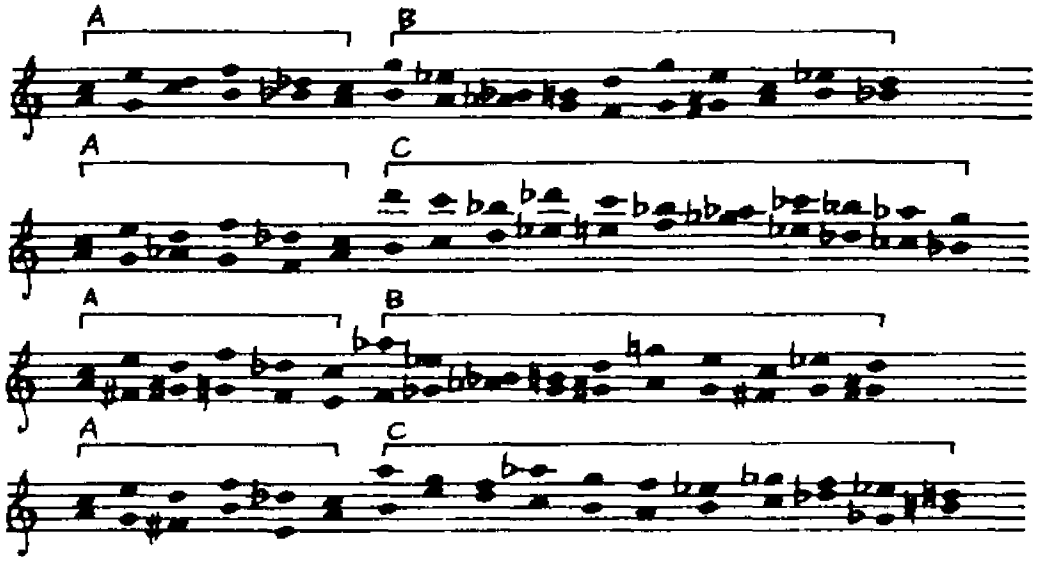
Example VII-2.



Example VII-3 depicts the pitch sequence of one carefully worked-out passage which, instead of being prominently displayed, is placed in the background. The passage consists of a long string of staccato dyads in an irregular rhythm. The sequence of upper pitches clearly marks out an ABAC-ABAC formal plan. Yet, despite its structural

interest, this passage functions simply as part of the accompaniment to a melody which, in contrast, sounds unstructured and improvised. Perhaps Nancarrow is making a subtle aesthetic point about the relative values of structure and freedom. Or perhaps he is drawing a parallel with the standard jazz format in which an unvarying background structure--the chord changes--provides the foundation on which a soloist builds his improvisation. Study No. 35 does in fact have many jazz features; more of them will be cited later in this chapter.

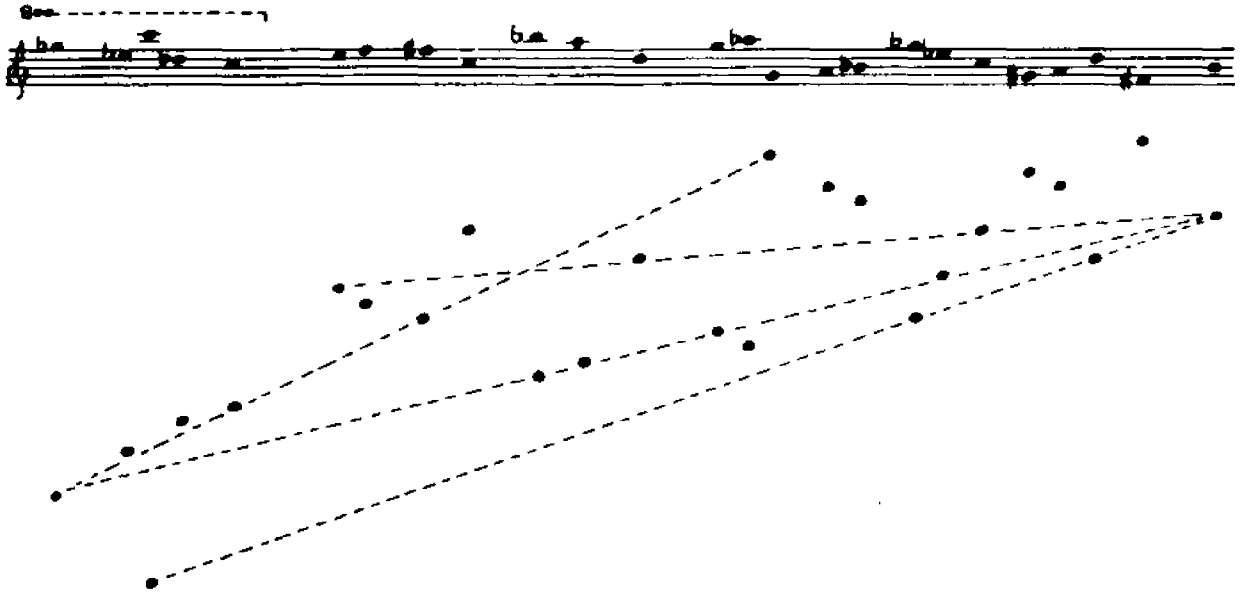
Example VII-3.



At least one passage harks back to the graphic organization of Study No. 23 (Ex. VII-4). Here, the geometry is much less precise than in the earlier study--some holes on the roll line up only approximately, and there are others which seem to fall entirely outside any hypothetical lines linking holes. But the alignment of the most important notes--high points of the melody as well as the final note--suggests that Nancarrow has indeed derived the general shape of

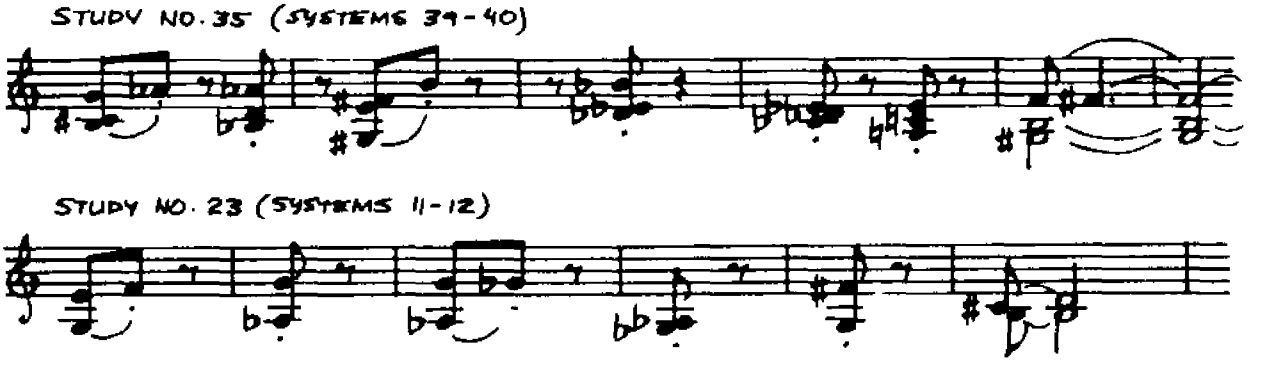
the passage from diagonal lines drawn on the roll. (One cannot help wondering how many other studies are based on this technique.)

Example VII-4.



Nancarrow also alludes to Study No. 23 in a short metrical passage whose melodic and rhythmic gestures are very reminiscent of the metrical voice in the earlier study:

Example VII-5.



The catalogue of compositional devices would not be complete, of course, without examples of canon. Nancarrow includes at least two different types in this study. One type is the converging canon, which occurs twice, the second one at the very end when three voices in different tempos converge to a unison conclusion (see Ex. VII-1). The other type is technically not canon at all since it does not involve exact imitation of rhythm and pitch; but there is imitation of role and function, basic gestures, and repertoire of materials. This can be understood by examining the first section of Study No. 35 (systems 1-23).

There are five voices in this section. They enter one by one, progressing from slowest and lowest to fastest and highest (as in, for example, Studies No. 19 and 36). Strictly speaking, the voices are imitative only in the sense that each potentially moves through the same three stages of musical material:

Stage A

As each voice enters, it presents a long melody whose most characteristic figure is an eighth-note slurred to a staccato note. Rhythms are flexible and not bound tightly to an eighth-note pulse as in the following two stages. The phrases are brief and usually end with relatively long sustained notes (followed without pause by the first note of the next phrase--Nancarrow makes sure, as in most of his music, that rests are preceded only by staccato notes). Melodic material is based primarily on fourths and fifths, arpeggiated triads, and the minor-third motive.

Stage B

This stage begins in a voice at least one system before the next voice enters. All notes are staccato eighth-notes, presented singly or in groups of two, separated by rests of various lengths. The pitches express major triads with the roots sounded alone, and the thirds and fifths together (see Ex. VII-2).

Stage C

The progression to this stage occurs when the next voice moves to stage B. As in stage B, all notes are staccato, but there now may be as many as six staccato eighth-notes in a row, and no more than one note sounds at a time (there is one isolated instance of twelve notes in a row at system 18 in the bass voice). With the exception of arpeggiated triads, the melodic gestures are based on the same materials as in stage A.

To clarify the above, here is a diagram of the entire section with each voice identified by its tempo:

TEMPO OF VOICE

340 A----

283.33 A----B---------

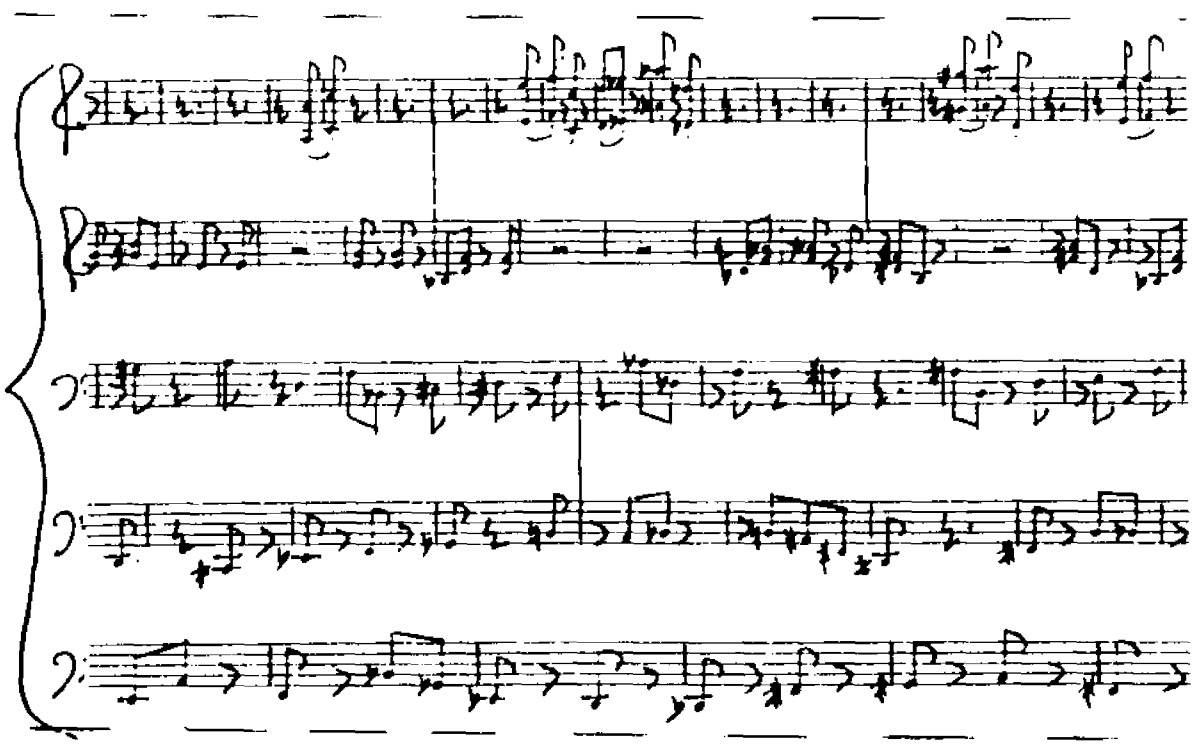
204 A----B---------C---------

170 A----B---------C----------

119 A----C----------

The increasing excitement as the texture thickens is reinforced by a stepped increase in dynamic level at the entrance of each new voice, progressing from piano at the beginning to fortissimo when the fifth voice enters. Example VII-6 (from system 21) shows the music after all voices have entered. As represented in the diagram above, the top voice is at stage A, the second voice--with its arpeggiated major triads--is at stage B, and each of the three lower voices is at stage C. (The middle voice at this point is based on an isorhythmic pattern, the one shown in Example VII-2.)

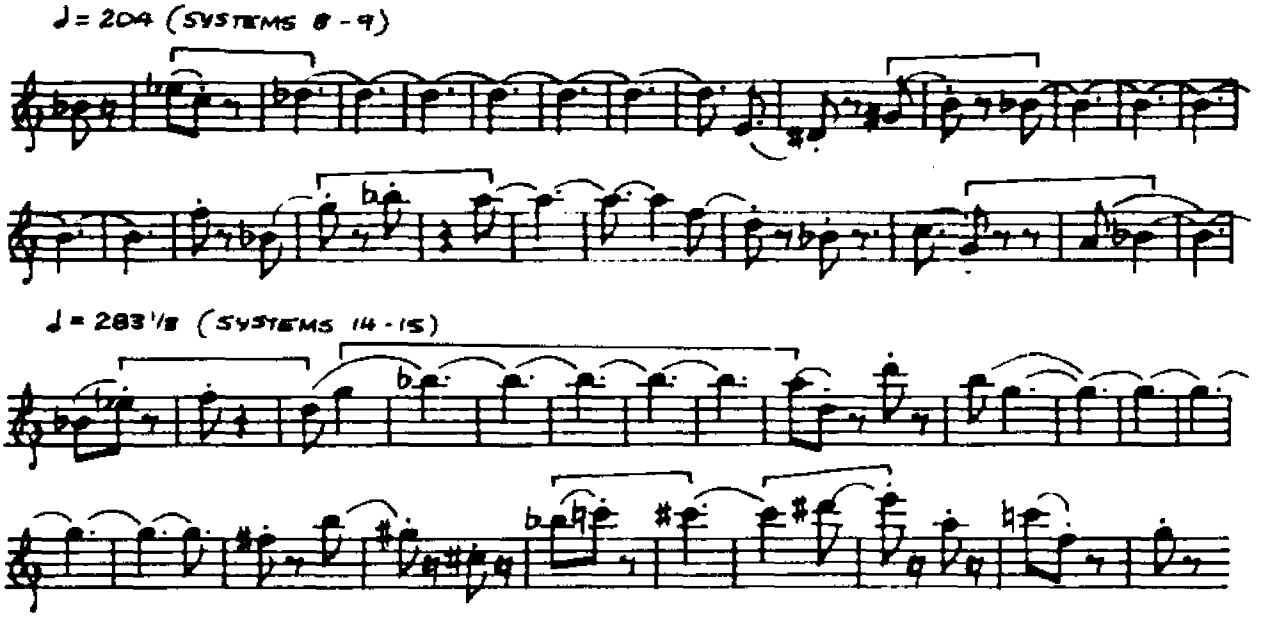
Example VII-6.



As each voice takes its turn at stage A, the listener hears similar melodic turns, rhythms, and pitch centers (B-flat, for example, is prominent in each voice). But, in fact, despite striking

similarities in character, there is almost no exact imitation from one voice to the next. They maintain their independence; each expresses the general tone and gestures of the A stage in its own way. By way of illustration, Example VII-7 shows how similar, and yet how different, are the beginnings of two of the voices. Brackets in the example pinpoint the recurrent minor-third motive; significantly, it is often approached or left by another important motive--the leap of a fourth. (In this example, as in Example VII-8 and several others in this paper, the different time signatures have been left out to save space. It is worth noting, however, that Nancarrow is very diligent about indicating all changes of meter in the score when he is using barlines.)

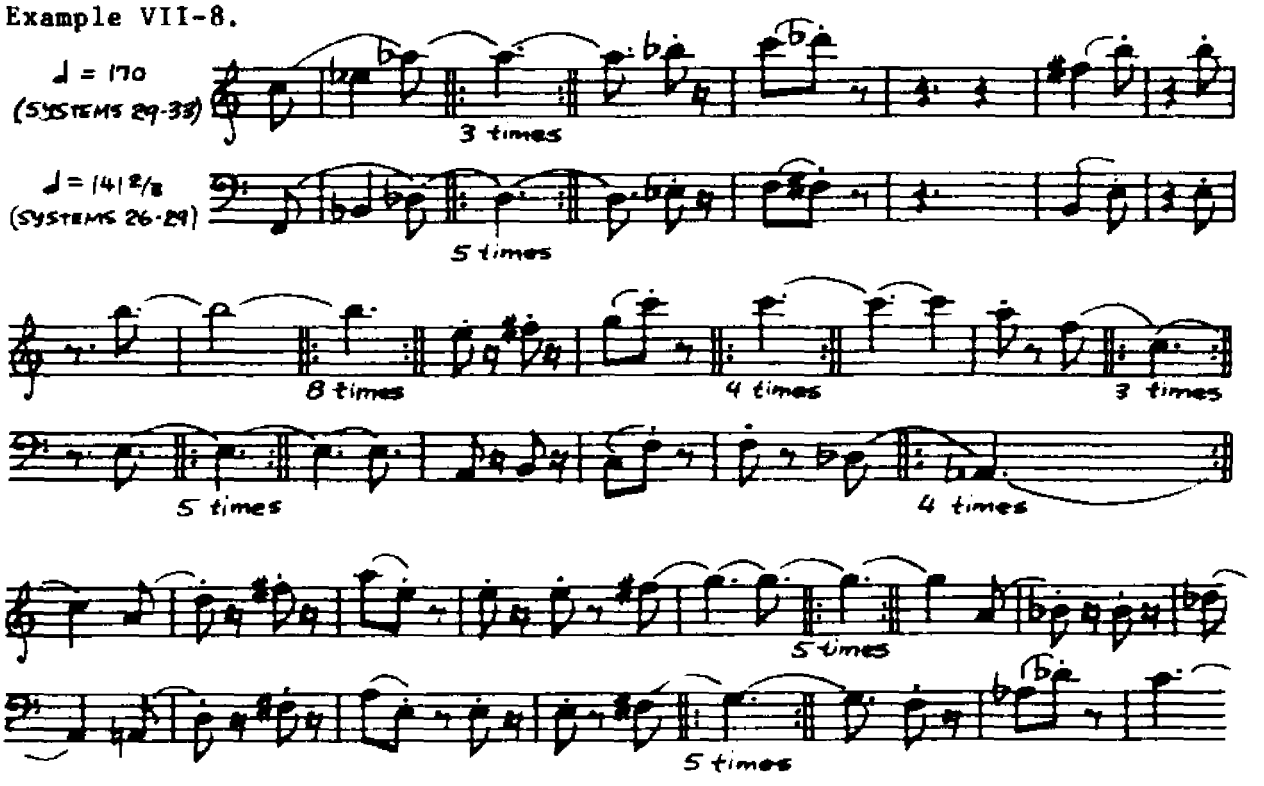
Example VII-7.



In the next section of the study (systems 23-39), a canon is spun out whose imitations of rhythm and melody are more nearly alike, though still far from exact. Three voices are involved in the canon (a fourth voice contributes a sort of limping, "boom-chick" accompaniment).

Example VII-8 superimposes the beginnings of the first two canonic voices so that several of their points of "imitation" are aligned vertically, revealing how different from one another they actually are.

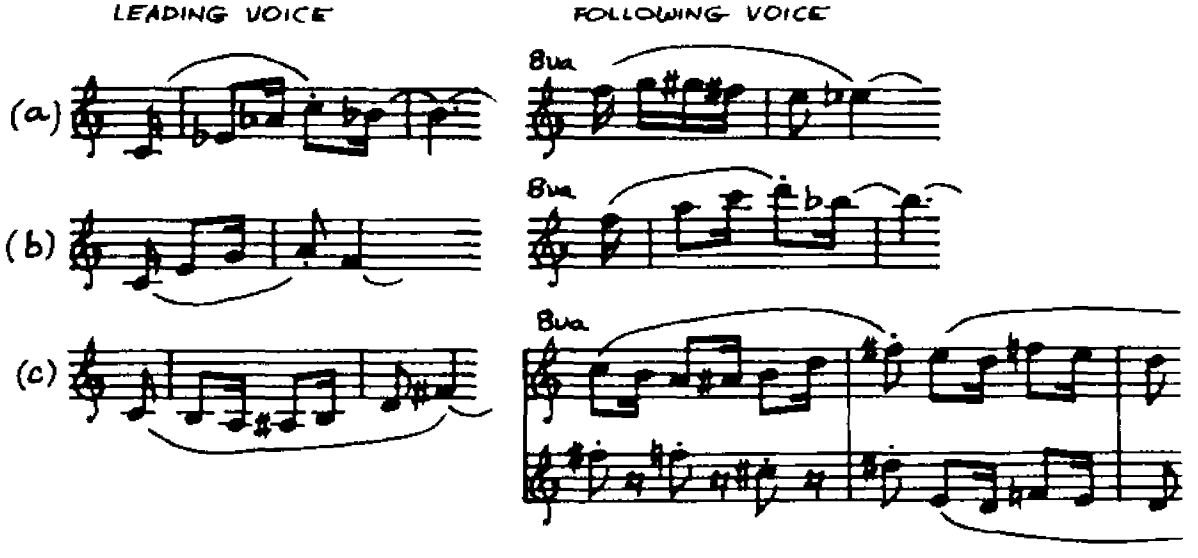
Example VII-8.



Such imperfect canons occur several more times, although in general the later in the study one gets, the more exact the imitation becomes. Thus, over the course of the study, there is a gradual development of canon, from the vague hints at imitation in the beginning, to the more exact imitation with some discrepancies in the middle, to the very strictly imitative, converging canons at the end which culminate in the unison cadential statement. In a broader sense then, there is an evolution from great independence to total unification of voices. This process is encapsulated in a short passage from systems 48-51. The upper lines of the two canonic voices there (both of which

also contain their own staccato accompaniments) are initially related only in an antiphonal way, with the leading voice's antecedent figure answered by a consequent figure in the other voice (a). But the next relationship (b) is one of exact imitation at the eleventh (plus one octave), followed shortly thereafter by an even closer connection between voices--imitation at the octave, although with a shift in rhythm (c). Finally, the two lines of the following voice monophonically join together in octaves. The four steps of that development are illustrated in Example VII-9.

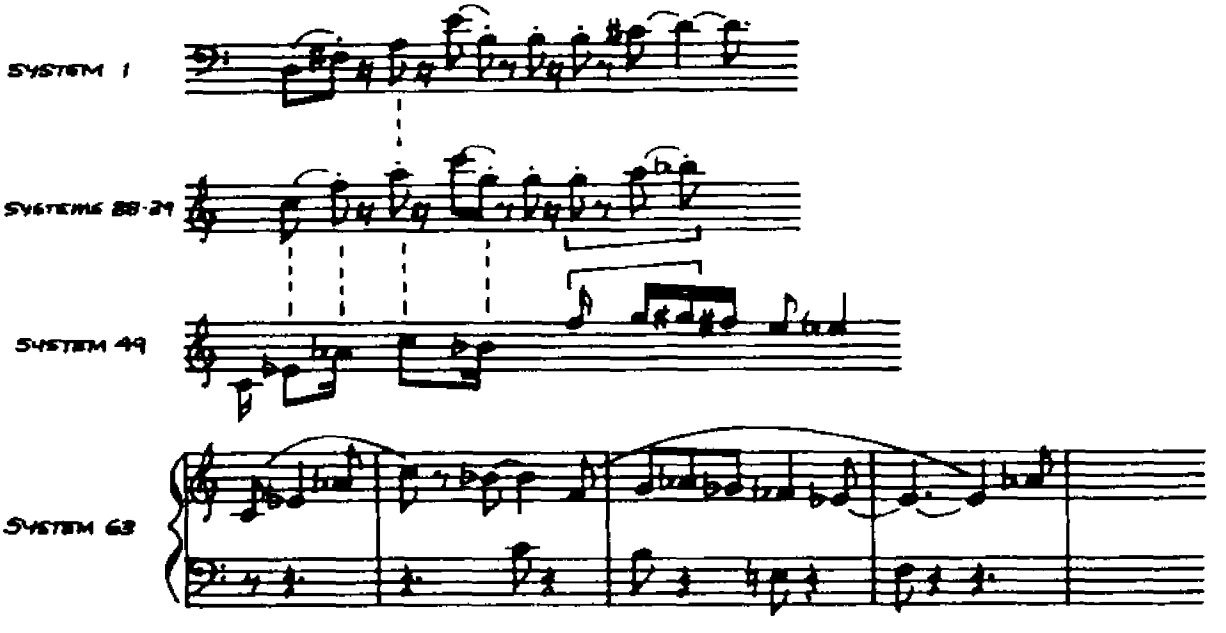
Example VII-9.



The kind of evolutionary process illustrated above is also apparent in the gradual emergence of the study's most prominent theme. As implied already, nearly all sections of the composition have in common the presence of prominent melodies which are constructed out of the same basic materials--syncopated, trochaic rhythms, the minor-third motive, fourths and fifths, and arpeggiated triads. In contrast to the

accompaniments, which are exclusively staccato, these melodies contain many sustained notes; that is the principal feature setting them off from their surroundings. From section to section, the melodies change in various ways, evolving through different tempos, dynamic levels, and accompaniments. At the beginning in particular, the melodic gestures, even though based on the same materials, are constantly varied, suggesting improvisation and a vague search for pattern; but over the course of the study, the melodies begin to coalesce into a recognizable theme that is finally heard complete in the converging canon at the very end. Example VII-10 depicts a few stages of that evolution, concluding with the beginning of the theme itself as it appears in the middle voice near the ending.

Example VII-10.



This final theme, like many of the melodies that precede it, sounds like a jazz tune. Its trochaic syncopations are strongly

suggestive of jazz swing, a fact highlighted by the intermittent accompaniment of a walking bass. Like any popular song, it is distinctly tonal; nearly all its notes are drawn from the key of A-flat major, and there are even several arpeggiations of the A-flat triad. Study No. 35 contains other jazz elements, some of which have already been alluded to: melodies that sound improvised, often supported by repetitive or structured accompaniments; the loping, albeit irregular, stride-piano feeling of the "boom-chick" passage in systems 23-39; the call-and-response of the upper voices in systems 20-23 (see Ex. VII-6); and the almost constant presence of jazz-like rhythms. The jazz references are right on the surface, not submerged as Tenney suggests ("Studies No. 10 and 11 are the last of the blues/ragtime/jazz pieces in the set--before this stylistic feature becomes submerged in what I am calling [Nancarrow's] abstract style").[2] By almost any criterion, Study No. 35 is more jazzy than Study No. 11. Apparently, though, some have accepted Tenney's statement without examining the evidence in the music itself. Gagne and Caras, for example, in their interview with Nancarrow, pose the following question: "After Study No. 12, references to jazz and Spanish music pretty much disappear from your work. Did you deliberately choose to exclude these styles?"[3] Nancarrow's response is indicative of his exasperation at such an ill-considered query: "No, I just did what I wanted to do. It had nothing to do with excluding or including."[4]

For all its variety, Study No. 35 is a very coherent composition. The major factor in its coherence is the close

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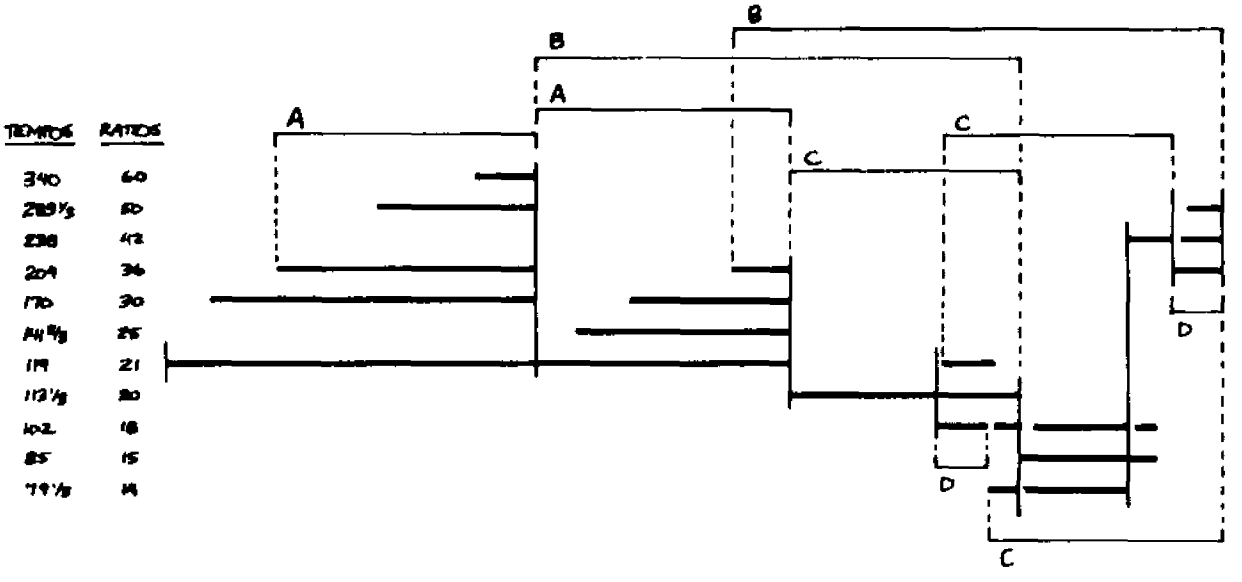
2. Tenney, 50. 3. Gagne and Caras, 291. 4. Ibid.

relationship among the many different melodies. But another important factor, much less obvious, has to do with the work's structural proportions; they can be discovered by examining the lengths of sections and the points at which various tempos are introduced. There is an unusual abundance of tempos in Study No. 35, reflective of the work's great variety. In the majority of Nancarrow's studies, the number of different tempos matches the number of voices, but here, even though no more than five voices are sounding at any one time, eleven tempos are indicated altogether. As is usually the case, all the tempos are related by simple ratios. Each new section of the composition introduces at least one new tempo that has not been heard previously; as the study progresses, faster tempos are abandoned in favor of slower ones, until the last few systems when several fast tempos return to bring the work to a rousing conclusion. Changes in texture as well as in tempo mark the beginnings of sections. Through most of the piece, each new section is shorter than the previous one: the first section lasts for approximately 22½ systems, the next for 15½, the next for 9, the next for 6, and so on, as Example VII-11 shows. In the example, horizontal lines mark the appearances of the various tempos, showing exactly when each begins and how long it lasts; unbroken vertical lines delineate the work's seven sections.

Laying out the tempos in this way reveals Study No. 35's grand substructure. It is apparent, for example, that the amount of space from the entrance of the third voice (M.M. 204) to the end of the first section is the same as the total length of the second section (brackets labeled "A"). A careful measurement of the two passages in the score

confirms that they are indeed--to the millimeter--exactly the same length. Other similar relationships are also bracketed in Example VII-11.

Example VII-11.



Of course, even without such an elaborate substructure, Study No. 35 would still offer much to delight both the ear and mind. In purely pragmatic terms, there was no need for Nancarrow to devote such careful attention to a facet of the composition that is essentially inaudible. But the fact that he did says a great deal about his aesthetic philosophy and his apparent desire to impose an order on all levels of the composition, from the simple ratios between tempos to the long-range proportions of entire sections; like his beloved J.S. Bach, Nancarrow delights in the hidden play of numbers and in the construction of musical edifices whose architecture may be known only to himself.

Chapter VIII

C O N C L U S I O N S

The close examination of five of the nearly fifty player-piano studies by Nancarrow has revealed many important features of his style--temporal dissonance, canon, motivic trademarks such as the ascending fourth and minor-third motive, major triads and other diatonic materials, symmetrical structures, isorhythm, arithmetic and geometric progressions, rhythmic explorations of the overtone series, superhuman virtuosic display, jazz influences, long-range structural proportions, and graphic organization. A few broader issues--some concerning the motivating principles behind the music--should be considered briefly in conclusion.

When Nancarrow turned to the player piano, he found a medium perfectly suited to his temperament and artistic outlook. All along, as he has said, he was interested in getting rid of the performer so he could explore rhythm and tempo with absolute control and precision. The instrument became a true partner in these explorations: "When I started really working with player pianos, the whole idea of temporal relationships expanded into much more than I had originally thought. . . It developed in the actual working with punched rolls. Every time I do something and hear it, it has an effect on the next thing I do."[1] Some

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1. Reynolds, "Interviews," 2.

of the most characteristic and innovative elements of Nancarrow's music were born right on the blank surface of the unpunched paper roll: the graphic organization of Study No. 23, for example, is practically inconceivable apart from the player piano medium. The roll is highly conducive to the use of exact measurements, templates, replications, and geometric constructions; thus, to a certain extent, it exerts an influence on the music that is purely visual and mathematical. Nancarrow, with his mathematical and structural turn of mind, is quite receptive to such influences. Numbers are obviously very important to him. For example, he always sets up a specific mathematical relationship among the different tempos in a study, even if it is an irrational one such as the e:pi of Study No. 40. Acceleration and deceleration are based on fixed rates of change adhered to consistently, whether by percentages (Studies No. 22 and 27), a specific set of durations (Study No, 8), or geometric (Study No. 23) and arithmetic progressions (the ending of Study No. 7 where each measure is one eighth-note shorter than the previous one). Related to Nancarrow's mathematical concerns is his abiding interest in such formal structures as isorhythm, symmetries, sequence, long-range proportions (as in Study No. 35), and, of course, canon.

Yet, for all his preoccupation with numbers and structures, Nancarrow always seems very conscious of the way a particular piece is going to sound. He strives to communicate directly with the listener; a comment he made in connection with Study No. 40 applies as well to his other works: ". . . my essential concern, whether you can analyze it or

not, is emotional; there's an impact that I try to achieve by these means."[2]

His music exhibits a fairly consistent sound-ideal, exemplified by the incisive attacks of his altered hammers combined with terraced dynamics, avoidance of the damper pedal, and a general preference for staccato notes. The crisply percussive articulation gives even the thickest of textures a remarkable clarity. And purely in terms of sound, the staccato produced by Nancarrow's pianos has a dry, pristine beauty that is unique to the instruments, especially when all the notes of a staccato chord, spread over the range of the entire keyboard, are struck precisely at the same instant.[3]

One must be deeply grateful to Nancarrow for meticulously copying out scores which so faithfully reproduce the spatial proportions and rhythmic relationships of the punched rolls. The manuscripts are remarkably accurate as well as very easy to read. Copying them out with such care must have been an arduous task, especially since it was absolutely unnecessary from the standpoint of performance--none of the studies depends on a score for its existence. Why did he do it? It seems likely that Nancarrow felt it was important to leave accurate

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2. Reynolds, "Interviews," 23.

3. There is also a pragmatic reason for the prevalence of staccato notes--it is much less work to punch a single hole for a staccato note than it is to punch a line of holes for a sustained one. When Nancarrow had his punching machine altered to achieve a continuous advance of the roll (after Study No. 20), he also had a device added that enabled him to punch a line of four holes at once. Before that improvement, as he says, ". . . there were very few pieces with any sustained notes in them because there was so much effort involved in punching out strings of holes. Everything was staccato!" (Ibid., 20).

documentation of the rolls, given their priceless, one-of-a-kind nature (he has consistently rejected suggestions that the rolls be duplicated). At the same time, he perhaps suspected--or hoped--that people would eventually want to find out more about his music than they could learn just by listening to recordings of it. The scores are wonderful treasure maps for those eager to uncover the studies' secrets. In devising the hidden structures and proportions of such works as Studies No. 23 and 35, and then supplying the scores as clues for finding them, Nancarrow carries on the old tradition of those Renaissance and Baroque composers--and later ones, too--who delighted in constructing cryptic, canonic riddles for their friends to attempt to solve. But it may be most accurate to say that Nancarrow has always composed simply for the joy of the work itself, sustained through the long years of musical isolation by a deep belief in the worth of his music, a conviction that is surely strengthened anew each time he puts a freshly-punched roll in the piano and hears it for the first time.

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F A I R S E E D - T I M E

for tenor and orchestra

(Selections from William Wordsworth's Prelude)

by

PHILIP CARLSEN

A composition submitted to the Graduate Faculty
in Music in partial fulfillment of the requirements
for the degree of Doctor of Philosophy,
City University of New York.

1986

This manuscript has been read and accepted for the Graduate Faculty in Music in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy. There is also a composition entitled Fair Seed-time for tenor and orchestra.

13 January 1986
date

H. Wiley Hitchcock
Professor H. Wiley Hitchcock
Chairman of Examining Committee

14 January 1986
date

Barry S. Brook
Professor Barry S. Brook
Executive Officer

Professor Charles Dodge (adviser)
Professor Joel Lester
Professor Bruce Saylor
Professor Sherman Van Solkema
Professor Hugo Weisgall

Supervisory Committee

The City University of New York

I N S T R U M E N T A T I O N

2 flutes
2 oboes
2 clarinets in Bb
2 bassoons
2 horns in F
1 trumpet in Bb
1 trombone
1 percussion
(suspended cymbal,
vibraphone)
piano
strings
tenor solo

(Duration: approximately 17 minutes)

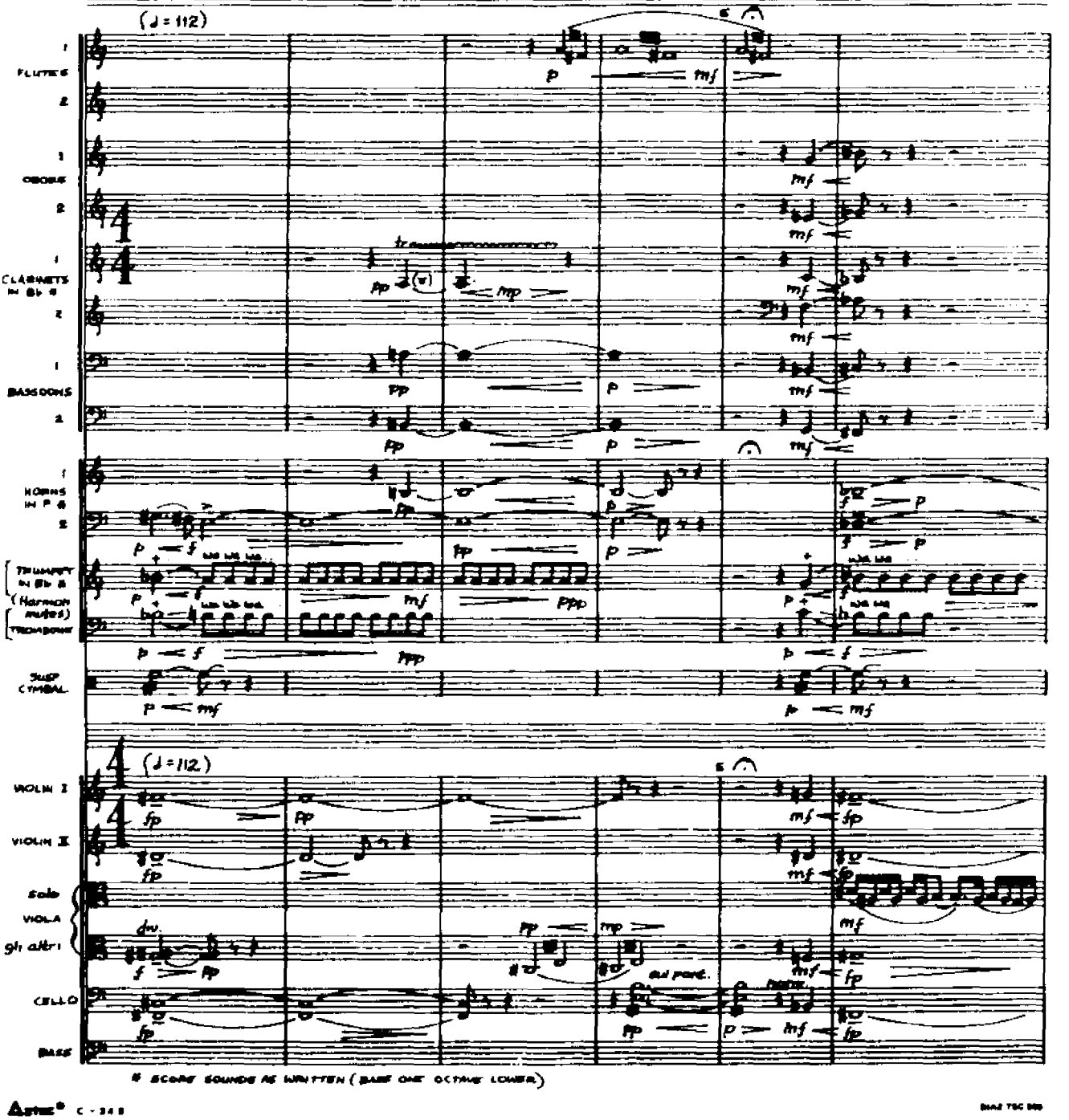
C O N T E N T S

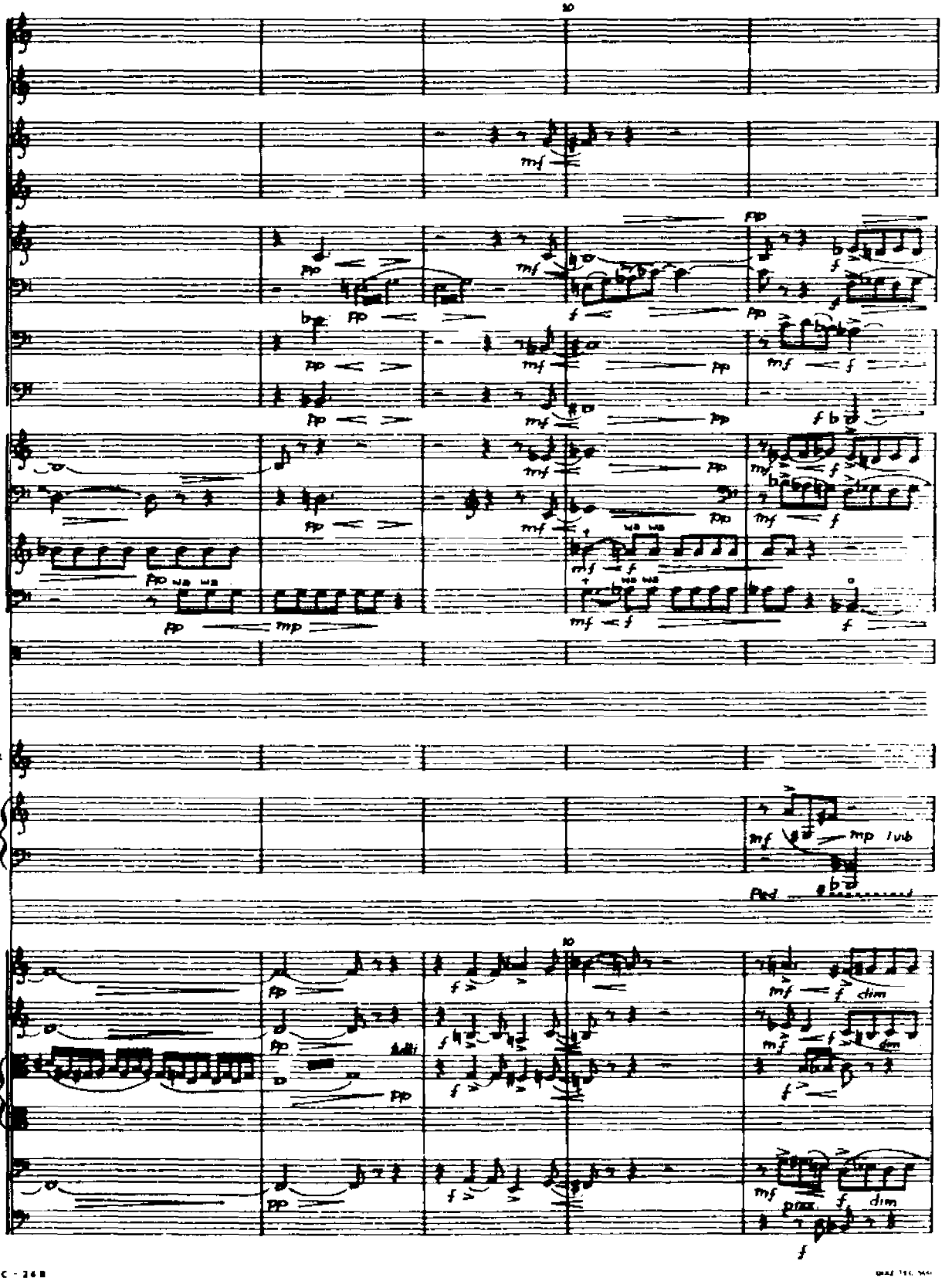
FAIR SEED-TIME

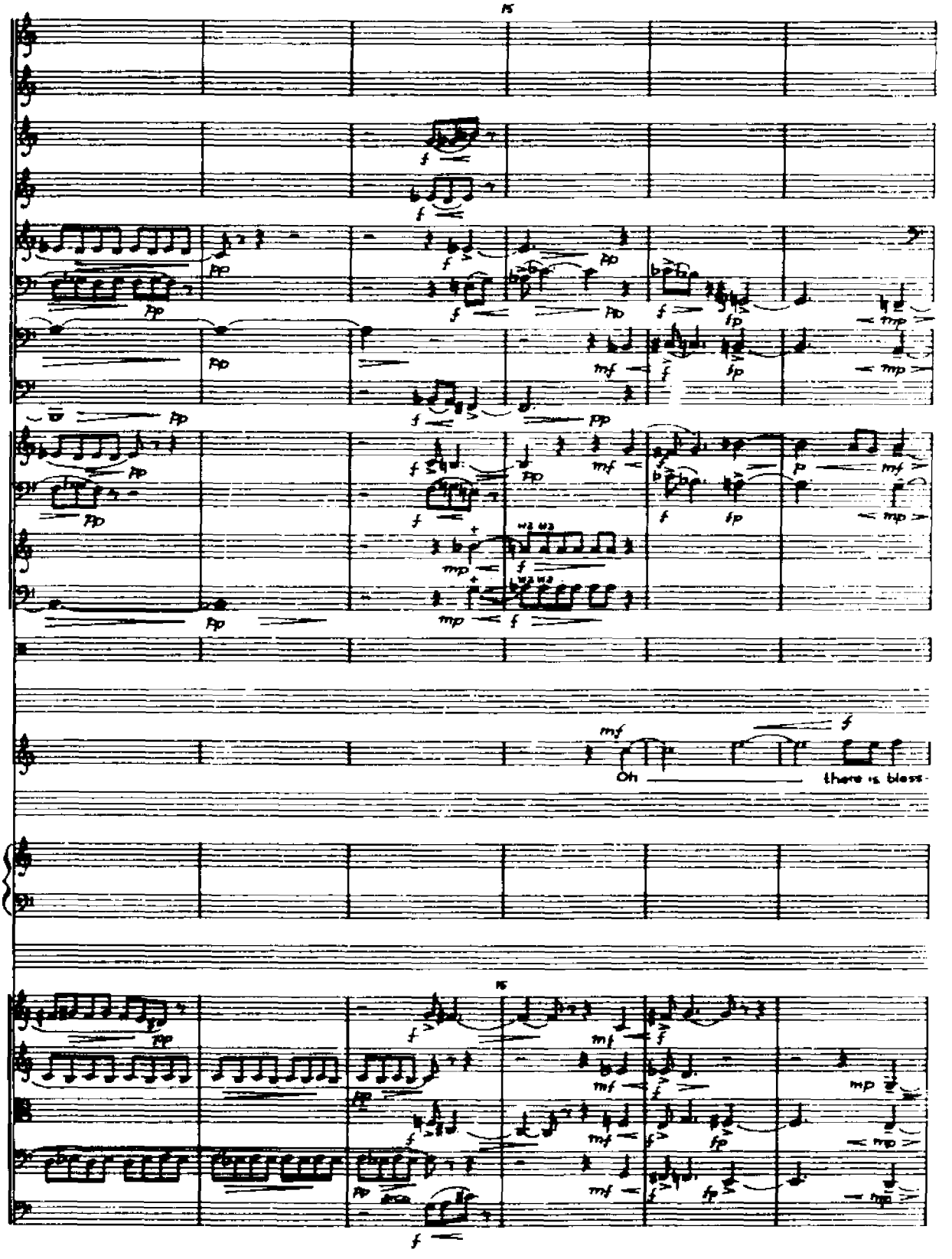
PHILIP CARLSEN

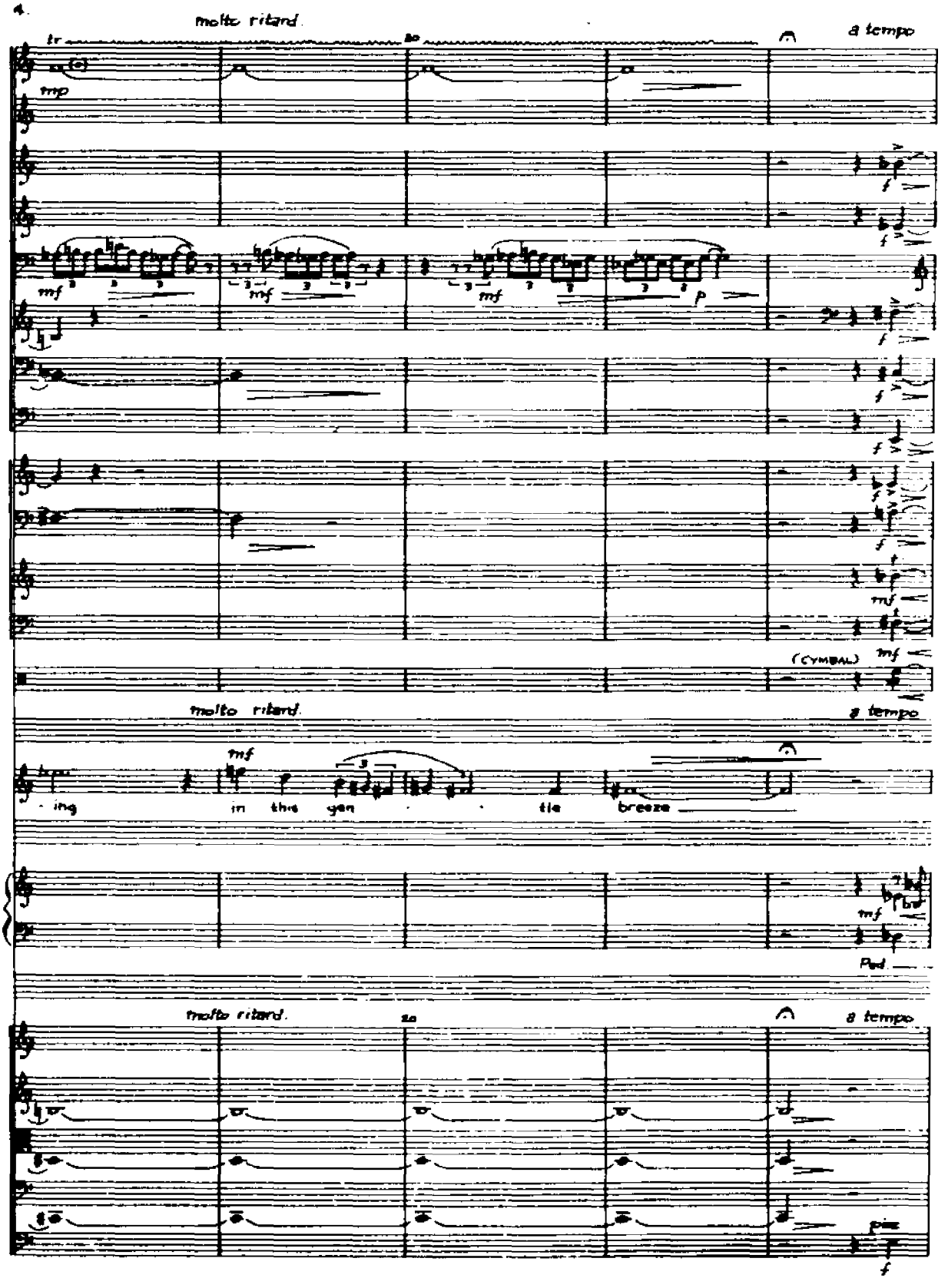
Selections from William Wordsworth's Prelude

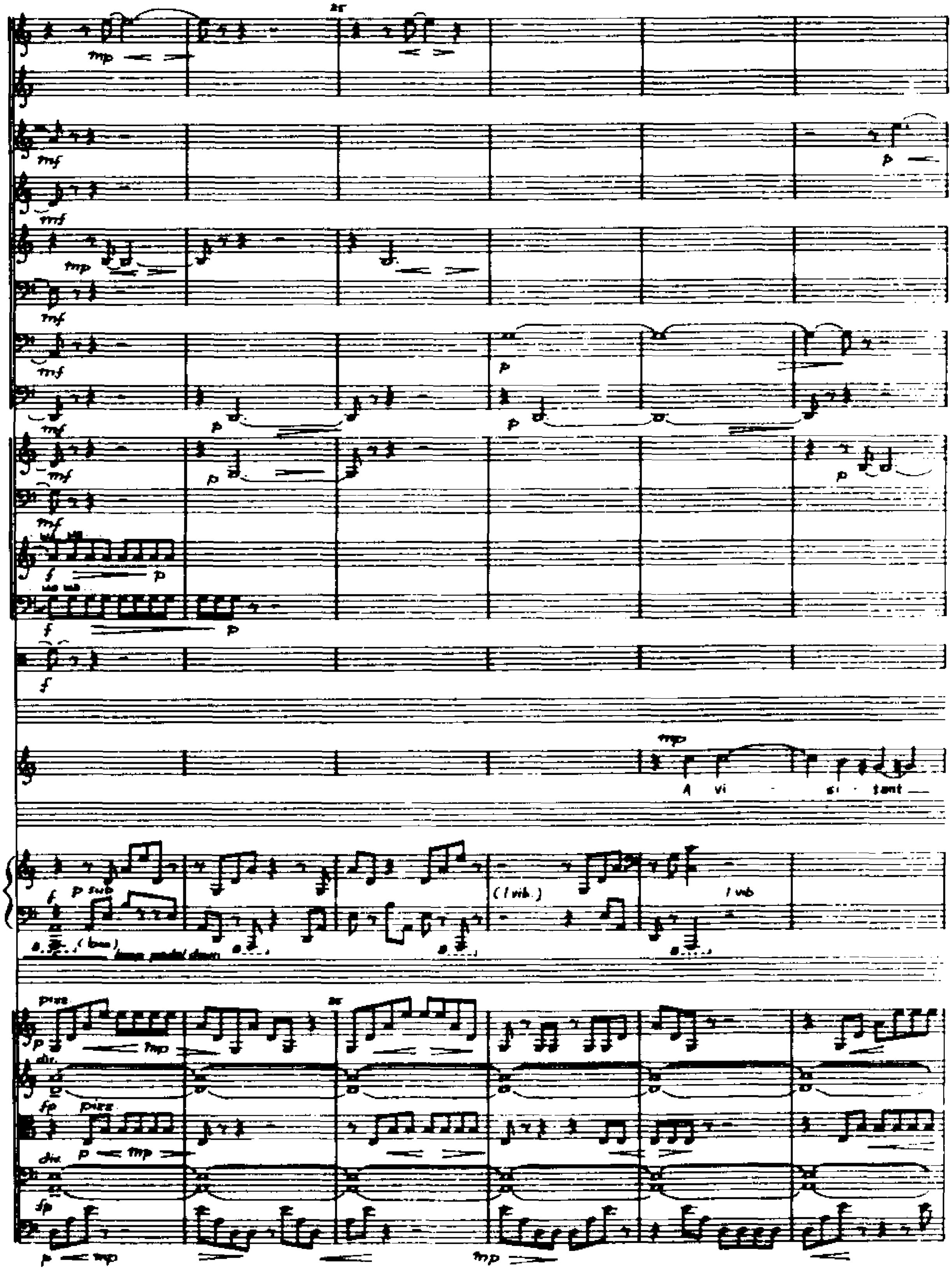
1. This Gentle Breeze

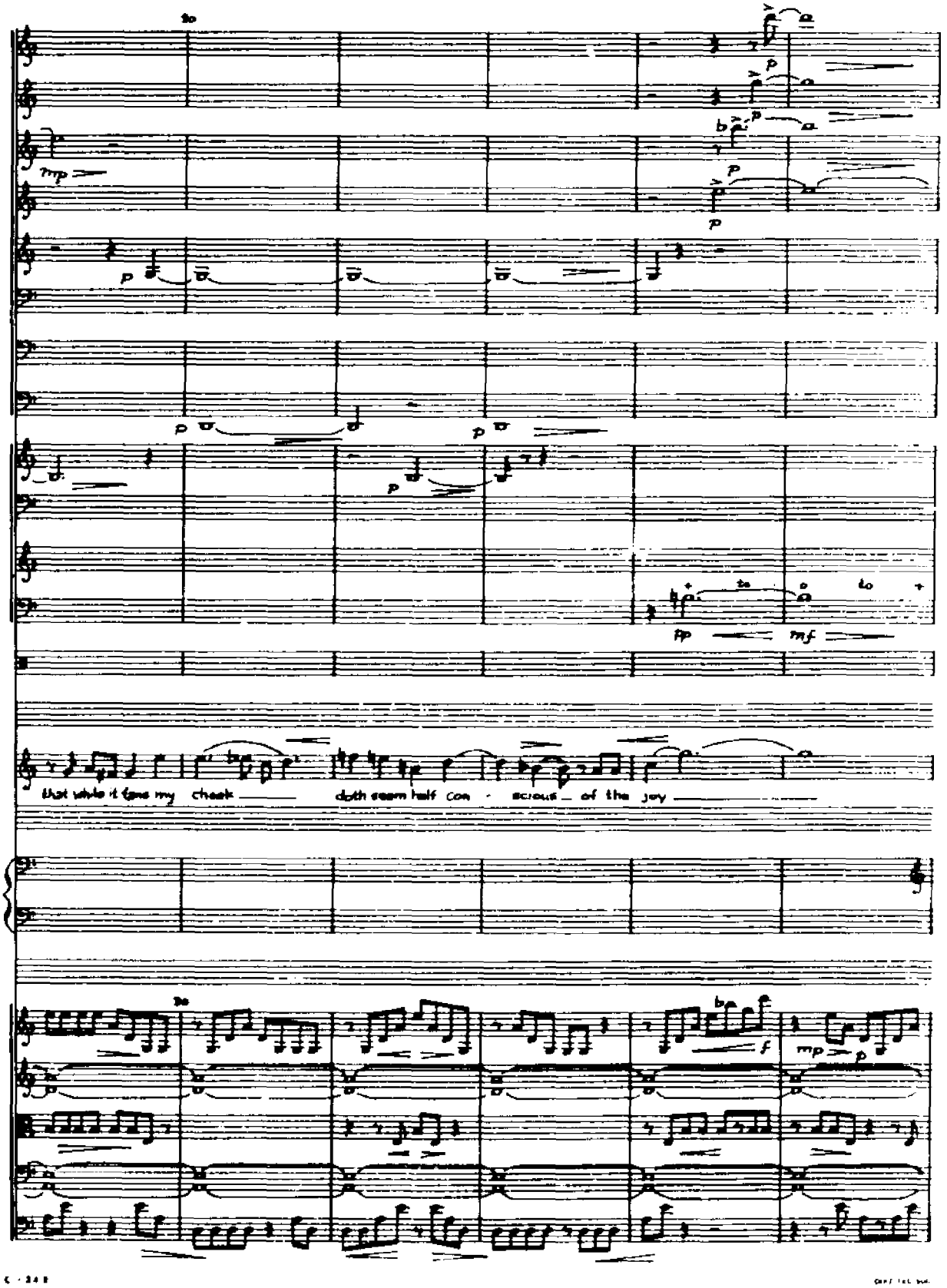


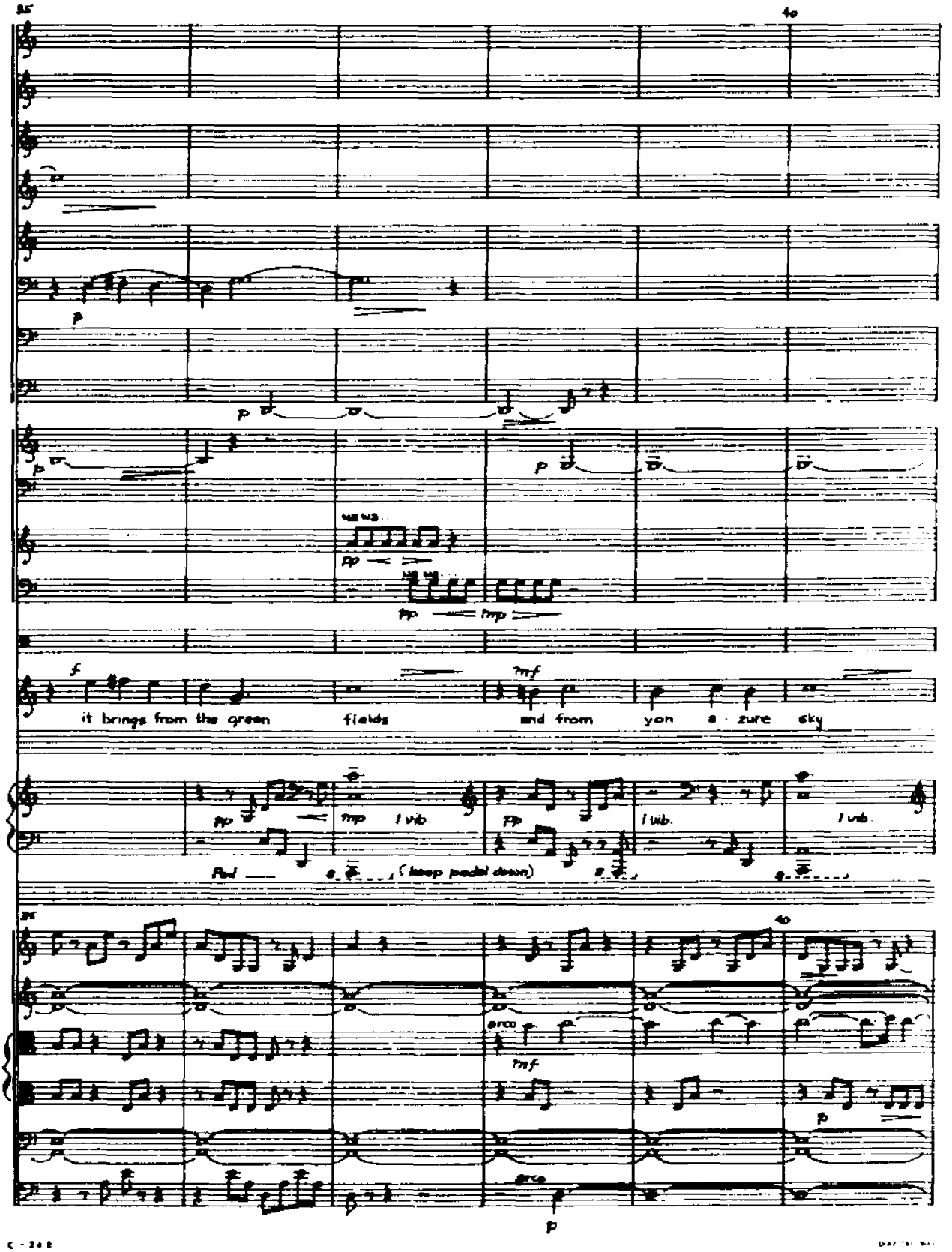

10
TENOR
PIANO
10

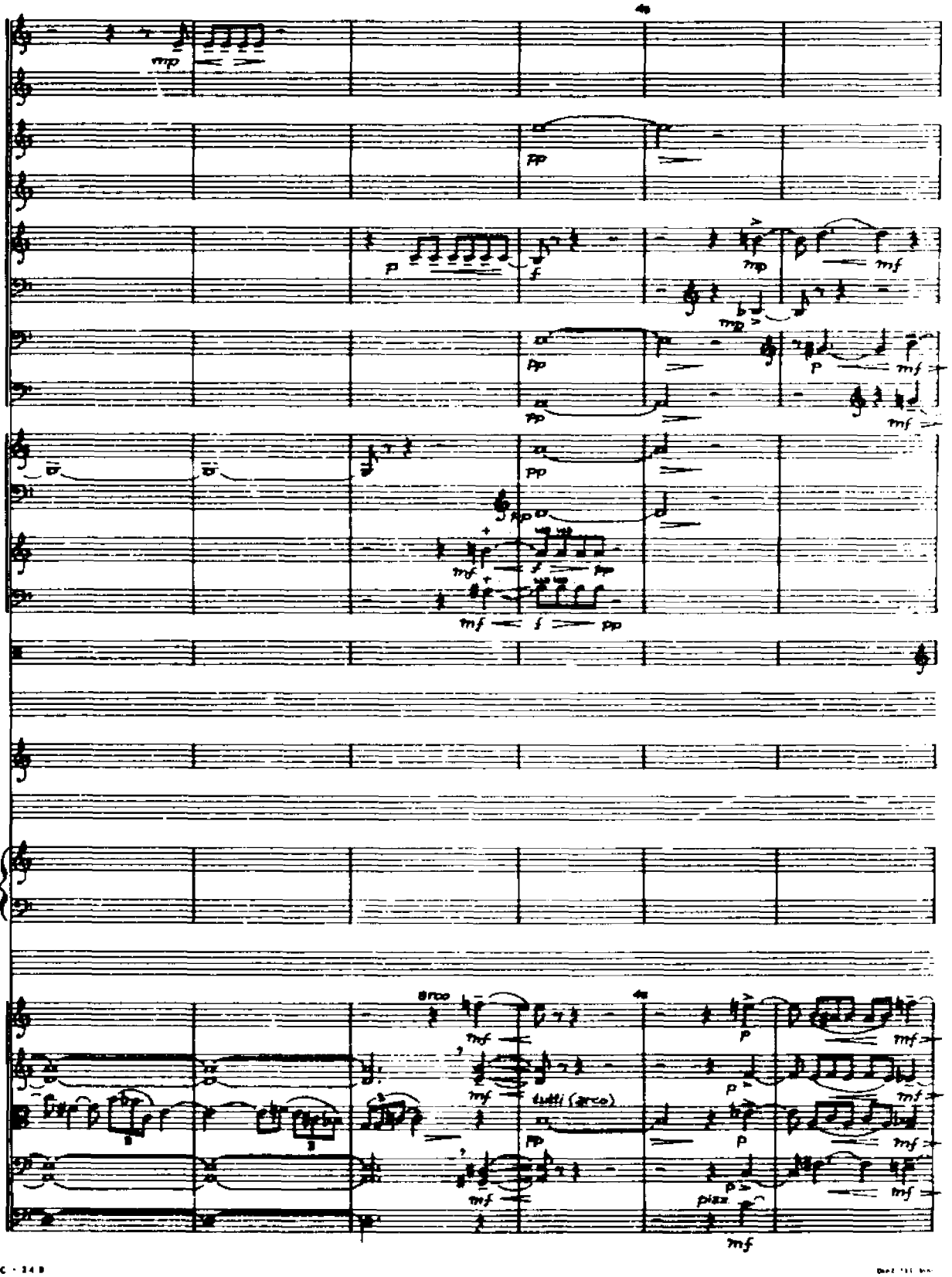

15
Oh
there is bless-
15

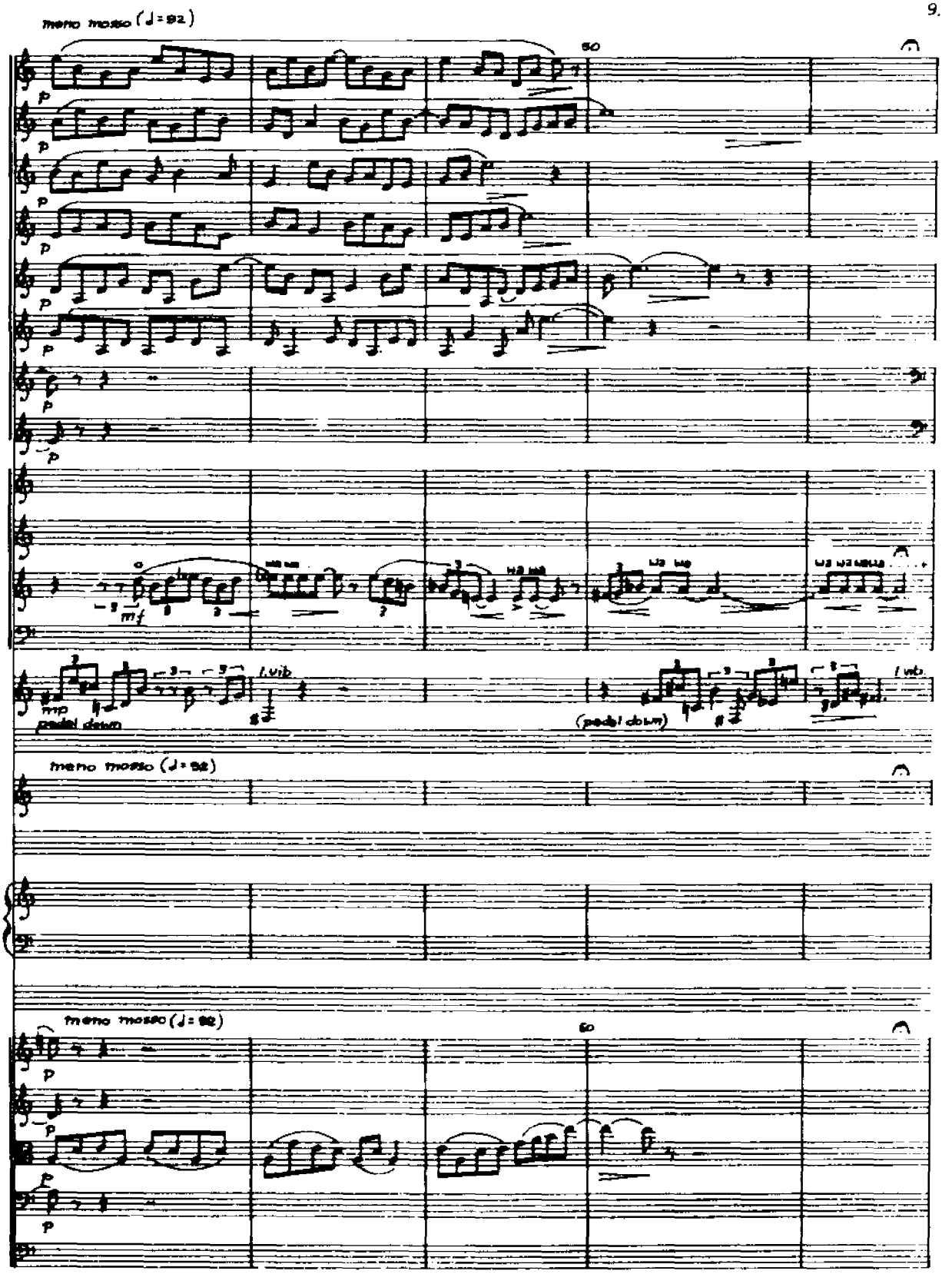

4.
molto ritard.
a tempo
tr
mp
mf
mf
mf
p
f
(CYMBAL)
molto ritard.
a tempo
ing
in the yen
tle
breeze
Ped.
molto ritard.
a tempo
pizz.

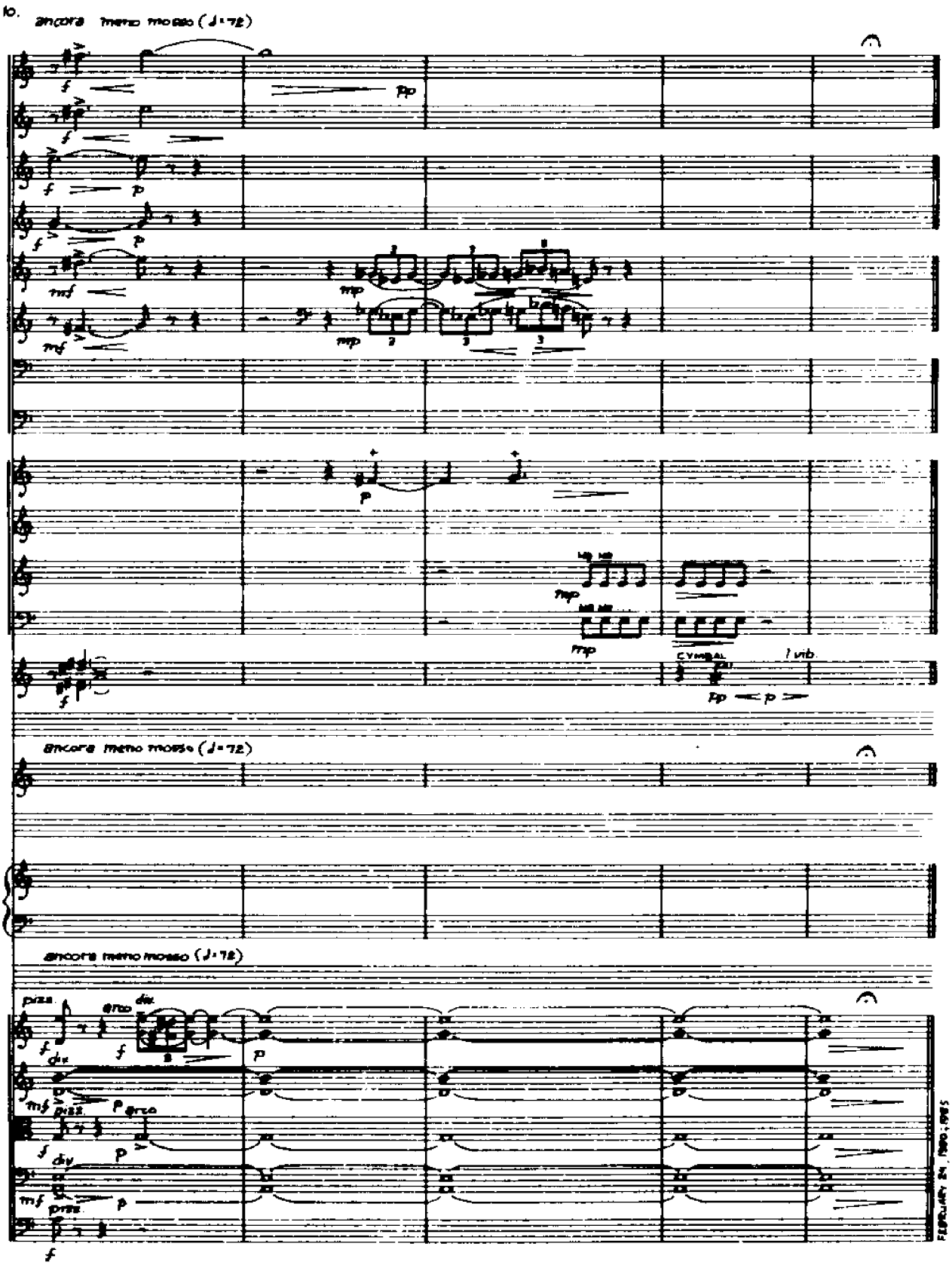

A vi - si - tant
(1 vib.)
1 vib
keep pedal down
pizz.
div.


mp
p
pp
mf
f
mp
that while it fans my cheek
doth seem half con - scious of the joy

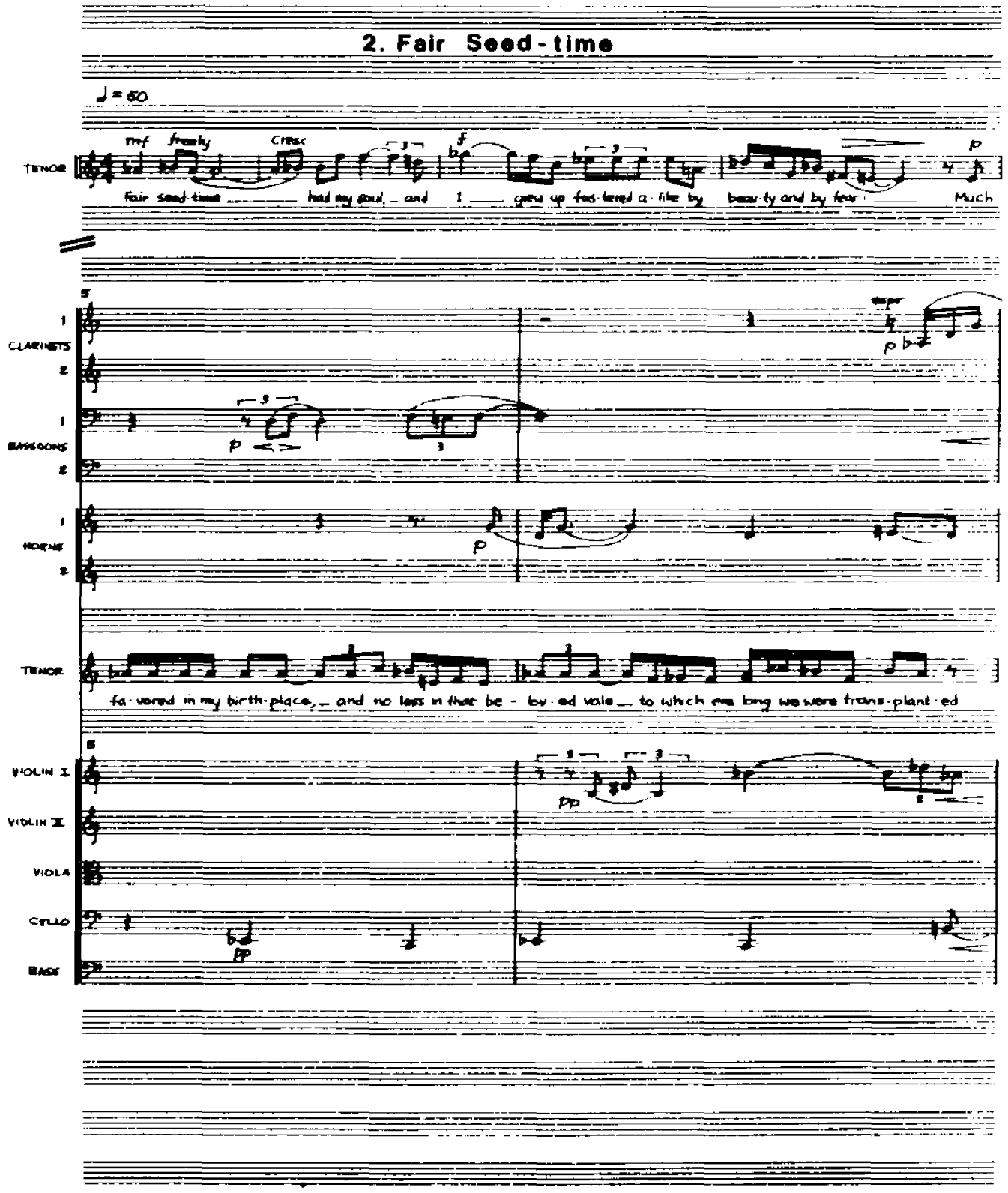

35
40
p
p
p
pp
mp
f
mf
it brings from the green fields and from yon a · zure sky
pp
mp
1 vib.
pp
1 vib.
1 vib.
Ped.
(keep pedal down)
35
40
Solo
gli altri
arco
mf
p
arco
p

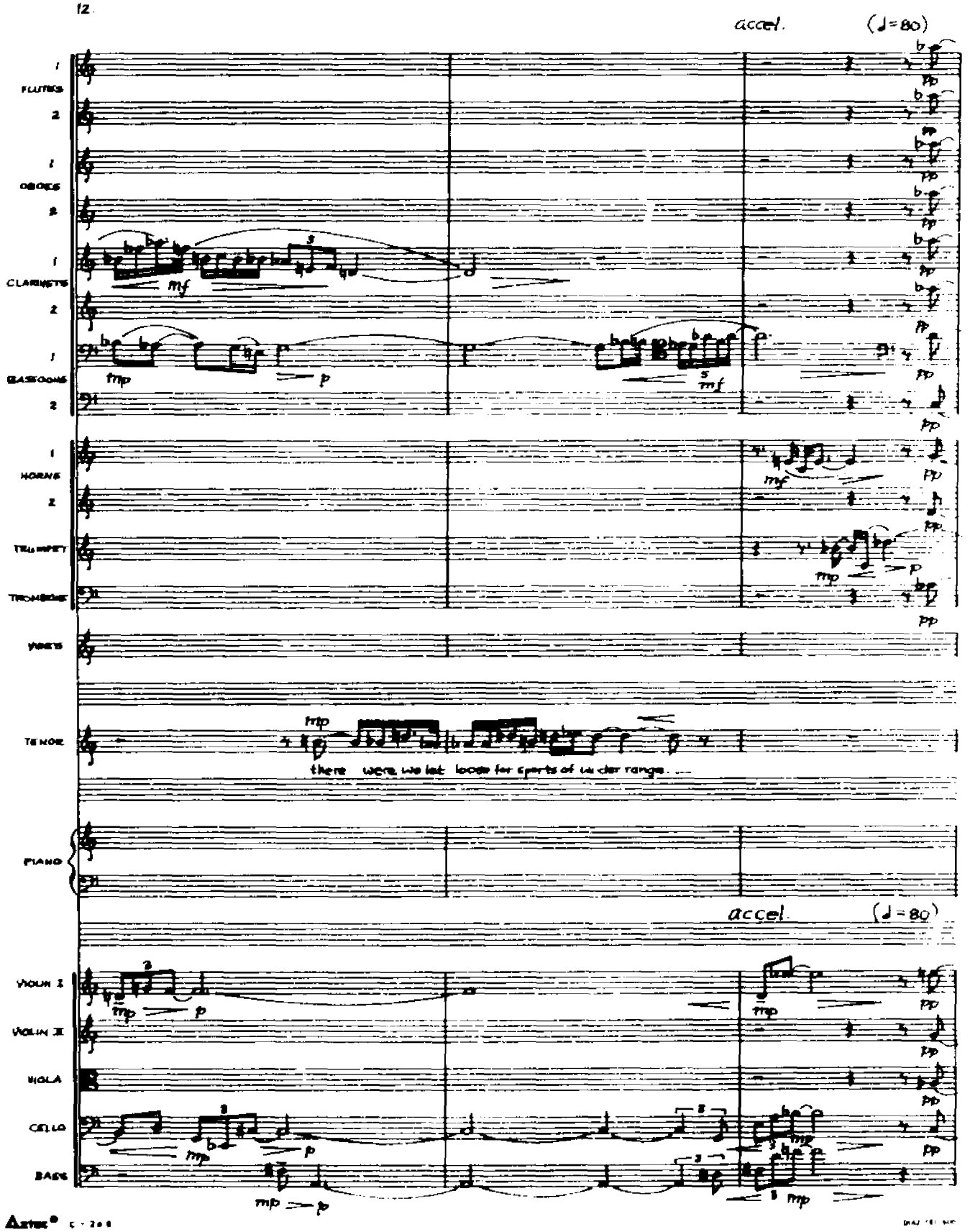

4a
mp
pp
p
f
mf
arco
tutti (arco)
(solo)
pizz.

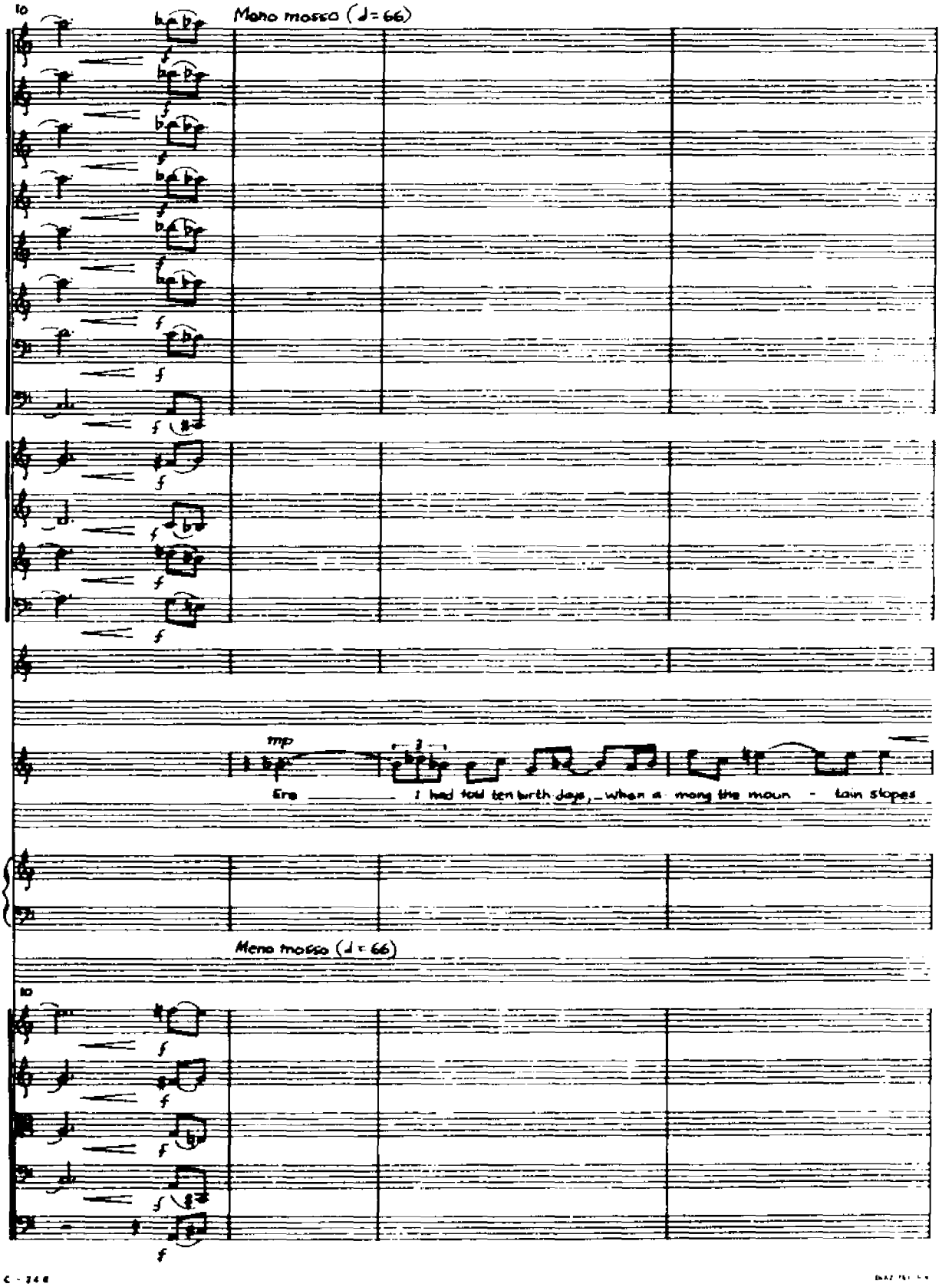

meno mosso (♩= 92)
60
VIBES
l.vib
(pedal down)
meno mosso (♩= 92)
meno mosso (♩= 92)
60

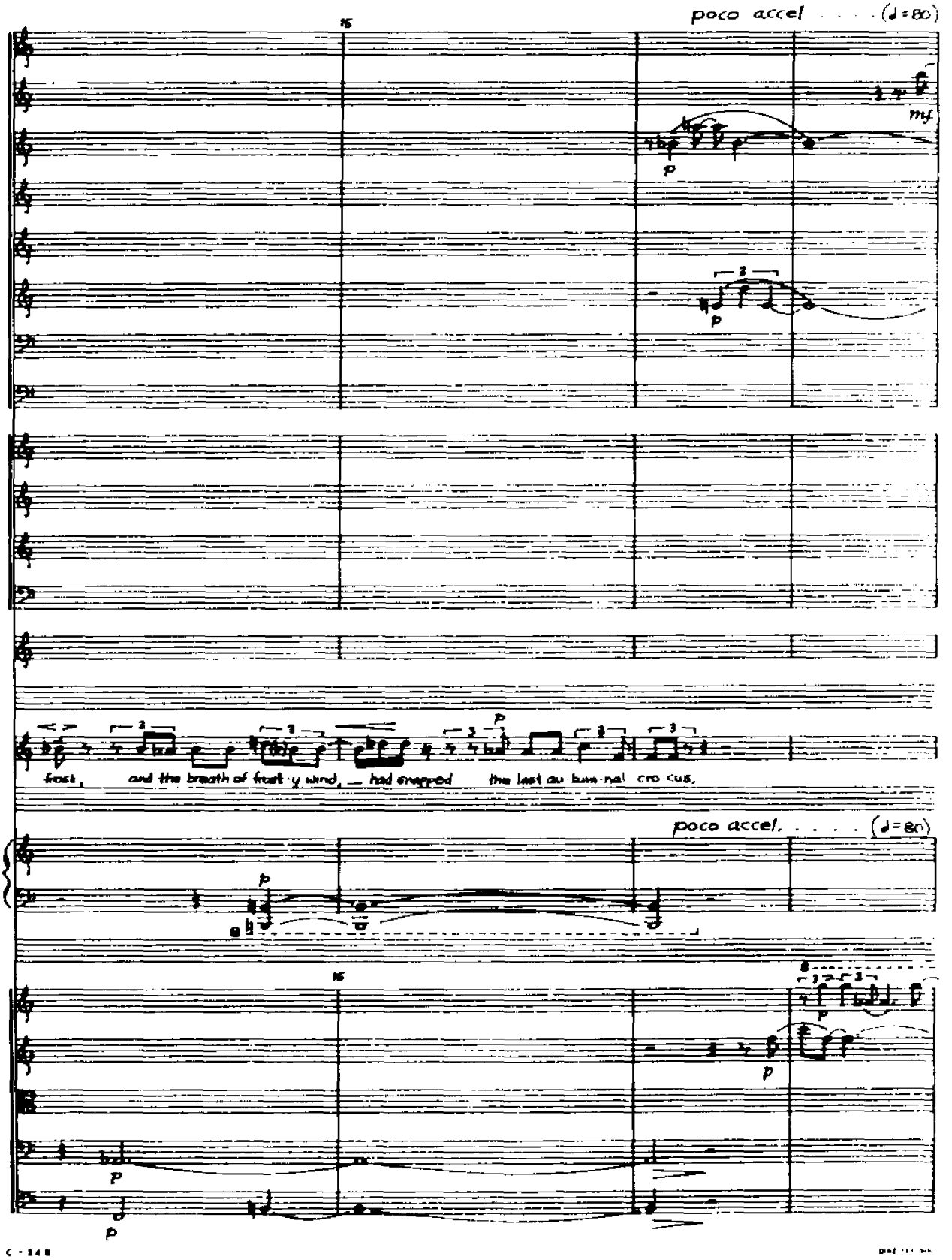

10.
ancora meno mosso (♩=72)
ancora meno mosso (♩=72)
ancora meno mosso (♩=72)
cymbal
1 vib
FEBRUARY 24, 1980 - 1985

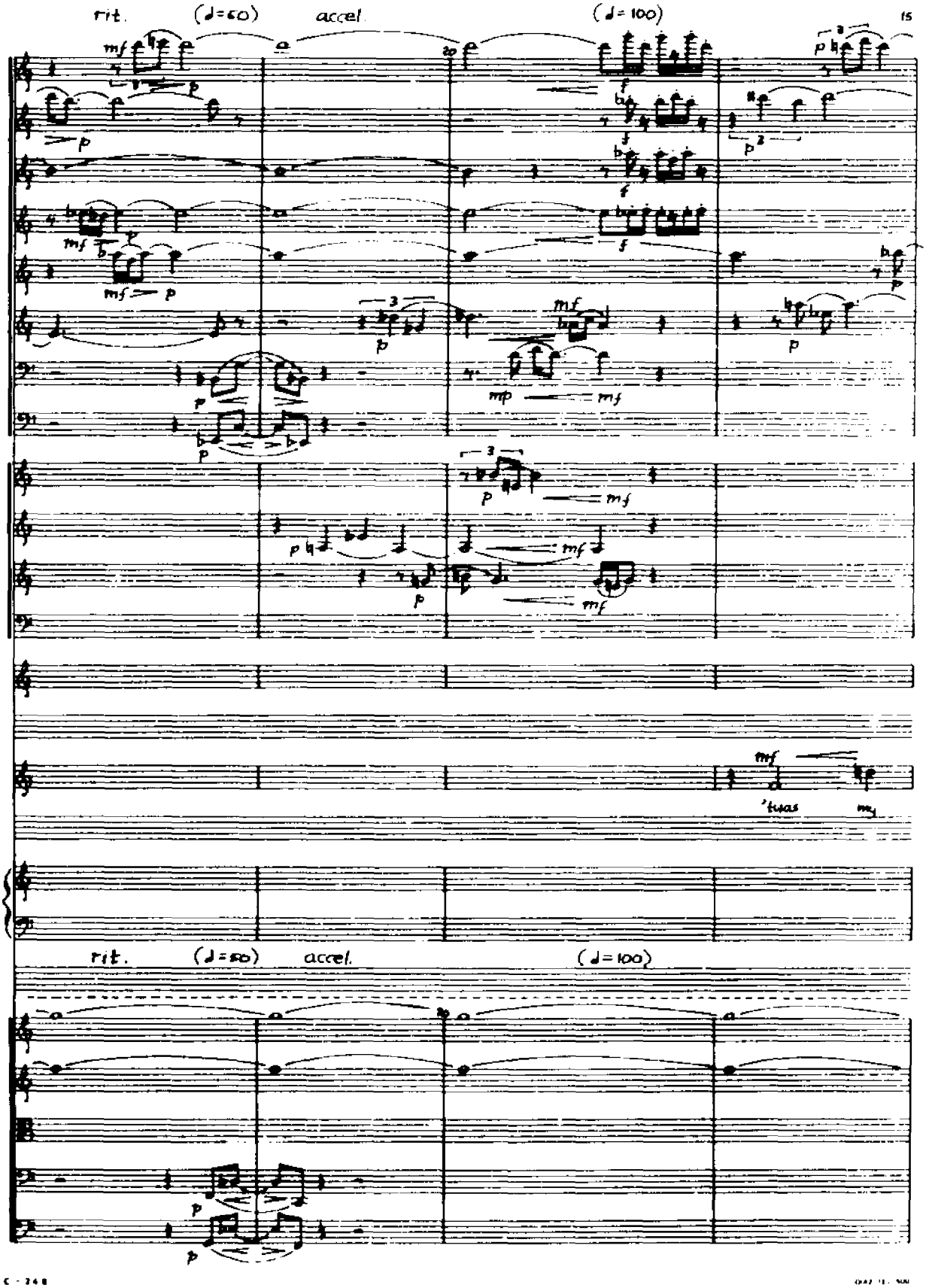
2. Fair Seed-time

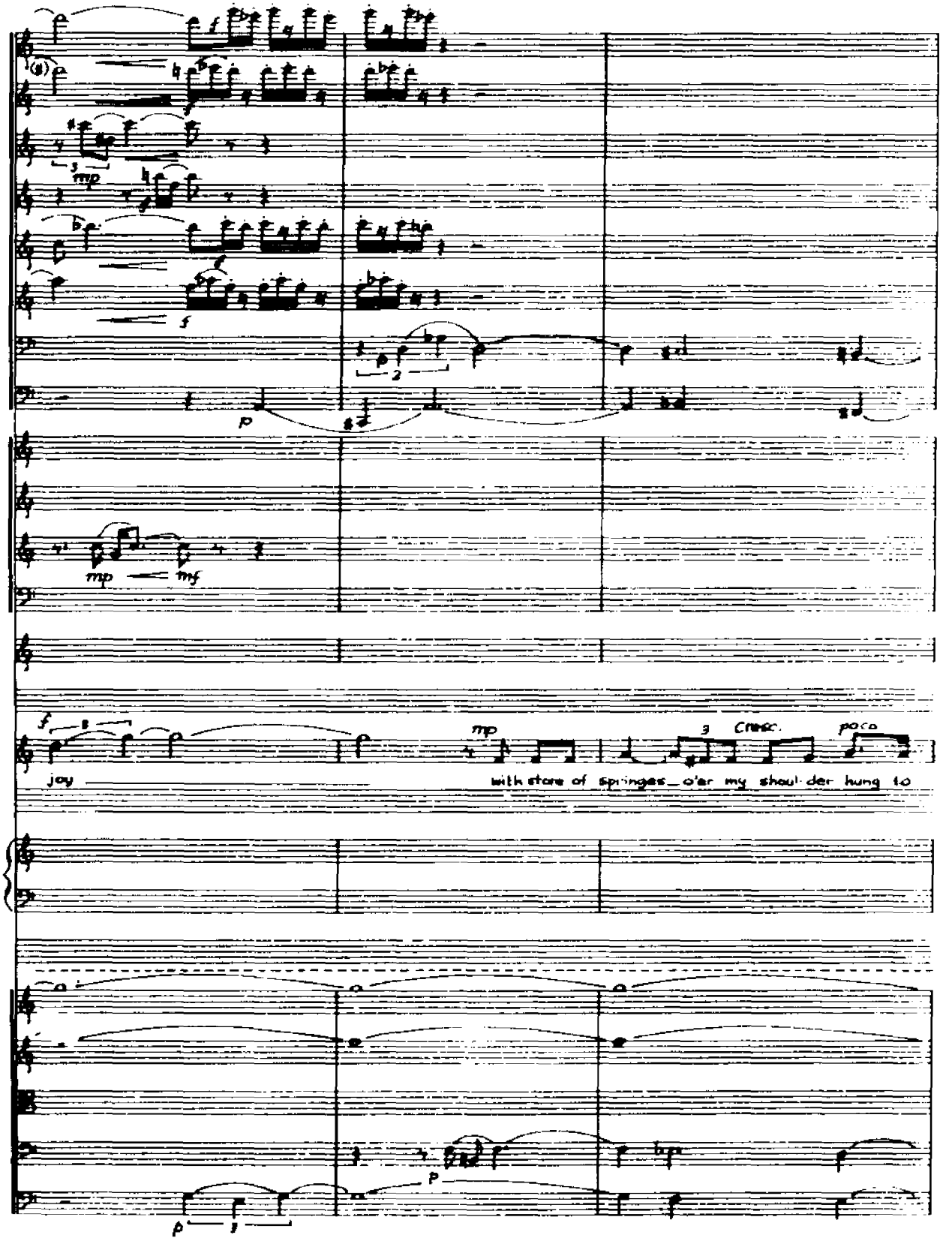


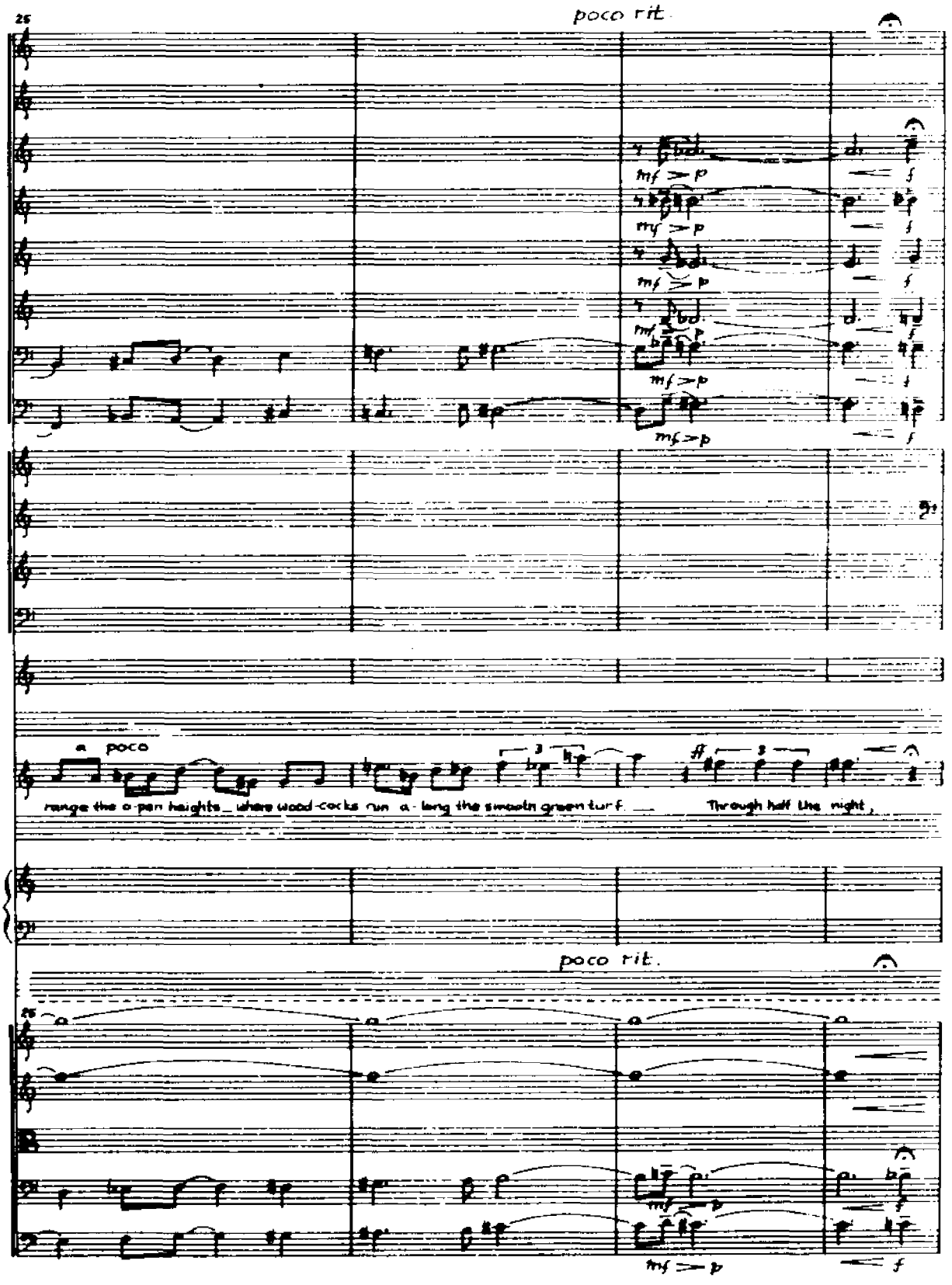

accel. (♩=80)
1 FLUTES
2
1 OBOES
2
1 CLARINETS
2
1 BASSOONS
2
1 HORNS
2
TRUMPET
TROMBONE
VIBES
TENOR
there were we last looks for spirits of wider range.
PIANO
accel. (♩=80)
VIOLIN I
VIOLIN II
VIOLA
CELLO
BASS

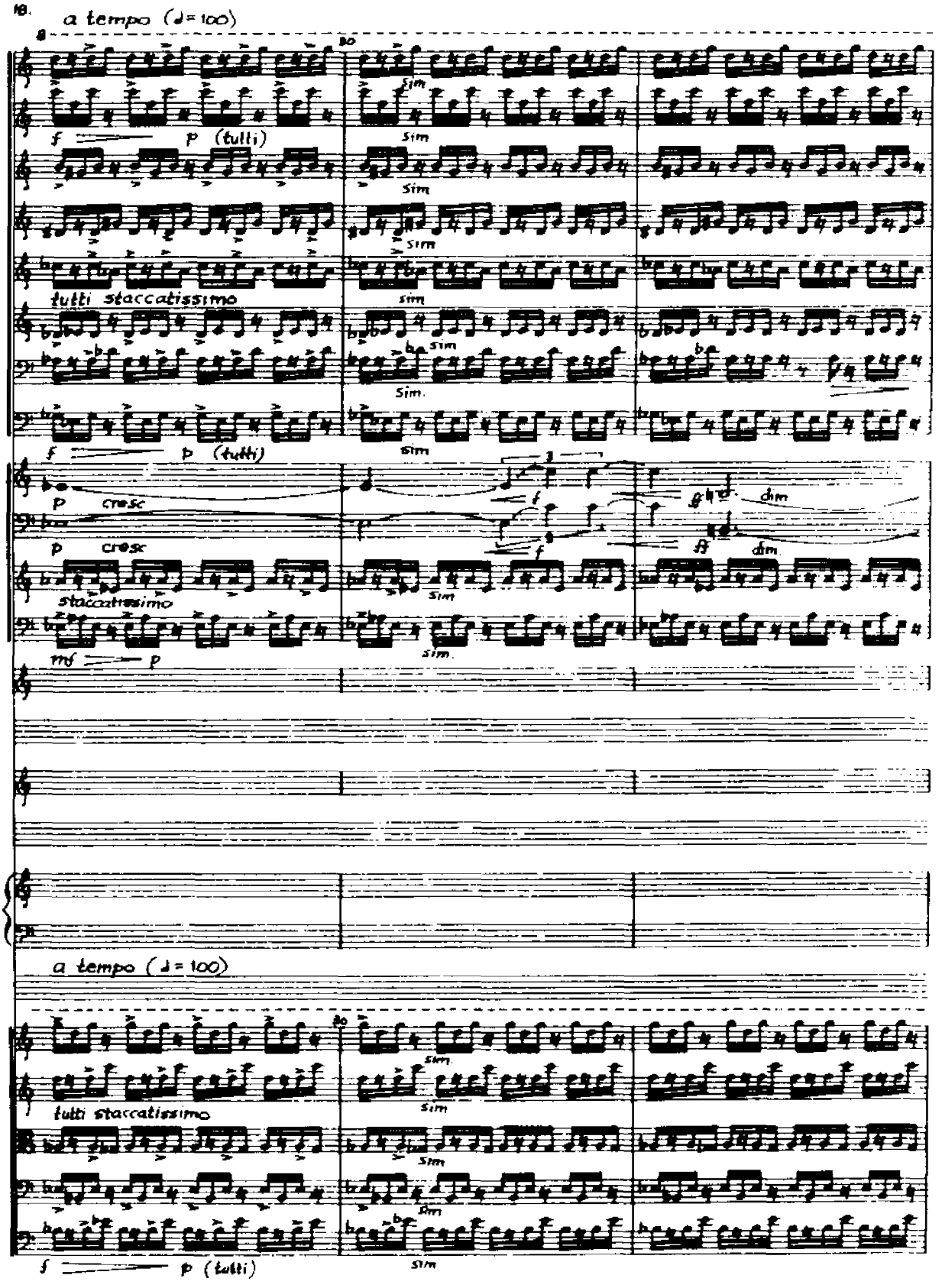

10
Meno mosso (♩= 66)
mp
Era
I had told ten birth days, when a mong the moun - tain slopes
Meno mosso (♩= 66)
10

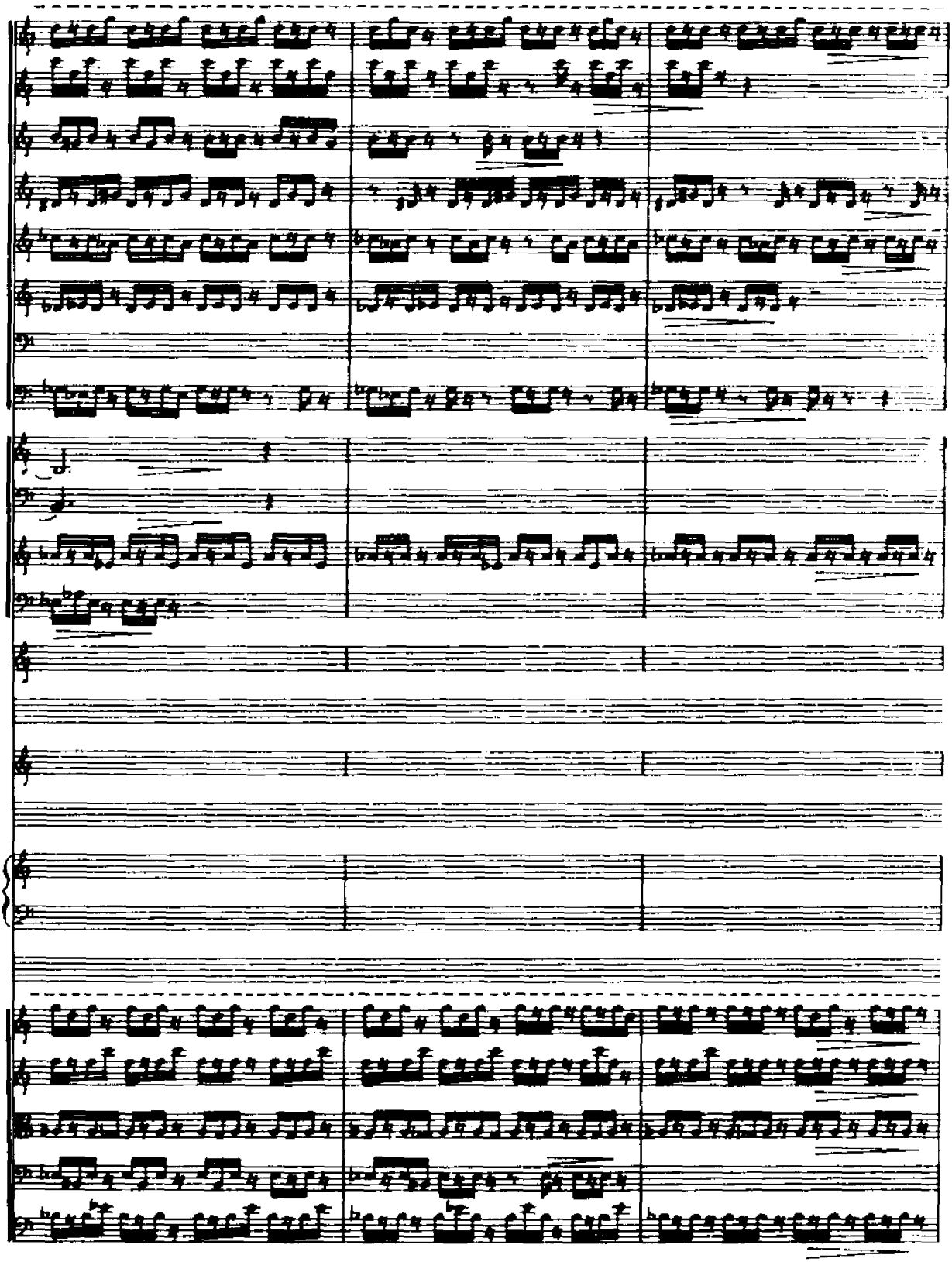

poco accel . . . . . (♩=80)
15
mf
p
frost, and the breath of frost-y wind, — had snapped the last au-tum-nal cro-cus,
poco accel. . . . . (♩=80)
15

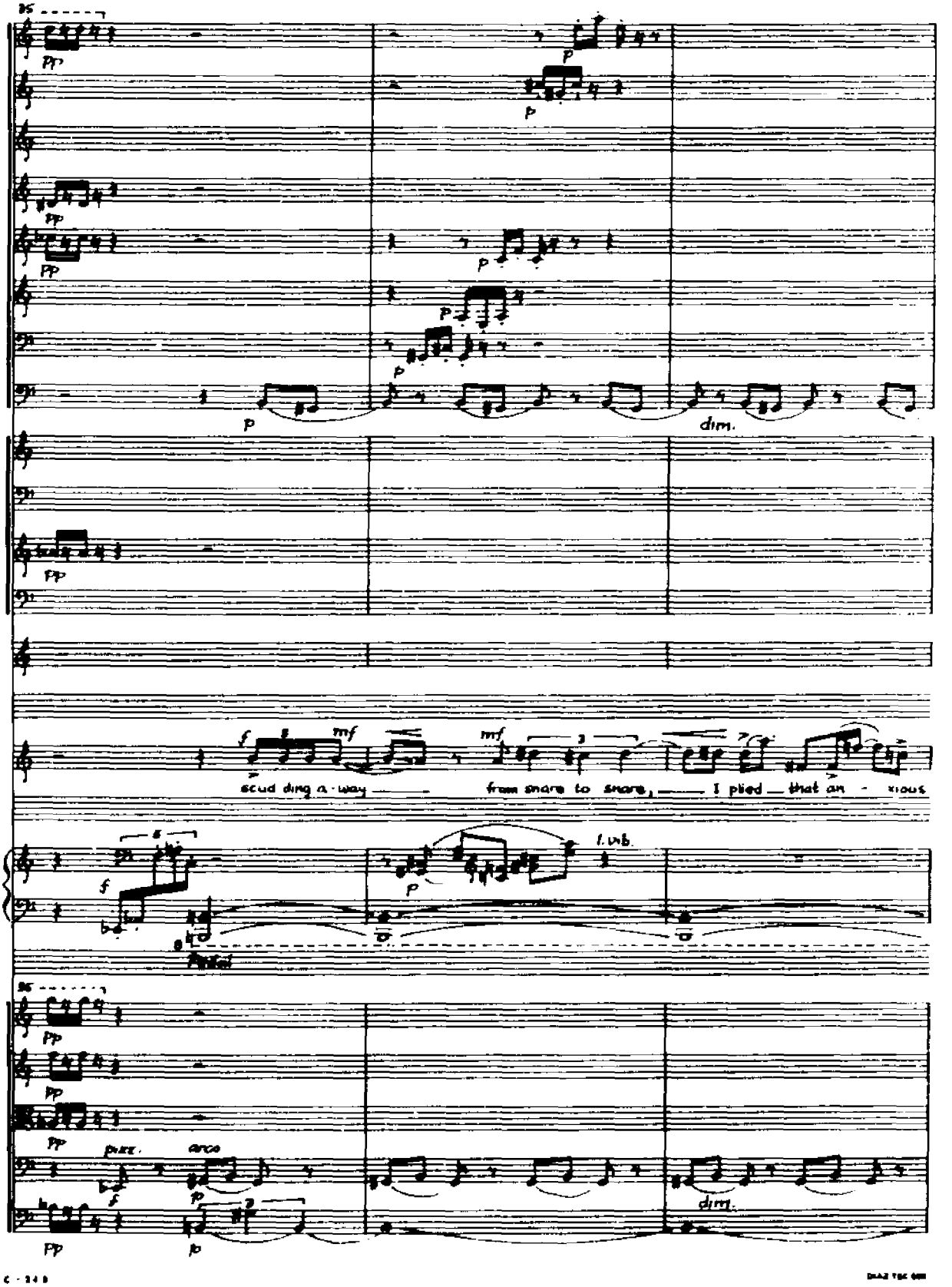

rit. (♩=60) accel. (♩=100)
'twas
rit. (♩=80) accel. (♩=100)

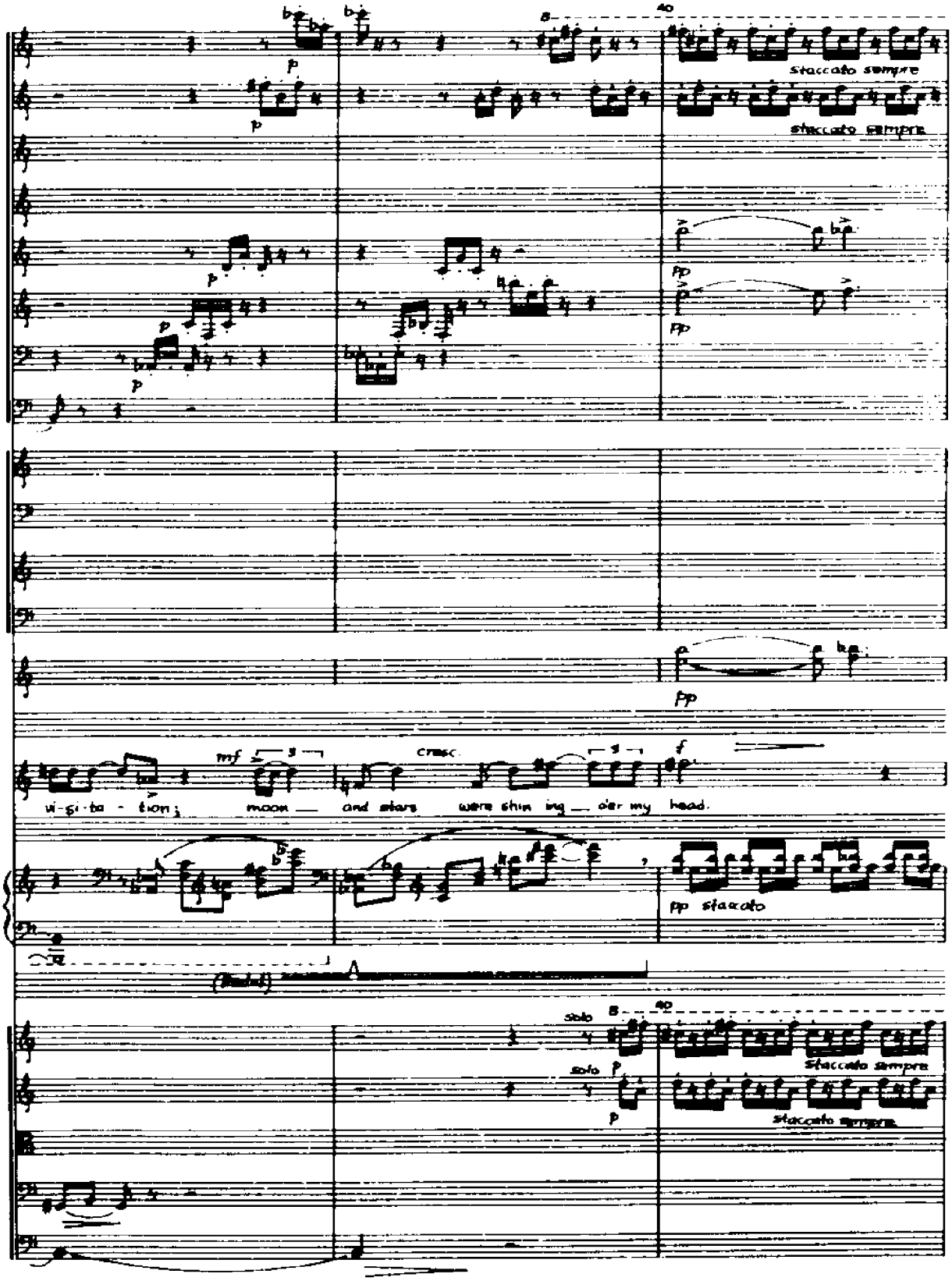

mp
mf
mp
joy
with store of springes_ o'er my shoul-der hung to
Cresc.
poco
p

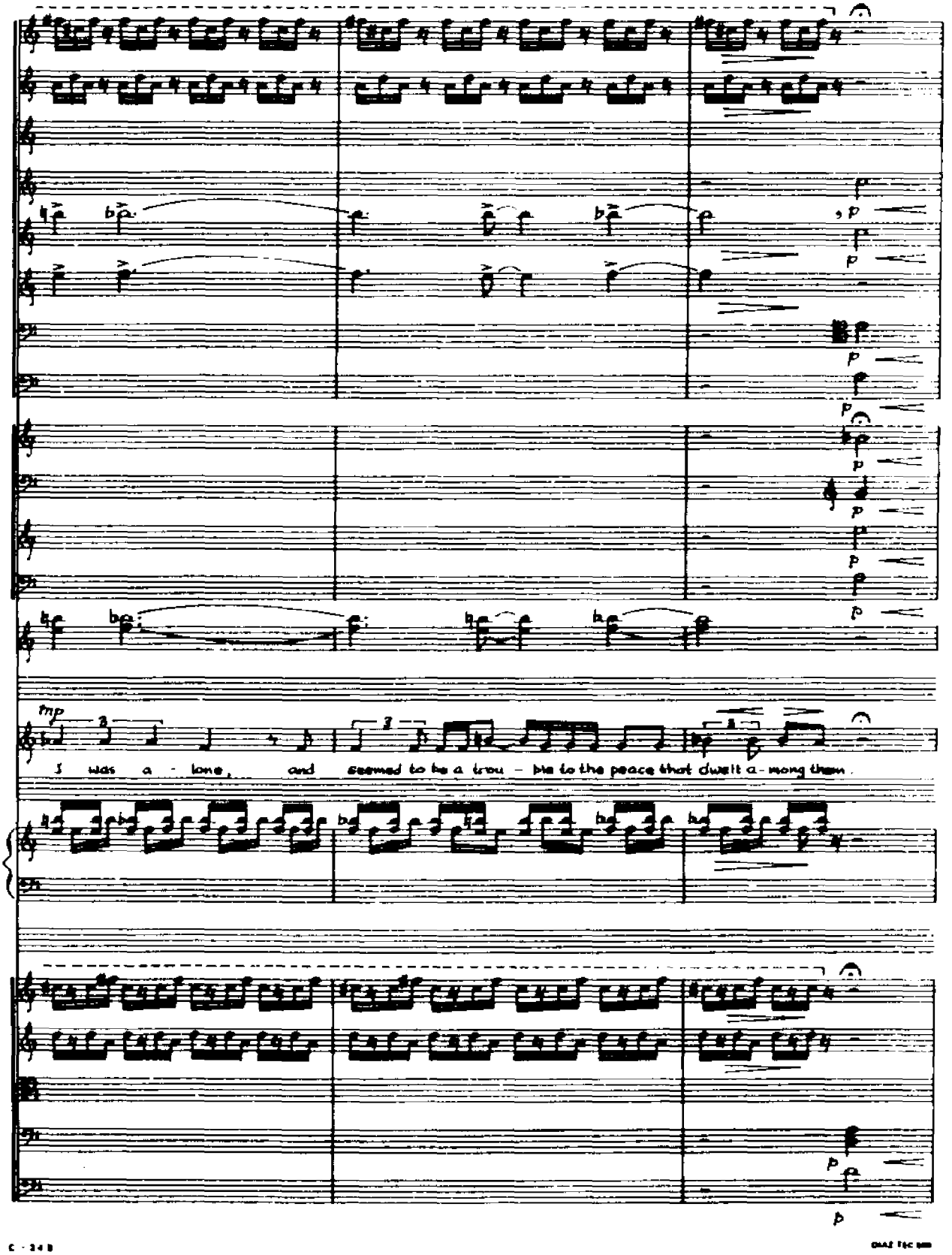

25
poco rit.
mf > p
a poco
ff
range the o-pen heights_ where wood-cocks run a-long the smooth green turf. Through half the night,
poco rit.
25
mf > p
f

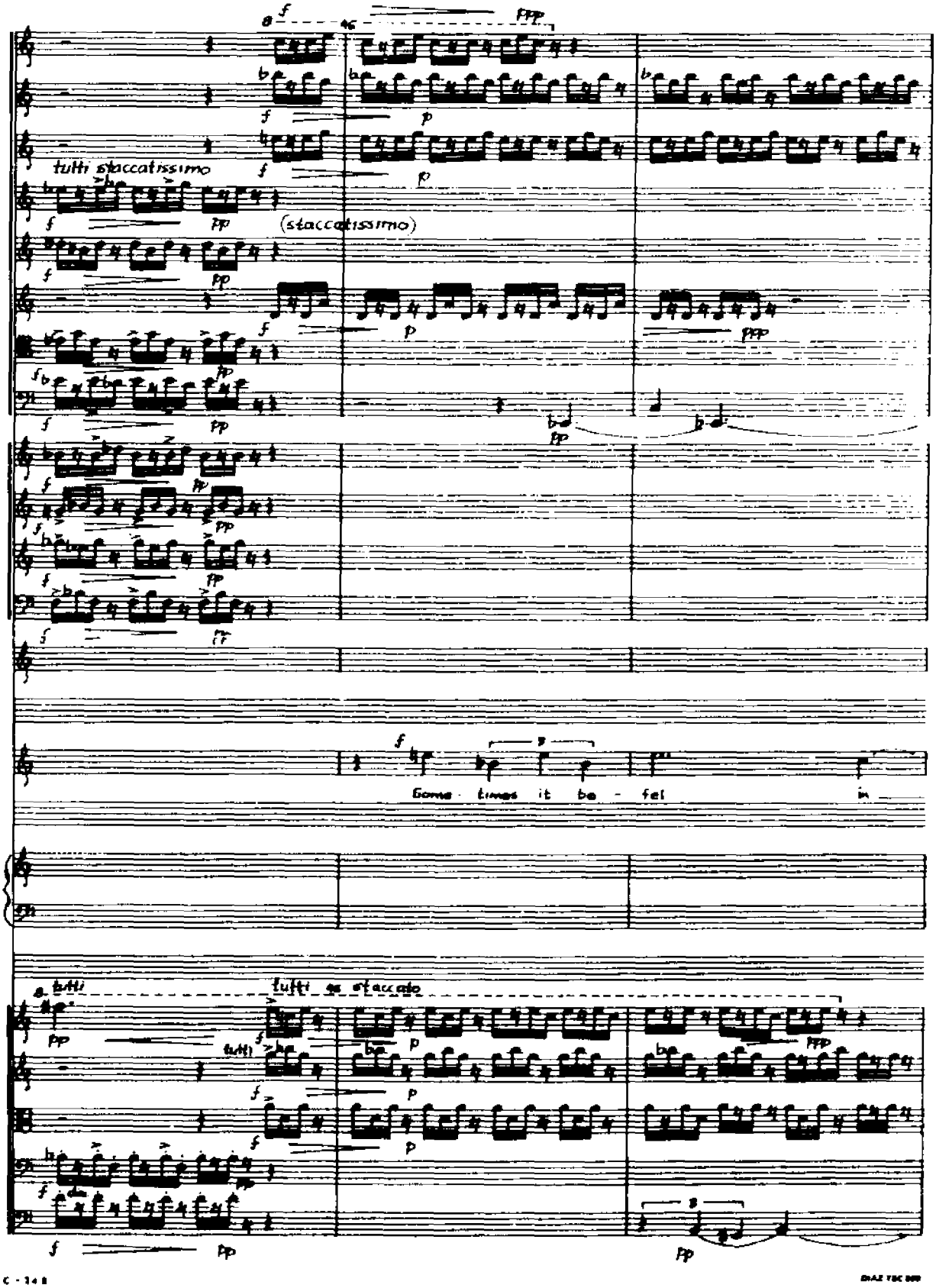

18.
a tempo (♩= 100)
8
8va
f
p (tutti)
sim
tutti staccatissimo
p cresc
staccatissimo
mf
p
ff
dim
a tempo (♩= 100)

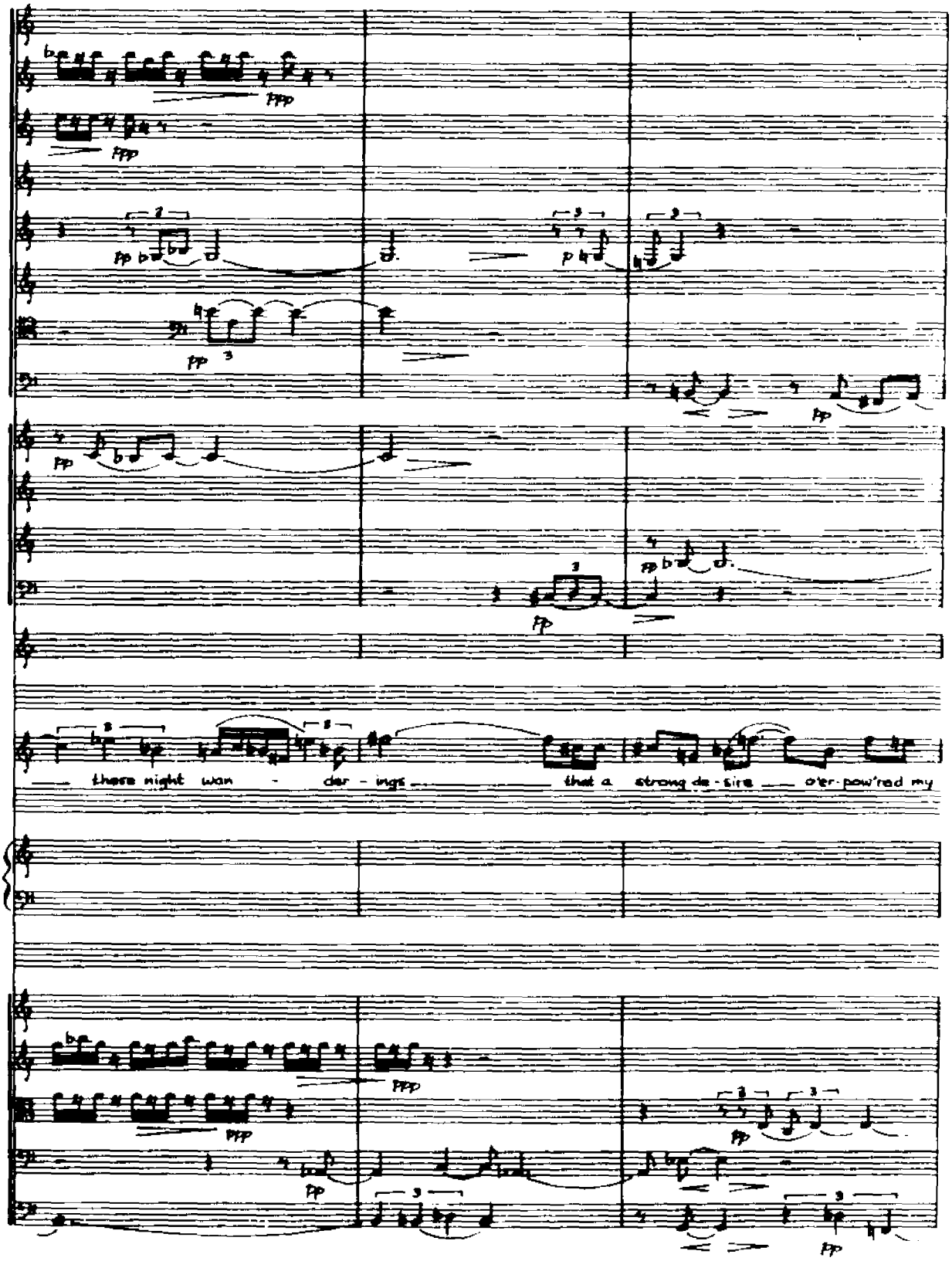


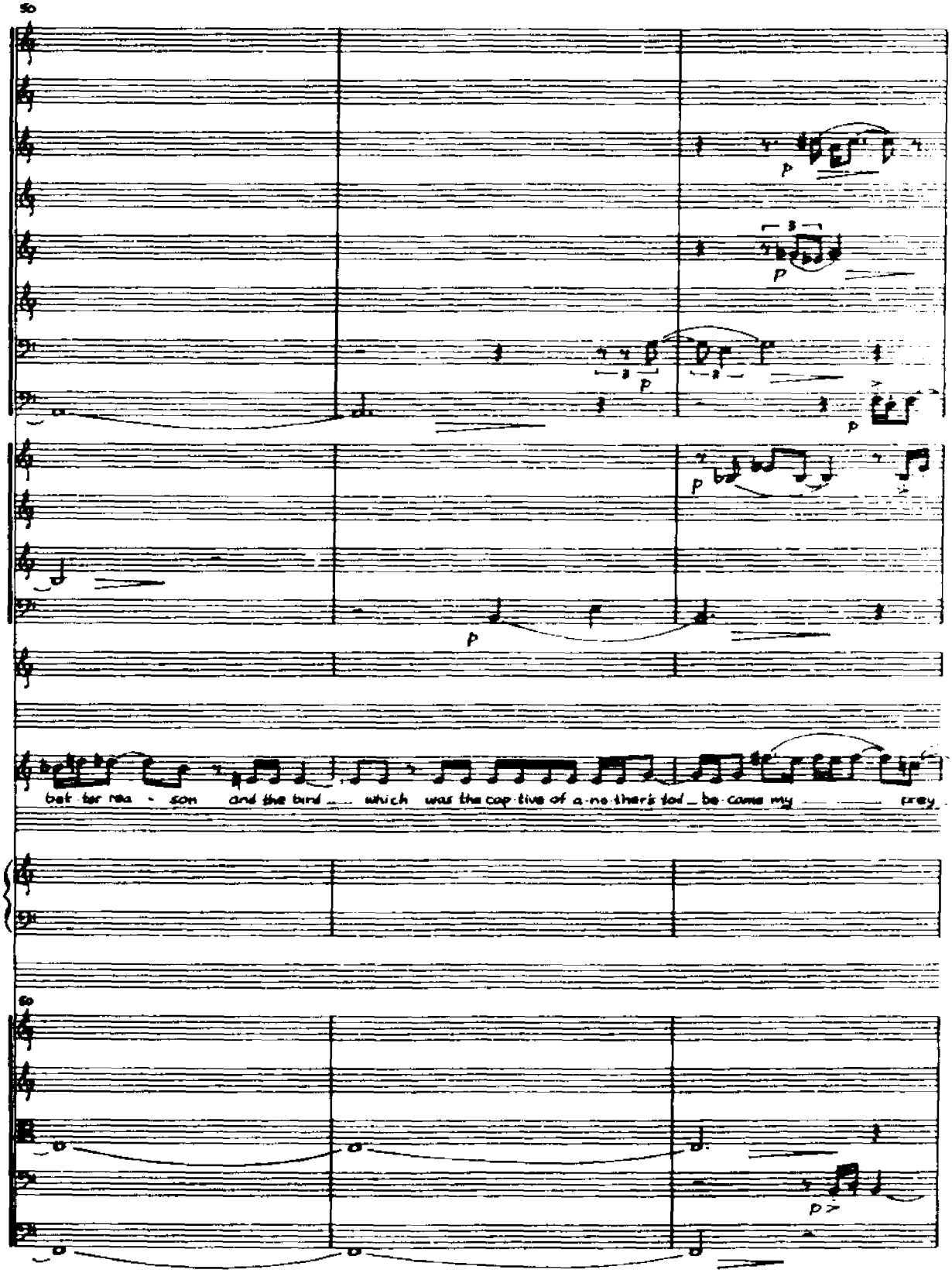

pp
p
dim.
f
mf
scud ding a - way
from snare to snare,
I plied that an - xious
1. vib.
Pedal
pizz.
arco

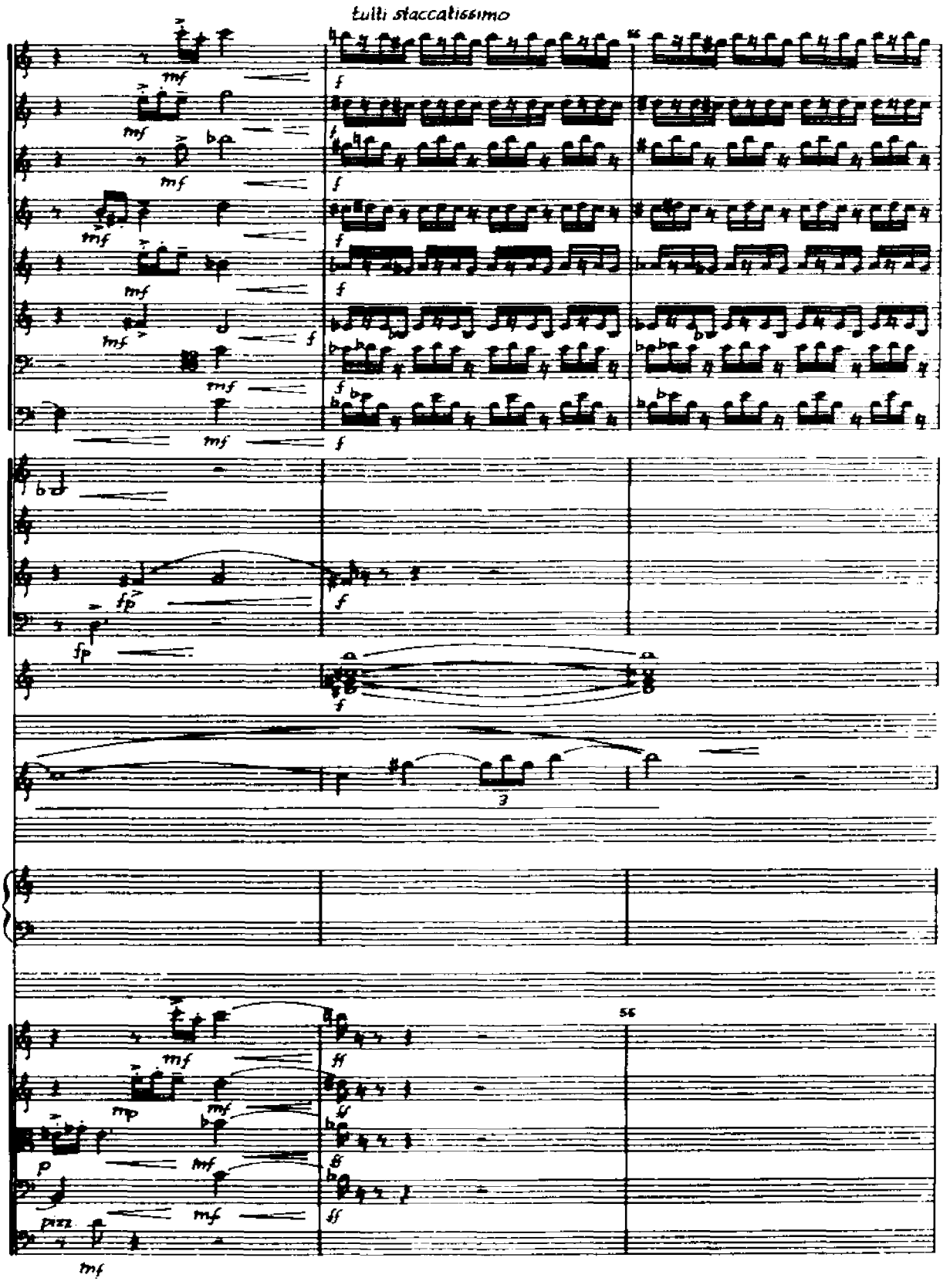

staccato sempre
staccato sempre
pp
pp
pp
mf
cresc.
f
vi-si-ba-tion; moon and stars were shin ing o'er my head.
pp staccato
solo
p
staccato sempre
staccato sempre

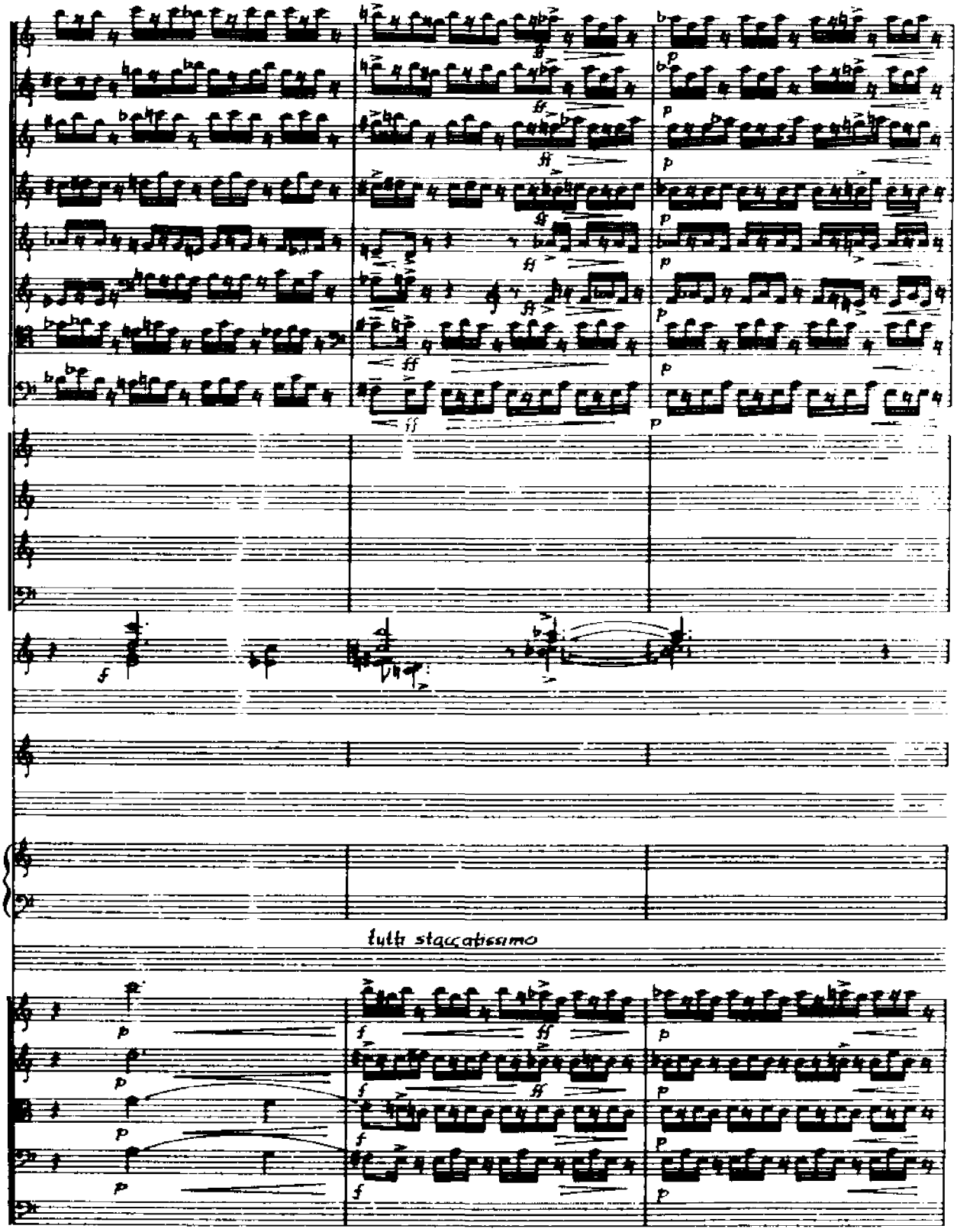

mp
I was a - lone, and seemed to be a trou - ble to the peace that dwelt a - mong them.

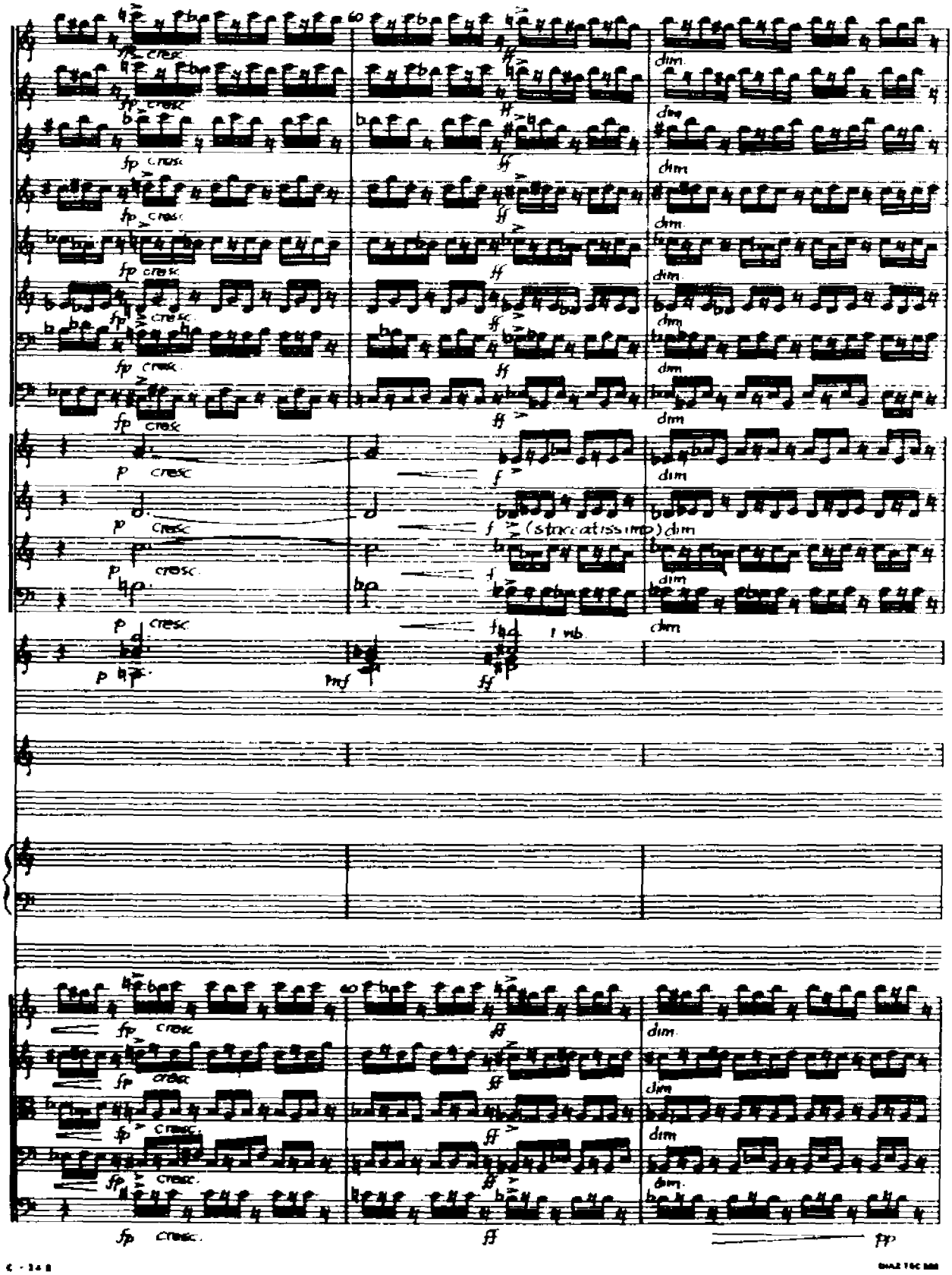

tutti staccatissimo
(staccatissimo)
Some times it be - fel in
tutti
tutti ss staccato

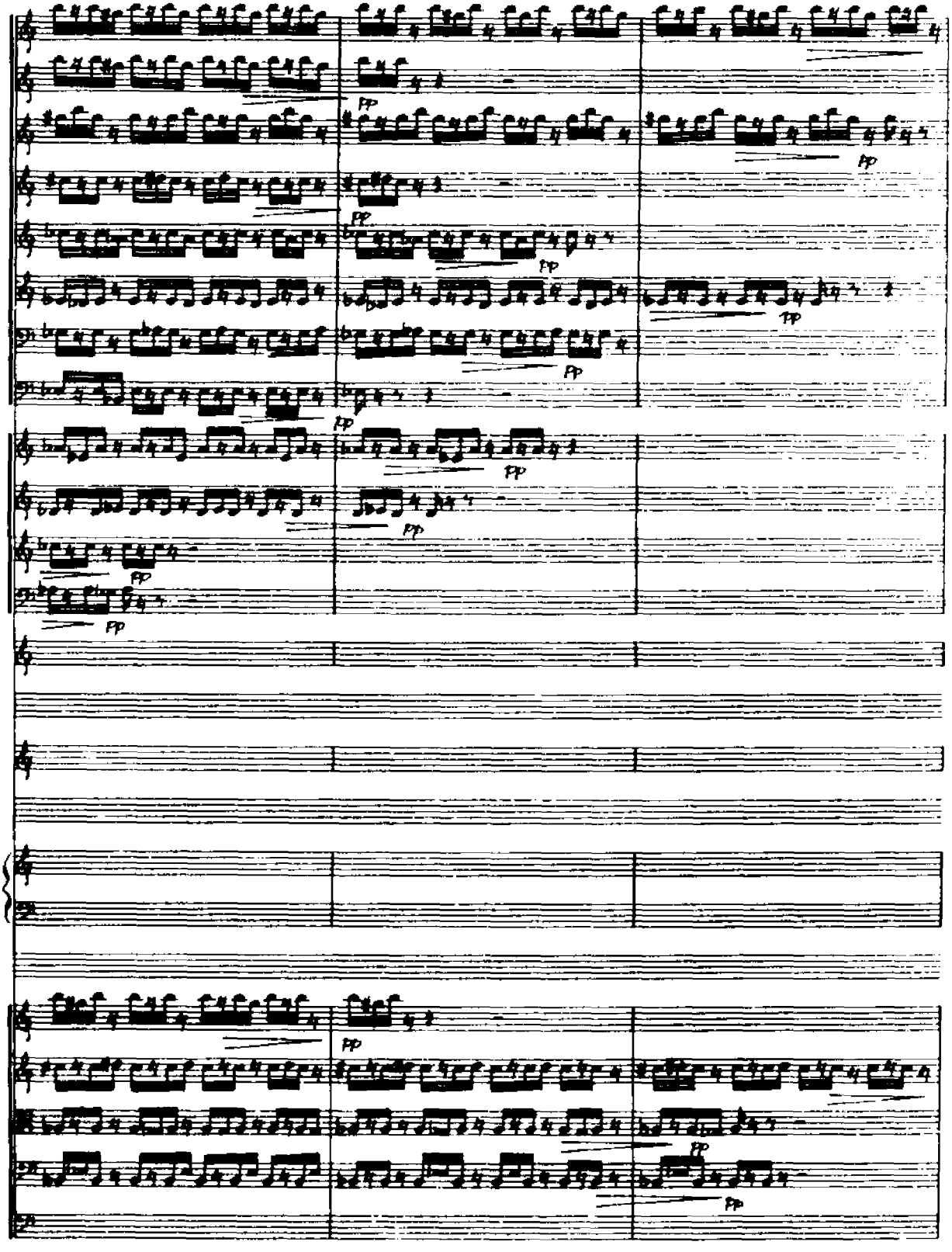

ppp
ppp
pp
p
pp
pp
pp
pp
pp
ppp
ppp
pp
pp
there night wan - der - ings
that a strong de - sire
o'er-pow'red my

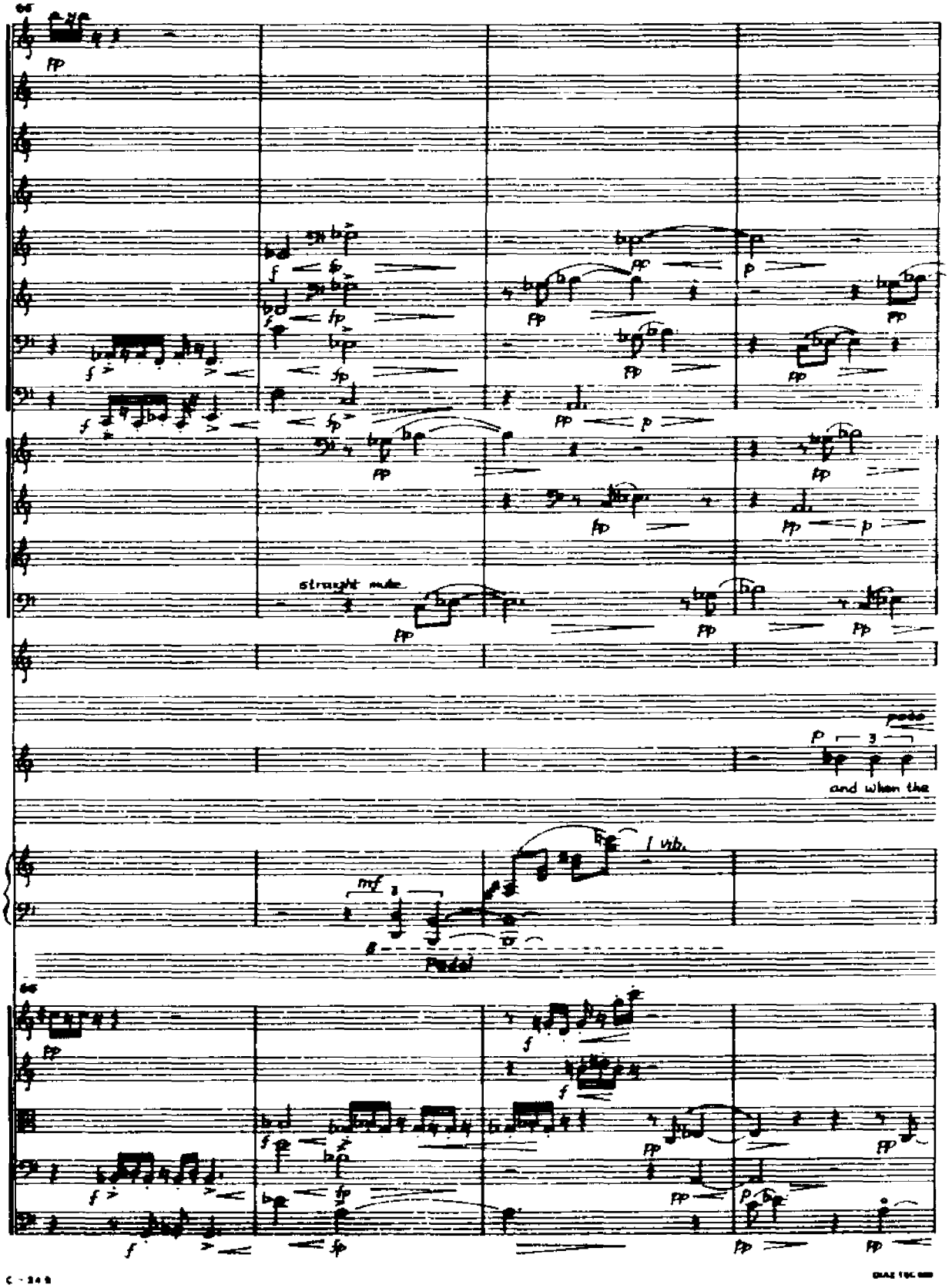

50
p
p
p
p
p
bet ter rea - son and the bird ... which was the cap tive of a no ther's fad _ be came my ... prey
60
p>

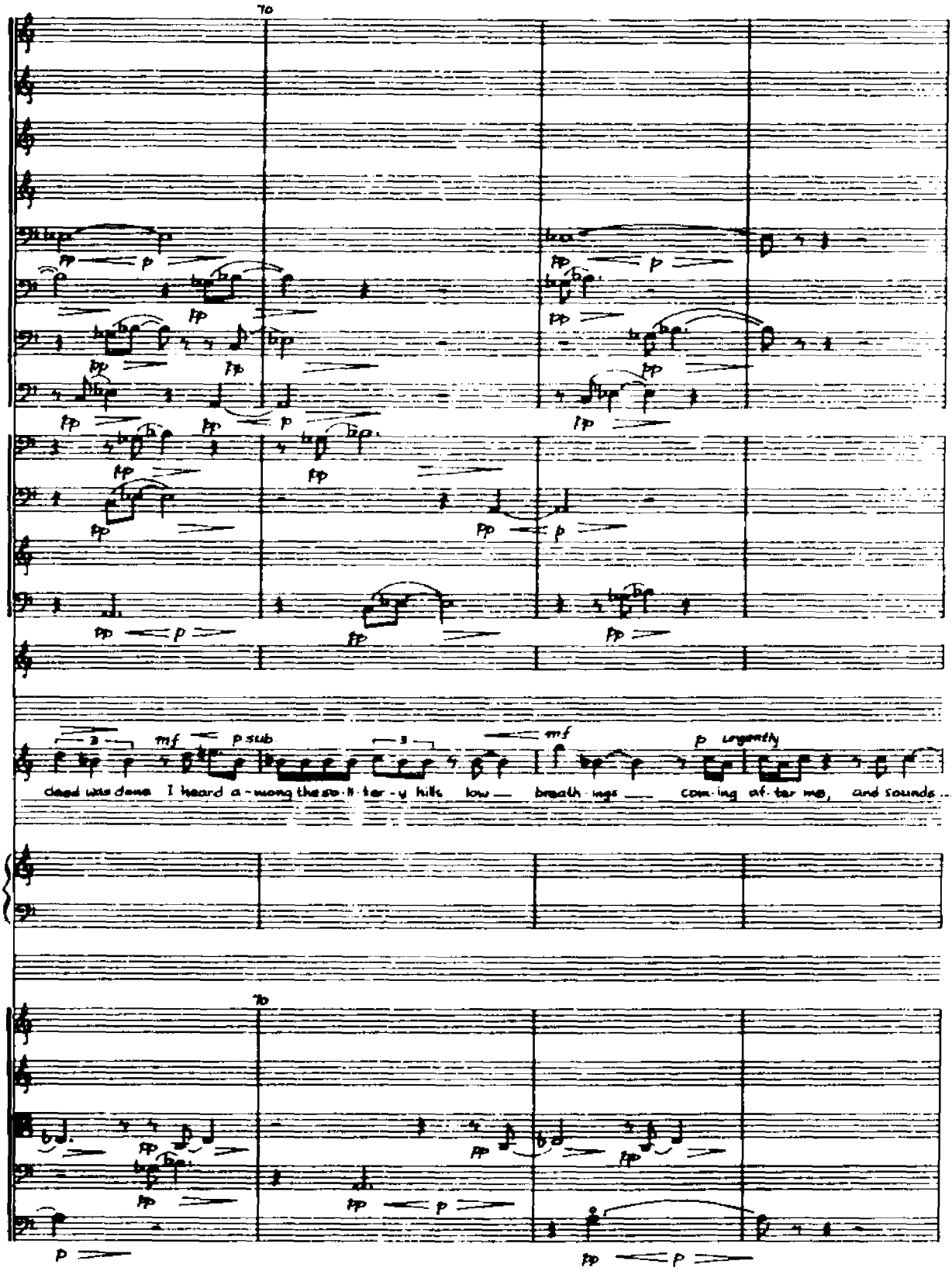

tutti staccatissimo
55

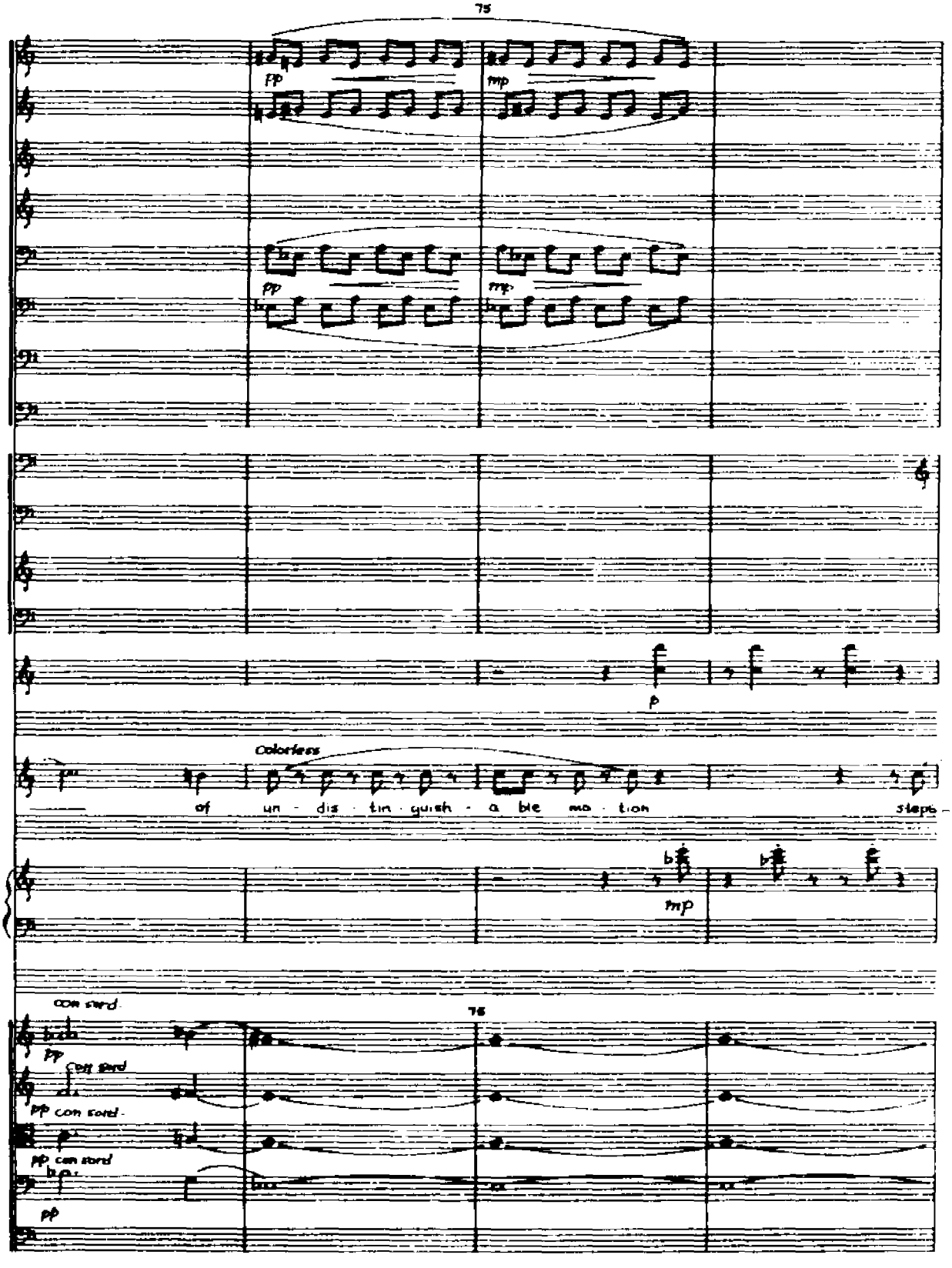

tutti staccatissimo

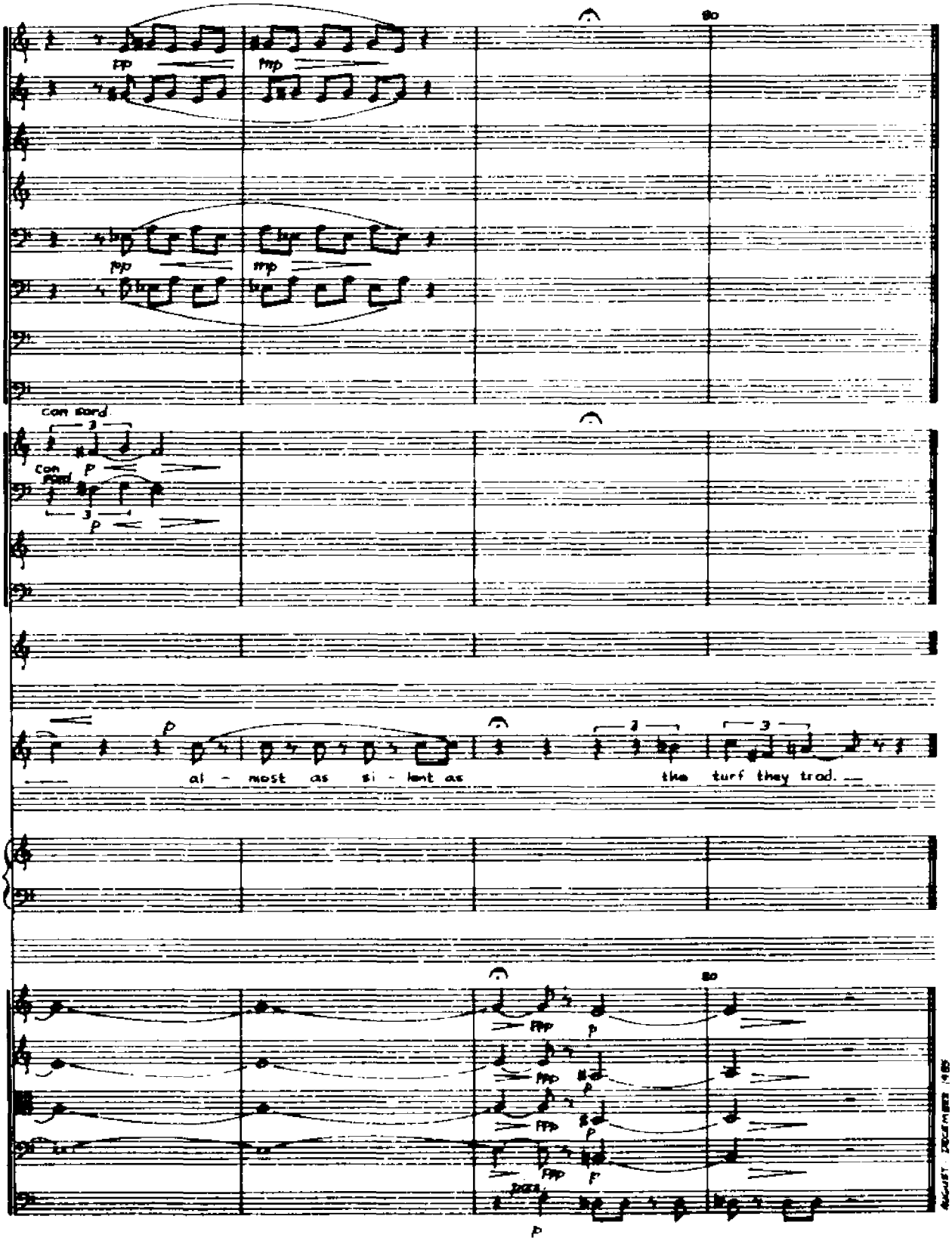

fp cresc.
ff
dim.
p cresc.
f
(staccatissimo) dim
1 mb.
pmf
fff
pp


pp


straight mute
and when the
1 vib.
Pedal

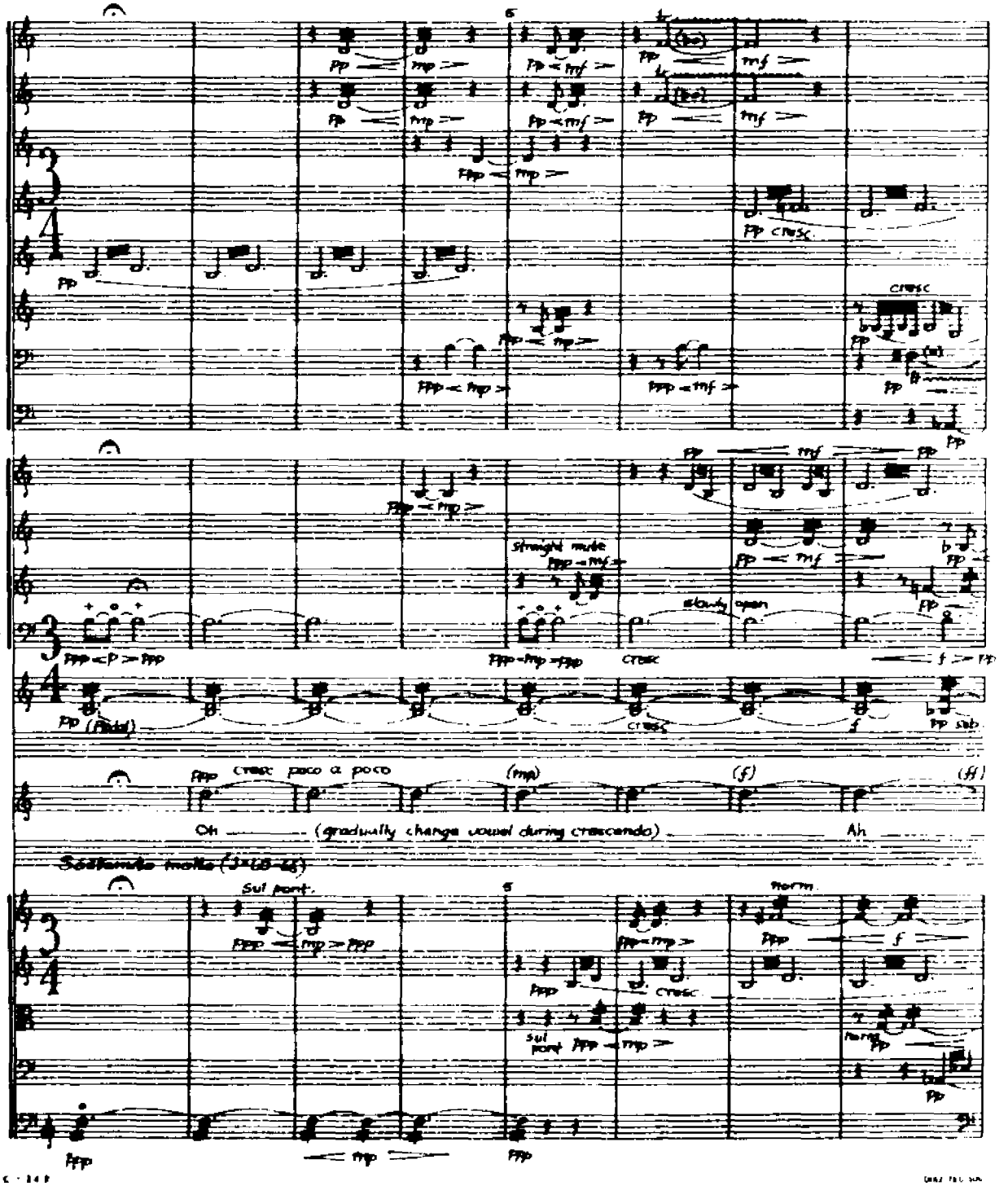

To
pp
p
mf
p sub
p urgently
dead was done I heard a-mong the so-li-tar-y hills low breath-ings coming af-ter me, and sounds
To

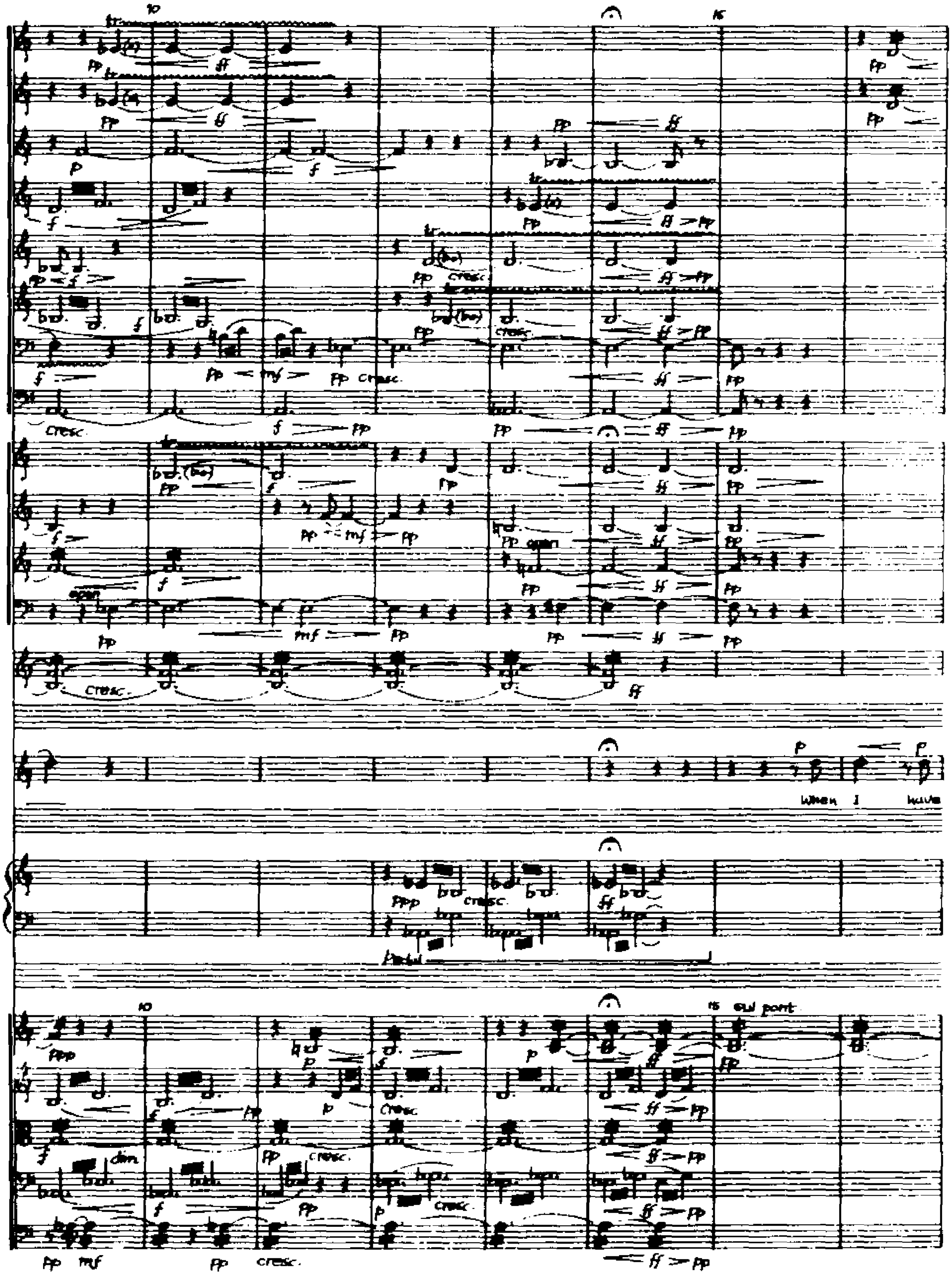

75
fp
mp
pp
mp
p
Colorless
of un - dis - tin - guish - a ble mo - tion step -
mp
con sord.
76
pp
Ord. sord.
pp con sord.
pp con sord.
pp

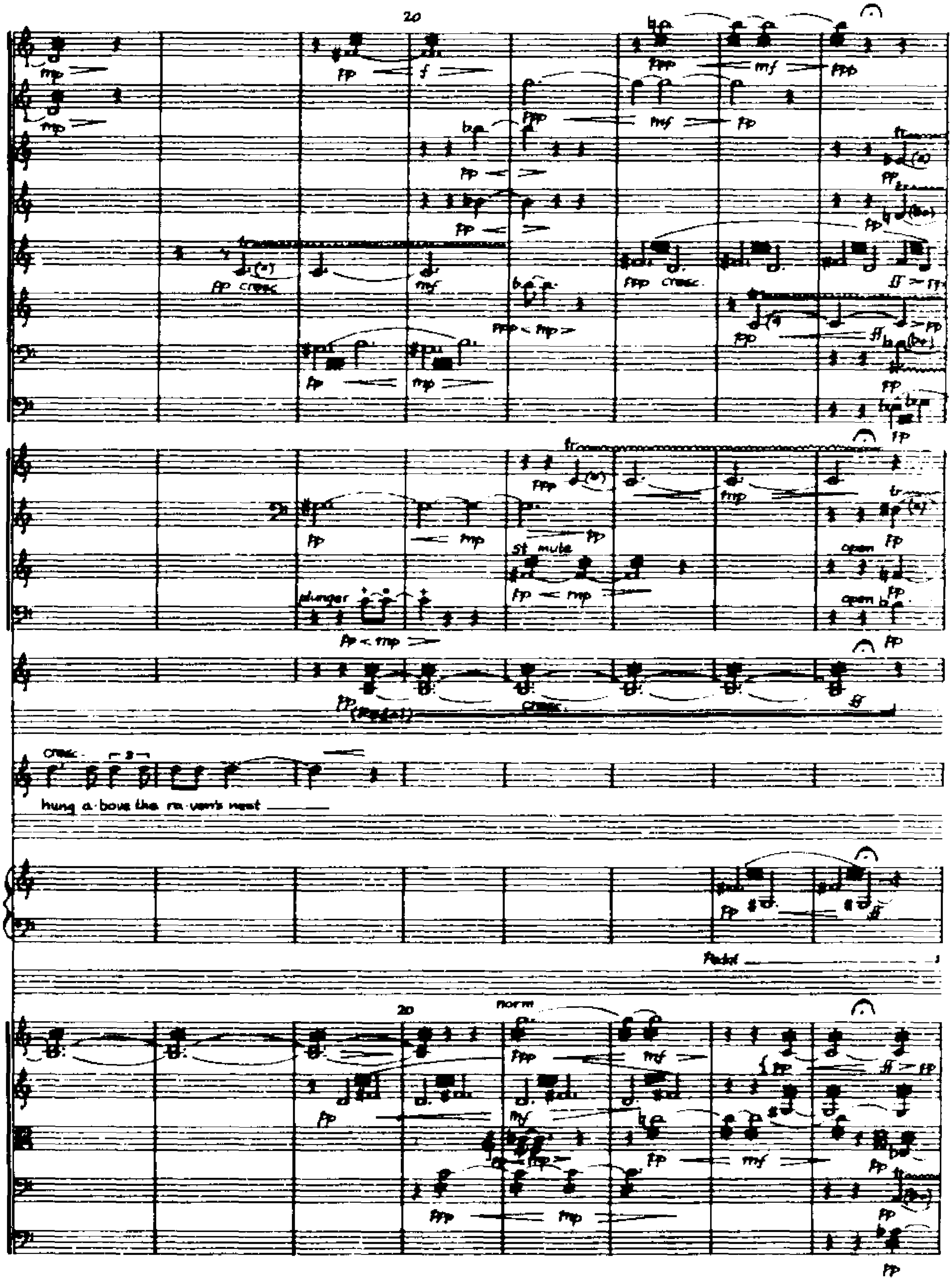

8va
pp
mp
pp
mp
Con sord.
Con sord.
p
p
p
al - most as si - lent as
the turf they trod.
8va
fpp
p
fpp
p
fpp
p
fpp
F
poco
p

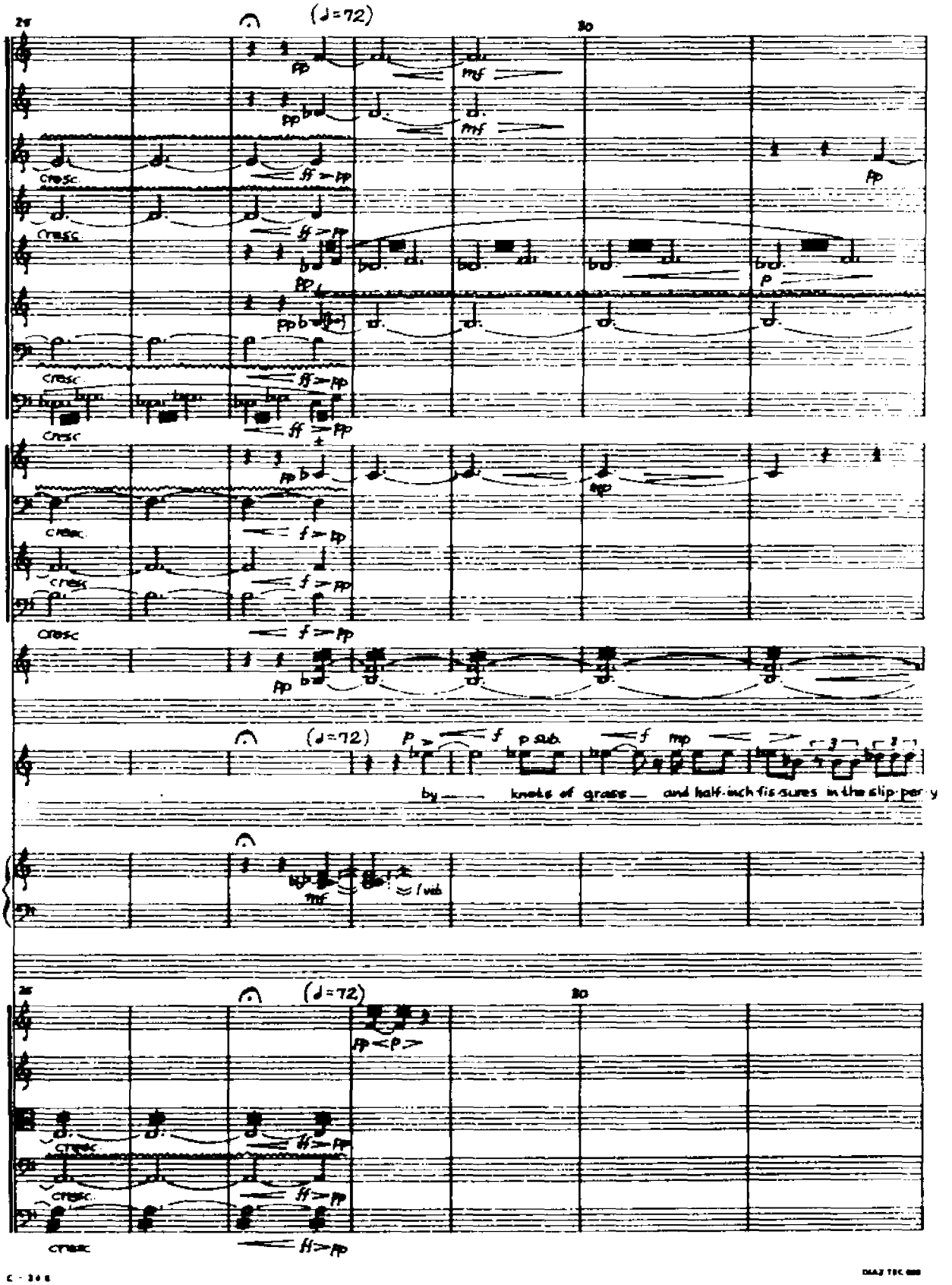
3. Above the Raven's Nest

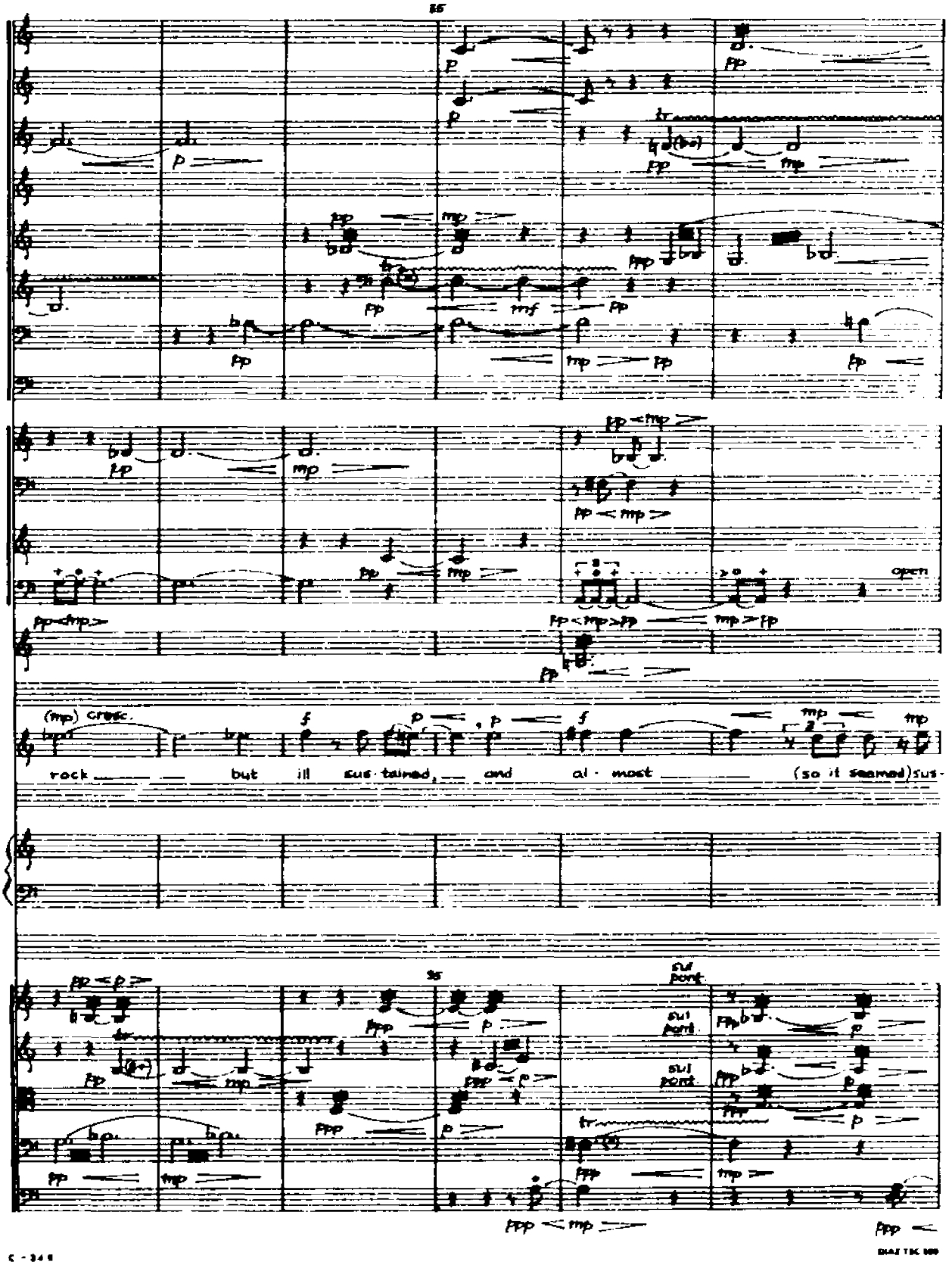
Sostenuto molto (♩=60–66)

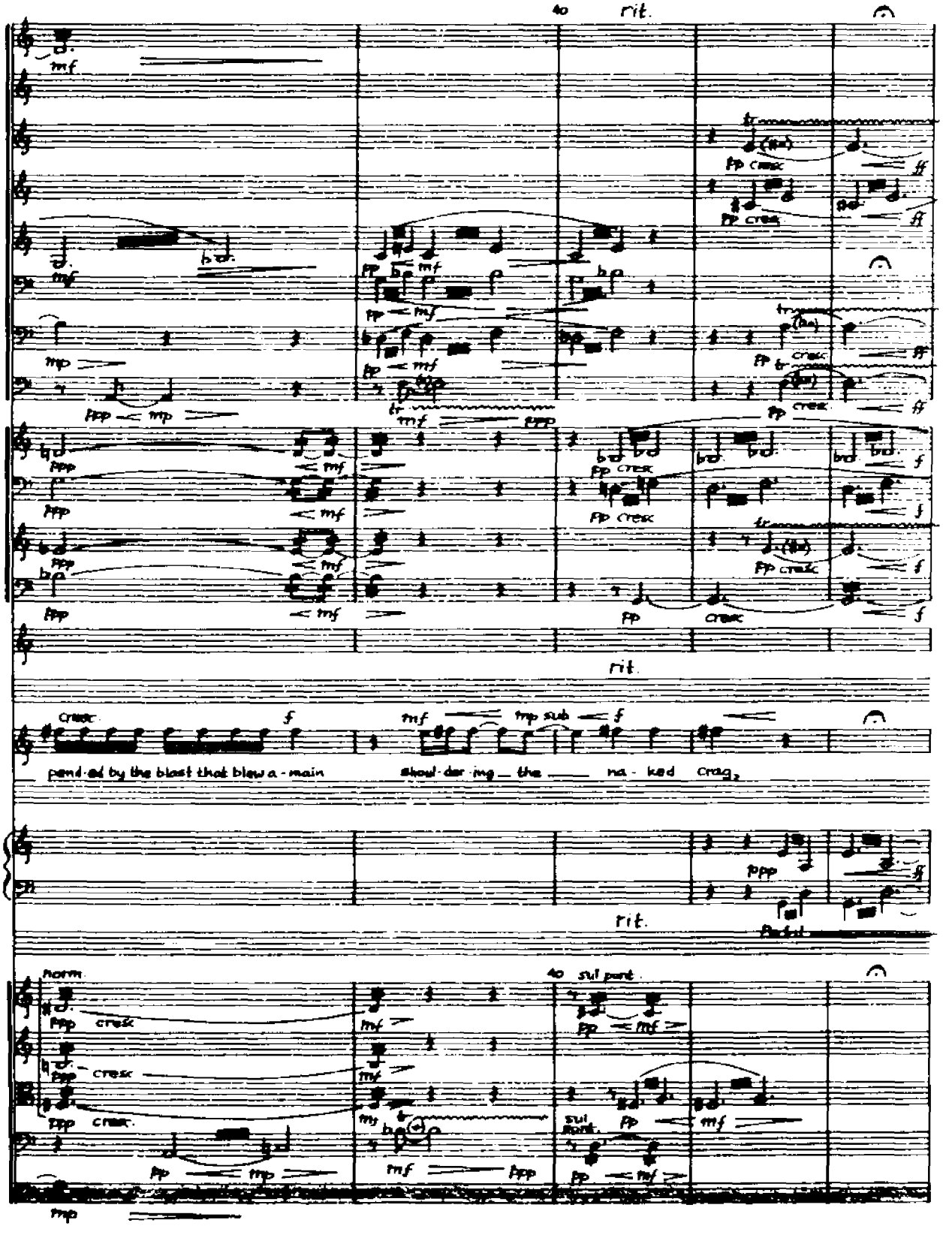


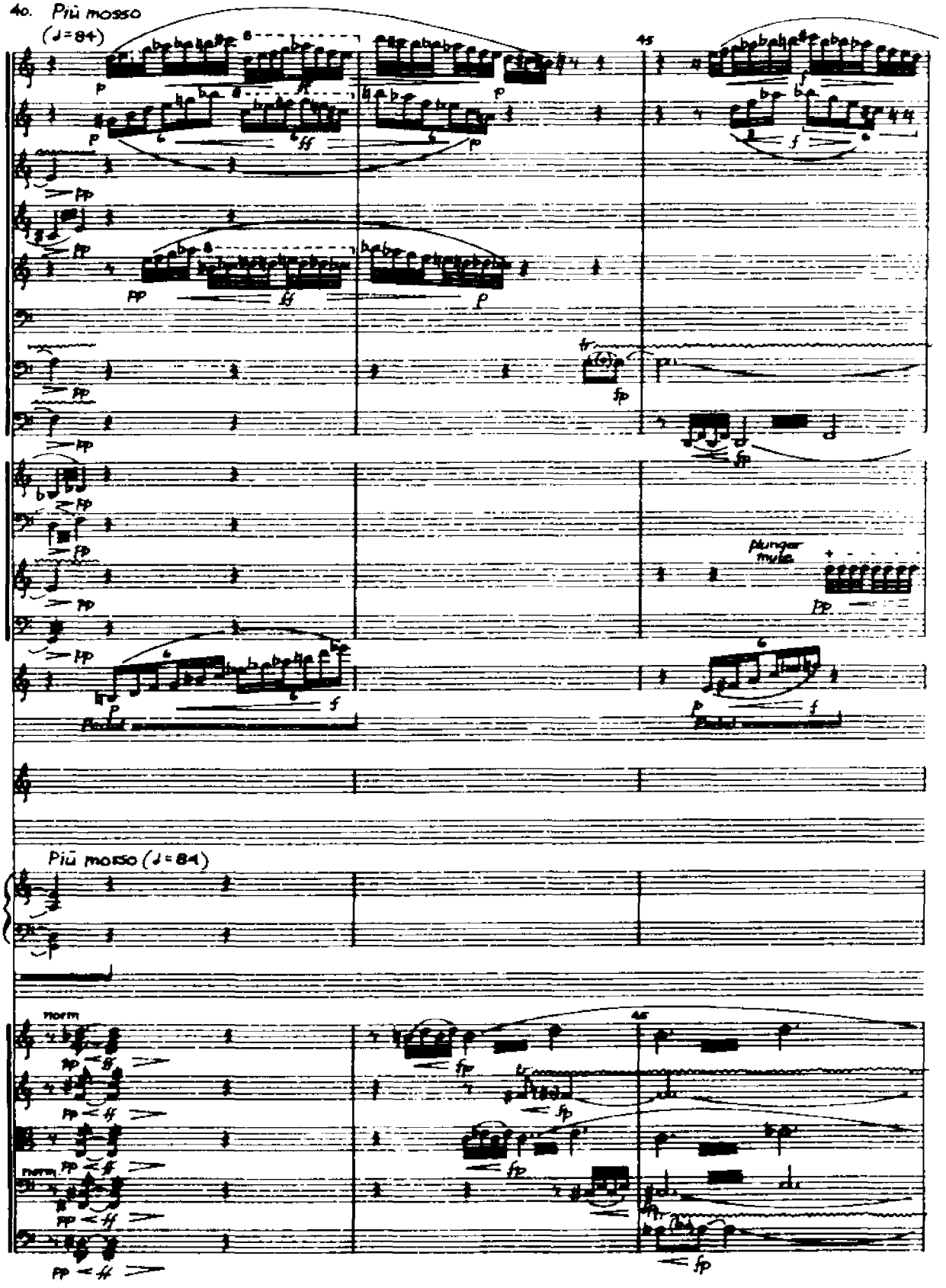


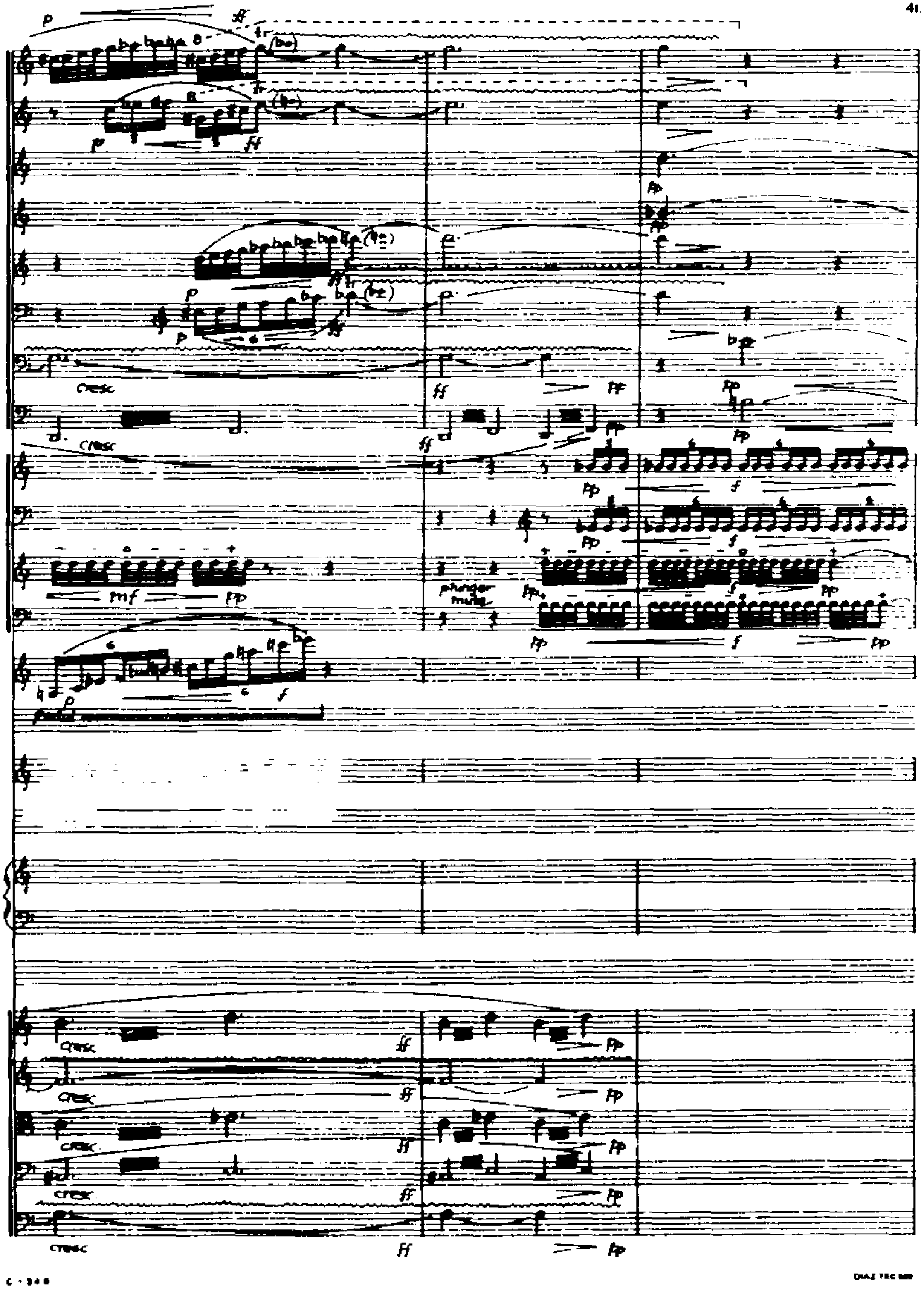


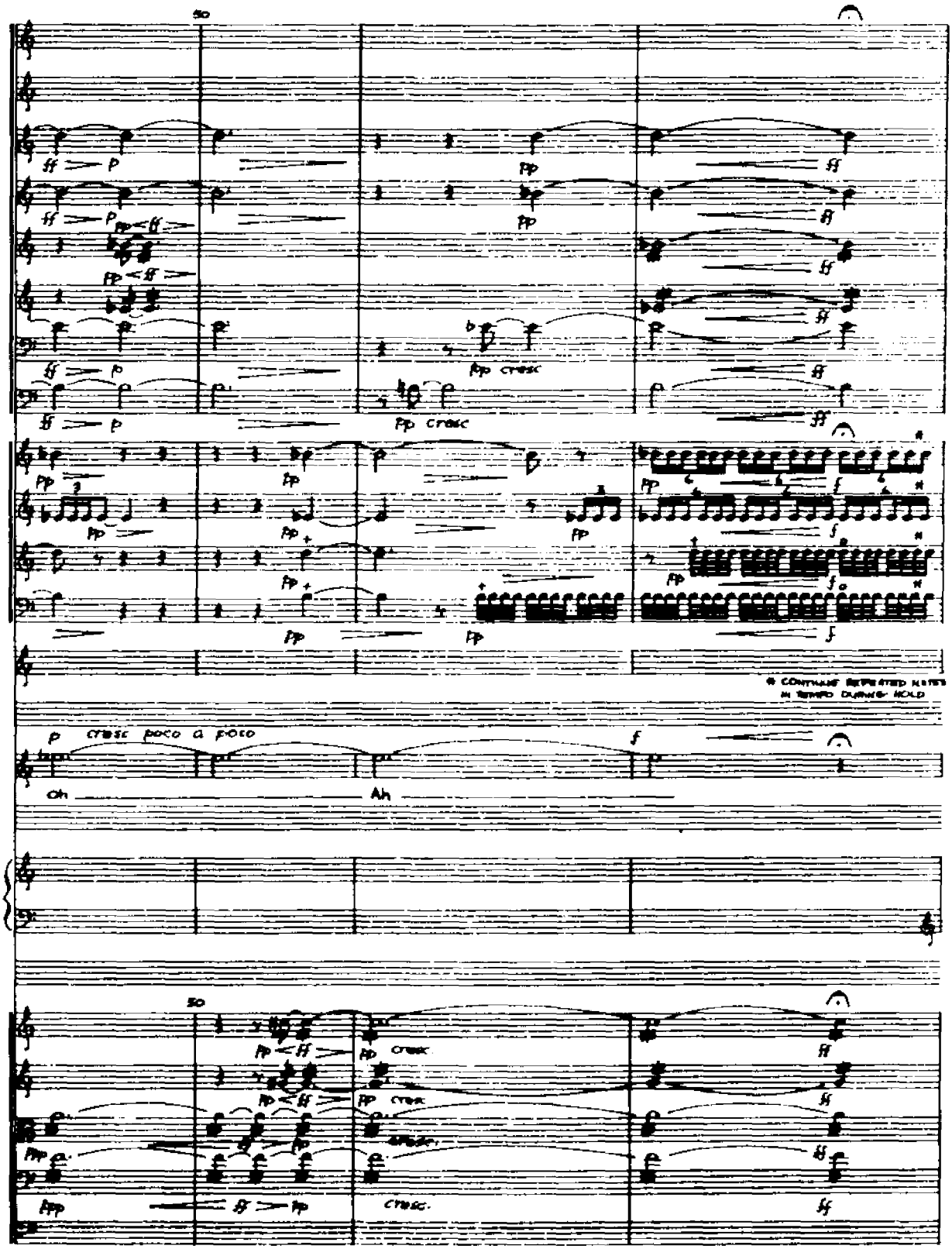

(♩=72)
mf
cresc.
ff > pp
p
f > pp
f
p sub.
mp
by — knots of grass — and half-inch fis sures in the slip per y
mf
l'vib
fp < p >
(♩=72)

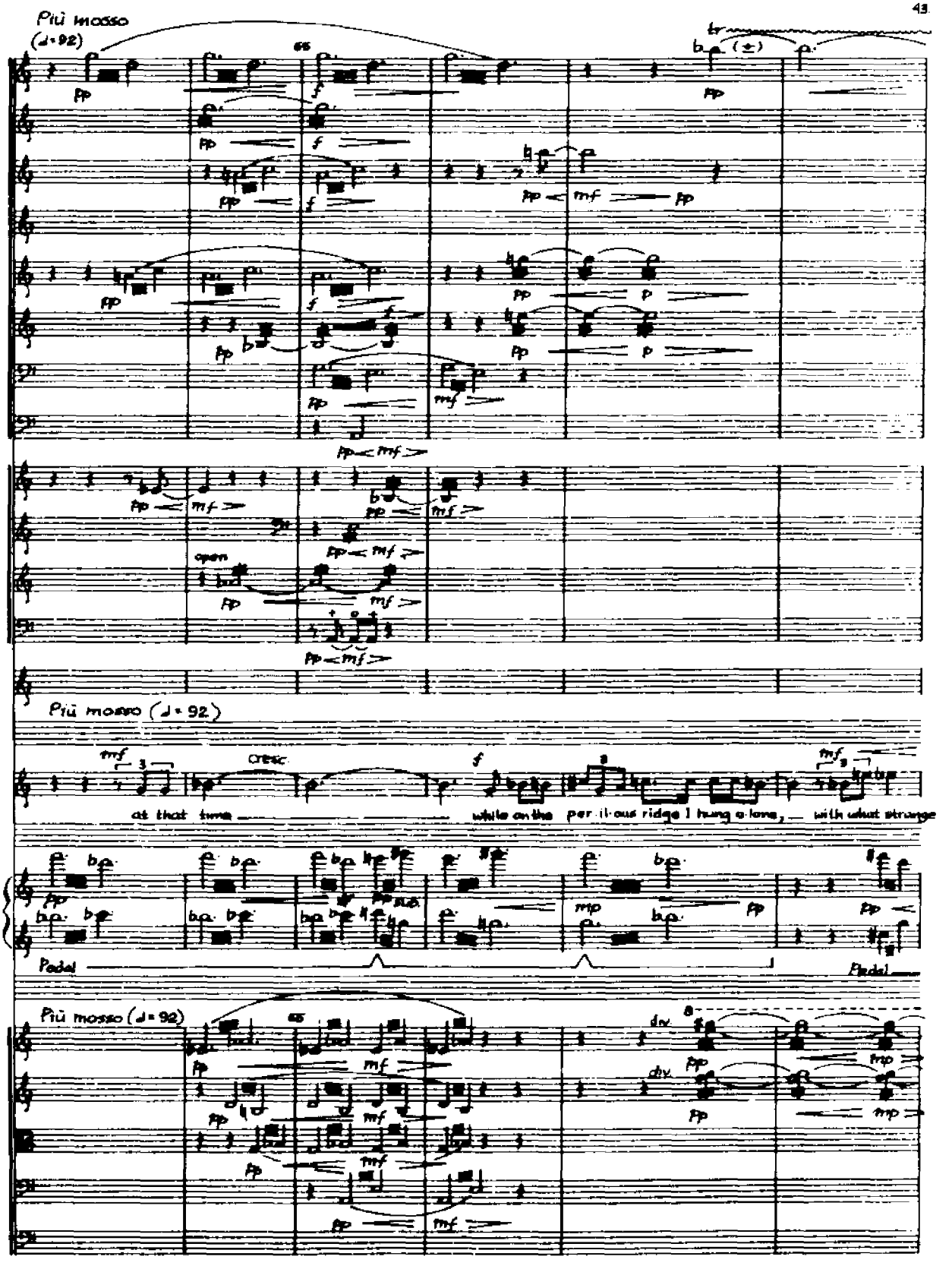

55
(mp) cresc.
rock but ill sus-tained, and al-most (so it seemed) sus-
open
sul ponti
sul ponti
sul ponti
95

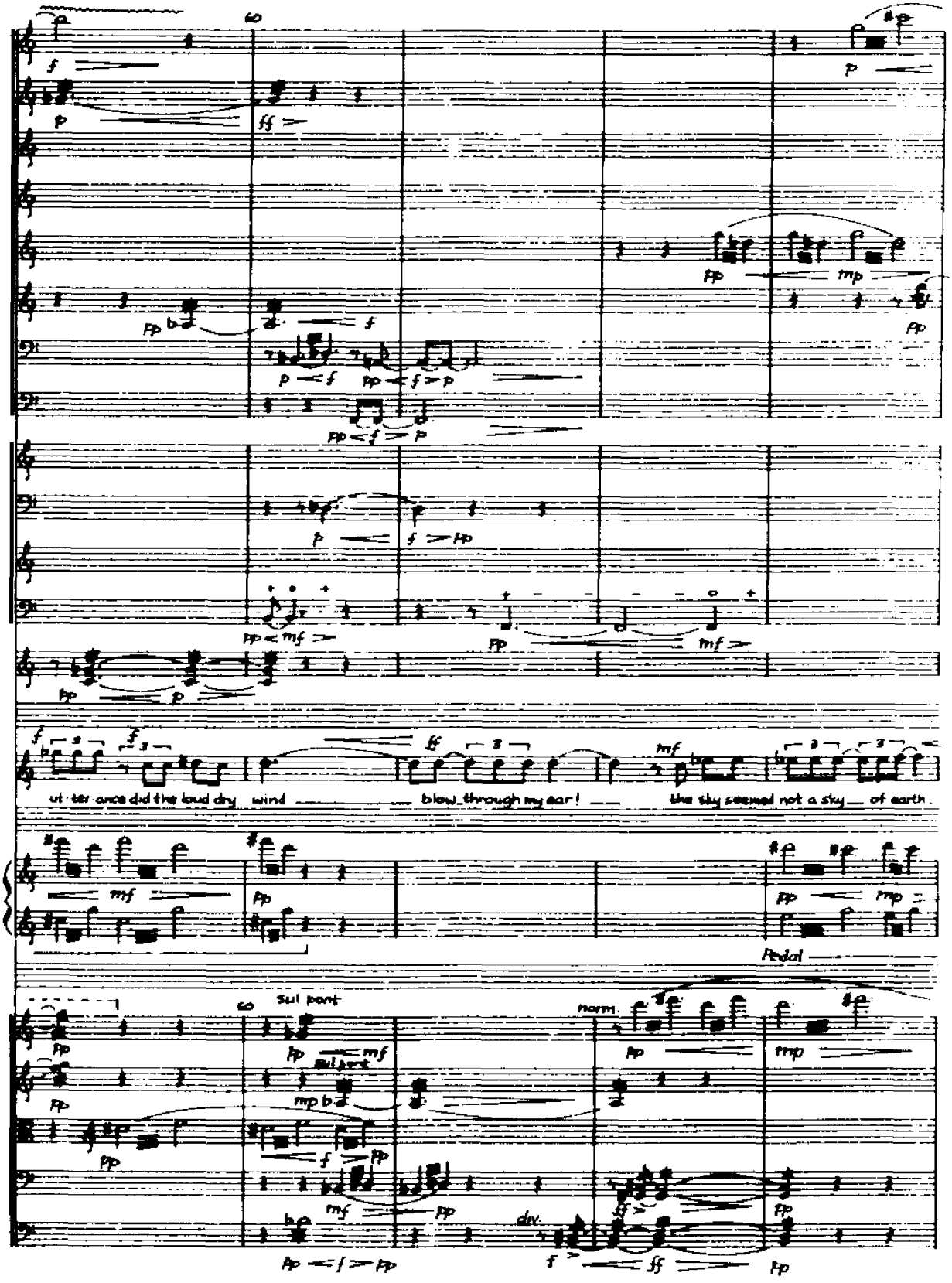

40
rit.
mf
pp cresc
ff
mp
ppp
mf
pp
f
cresc
rit.
pend-ed by the blast that blew a-main
shoul-der-ing the na-ked crag,
ppp
rit.
Pedal
norm.
40
sul pont.
cresc
mp
sul pont.

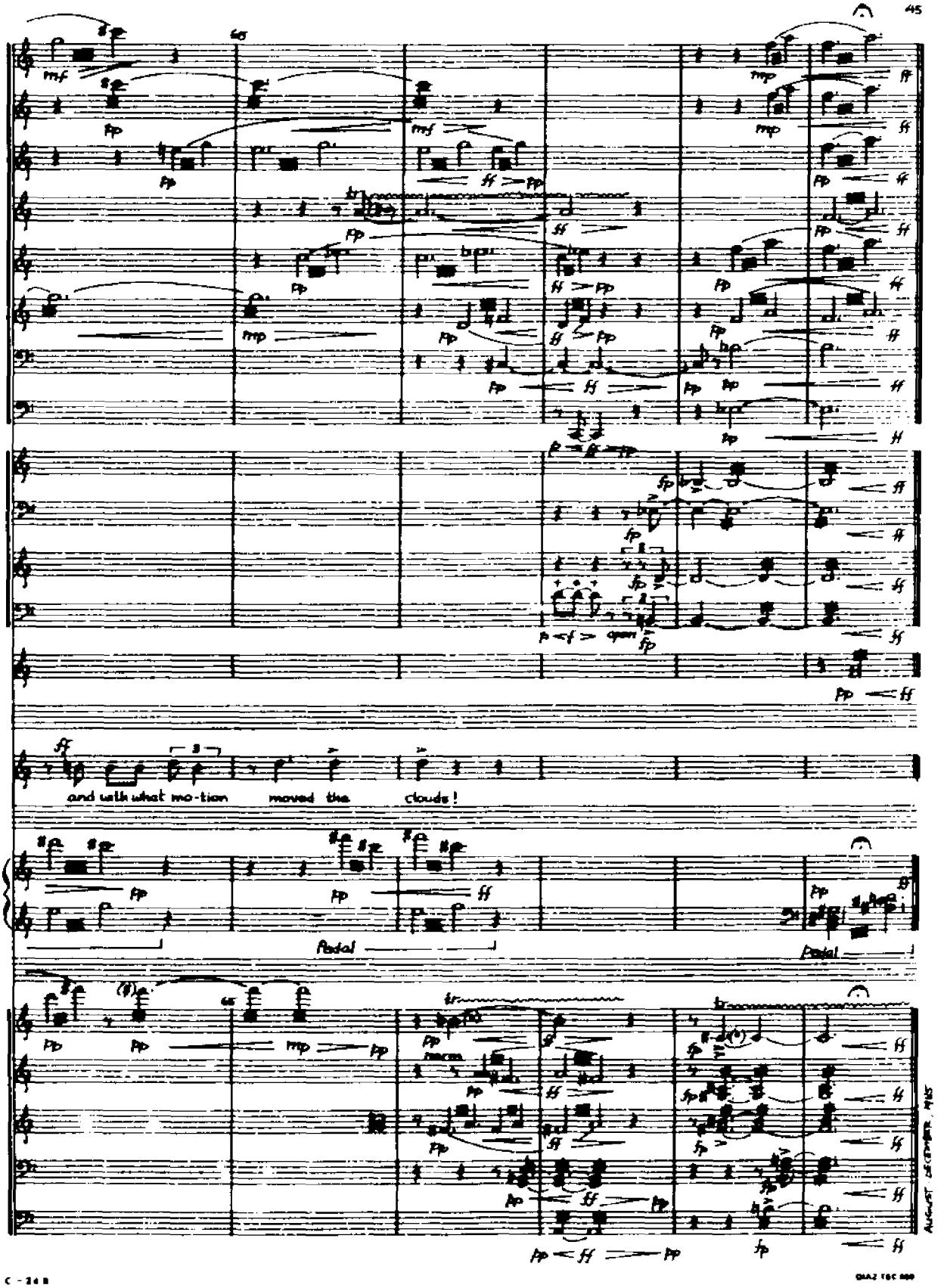

40. Più mosso
(♩=84)
45
plunger mute
Più mosso (♩=84)
norm
norm
46


p
ff
tr
pp
cresc
ff
pp
mf
f
plunger mute
6
pedal

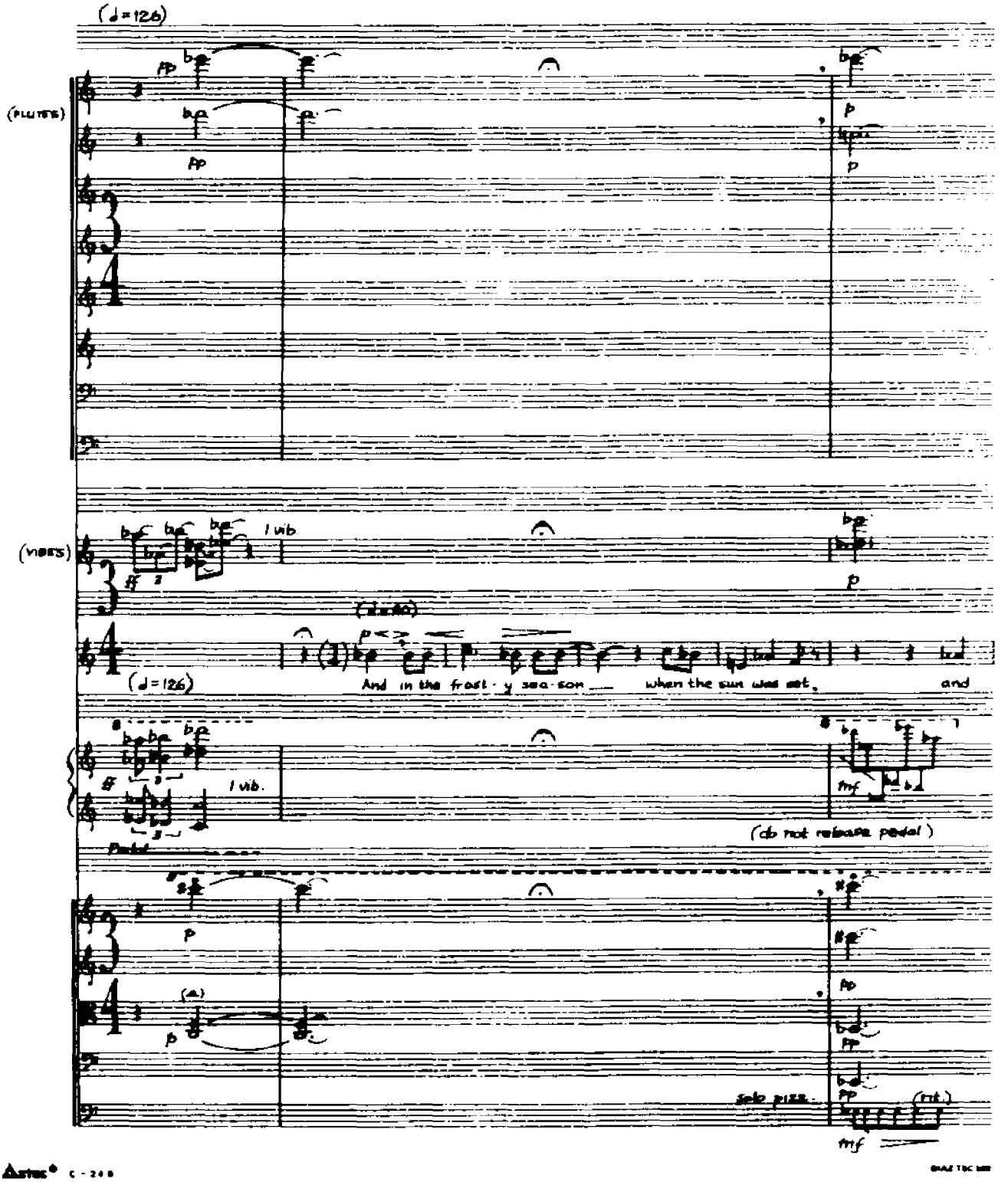

8va
ff p
pp
ff
pp cresc
* CONTINUE REPEATED NOTES IN TIMED DURING HOLD
p cresc poco a poco
f
Oh
Ah
8va
cresc.

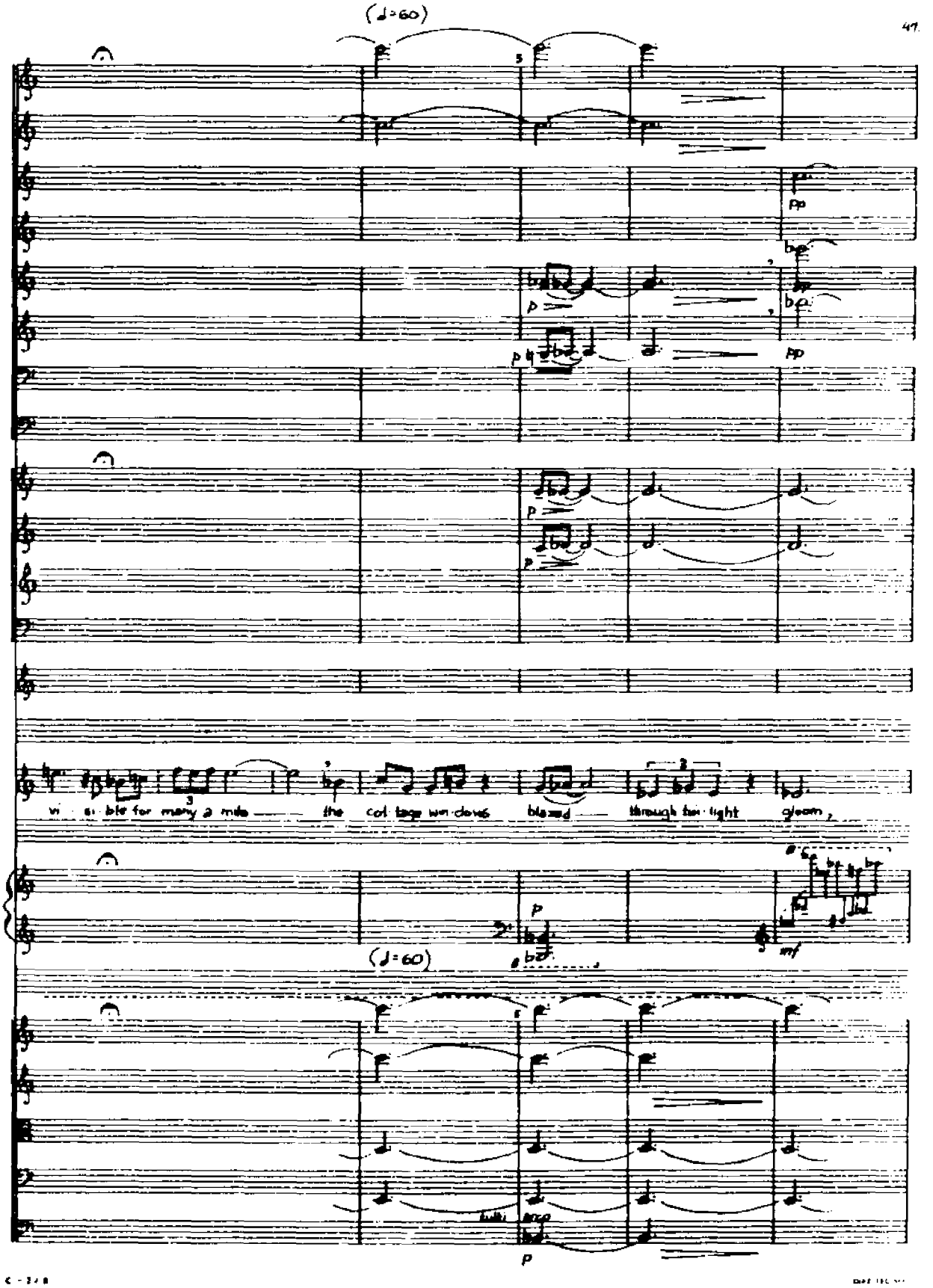

Più mosso
(♩=92)
Più mosso (♩=92)
at that time
cresc.
while on the per-il-ous ridge I hung a-lone,
with what strange
Pedal
Più mosso (♩=92)

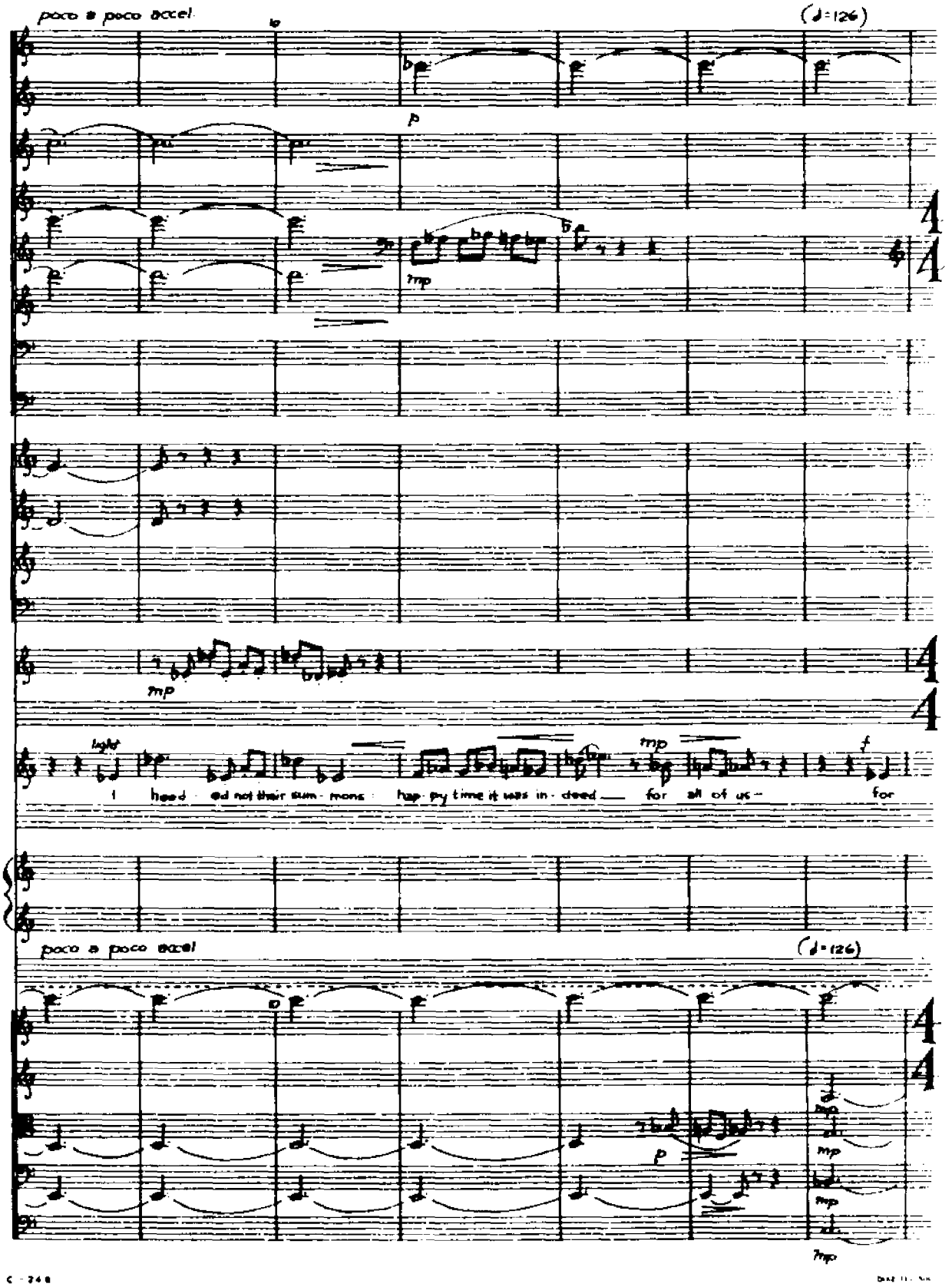

60
ut ter ance did the loud dry wind blow through my ear! the sky seemed not a sky of earth
Pedal
60
sul pont
norm.
div.

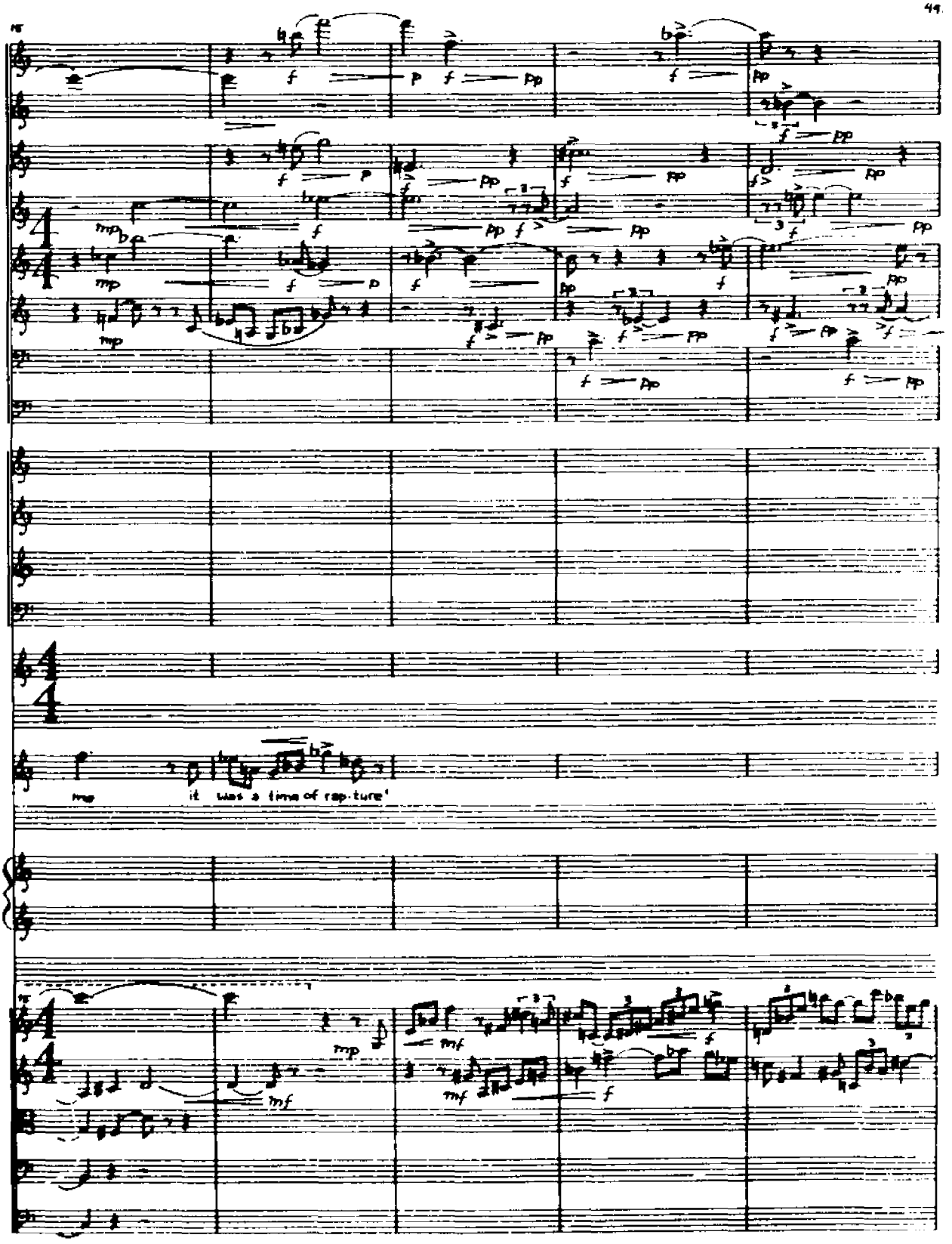

and with what mo-tion moved the clouds!
Pedal
Pedal

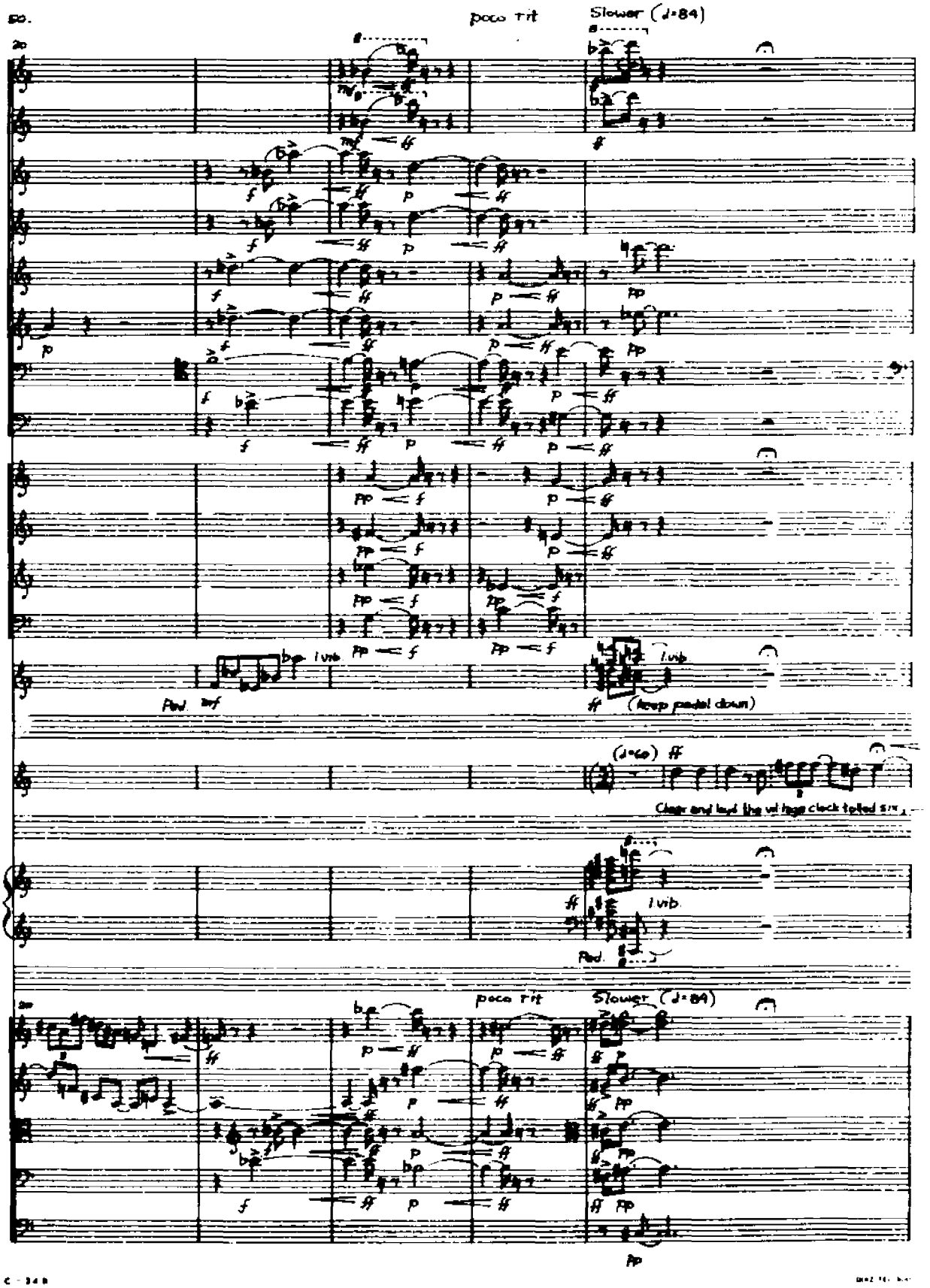
4. In the Frosty Season

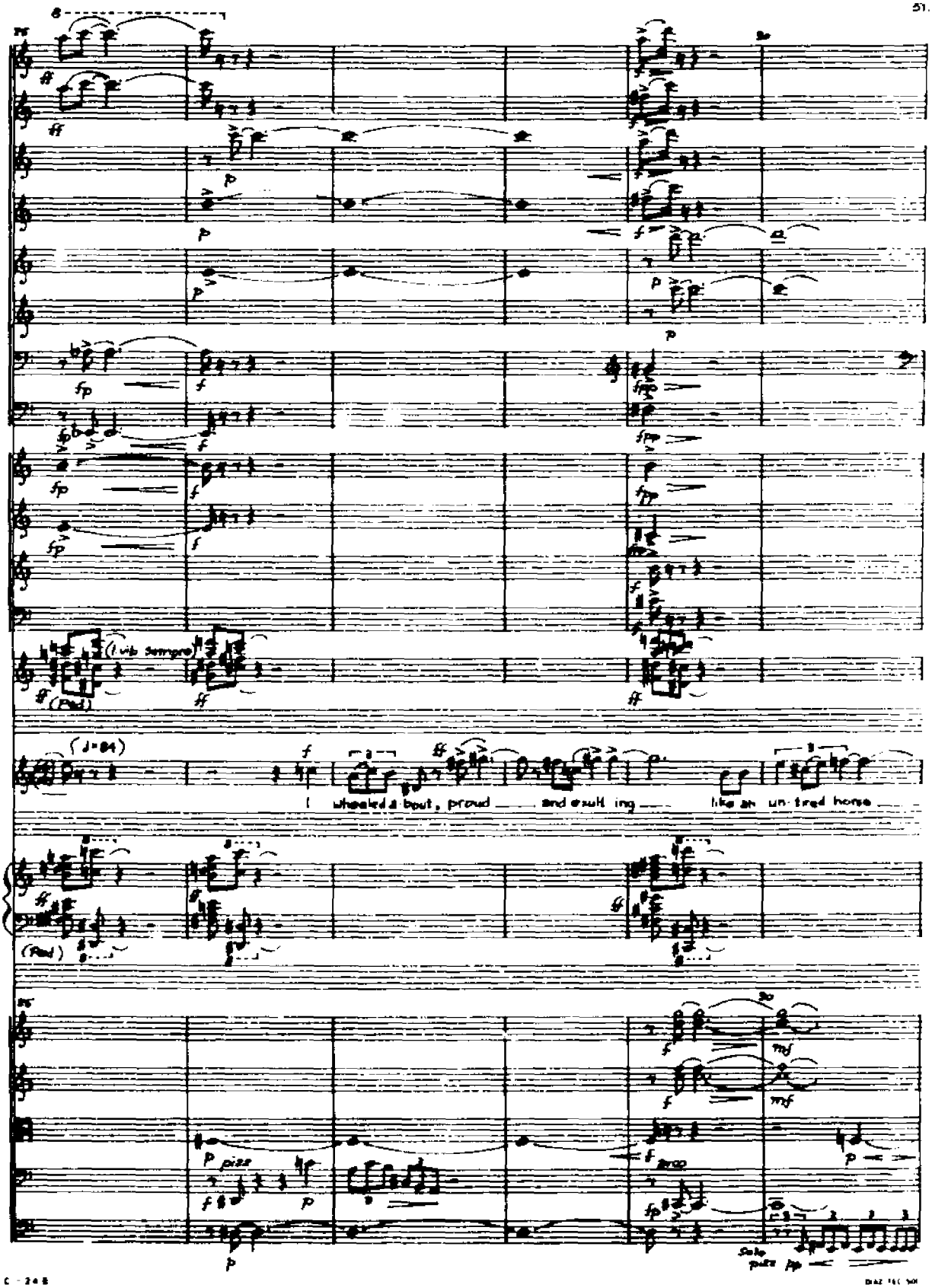


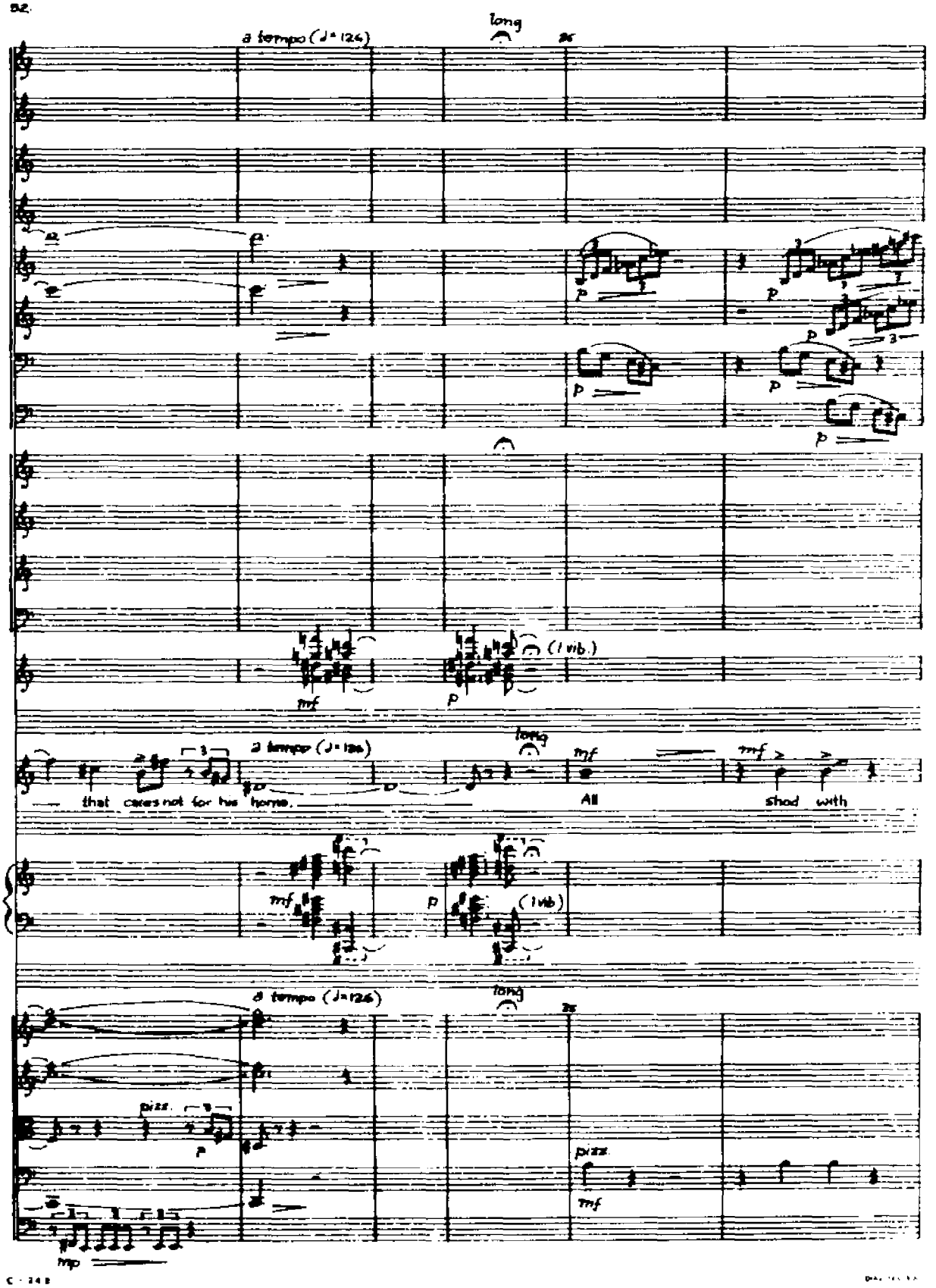

(♩=60)
pp
p
pp
vi si ble for many a mile the cot tage win dows blazed through twi light gloom,
mf
(♩=60)
p

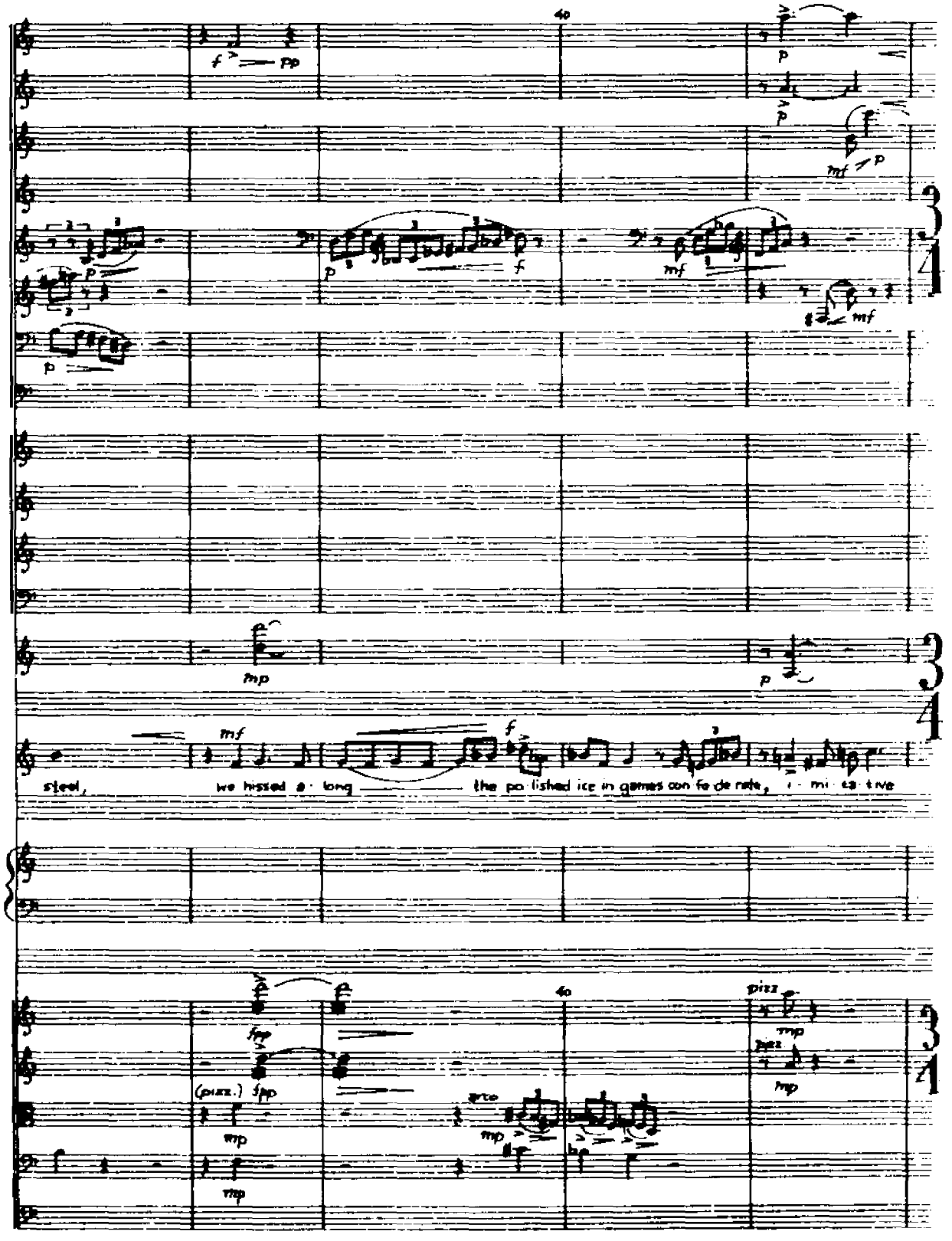

poco a poco accel
(♩=126)
p
mp
mp
light
I heed - ed not their sum - mons hap - py time it was in - deed — for all of us — for
mp
f
poco a poco accel
(♩=126)
p
mp
mp
mp

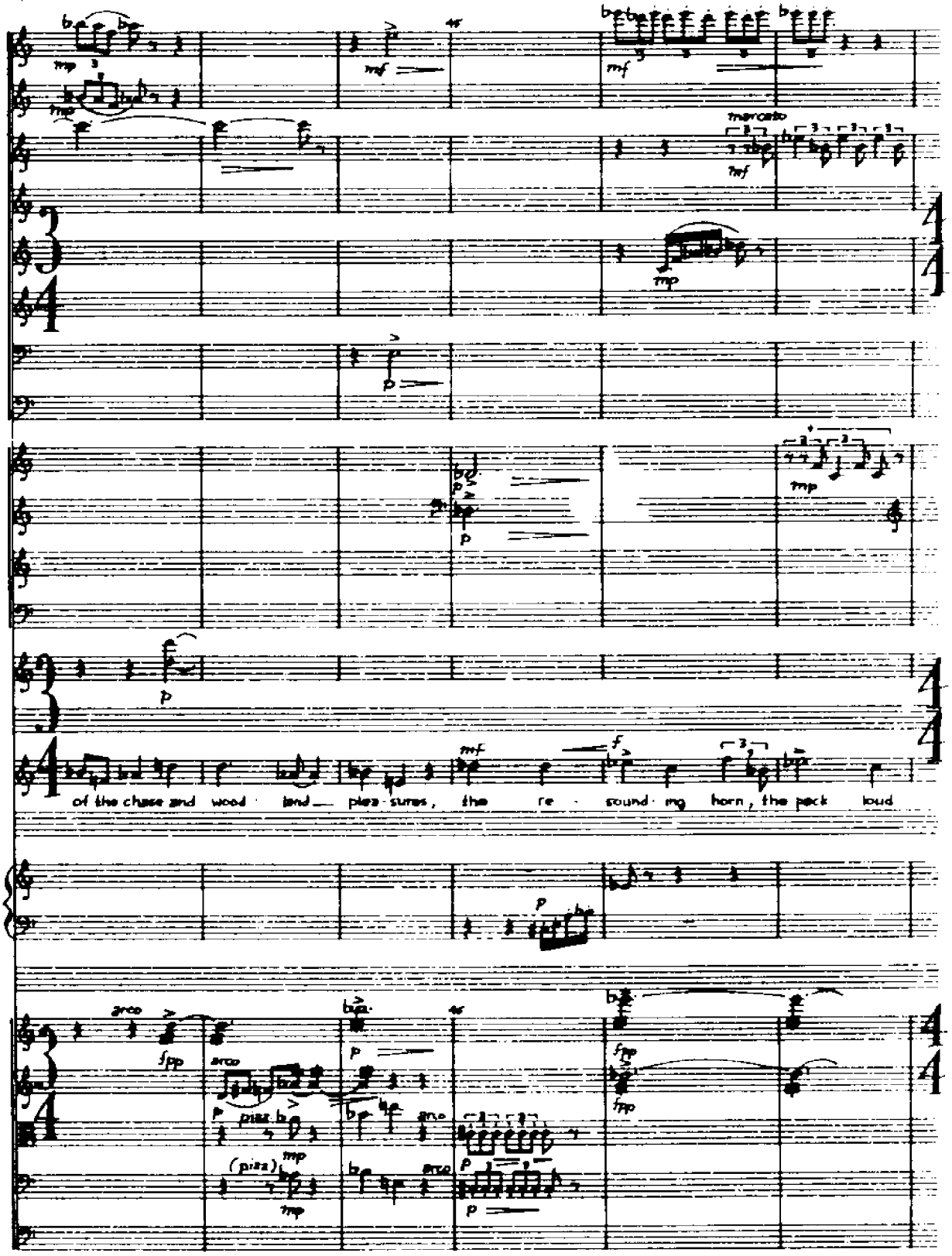

it was a time of rap-ture'

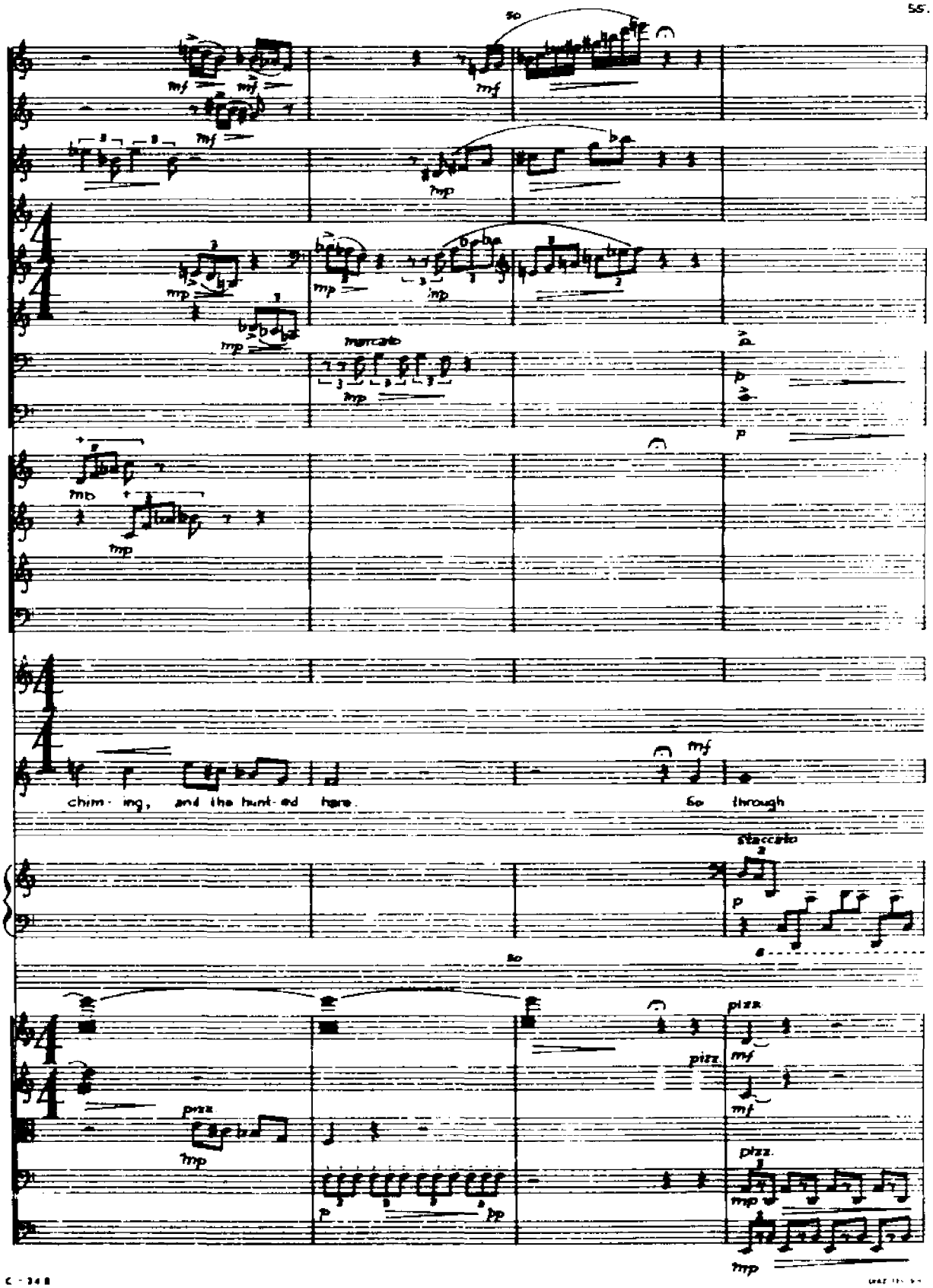

poco rit
Slower (♩=84)
1 vib
Ped.
(keep pedal down)
(♩=60)
Clear and loud like old fashioned clock tolled s/n
poco rit
Slower (♩=84)

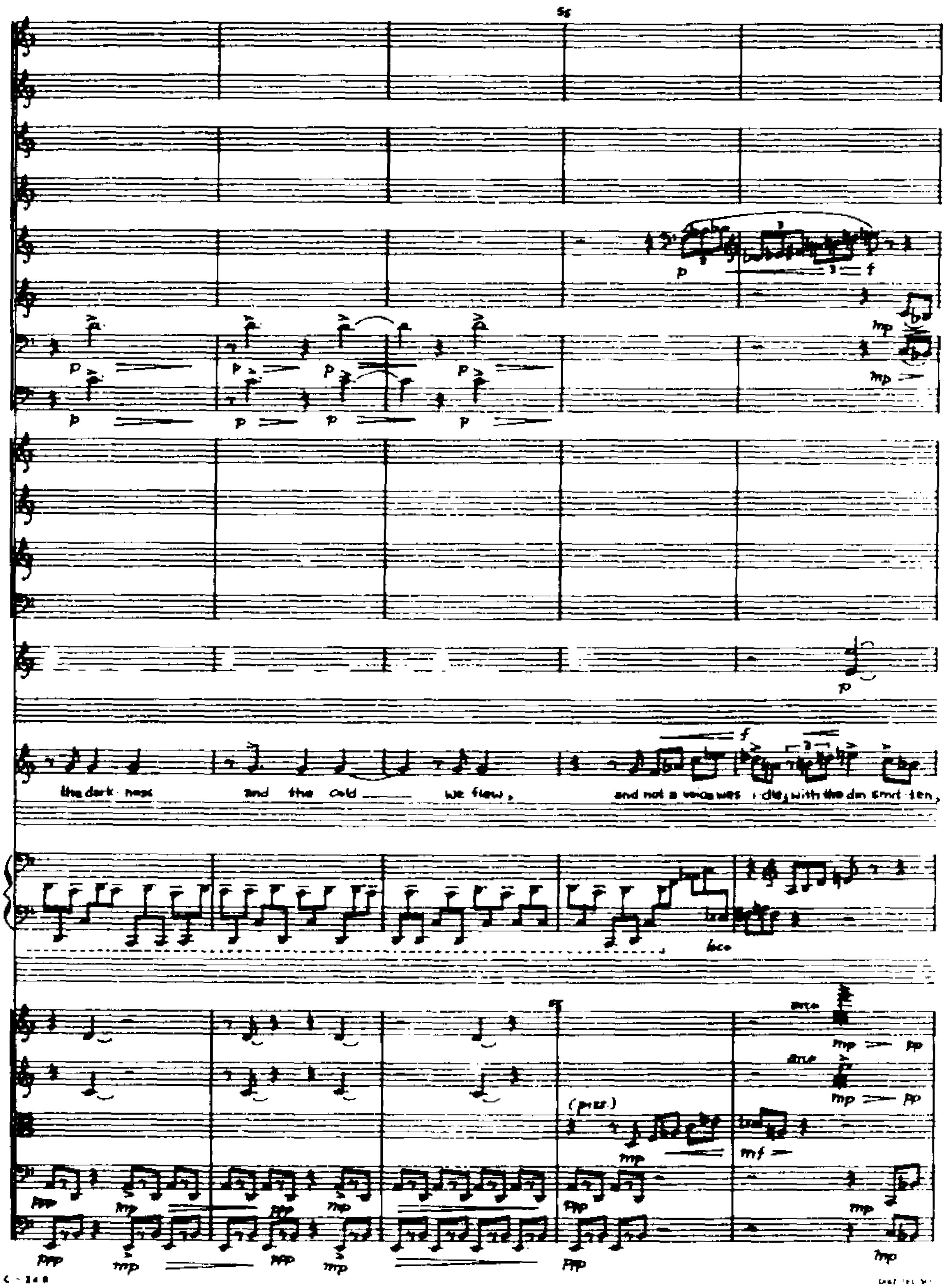

8
(J=84)
wheeled a bout, proud ___ and exult ing ___ like an un-tired horse ___
(Ped.)
pizz.
arco
Solo
poco

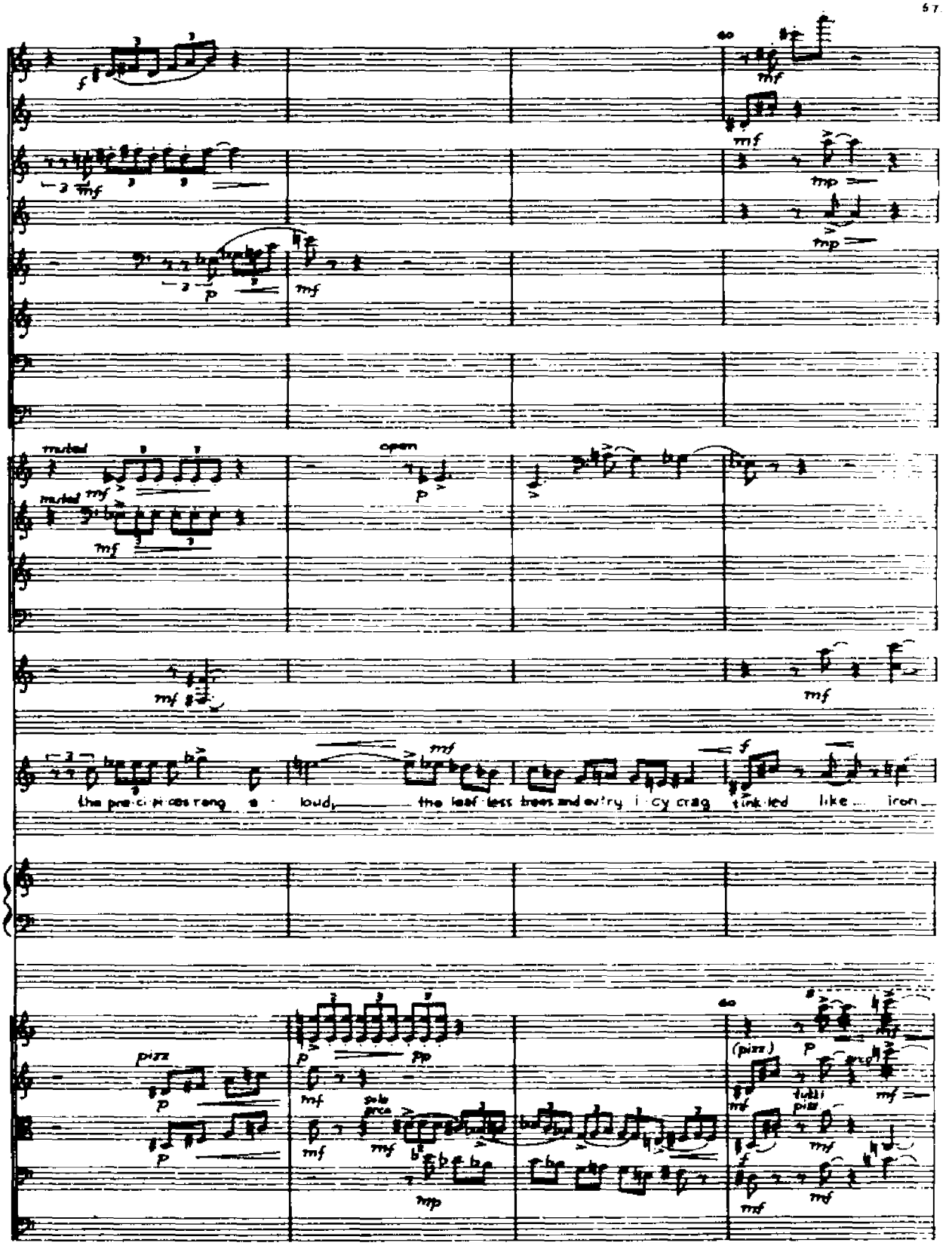

a tempo (♩= 124)
long
a2
(1 vib.)
a tempo (♩=126)
long
that cares not for his home.
All
shad with
pizz.
pizz.

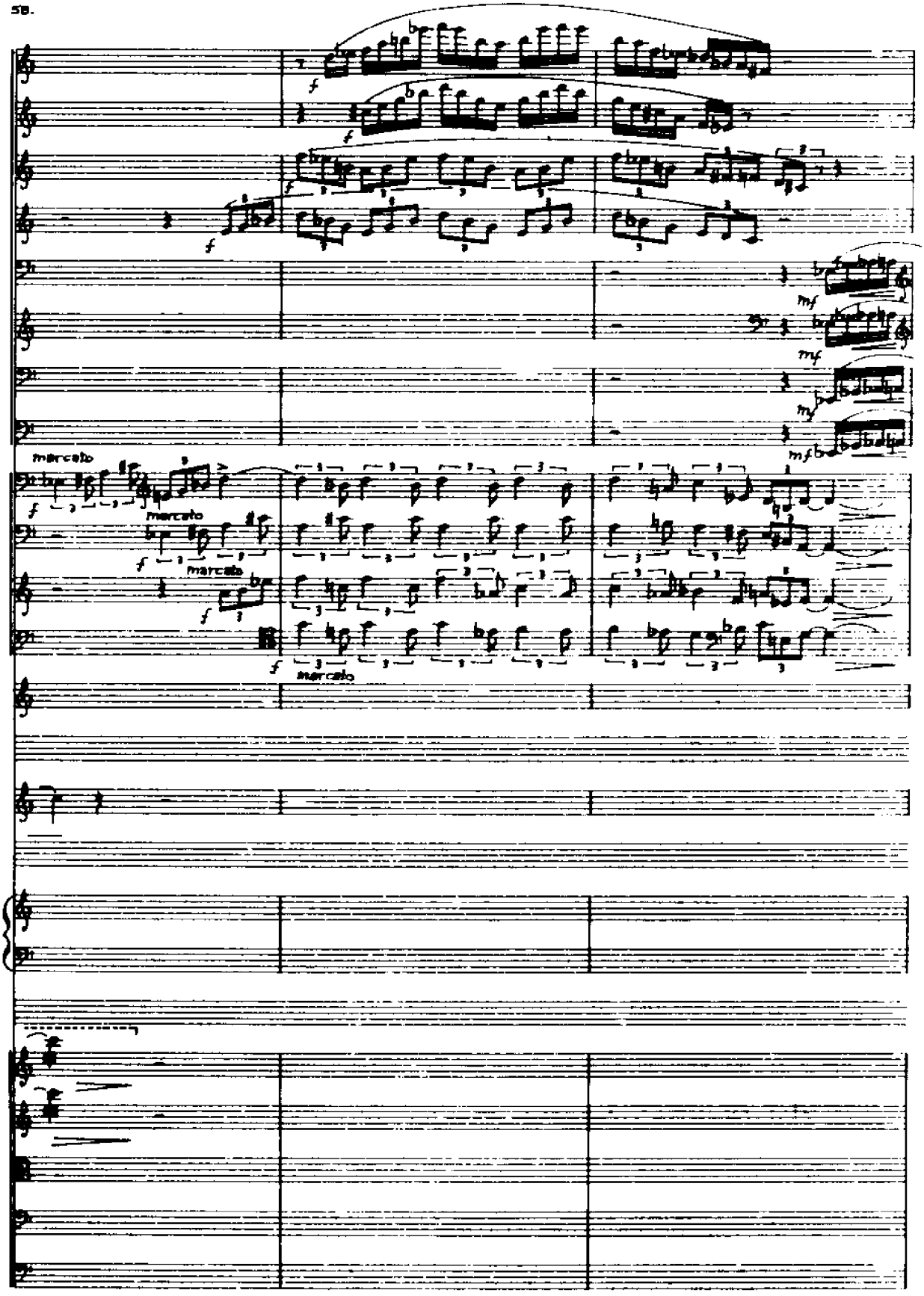

40
steel, we hissed a · long the po · lished ice in games con fe de rate, i · mi · ta · tive
40
(pizz.)
arco
pizz

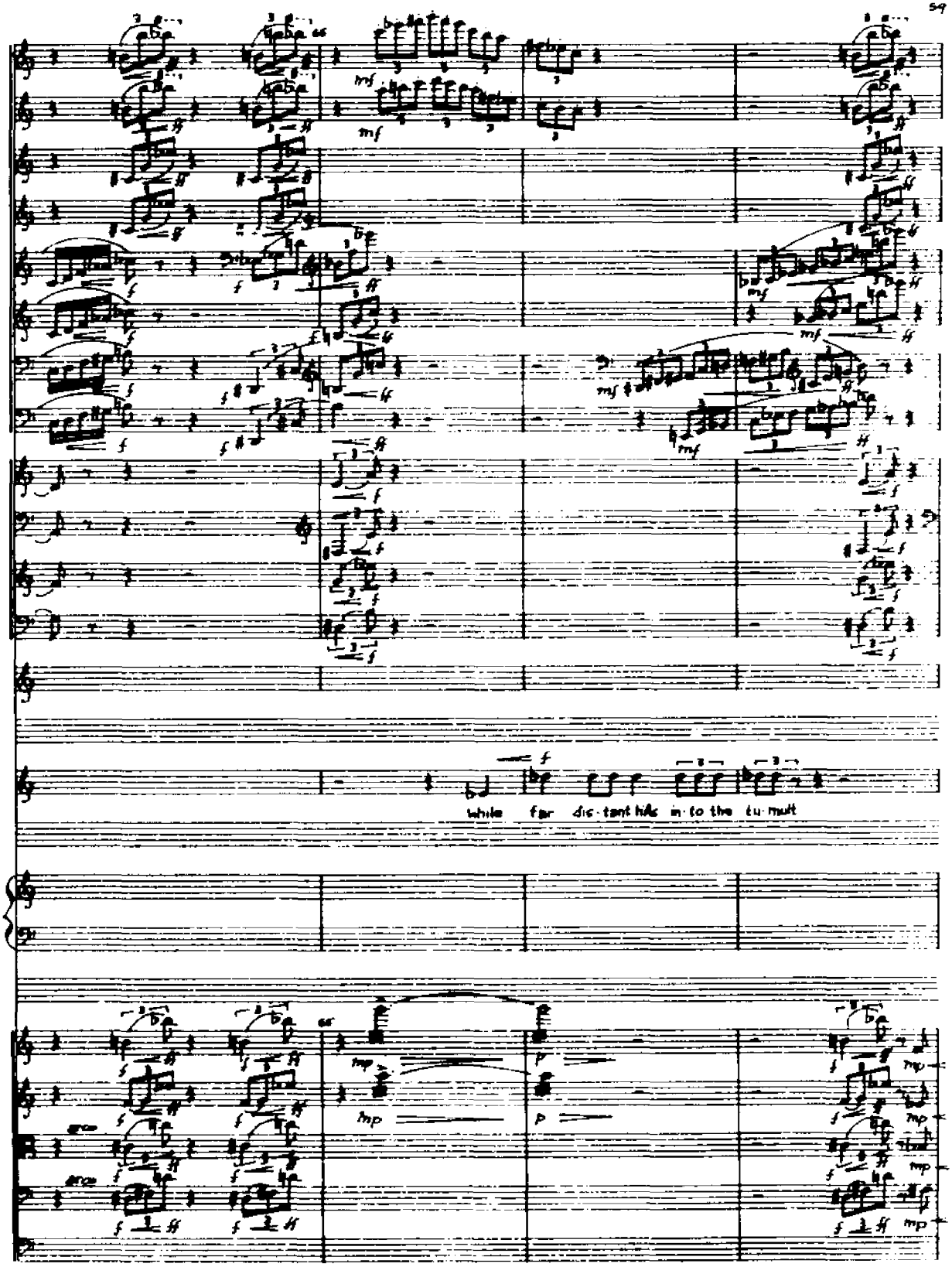

mp
mf
marcato
p
mp
mf
f
of the chase and wood land — plea - sures, the re - sound - ing horn, the peck loud
arco
fpp
pizz.
(pizz.)

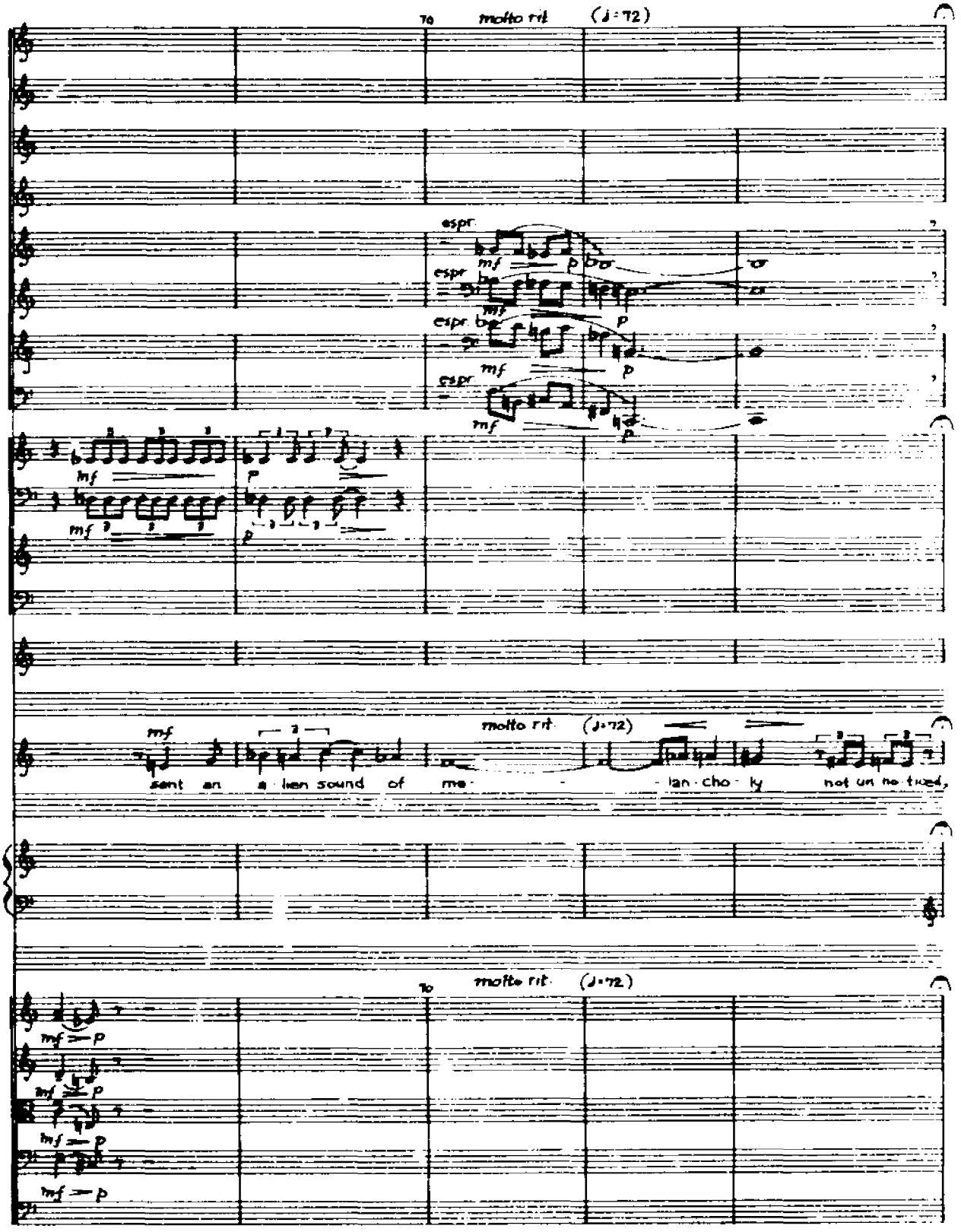

so
mf
mp
marcato
p
chim- ing, and the hunt-ed hare.
so through
staccato
pizz.
arco
pp

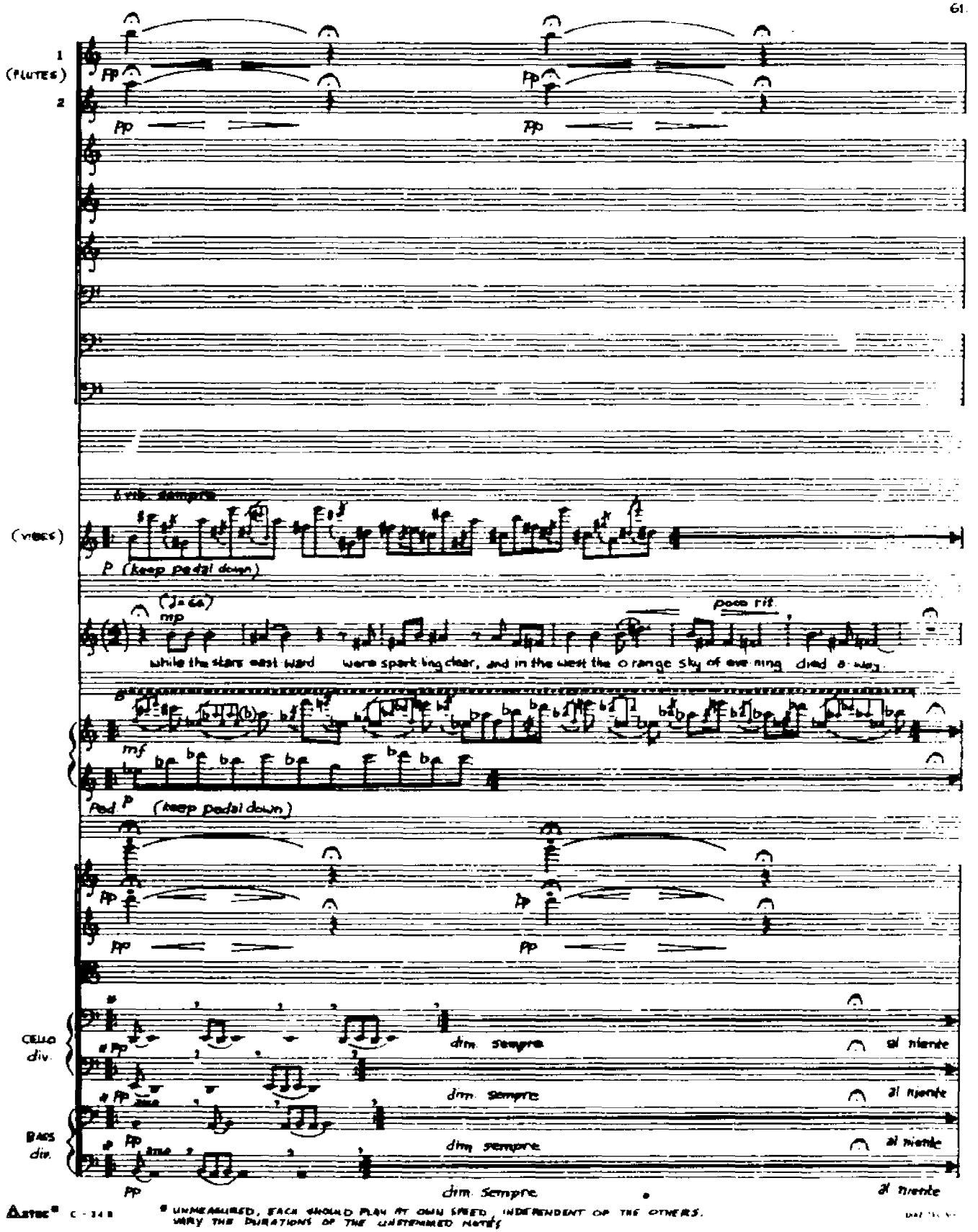

55
the dark has and the cold we flew, and not a voice was i die, with the din smit ten,
loco
(pizz.)
arco
arco


muted
open
the pre-ci-pi-ces rang a - loud, the leaf-less trees and ev'ry i-cy crag tink-led like... iron
pizz
(pizz)
tutti
pizz

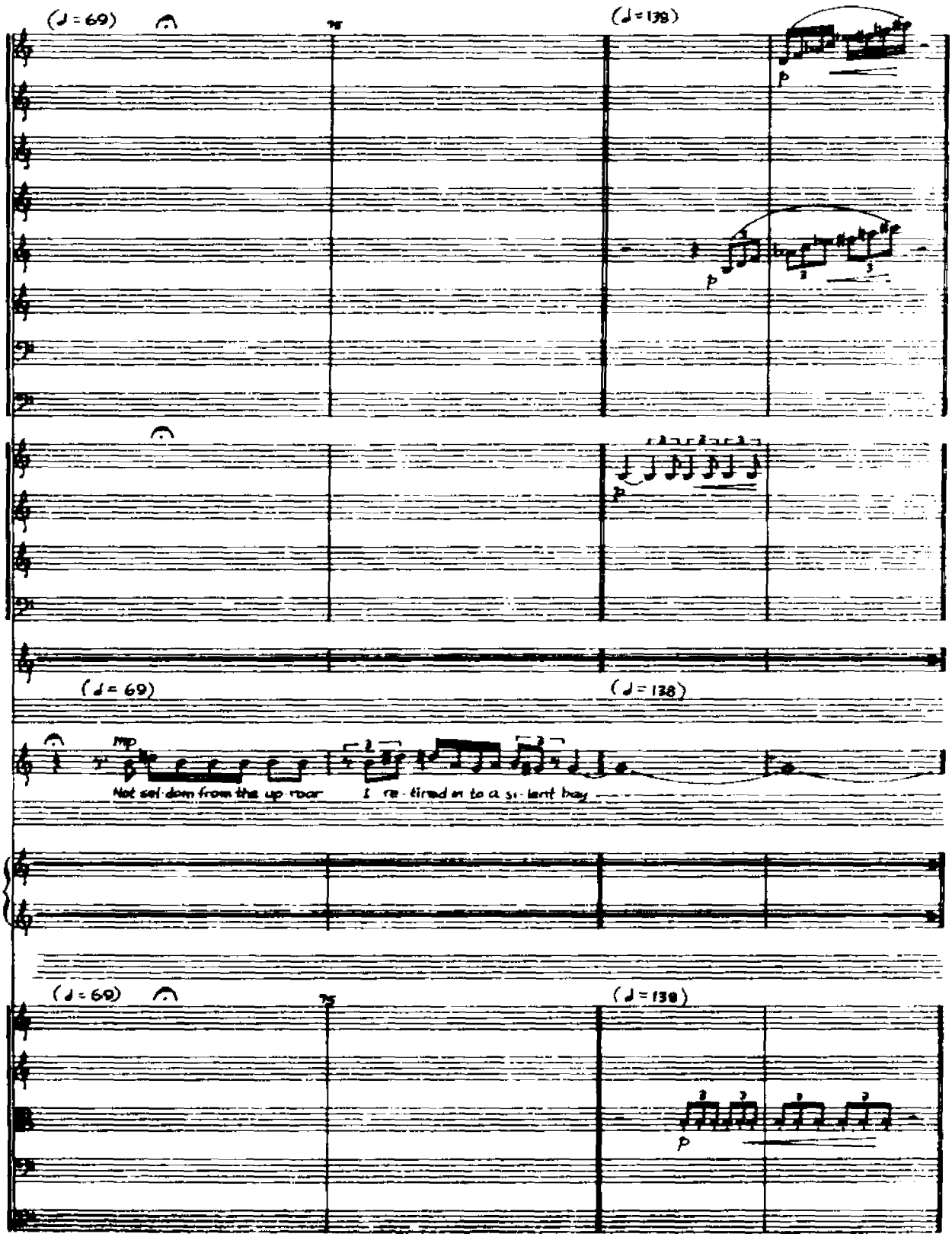

f
mf
marcato

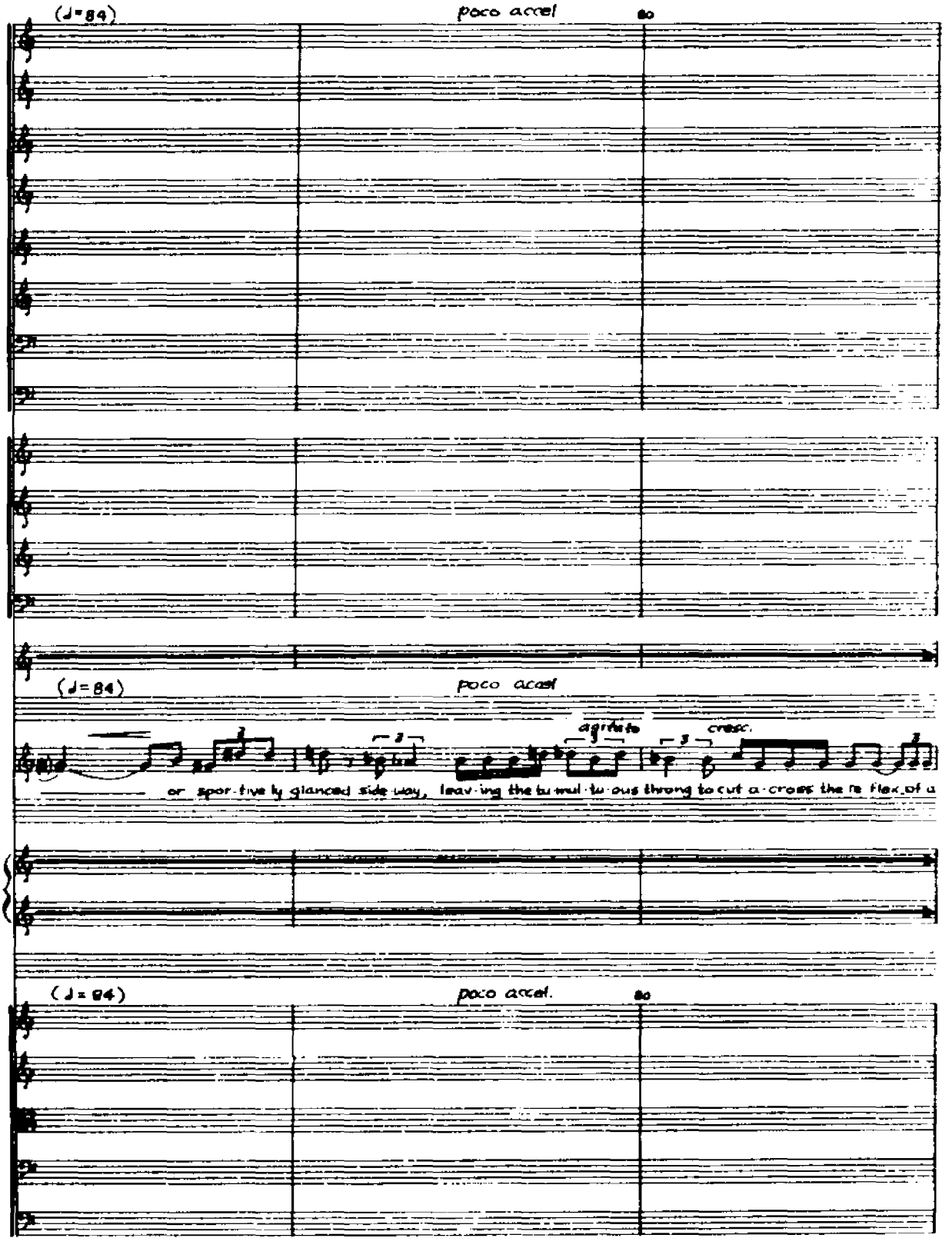

while far dis-tant hills in-to the tu-mult

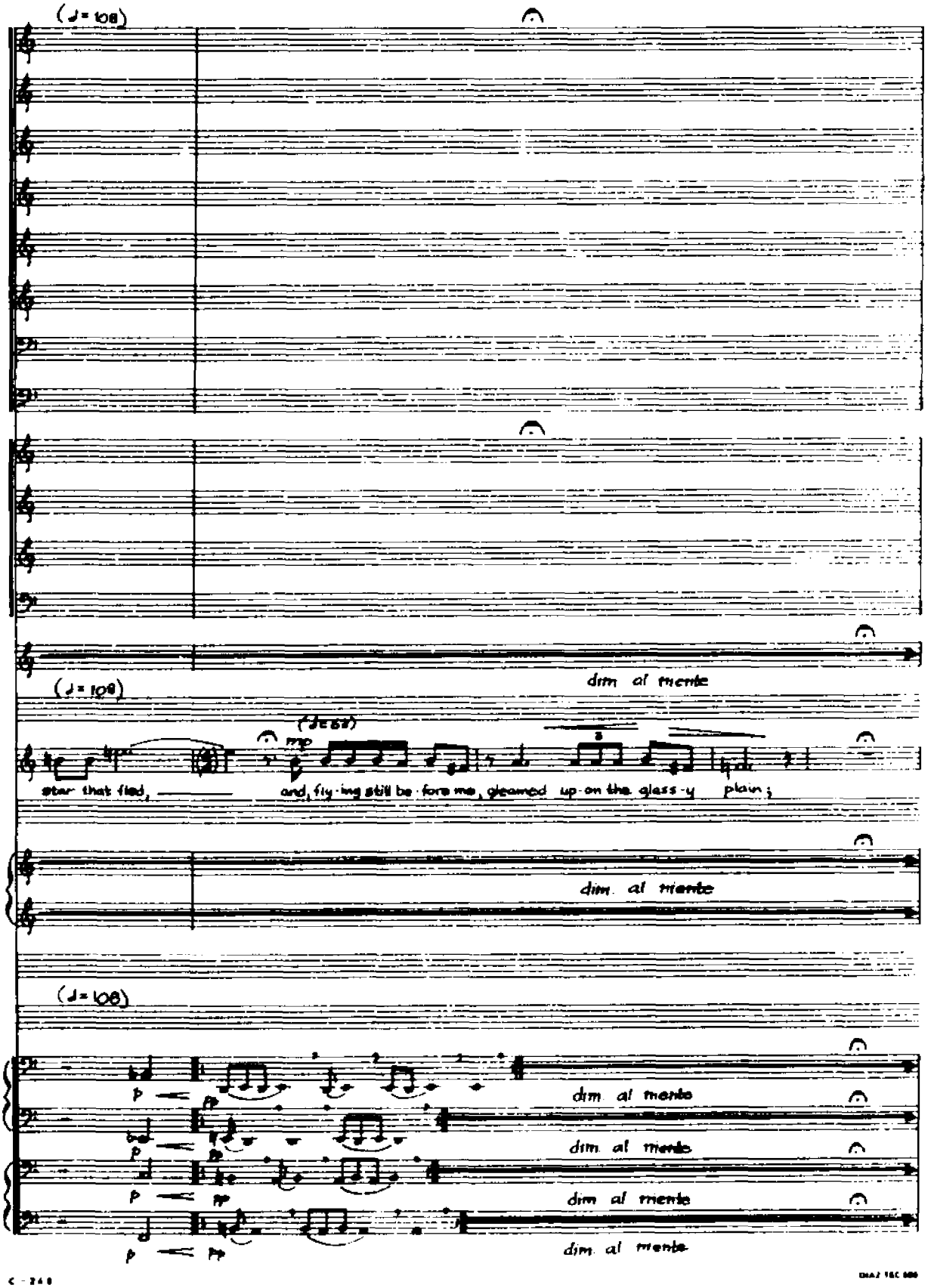

To
molto rit
(♩=72)
espr
mf
p
mf
p
mf
p
mf
p
mf
p
mf
p
mf
p
molto rit
(♩=72)
sent an a lien sound of me - lan cho ly not un no ticed,
To
molto rit
(♩=72)
mf
p
mf
p
mf
p
mf
p

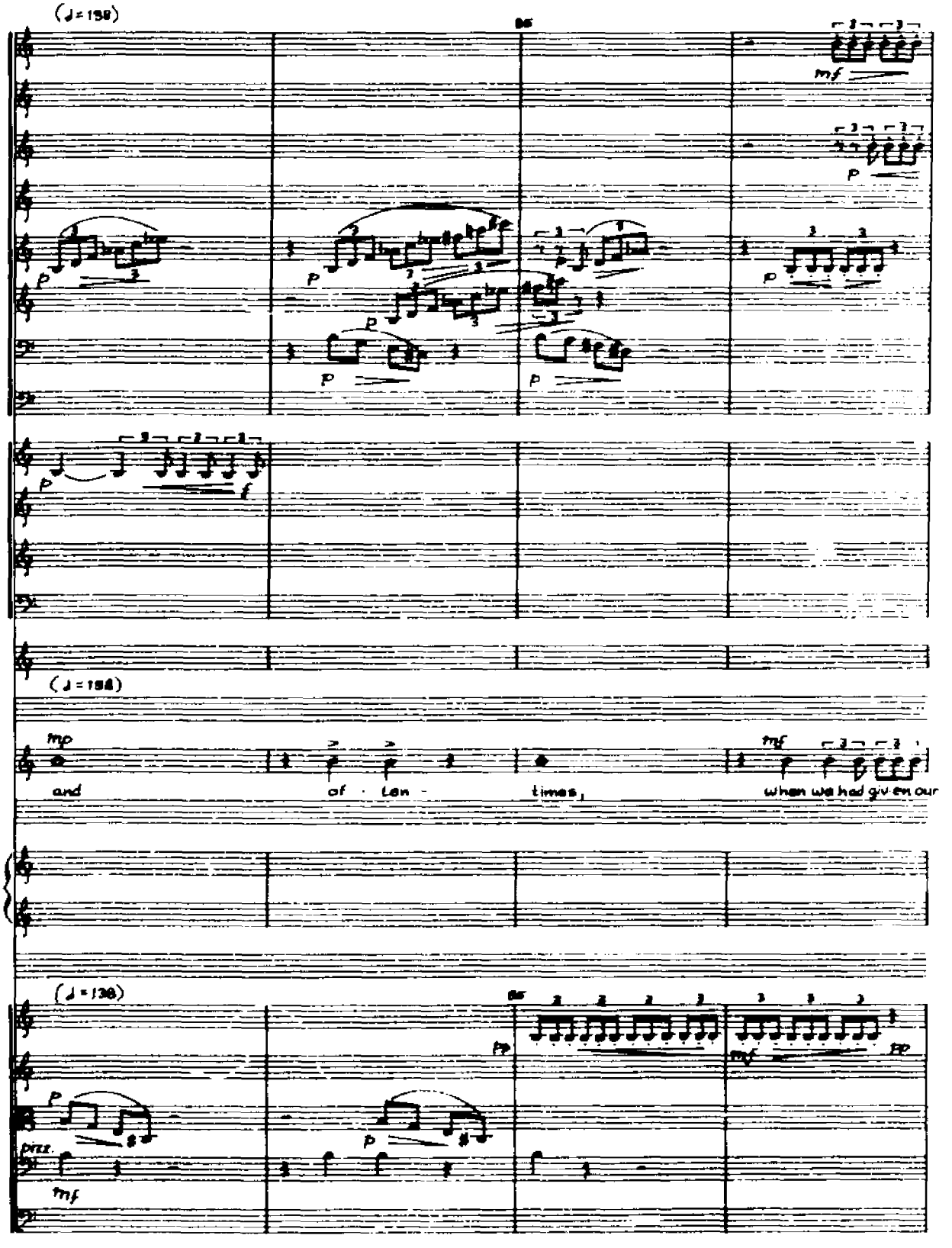


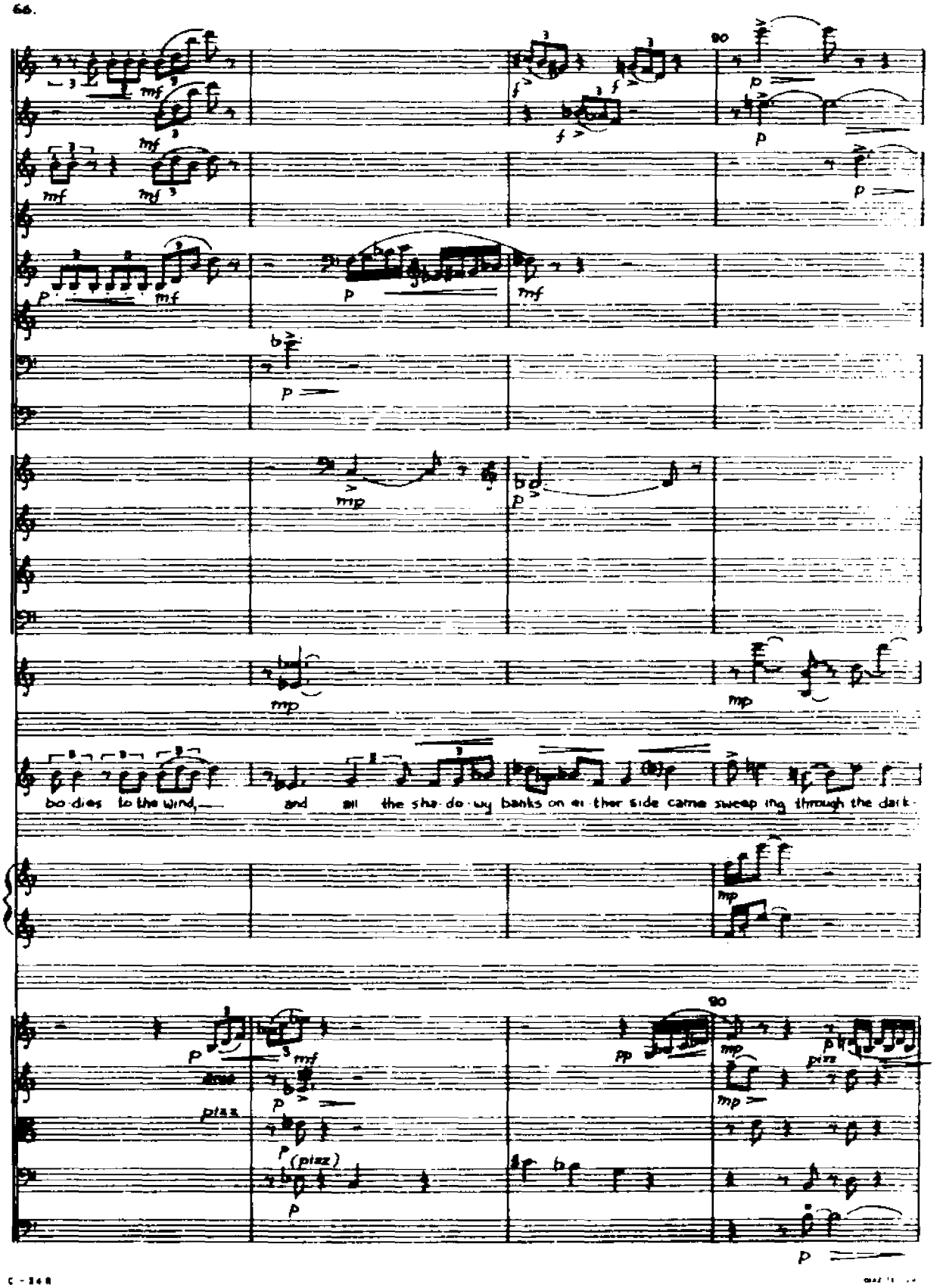
* UNMEASURED, EACH SHOULD PLAY AT OWN SPEED, INDEPENDENT OF THE OTHERS. VARY THE DURATIONS OF THE UNSTEMMED NOTES

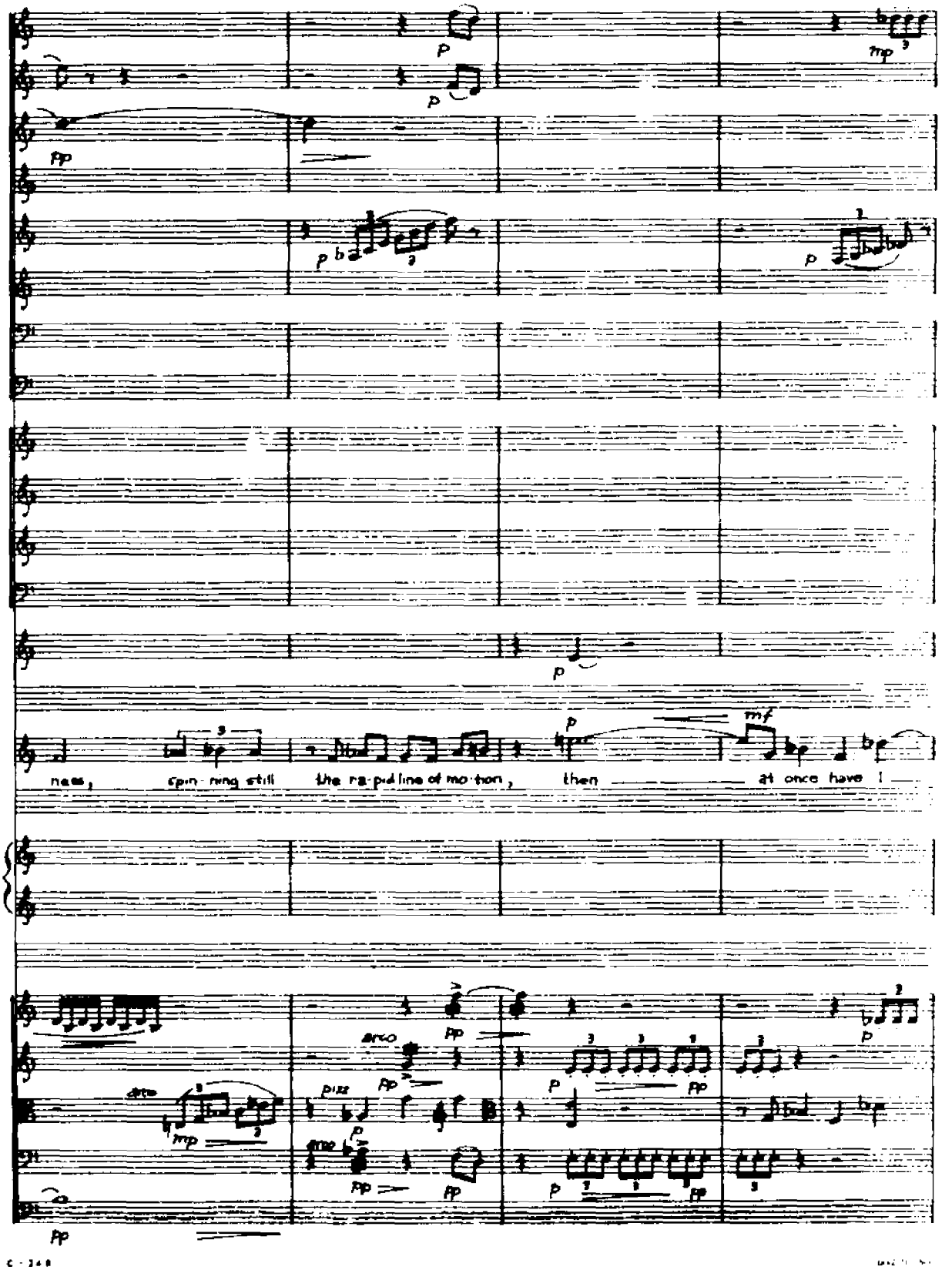

(♩ = 69)
(♩ = 138)
mp
Not sel-dom from the up roar
I re-tired in to a si-lent bay
(♩ = 69)
(♩ = 138)
(♩ = 69)
(♩ = 138)

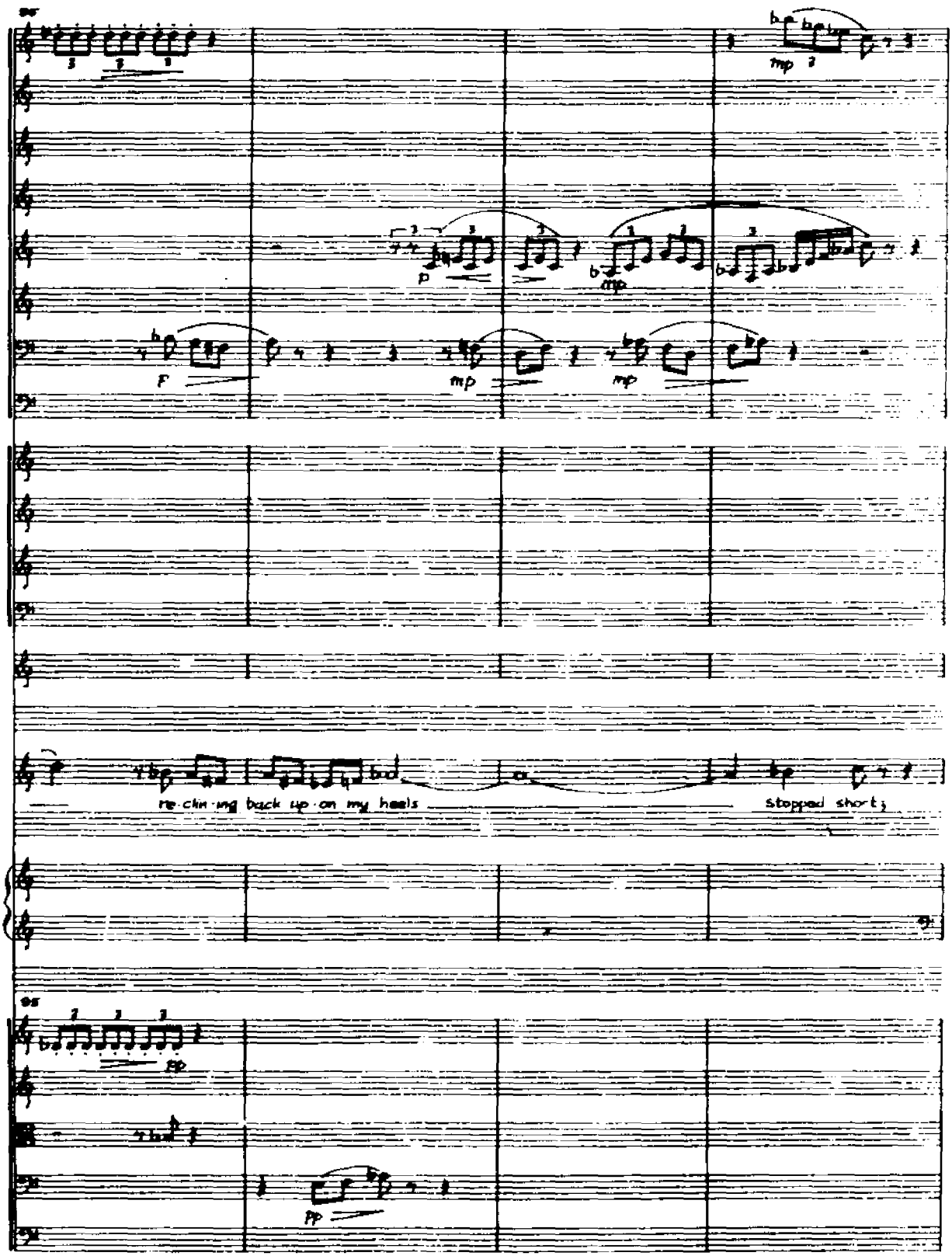

(♩=84)
poco accel
80
(♩=84)
poco accel
agitato
cresc.
or spor-tive-ly glanced side-way, leav-ing the tu-mul-tu-ous throng to cut a-cross the re-flex of a
(♩=84)
poco accel.
80

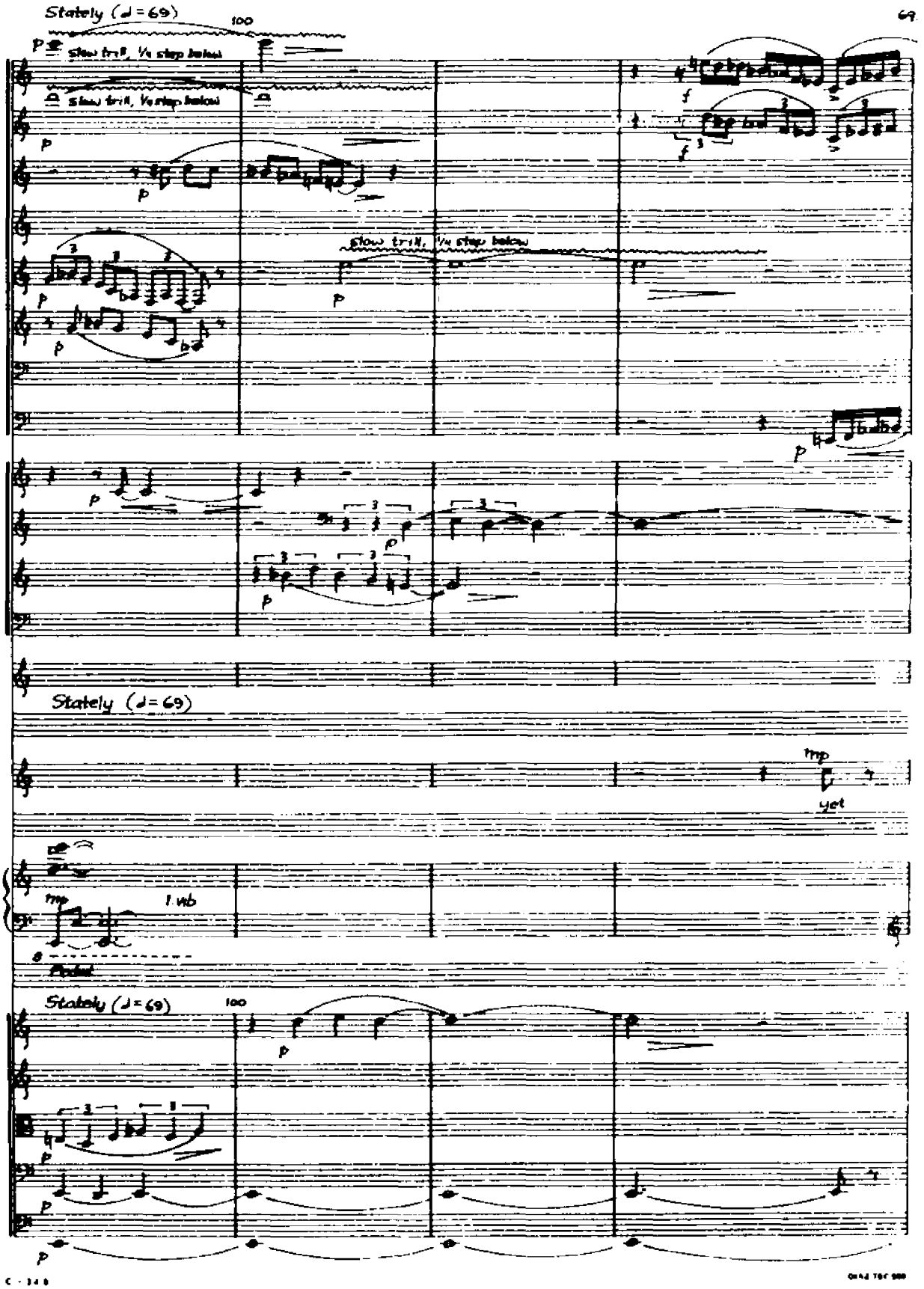

(♩= 108)
dim. al niente
(♩= 108)
(Jessi)
mp
star that fled, and, fly-ing still be-fore me, gleamed up-on the glass-y plain;
dim. al niente
(♩= 108)
CELLO div.
BASS div.
p
pp
dim. al niente
dim. al niente
dim. al niente
dim. al niente

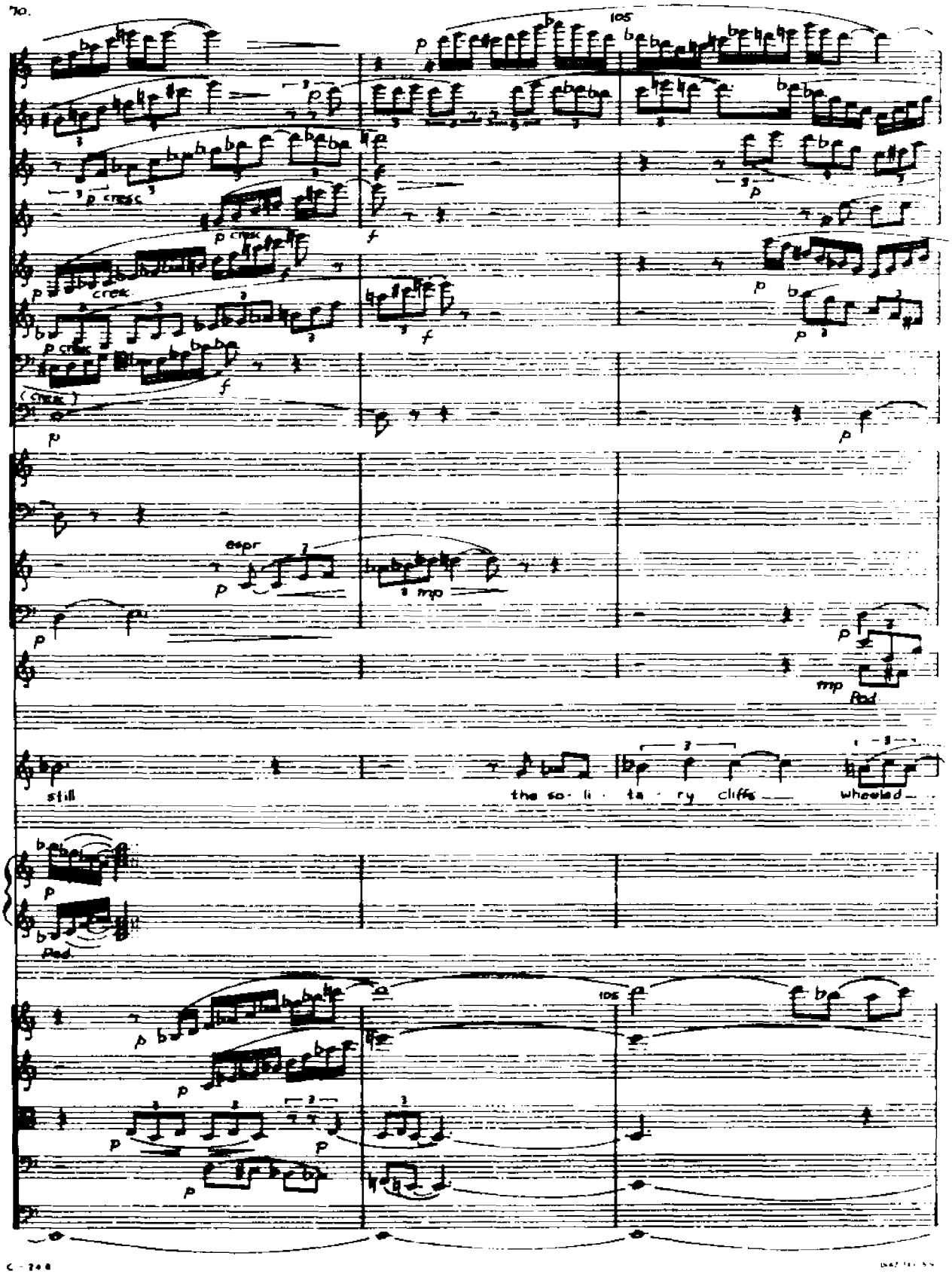

(♩= 138)
86
mf
p
(♩= 138)
mp
and
of · ten ·
times,
mf
when we had giv-en our
(♩= 138)
86
pp
mf
pp
p
poco
mf

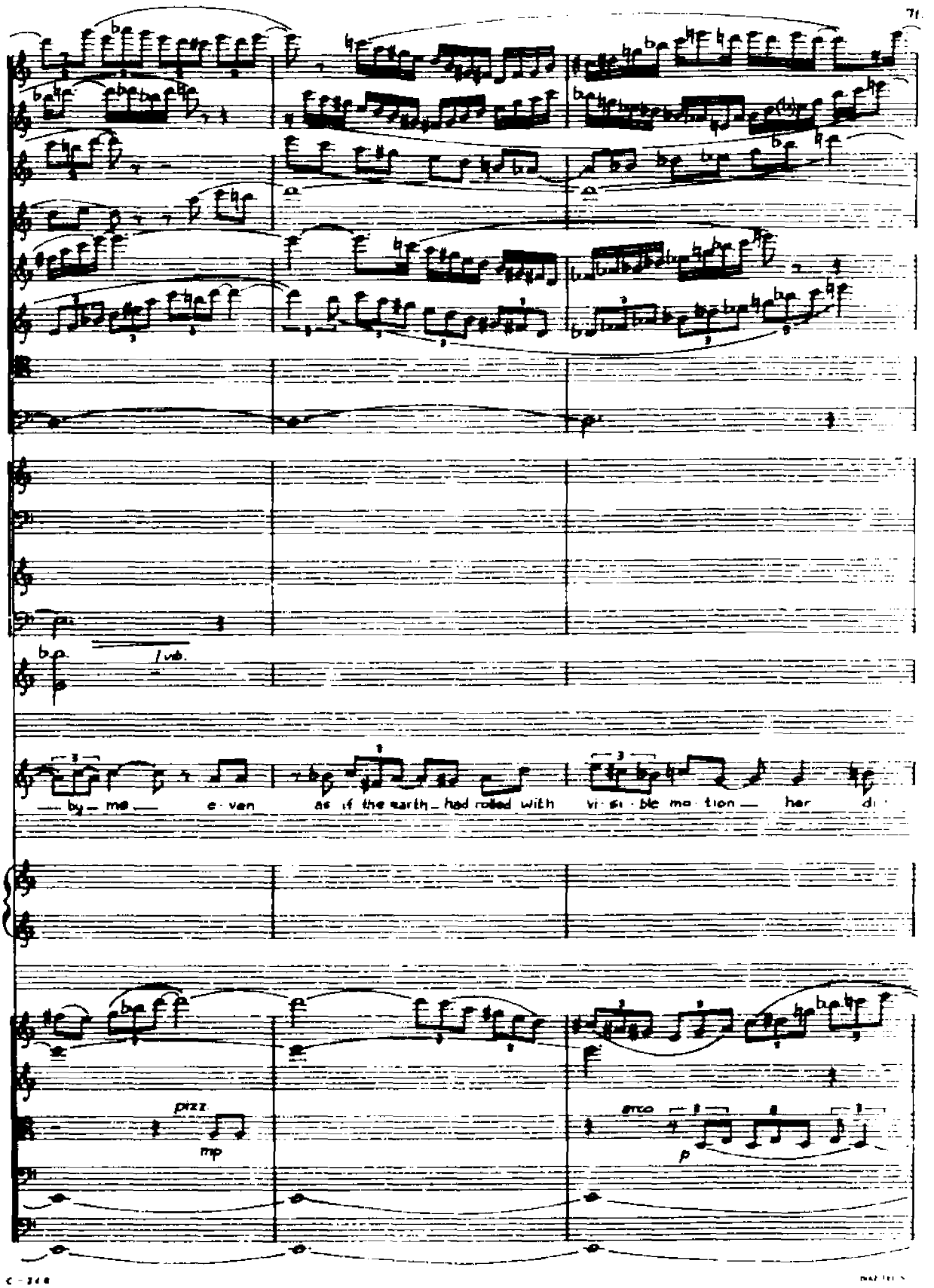

bo·dies to the wind, — and all the sha·do·wy banks on ei·ther side came sweep ing through the dark·
(pizz)

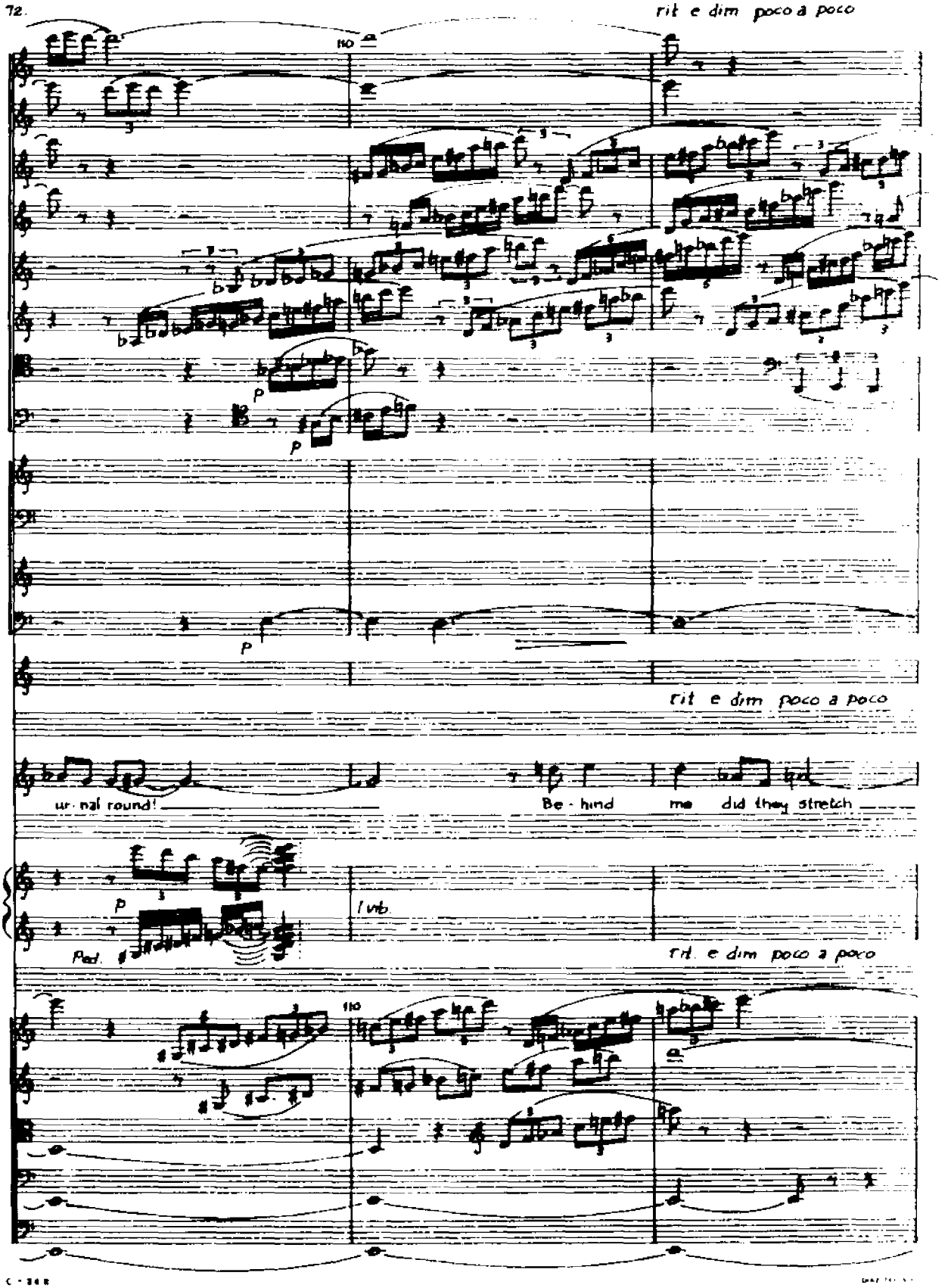

p
mp
pp
p
p
p
p
mf
ness, spin ning still the ra pid line of mo tion, then at once have I
arco
pizz
arco
pizz
p
pp
mp
pp
pp
pp
p
pp
p
pp
pp

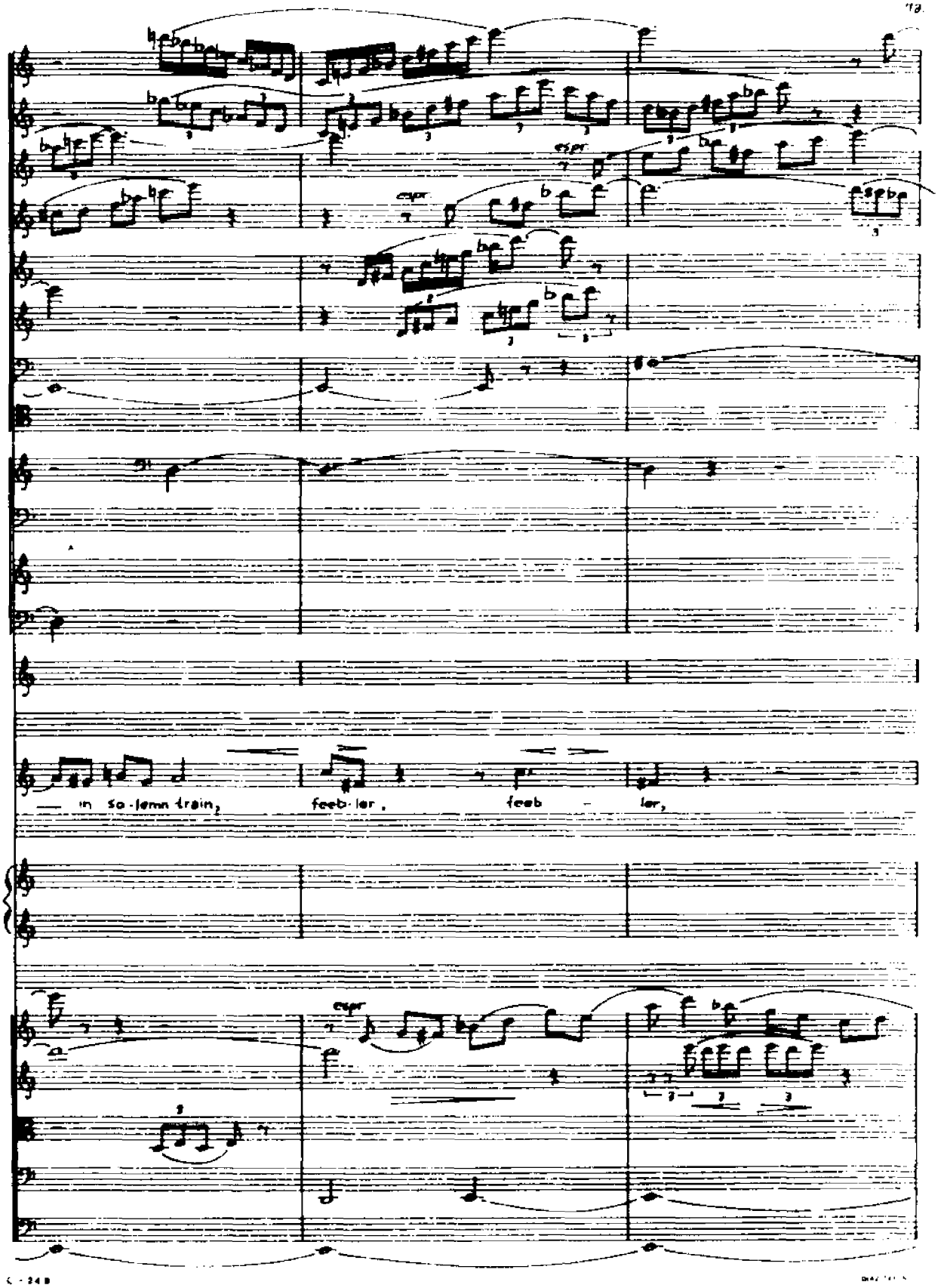

mp
p
mp
F
mp
mp
re-clin-ing back up on my heels
stopped short;
pp
pp

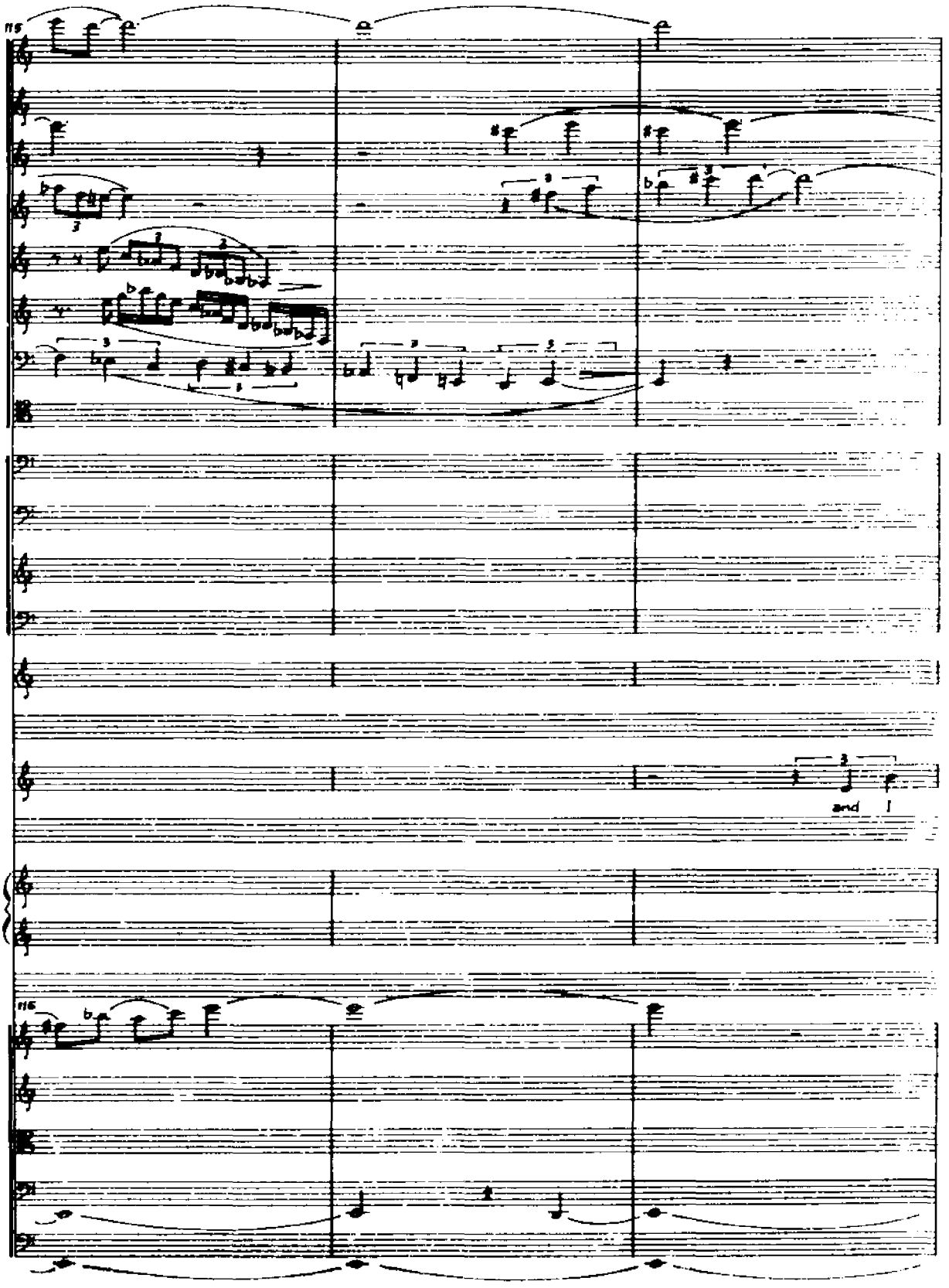

Stately (♩= 69)
100
p
slow trill, ½ step below
slow trill, ½ step below
f
slow trill, ½ step below
mp
yet
1. vib
Stately (♩= 69)
100

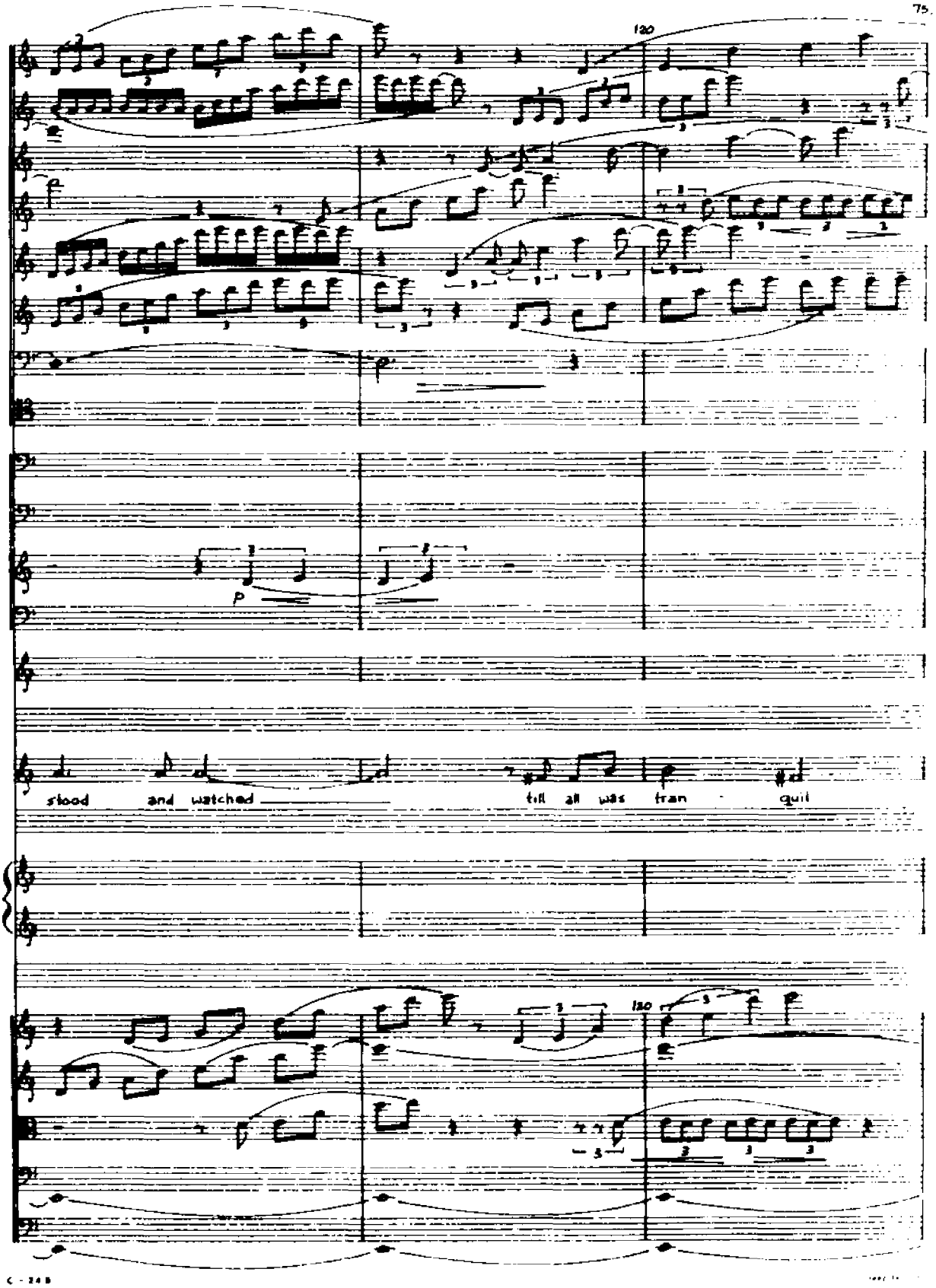

105
p
p cresc.
creek
f
espr
mp
Ped
still
the so- li - ta - ry cliffs
wheeled
105

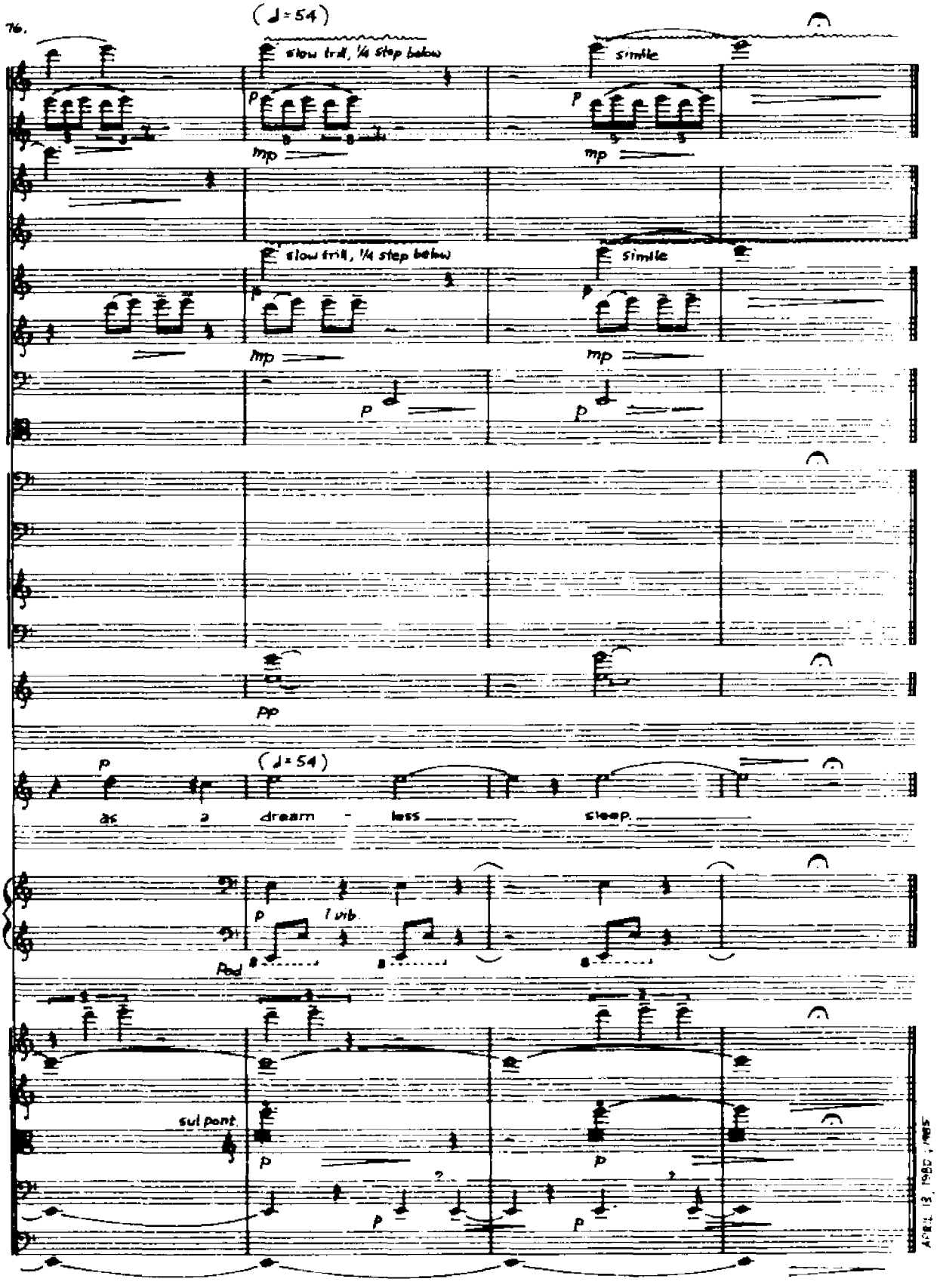

l.v.b.
— by — me — e · ven as if the earth had rolled with vi · si · ble mo · tion — her
pizz.
mp
arco
p


rit e dim poco a poco
110
P
P
P
rit e dim poco a poco
ur-nal round!
Be-hind me did they stretch
P
Ped.
l.vib.
rit. e dim poco a poco
110


— in so-lemn train, feeb-ler, feeb — ler,


115
and I
116


120
p
stood and watched
till all was tran - quil
130



T E X T S

selections from Book I of William Wordsworth's Prelude

(1850 edition, edited by Jack Stillinger)

I. This Gentle Breeze (lines 1-4)

O there is blessing in this gentle breeze,
A visitant that while it fans my cheek
Doth seem half-conscious of the joy it brings
From the green fields, and from yon azure sky.

II. Fair Seed-time (lines 301-25)

Fair seed-time had my soul, and I grew up
Fostered alike by beauty and by fear:
Much favoured in my birth-place, and no less
In that beloved Vale to which erelong
We were transplanted -- there were we let loose
For sports of wider range. Ere I had told
Ten birth-days, when among the mountain slopes
Frost, and the breath of frosty wind, had snapped
The last autumnal crocus, 'twas my joy
With store of springes o'er my shoulder hung
To range the open heights where woodcocks run
Along the smooth green turf. Through half the night,
Scudding away from snare to snare, I plied
That anxious visitation; -- moon and stars
Were shining o'er my head. I was alone,
And seemed to be a trouble to the peace
That dwelt among them. Sometimes it befel
In these night wanderings, that a strong desire
O'erpowered my better reason, and the bird
Which was the captive of another's toil
Became my prey; and when the deed was done
I heard among the solitary hills
Low breathings coming after me, and sounds
Of undistinguishable motion, steps
Almost as silent as the turf they trod.

III. Above the Raven's Nest (lines 330-39)

. . . Oh! when I have hung
Above the raven's nest, by knots of grass
And half-inch fissures in the slippery rock

But ill sustained, and almost (so it seemed)
Suspended by the blast that blew amain,
Shouldering the naked crag, oh, at that time
While on the perilous ridge I hung alone,
With what strange utterance did the loud dry wind
Blow through my ear! the sky seemed not a sky
Of earth -- and with what motion moved the clouds!

IV. In the Frosty Season (lines 425-63)

And in the frosty season, when the sun
Was set, and visible for many a mile
The cottage windows blazed through twilight gloom,
I heeded not their summons: happy time
It was indeed for all of us -- for me
It was a time of rapture! Clear and loud
The village clock tolled six, -- I wheeled about,
Proud and exulting like an untired horse
That cares not for his home. All shod with steel,
We hissed along the polished ice in games
Confederate, imitative of the chase
And woodland pleasures, -- the resounding horn,
The pack loud chiming, and the hunted hare.
So through the darkness and the cold we flew,
And not a voice was idle; with the din
Smitten, the precipices rang aloud;
The leafless trees and every icy crag
Tinkled like iron; while far distant hills
Into the tumult sent an alien sound
Of melancholy not unnoticed, while the stars
Eastward were sparkling clear, and in the west
The orange sky of evening died away.
Not seldom from the uproar I retired
Into a silent bay, or sportively
Glanced sideway, leaving the tumultuous throng,
To cut across the reflex of a star
That fled, and, flying still before me, gleamed
Upon the glassy plain; and oftentimes,
When we had given our bodies to the wind,
And all the shadowy banks on either side
Came sweeping through the darkness, spinning still
The rapid line of motion, then at once
Have I, reclining back upon my heels,
Stopped short; yet still the solitary cliffs
Wheeled by me -- even as if the earth had rolled
With visible motion her diurnal round!
Behind me did they stretch in solemn train,
Feebler and feebler, and I stood and watched
Till all was tranquil as a dreamless sleep.