

"NODAL EXCITATION"

JUNE 1, 1980

Experimental Intermedia Foundation
224 Center St.
New York, N.Y.

ARNOLD DREYBLATT

&

ARNOLD'S ORCHESTRA

OF

EXCITED STRINGS

presents

"NODAL EXCITATION"

with

Arnold Dreyblatt

&

Tracy Kirshenbaum:
Altered Double Bass Viols

Peter Phillips:
Midget Upright Princess Pianoforte

Michael Hauenstein:
Hurdy Gurdy

Arnold Dreyblatt:
Long Zither with Magnetic String Drivers

Sound by:
Bob Beleicki

Recorded by:
Steve Cellum

"Proposition IX:

To explain why an open string when sounded makes many sounds at once.

Proposition XV

To determine whether it is possible to touch the strings of an instrument or their keys so fast the ear cannot discern whether the sound is composed of different sounds, or if it is unique and continuous."

- Marin Mersenne in "Harmonie Universelle" 1637.

This information is supplied for those that are interested, but

ABOUT "NODAL EXCITATION"

My work in image and sound synthesis in the early seventies initiated an interest in the interactions of "waveform signal events." This interest has led in the past few years to a personal concern with the hearing of these events in the audio range, as sound, on acoustic instruments, and finally, as music. Because the transverse vibration of a string (as opposed to the longitudinal vibration of air columns in wind instruments, for example) presents a simpler acoustic situation with observable and controllable parameters, I have centered my recent activity in music with Stringed Instruments.

In "Nodal Excitation" I am concerned with presenting the mirror-like relation existing between the multiplicative tones naturally appearing in the harmonic series and the divisive systems usually generating scales and modal patterns. Having neither a traditional music training or childhood indoctrination in this or that cultural scale or system I have found it convenient to apply my background experimenting with electronic systems to composition with acoustic instruments; utilizing a tuning system derived from the harmonic series in lieu of traditional musical content. While the subject matter of harmonic overtones is certainly nothing new, having figured prominently in the music of quite a number of composers in the last fifteen years, I have been interested in further exploring and specifying the possibilities for myself; developing instruments and forming an ensemble to hear and explore these areas.

In my short solo performance of "Nodal Excitation" last year on Warren Street I first experimented with the possibilities of a string music created solely from the complex vibration of a vibrating string by consideration of the nodes of the string. From the program notes of that concert: "The integrity of a fundamental vibration is maintained for each string, all movement of pitch occurs in the overtone structure. A shorter speaking length is never created thru "stopping" or "fretting" techniques. Harmonic (partial) vibrations are occasionally isolated." The current performance had its beginning in this concept.

The rhythmic and pitch sense in tonite's performance exists not for its own sake but for the generation and manipulation of the harmonic series. The melodic events present for the most part are not played on any one instrument but occur as partials coalesce in the space and in the ear. The double basses (tuned to 1 & 1, and 1 & 3) produce a complex series of overtone multiples. The Piano and Hurdy-Gurdy are tuned to fundamentals and multiples of the first seven harmonics (with the addition of fundamental 11) transposed down in pitch to within the two octave range of generating tones, referred to the overall fundamental pitch of 1 = 340 Hz. The following table illustrates the pattern of generating tones used:

lower prime harmonics:							
(odd)	→	1	3	5	7	9	11
		1	3	5	7	9	11
		3	3	9	15	21	27
multiplied by:	→	5	5	15	25	35	
		7	7	21	35	49	
		9	9	27			
		11	11				

(even numbers represent octaves)

Against the wall of overtones generated by the basses the piano and hurdy gurdy serve to reinforce a specific series of overtone multiples. For instance, in 7, we have 7 x 1 (the seventh harmonic), 3 x 7=21 (a fifth above 7), 7 x 5=35 (a third above 7) and 7 x 7=49 (a seventh above a seventh harmonic) all justly tuned down so that we can play them.

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it should be noted that all this preparation merely "sets up" the situation; and that by the time the sound waves reach the ear it is often a "now you hear-it now you don't" sort of situation.

The different sections of "Nodal Excitation" explore specific harmonic regions (such as 3, 5, and 7), more complex harmonic content generated by the basses, and the isolation of harmonics by both fingering and exciting the nodes of a string.

THE INSTRUMENTATION

The Midget Upright Princess Pianoforte is approximately 32" high, 26" wide and originally had a $3\frac{1}{2}$ octave range. With the means of calculating string lengths, tensions, diameter and frequency relationships provided for me by Bob Beleicki, the piano has been completely restrung and the felt has been taken off the hammers for a brighter harmonic content. I originally tuned it to the first 23 odd harmonics but for the purposes of this piece the tuning has been restricted to the first 7 harmonics and their multiples plus 11. (see the table on previous page) There are two sets of keys and hammers for each pitch (except 1 with 10 keys) and one string for each hammer. Peter Phillips has muted selected pitches for greater dynamic range.

The Two Altered Double Bass Viols are strung with thin piano wire rather than thick wound bass strings since thinner strings are capable of vibrating in the shorter lengths necessary in the production of higher harmonics. Double Basses have been of interest to me because of their huge sound boxes and the long speaking length of its strings. The smaller bass has a speaking length of 42". I chopped off the neck of the blonde bass at the neck and extended its speaking length to 52" against the advice of a reputable acoustic bass luthier.

The Hurdy Gurdy is one of a group of instruments developed from the medieval monochord. It first came into use somewhere around the middle of the twelfth century, where it functioned as a classical instrument of the church and monastic schools in Europe. Known originally as the Organistrum, it often measured 5 to 6 feet long and required one player to turn the wheel which bows the strings, and one to depress the tangents which stop them. It was superseded by the organ, and as its bright sound became undesirable in western classical music it has only survived in its smaller minstrel-beggar form from France to the Ukraine. The instrument used here is a copy of a 14th Cent. instrument built for me by George Kelischek and it features programmable tangents for variable intonation. Only 2 of its 3 strings are used here- a drone on 1 and a melody string tuned to 5 21 3 7 1 35 3 5 21 3 49 27.

The Long Zither with Magnetic String Drivers utilizes magnetic string exciter elements manufactured commercially for electric guitars. The elements are capable of sustaining a steel string in permanent vibration, and isolated partials can be locked into sounding indefinitely. It features 6 elements and 6 strings with separate signal outputs for each string. Heard only briefly in tonight's performance, it will be featured prominently in a future performance of the orchestra.

THE MUSICIANS

The music has evolved as much collectively among the performers as from my own conception and my thanks to them for their hard work and dedication.

PETER PHILLIPS is a noted Composer, Educator, Author and accomplished musician on many instruments; now adding the Midget Upright Princess Pianoforte to his list. His knowledge, patience, and expertise have been indispensable in making this music happen, and in helping to translate my designs into practice.

TRACY KIRSHENBAUM has played mandolin and guitar, is a painter and professional film animator. Both Tracy and MICHAEL HAUENSTEIN have worked with Neon sculptures and Michael has played a number of wind instruments including Chinese Mouth Organ (Sheng) with a Chinese Music ensemble.

The members of the band have all mastered unusual instruments with difficult playing techniques in a short amount of time.

ALSO SPECIAL THANK TO THE FOLLOWING ODD FELLOWS:

Phill Niblock for his longstanding support and encouragement; Bob Beleicki for valuable help and shared sounds; Claire Fergusson for making the poster possible; Bohuslav and Steinunn Vasulka for a history of generosity and support; Yoshimasa Wada for past tubular employment; Jon Burris for listening thru microphone hell; Bill Biola far far away; and Yoshiharu Chiba for nothing. Also thanx to Steve Cellum, Alvin Lucier, Andy Statman and Barbara Soloway.

This concert supprted in part by the Creative Artists Public Service Program, the New York State Council on the Arts, The Art Resource Center in East Harlem and occurs without any support from the dia art foundation....

Arnold Dreyblatt
Brooklyn, N.Y. 1980

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