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THE MANY WORLDS OF MUSIC
SUMMER ISSUE 1970

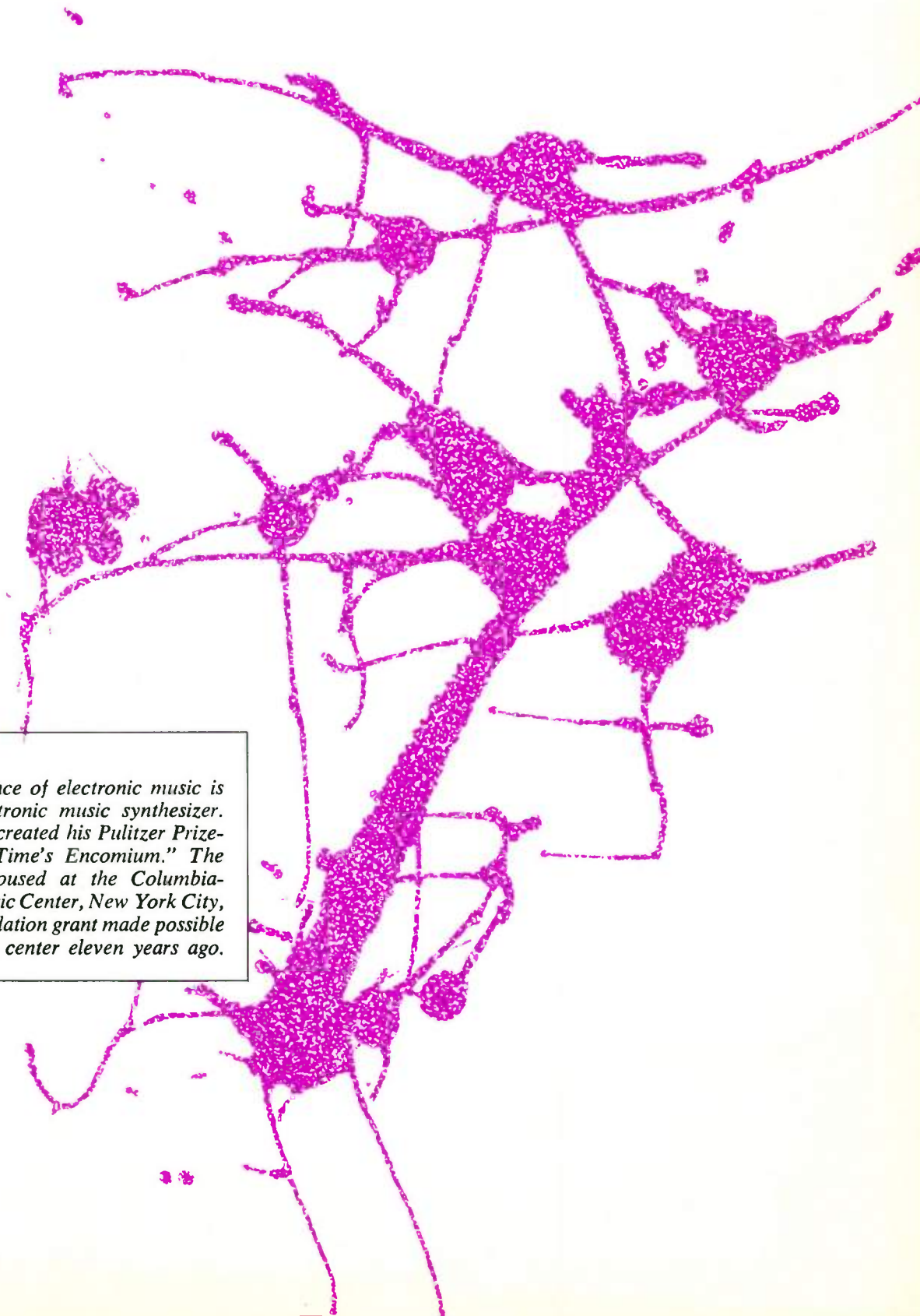
Courtesy of RCA Victor

ELECTRONIC MUSIC SPECIAL



On the Cover:

Symbolic of the emergence of electronic music is the RCA Mark II electronic music synthesizer. On it Charles Wuorinen created his Pulitzer Prize-winning composition, "Time's Encomium." The synthesizer has been housed at the Columbia-Princeton Electronic Music Center, New York City, since a Rockefeller Foundation grant made possible the establishment of the center eleven years ago.



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THE MANY WORLDS OF MUSIC • SUMMER ISSUE 1970



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MUSIC MOVES INTO THE FUTURE

The sound and means: electronic...

The possibilities: limitless...

The history of a revolution

By **CARTER HARMAN**

Among citizens of the world of music there has always lurked a feeling of restlessness and discontent; the means of making music rarely seem adequate for the desired ends. This is perhaps the chief psychological reason for the constant search for newness, for even as the Bachs, the Mozarts and the Beethovens were solidifying their splendid edifices of sound, their contemporaries were testing new attitudes and new music-making mechanisms.

This constant restless search for newness resulted in what we think of as changing styles—historically, the Baroque, the Classical and the Romantic—and in the instruments that bore the several styles to their loftiest achievements: the human voice and pipe organ; the symphony orchestra and the piano.

The search has continued in our own time, and though we cannot yet tell what its dominant style will be, we can reasonably be sure that today's seminal instrument is the tape recorder. Chief evidence is the phenomenal proliferation of the stuff composed for it, which is lumped, for better or worse, under the name electronic music.

The proliferation is already too far advanced, and its repercussions too broad, to be dismissed as a passing fad.

Hugh Davies' *International Electronic Music Catalogue*, now almost three years old, listed 5,000 electronic compositions. The American record industry, which can be depended on to blow with the winds of popular taste, has taken up electronic music with enthusiasm.

Although it might be hard to tell from reading the musical press, the United States is in a period of extraordinary musical activity. The "serious" composer population rose dramatically during the past 20 years, and Schwann's record catalogue reflects this increase in its New Listings section, where the proportion of compositions by living as opposed to dead composers has increased from 1:10 to 1:2 in three years.

In accounting for the increased activity, one cannot ignore the fact that it recently has become possible to create music at very little personal expense, mainly by use of the new mechanisms. While a modest music synthesizer remains somewhat more expensive to own than it is to create the score and parts for a symphony, practically every college music department now has some sort of electronic music laboratory, which student composers may use without cost.

Electronic music has a fundamental appeal. Composing directly on tape by use of the music synthesizer and, now, the computer makes possible a degree of virtuosity that was only dreamed of earlier. Electronic music can produce notes faster and slower, higher and lower, smoother and rougher, louder and softer and with greater precision and accuracy of rhythm and pitch than humans ever could. Theoretically, it makes conventional (or “acoustic”) instruments obsolete, since it can duplicate any of their sounds (in practice, however, current axiom says, if you want an oboe sound, get an oboe). In addition, and perhaps more to the point, it is capable of creating sounds never before made by man or nature.

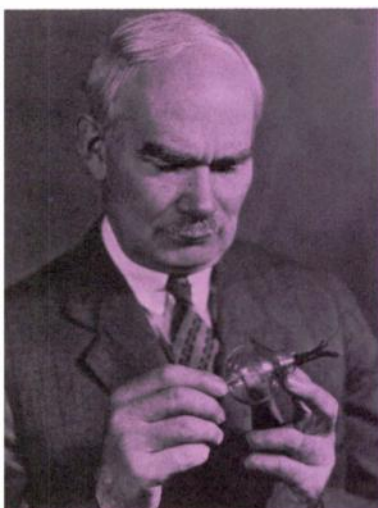
Perhaps its most telling advantage is that it frees composers from the hazards of “interpretation” by performing artists—those middlemen whose abilities cannot be guaranteed even when they are able to understand the crude instructions that can be put on paper. Like the painter, the sculptor and the author, the composer now deals directly with his medium—sound—and can create a finished product that always comes out the same way.

The restless, the dissatisfied and the curious citizens of the world of music were anticipating electronic music long before the word electronic entered the vocabulary. The word entered the vocabulary soon after Lee De Forrest invented the first electronic (vacuum) tubes, in the early 1920s. The tubes were traditionally used to harness the flow of electrons from one element of the tube to another to create waveforms which could be transduced into audible sounds. The hand-powered, pin-actuated barrel organ was probably the first music-making ma-

chine, appearing near the beginning of the 18th century. Mechanical musical snuff boxes appeared in Switzerland 100 years later. The first player piano was patented in Paris about 1850 and the advanced pianola type about the beginning of the 20th century. Meanwhile, Thomas Edison’s first cylinder phonograph was patented in 1877 and Emile Berliner’s disk machine in 1887.

By the end of the 19th century, many composers were unhappy about the limitations of means, specifically the scale of 12 equally spaced notes, which was all they had to work with. Scriabin tried to short-circuit its mechanical limitations by inventing a “mystic chord” and Debussy by use of the “whole tone scale.” The Mexican Julián Carrillo and the Czech Alois Hába (among others) delved into the possibilities of narrower intervals between the notes by creating microtonal scales, and Ferruccio Busoni, the eloquent as well as prescient composer-pianist, supplemented such speculations by proposing (in 1907) the use of music-making machines for accuracy in the creation of microtonal intervals.

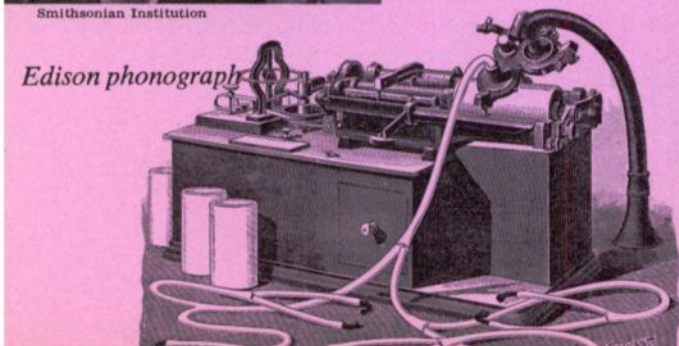
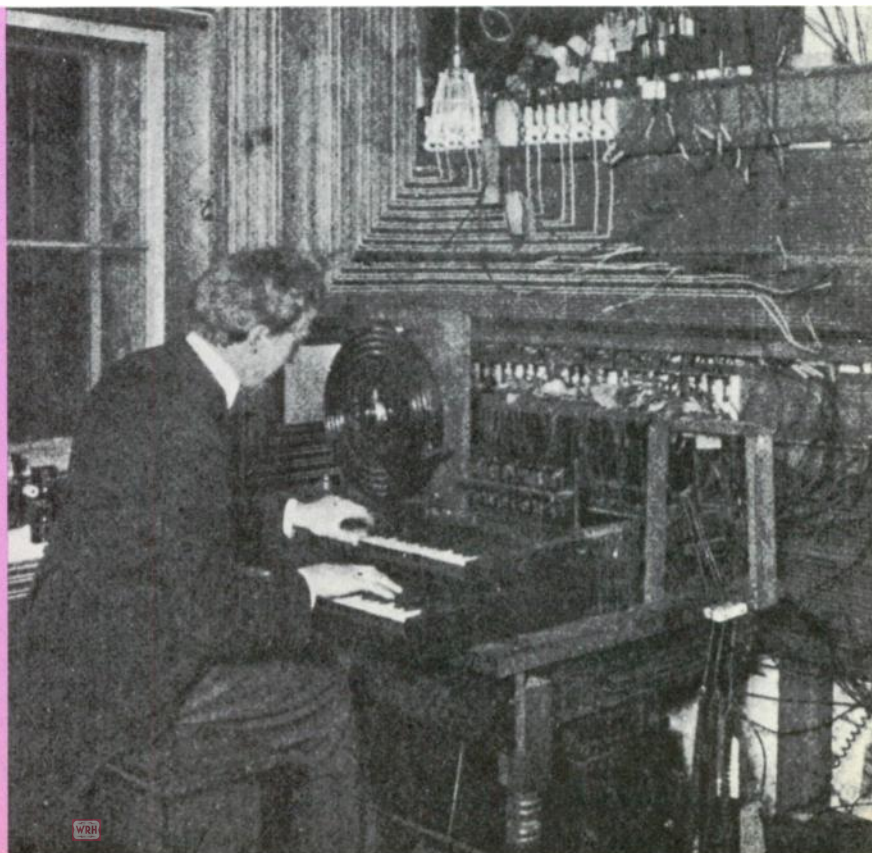
Busoni’s booklet, *Sketch of a New Esthetic in Music*, was partially inspired by reports that such a machine had actually been created: Thaddeus Cahill’s Dynamophone (also called Telharmonium). It was demonstrated in Holyoke, Mass., in 1906 — the same year that Lee De Forrest invented the electronic tube. Without the benefit of such miniature devices, the Cahill invention required the use of a series of dynamos and weighed-in at 200 tons, proving, as Otto Luening dryly comments in his *Unfinished History of Electronic Music* (*Music Educators Journal*, Nov., 1968), impractical.



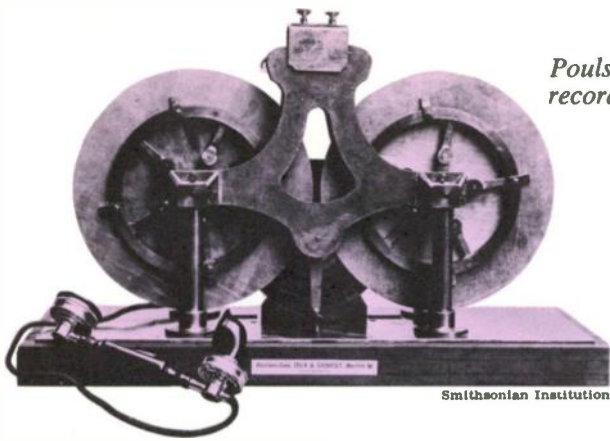
Lee De Forrest

Smithsonian Institution

Cahill Dynamophone control console (1906)



Edison phonograph



Poulsen steel tape recorder (ca.1902)

Smithsonian Institution

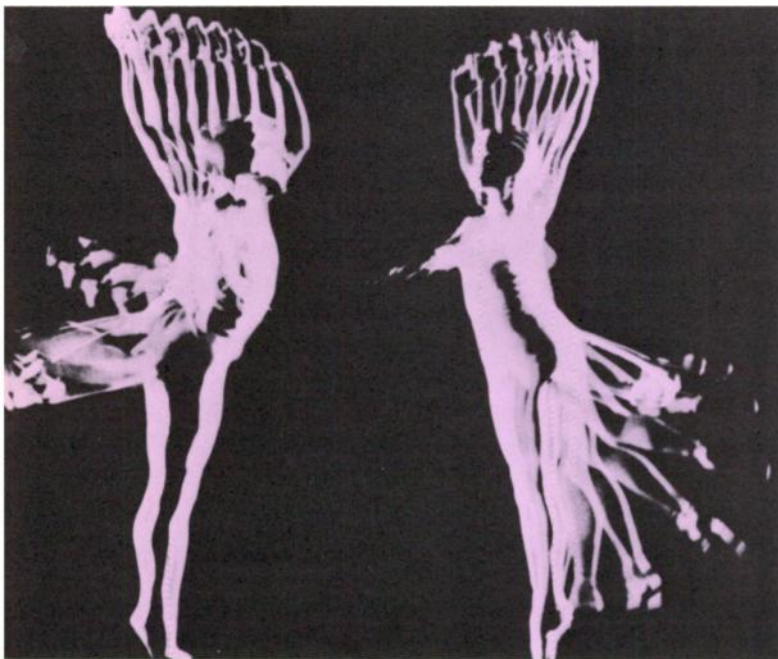


Hindemith

Theremin



Hadley Smith/Courtesy of Moog



From McLaren film 'Pas de Deux'

National Film Board of Canada

by the Russian, Leon Theremin. His Thereminovox or Etherphone makes use of the whistling electronic sound called oscillation, controlled by the performer who stands beside an antenna, growing from a black box. He waves his right hand back and forth for pitch, moving his left up and down over the box to regulate volume, a technique on the order of playing a musical saw—a sound not unlike that of Theremin.

Throughout the 20's, variants of this device kept appearing, each offering some advantage of tone or control. Chief among them are the Sphaerophon of 1924, which may have been inspired by the humming spheres described by W. H. Hudson in his utopian novel, *A Crystal Age*; the Trautonium (1928); the Ondes Martenot (1928)—for which much music has been written by such composers as Olivier Messiaen, Darius Milhaud, Arthur Honegger, Andre Jolivet and Calvin Hampton—and, in 1929, the Hellertion.

That year, the Hammond electric organ, the first one that could produce more than one note at a time, was invented (it made its public appearance in 1935), more or less bringing the series to a close. From the earliest days of the electronic age, inventors were inspired to create a single instrument that would reproduce the sound of a symphony orchestra without the complications of hiring people to hit, scrape or blow anything. The Hammond organ created sounds electro-magnetically, with one rotating disk for each note, amplified them electronically and varied their tone-colors by adding fainter overtones above the fundamental notes. Partly because the distinctive qualities of musical instruments are usually created at the instant of attack—which cannot be varied much on the Hammond—the instrument now exists as a substitute for the pipe organ rather than the orchestra.

The next few years saw a change in approach on the part of musically oriented inventors. Now there was an effort to build something that would make music without

Thus began the half century of speculation and invention that was to culminate in electronic music. In Italy, between 1910 and 1913, the Futurist movement got under way, with Luigi Russolo issuing a catalogue of noises and later sponsoring a "noise concert" featuring hand-driven machines that howled, gurgled, thundered, etc. In 1916 Edgard Varèse declared that new instruments were needed to enrich the musical vocabulary (his own "Ionisation," which made use of some, was composed in 1931). This line of endeavor was continued by the composer-pianist, Percy Grainger, and the composer Harry Partch, who invented and built instruments to sound their highly individual approaches to subtleties of pitch and tone color.

In 1920, a breakthrough occurred when the first of a line of electronic performance-instruments was introduced

the use of musicians; in other words, a music synthesizer. A pair of Frenchmen, A. Givelet and E. E. Coupleux, combined oscillators with a control system using a roll of punched paper to create the first true synthesizer in 1929. The next year Hindemith and Ernst Toch made use of variable-speed phonographs to create sounds for concert performances. At about the same time, a group of *Bauhaus* artists were experimenting with the conversion of visible or hand-drawn patterns and waveforms into audible sound by means of rotating mirrors and photoelectric cells.

This last attempt grew out of the development, during the mid-1920s, of the "optical" soundtrack for talking pictures, the first generally available medium to offer some of the flexibility of today's magnetic tape recorder. The soundtrack makes use of visible patterns on the rapidly moving film, which modulate the light reaching a photoelectric cell. The resulting voltage changes are electronically converted to audible sound. Sound effects were created early by running tracks backwards and at varied speeds, but the soundtrack's limited fidelity and cumbersome nature restricted its use as a musical instrument.

There were, and still are, experiments with the creation of sounds by writing or scratching the track by hand. A pioneer in the hand-drawn synthetic sound area, Canada's Norman McLaren became involved after noting how scratches on film squawk when passed through the playback machine. He began drawing sound directly on film. By changing the size, shape and heaviness of his ink marks, McLaren learned to control loudness, pitch and tone. By drawing or exposing two or more patterns on the

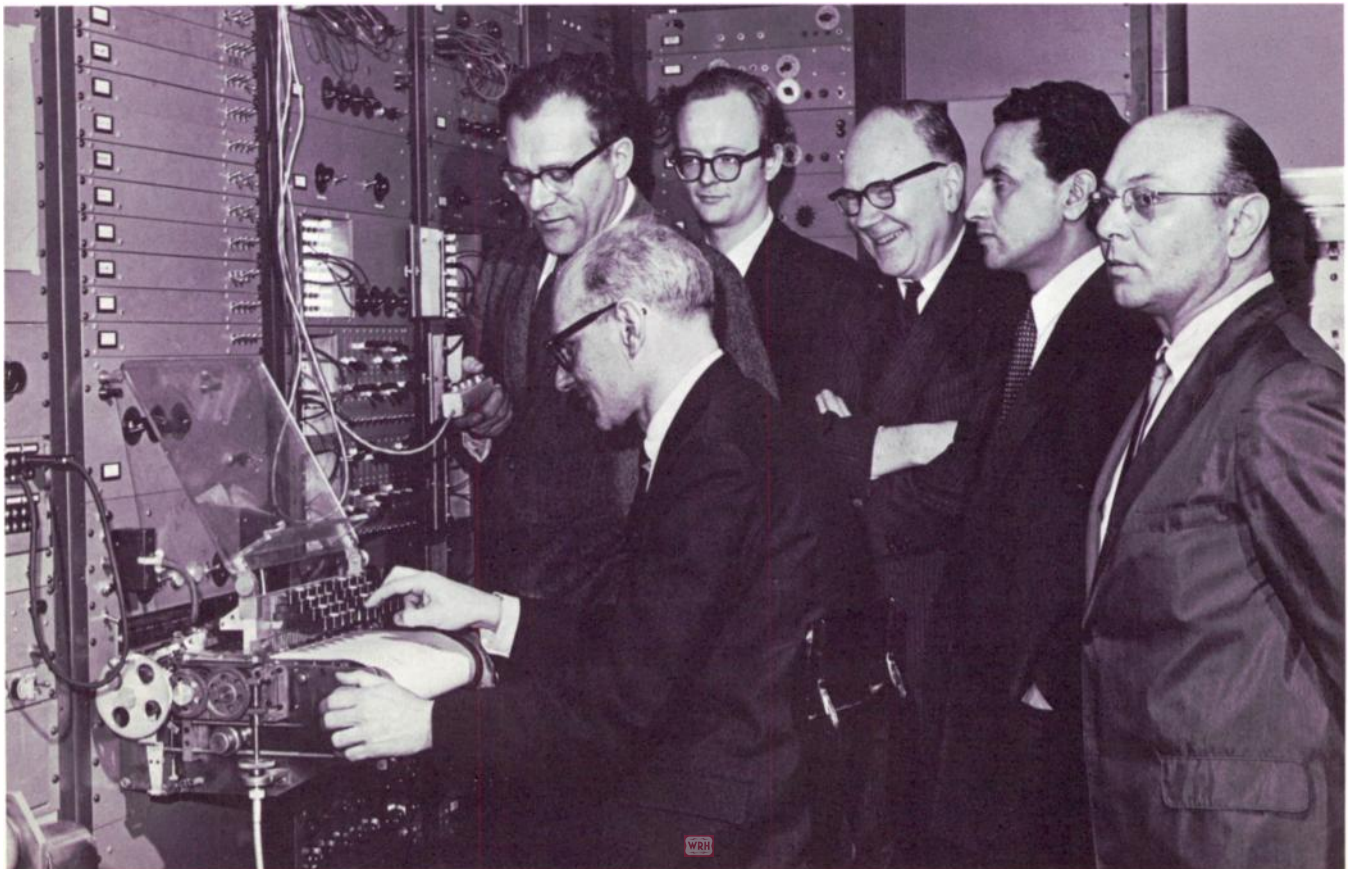
same bit of film, he found he could create harmony and textural effects.

The possibility of using magnetic fluctuations for recording and reproducing sound were known as early as 1898, when a patent was issued to Valdemar Poulsen of Copenhagen. The first magnetic tape recorder, the AEG magnetophon, was demonstrated in Germany in 1935. The tape was made of metal, and the device did not reach manageable proportions until plastic tape was developed, after World War II. The working side of this tape is coated with an emulsion containing microscopic metallic particles. As it passes the recording head, a fluctuating magnetic field, created in response to modulated electrical signals, causes the particles to align themselves in patterns. These patterns can later be made to create identical voltages in the playback head, whence they are fed to an amplifier and converted to audibility.

The tape recorder provided the first practical step towards composition that is completely independent of physical sound production, since the tape flows with the passage of time, and yet allows any instant to be picked up and isolated. It is, moreover, easy to clip and splice bits of tape together, and to play the tape backwards for novel effects, and at varying rates of speed to create pitch and character changes.

The music synthesizer, or something resembling this ideal gadget, turned up in several varieties before one was developed that had a broad sound-potential that could be effectively controlled. The definitive one was the RCA monster, one version of which was installed at the Colum-

Electronic pioneers at the RCA Sound Synthesizer (l. to r.): Milton Babbitt, Vladimir Ussachevsky, Charles Wuorinen, Otto Luening, Halim El-Dabh and Bulent Arel (ca.1961, Columbia-Princeton Center).



bia-Princeton Electronic Music Center in New York in 1959. It consists of a battery of signal generators, followed by amplifiers, modulators, filtering devices and "envelope" controls to shape the electronic waves before they emerge as sound waves.

The method of control is a roll of paper tape, similar to a player piano roll, which is punched in pre-determined patterns by the composer, and then unreeled over a "reader" to trigger the desired type and sequence of sounds. These are tape-recorded, segment by segment, until all the elements are on tape, and the segments are then spliced together in the ordinary way.

More recent synthesizers—prominent among them machines called Moog, Syn-Ket and Bucla—are more portable and "playable." That is, much of the elaborate setting-up of sound sources and modifiers has been simplified and automated, and there are piano-type keyboards to trigger

them. In addition, they feature a wonderful—and terrible—device called a "sequencer" which can release any sequence of aural events (sometimes just notes) up to (normally) 8, in the same pattern any number of times.

The first electronic music (I use the word generically) was considered either as experimental or as sound effects, even by its creators. The earliest date for actual results is 1948, when producers in Berlin and New York began to work independently. The German was Oskar Sala, who used and still uses an instrument called the mixturtrautonium to create electronic compositions. In New York, the team of Louis and Bebe Barron set up their own laboratory and started creating soundtracks for science-fiction movies, the best known among these films being *Forbidden Planet*.

Almost simultaneously, the first major studio had its inception when Pierre Schaeffer, a Parisian radio broadcaster, presented his first work on the air in May, 1948, making use of phonograph records, as he as yet had no tape equipment. His first composition was "Railroad Study"; it made use of steam whistles and other train sounds, laboriously compiled and "composed" by use of a series of special phonograph records (Schaeffer did not obtain tape equipment until three years later) re-recorded and mixed onto the final disk.

This medium, making use of sounds collected by microphone from natural or man-made sounds, he called *musique concrète*—"concreteness" being distinguished from the "abstractness" of sounds made by musical instruments. Although Schaeffer continued to compose in this manner, his training was not basically musical, and in 1949 he began the first of the musical collaborations that distinguish the medium, with the composer Pierre Henry, a pupil of Messiaen. In 1951, the French radio established the first electronic music studio.

That year, composers in Germany and New York began working in slightly different aspects of the medium. In New York, Vladimir Ussachevsky began experimenting with the use of a tape recorder for the transformation of piano sounds, and the following year began a long-lasting collaboration with Otto Luening, who used his own flute



UNESCO Photo/Courtesy of Columbia-Princeton Center

Pierre Henry

AMERICAN COMPOSERS ALLIANCE

Two Concerts of Contemporary American Music

conducted by

LEOPOLD STOKOWSKI

in the auditorium of the Museum of Modern Art

Sunday, October 26th at 8:30 P.M.

and

Tuesday, October 28th at 8.30 P.M.

presented under the auspices of
Broadcast Music, Inc.

Second Concert

Tuesday evening, October 28th at 8:30 P.M.

Leopold Stokowski, conductor

VLADIMIR USSACHEVSKY

Sonic Contours

(first performance)

OTTO LUENING

Low Speed

Invention

Fantasy in Space

(first performance)

For tape recorder

INTERMISSION

BEN WEBER

Symphony on Poems of William Blake,

opus 33 (first performance)

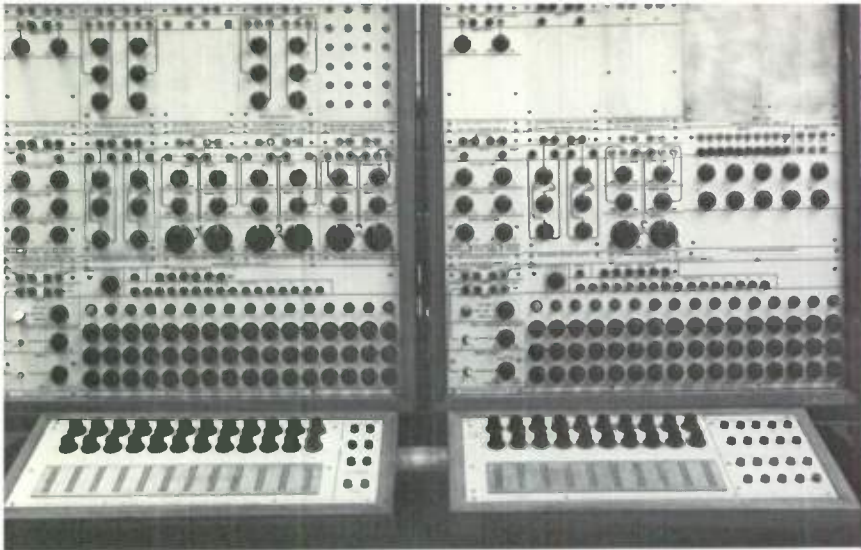
moderato assai (Autumn)

lento assai ("Never seek to tell thy love")

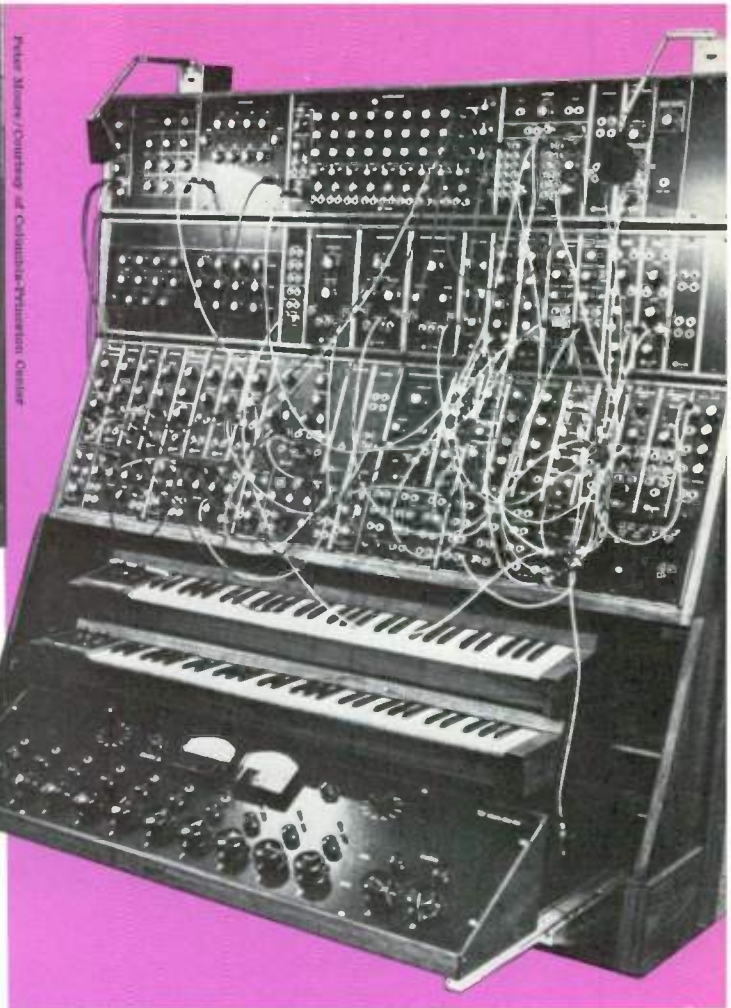
largo misterioso (Mad Song)

allegro moderato (To Spring)

Warren Galjour, baritone



Bucla



Moog synthesizer

Courtesy of Moog

playing for a sound source. Their works were performed before the public in 1952, with premieres of Ben Weber and Elliott Carter compositions and a Lou Harrison opus. The concert: a landmark BMI-sponsored event at New York's Museum of Modern Art. David Randolph discussed the event in *Horizon Magazine* (1959):

"How many of those present in the auditorium... on October 28, 1952, realized that they were witnessing the beginning of a new era in the annals of music in America? As is the case with so many important happenings—events that are later invested with a certain aura by the passage of time—this was announced with no special fanfare... The occasion was a concert of contemporary American music conducted by Leopold Stokowski... Mr. Stokowski spoke briefly about the fact that the audience was now going to hear music conveyed directly from the composer to the listener, without the necessity of musicians to 'interpret' it. Then, he, too, left the stage, and the audience was left face to face with the (tape recorder) speaker."

In 1954, the Luening-Ussachevsky "Rhapsodic Variations" became the first work to combine electronic sounds with those of a live symphony orchestra in concert. The collaboration of the two men was also to result in the establishment of the great Columbia-Princeton Electronic Music Center.

In Germany, a triple collaboration resulted in purely electronic music. The collaborators were Werner Meyer-Eppler and Robert Beyer—specialists in mathematics, physics, communications and electronics—and Herbert Eimert, a composer. In October, 1951, a broadcast from Cologne featured the "Sound-world" of music created on an electronic instrument called the melochord, and the collaborators resolved to establish a laboratory there. The music that came from this group was characteristically of the pointillist style, an extension of the music of Webern, for which the medium is particularly well suited.

It was in 1953 that the most famous of European electronic composers, Karlheinz Stockhausen, began working

Ussachevsky and Luening
(ca.1952)



Harold Stein/Courtesy of Columbia-Princeton Center



John Cutala

Stockhausen

at Cologne. An eloquent theorist as well as composer, Stockhausen expressed the reasons why he turned to purely electronic sound sources, implying that the vast world opened up by natural ("concrete") sounds was simply too chaotic to be systematically controlled. Using the simple sine wave (the source for his "Studie I"), he could apply the principles of serial composition, not only to pitch but to rhythm and timbre. Nevertheless, his next important work, "Gesang der Jünglinge" (1956) made use of mixed sound sources, superimposing on the electronics the fragmented, half-buried, multiple-channeled voice of a boy.

At about this time, in New York, Edgard Varèse received a gift of a studio tape recorder which fulfilled his quest of decades for an adequate new instrument. By 1954 he had completed the first version of his "Déserts" for tape and orchestra (he re-recorded the electronic part at the Columbia-Princeton EMC with the help of Mario Davidovsky in 1961), and began on "Poème Electronique." The two works were to become books of the Bible to a whole generation of young composers. Also, in Milan's new electronic music studio, Luciano Berio was at work applying the principle of indeterminacy to the medium.

Milton Babbitt was the first composer to conquer the intricacies of the giant Columbia-Princeton music synthesizer to the degree necessary to produce music on it (there are still very few composers who can do this without the help of an engineer). He leads what might be called the classical school of electronic music, minimizing



Melle playing his electronic saxophone

the spectacular aspects of the sound possibilities and concentrating on fantastic structures built using serial techniques. His colleagues in this school include the Argentinian-American Mario Davidovsky and the Turkish-American Bulent Arel.

With the appearance of playable synthesizers in the mid-1960s, electronic music entered its romantic period. Among the germinal events was a commissioning program by Nonesuch Records, which resulted in a number of important works, notably the Pulitzer Prize-winning "Time's Encomium" by Charles Wuorinen and the evocative "Silver Apples of the Moon" by Morton Subotnick. This company also released a helpful though hard-to-follow album called *The Nonesuch Guide to Electronic Music*, which explains and illustrates the workings of the medium.

Other notable and sometimes sensational contributions have been made by Berio, Tod Dockstader and Jacob Druckman, among others. A pioneer in the "live" use of synthesizers, in concertlike combination with other players, is John Eaton, who specializes in the use of the Syn-Ket. Pre-recorded tapes in combination with live players are now commonplace; less familiar is the use of electronics to modify live sounds as they are made on stage, which has been successfully accomplished by Henri Pousseur and Pauline Oliveros, among others.

The use of amplification, electronic devices and instruments in jazz is on the rise. Over the past four decades, electronically motivated sounds have been heard; only



Miss Peacock and the Moog

recently, however, has there been a rush of interest in the jazz idiom. Technology and the thrust of music are running a parallel course.

The vibraharp (also known as the vibraphone), with its revolving fans under the bars to create a controllable vibrato, was the first instrument with an electronic base to achieve currency. Lionel Hampton helped to popularize it in the 1930s. Almost simultaneous with the emergence of the vibraharp, the guitar, via amplification, assumed a new position as a jazz solo instrument. Eddie Durham and particularly Charlie Christian were the forerunners of uncountable other artists who availed themselves of the guitar in its new guise.

The bass also was in the vanguard of instruments to be electrified. Monk Montgomery, Lionel Hampton bassist in the early 1950s, played a pioneering role. The reason according to Hampton: many low notes when played on the acoustic bass were lost in the big band context.

Other instruments used in the jazz idiom have acquired new strength and dimensions in recent years, since being plugged into the wall. The electric piano, which provides a variety of sounds, makes it easier to play—or so the players say. It is used by many major artists, including Herbie Hancock, Bill Evans, Joe Zawinul and Cedar Walton. The electronic attachments for saxophone widen range and amplify sound. Eddie Harris is a leading proponent of this type of saxophone; Sonny Stitt and Lee Konitz also find these devices to their advantage and have added amplified instruments to their creative arsenal.

Other members of the reed family, i.e., flute, clarinet, are now electronically strengthened.

Manufacturers also have marketed amplification devices for brass. Trumpeters Clark Terry and Nat Adderley and trombonist Urbie Green, among others, use one kind or another. With electronic help, the tone of the instruments is enhanced and an additional lower octave becomes possible. Even drums now benefit from the variety of color and nuance made possible via amplification. Jazz percussionists like Tony Williams and Max Roach have used the new drum kits, with provocative results.

Don Ellis' involvement in this area is an important one. His orchestra is electronically enhanced—winds, brass—he also uses a keyboard device called a clavinet, specially constructed so the player can bend the pitch of the notes. Ellis himself plays a four-valve trumpet, connected to a pre-amp, that allows him to play quarter tones. In addition, he employs a tape loop device that produces repeats of anything he plays. Ellis can play as many as three or four notes while the original is repeating, producing chords.

Musique concrète has been employed by Roland Kirk. An album produced by Bill Dixon, featuring the Robert F. Pozar Ensemble, includes one work that couples electronically generated sounds with the spontaneous feeling of jazz. Jimmy Giuffre has used tape manipulation in some of his performances, as has pianist Roger Kellaway. Also increasingly involved with electronic music are William O. Smith, Quincy Jones, Oliver Nelson and Sun Ra.

George Russell recently entered the electronic sphere with the composition "Electronic Sonata for Souls Loved by Nature," centered around a tape he prepared in the electronic music studio of Radio Sweden. The tape includes fragments of many different styles of music—avant-garde jazz, ragas, blues, rock, serial music, etc.—treated electronically. It serves as a foundation upon which non-electronic musical statements of a pan-stylistic nature can be projected.

Paul Bley and Annette Peacock are into electronics. A recent concert at New York's Philharmonic Hall, showcasing the Bley Trio and the Peacock Ensemble, was entirely a matter of compositions for electronically amplified and enhanced instruments and a Moog synthesizer. Bley played the synthesizer keyboard, and Miss Peacock, via rearrangement of some of the modules, used her voice to activate and control it.

Lalo Schifrin is about to embark on a musical adventure involving electronics. Commissioned by the John F. Kennedy Center for the Performing Arts, Washington, D.C., for its opening season (1971-72), the work—with text to be written by Ray Bradbury—tentatively is titled "Madrigals for the Space Age." It would feature a symphony orchestra, Moog synthesizer, rock vocal quartet and chorus.

One of the earliest innovators, with jazz roots, in the

electronic area is Gil Melle. Working with electronics since 1959, Melle has developed his own concepts and compositions, instruments and devices. His first instrument, created early in the 1960s, was an electronic saxophone. Since then, he has designed and made use of other electronic instruments.

At the Monterey Jazz Festival in 1967, Melle introduced his Jazz Electronauts, later committing them to record. The unit featured five of his electronic instruments as played by three other jazz-oriented musicians and himself. Melle also has performed with his group at concerts given at a variety of schools and in mixed-media presentations on the West Coast.

Popular music dove into the electronic age when the first amplified guitar was introduced (by the Gibson company) before World War II. A vast complex of new ideas about what music should sound like resulted, not only from such ear-bending effects as feathery sounds of *pianissimo* that thunder out *fortissimo*, but from the hairy distortions that resulted from players turning up the volume control beyond the limits of the equipment. Today, guitars are shaped from slabs of wood (the acoustic soundbox being obsolete) and are capable of displacing the acoustic bass instruments as well.

Distortion, of course, is a requirement for any authentic rock sound. Distortion is now controlled by foot pedal, which actuates a ring modulator, commonly known as the *fuzz box*. This device accepts the pure guitar (or voice or any other sound) and puts it out as a thick, hoarse and

distinctive sound that has its own appeal. Proficient use of the pedal can produce wah-wah or talking effects, and can also be made to swallow the attack of each note, thus making an eerie organlike sound.

Another rediscovery is *tremolo*, common to most guitar amplifiers and electric organs. It is now used for tremulating the human voice as well as the other instruments.

Tape echo or *head reverberation* comes in a black box that can also be controlled by a foot pedal, introducing various speeds and levels of reverberation. This is the source of that hackneyed repetition-to-infinity that can be made to create an effect of disorientation.

In addition, electronic pickups (similar to phonograph pickups) have been adapted to piano- and harpsichord-like instruments, which are made more portable by elimination of the big sounding-boards, and more versatile by use of filters and modulators to manipulate the sound. The equipment required for all of these devices makes an engineer an almost obligatory new member of any properly electrified rock group.

Although the use of electronic sound sources in rock music is in a musically primitive stage, being limited to sine-wave whistles, bleeps and other sound effects, the capabilities of the recording studio are used to the fullest. Buried in the mix are such honorable devices as tape reversal and phase reversal effects, which produce a hallucinatory effect of the music or musicians wandering back and forth between channels.

Many big-name groups spend as much money record-

The Beatles and Yoko Ono listening to a record playback



ing a single new LP as it would cost to equip a complete electronic music laboratory. Making use of multiple-track tape machines, they "lay down" the basic elements of the music with a microphone and a private recording channel for almost every instrument. This material is subsequently "mixed" and balanced in the control room. If more or other music is needed, it is easily added, the extra musicians using earphones to synchronize their playing with existing material. In this way, sound structures of impossible luxuriousness have been built up.

The technique of what might be compared to orchestration in electronic music—putting the composition into a form that will make it come out on the playable magnetic tape—is a particularly arduous enterprise. The composer must, ideally, know in scientific terms, some highly intimate facts about every note, i.e., its duration (defined in terms of the basic rhythmic unit in milliseconds), amplitude (loudness), pitch, envelope (attack, sustaining and decay pattern), starting time, the characteristics (frequency and depth) of any vibrato or tremolo, and the particular waveform and the manipulations required to give it the desired tone color.

It is not necessary for him to understand electronics, although it helps.

At his disposal is an array of devices that do not produce any sounds at all, but only waveforms. The basic signal generators produce (1) sine waves, representing the simplest possible tones; (2) white noise, which is perhaps the most complicated sound, covering the entire audible spectrum at once, and sounding like a combination of roaring waterfall and hissing steampipes; and (3) certain more complicated waveforms called "sawtooth," square-waves, etc. Other elements are added to the sine wave to give it texture and color; unwanted aspects of white noise are filtered out until the desired tone is reached.

Among other modifying devices, the most important are the envelope controls. The envelope is, predictably, the word for how the sound starts and stops, and how it behaves in between. The attack is the most important instant in the life of a sound; it can be sharp or soft, i.e., resembling a pizzicato or an untongued flute tone, and it can contain various other qualities such as the rasp of a violin bow. The ending of the tone, called the decay, can also be sudden or a gentle fading away.

When all of the qualities of the tone have been programmed, the waveforms, still in the form of voltages, are passed through an amplifier and loudspeaker, and only then can they be heard. A composer on the Columbia-Princeton synthesizer sets up the sounds by ear before he punches the paper tape, but may still have to make corrections. The operator of a playable synthesizer can check his effects more easily by programming the events into his sequencer and letting it repeat his phrase, modifying it by ear until he is satisfied. In both methods, when all is well,

he punches the record-button and captures his fragment on tape.

The use of computers can entirely eliminate the need for complex and cranky signal generating and processing equipment—the whole synthesizer—because when properly programmed, an analogue computer can *compute* the signal patterns and impress them directly onto the final tape (a tape recorder tape is an analogue tape). This method widens the horizons of possible sounds beyond the limits of the synthesizer, and increases the possibilities for precision and details of the sound patterns.

For example, when the composer of an orchestral work writes a note, it is the player who provides the sharpness of attack, the trueness or stability of pitch, the amount of dynamic change and, because of the instrument in his hands, the variations in the timbre or color of the sound. When a trumpeter makes a crescendo, certain new overtones appear to make the sound "brassier." When a "trumpet" sound on a synthesizer is made louder, nothing new appears unless the operator adds it. It is possible to program a computer so that it will automatically make these tiny adjustments whenever they are needed.

At this writing, composers who use computers must work with large digital computers, which are capable of storing and releasing all the necessary information. Unfortunately, a digital tape contains nothing but numbers, and it is necessary to run it through a digital-to-analogue converter (or "interface") which will produce the playable tape. Because there is no actual sound generating equipment, the composer cannot test his music until the entire procedure is complete. Only three or four laboratories in the country are equipped for computer composing.

Does all of this make the composer an adjunct to a machine? Or even to a system? The experts say no; it was no easier to master the machinery of a symphony orchestra, in its youth, and the techniques of composition have always been subject to a massive body of rules. Music at the end of the 20th century has found its new instrument.

Bibliography

ELECTRONIC MUSIC, 1948-1953, by Lowell Cross; Perspectives of New Music.

AN UNFINISHED HISTORY OF NEW MUSIC, by Otto Luening; Music Educators Journal, November, 1968.

ELECTRONIC MUSIC REVIEW, January, 1967-April, 1968.

CONTEMPORARY COMPOSERS ON CONTEMPORARY MUSIC, Elliott Schwartz and Barney Childs, editors; Holt, Rinehart & Winston, 1967.

Carter Harman, composer, critic, record producer, was music editor of Time and a member of The New York Times music staff. Author of "A Popular History of Music" (Dell) and widely published in major national magazines, at present he is executive vice president, Composers Recordings, Inc.

A DISCOGRAPHY OF ELECTRONIC MUSIC ON RECORDINGS

This discography was compiled by Peter Frank, a student at Columbia College, New York, and conductor of a weekly radio program devoted to contemporary music which is broadcast over the college's FM station, WKCR. He was assisted by the staff of the Columbia-Princeton Music Center, which opened its files to him, and by Jim Carroll, who helped with the listing of the recordings of popular music. Hugh Davies, *International Electronic Music Catalogue*, Cambridge, Mass.: MIT Press 1968, was of tremendous help, as were the monthly issues of the *Schwann Catalogue of Long Playing Records*, Boston, Mass.

The following symbols have been used in the preparation of this discography:

- *The work is for electronic sound with live accompaniment
 - **non-electronic work available on record to bring the composer's discography up to date
 - †recording uses a live electronic instrument, usually the Theremin or Ondes Martenot; taped electronic sounds are not present; only records produced in the United States are listed
- (1) licensed for public performance by BMI
 - (2) licensed for public performance by others
 - (3) performing rights status in the United States unascertainable as of June 1, 1970

Where the information was available, the publisher is also listed.

AITKEN, ROBERT

Noesis (1) Folkways FM 33436
Alpha Film Music

ALMURO, ANDRE

Phonolite I and II(3) Mouladji/Festival
EMZ 13514 (mono)
Structure rouge (3) Mouladji/Festival
EMS 13510 (mono)

AMM

*Improvisation (3) Mainstream MS 5002

ANHALT, ISTVAN

Composition #3 (1960) (1)
Composition #4 (1962) (1) Allied
Record 17
Berandol Music

APPEL, KAREL

Musique barbare (3) Philips (Neth.)
99954 DL (mono)

AREL, BULENT

Electronic Music #1 (1)
Fragment (1)
Music for Sacred Service: Prelude and
Postlude (1) Orpheum SN-3
Purist Ent. Ltd.
Stereo Electronic Music #1 (1)
Columbia MS 6566
ACA

ARTHUYS, PHILIPPE

Boite a musique (3) Ducretet-Thomson
DUC 8 (mono)
Et l'enfant resta seul (3) Disques
Lumen LDI-511 (45 rpm. mono)
Le crabe qui jouait avec la mer (3)
Boite a musique BAM LD 070 (mono)

ASHLEY, ROBERT

*Untitled Mixes (1) ESP Disk 1009
*Wolfman (1) ESP Disk 1009; Source
1 (included in "Source" magazine #4)
Unpublished

ASUAR, JOSE VICENTE

Preludia "La Noche" 1 (3) Jornadas de Musica Experimental JME ME 1-2 (mono)

AUSTIN, LARRY

*Accidents (1) Source 2 (included in "Source" magazine #4)
Composer Performer Edition

AVNI, TZVI

Vocalise (3) Turnabout TV 34004S

BABBITT, MILTON

Composition for Synthesizer (1)
Columbia MS 6566

Ensembles for Synthesizer (1)
Columbia MS 7051

***Philomel (1)**

Co-written with John Hollander,
Acoustic Research Record

**All Set (1) Columbia C2S 831

**Compositions for four instruments (1)

**Composition for viola and piano (1)
CRI 138 (mono)

Associated Music Publishers, Inc.

**Du (3) Son-Nova S-1

**Partitions (2) RCA Victor LSC 7042

BADINGS, HENK

*Armageddon (1) Point Park College
KP 101 (mono)

C. F. Peters Corp.

*Capriccio for violin and two sound
tracks (3)

Genese (3)

Evolutions (3) Limelight 86055

Kain et Abel (3) Philips (Neth.)
400036 AE (45 rpm, mono)

*Pittsburgh Concerto (3) American
Wind Symphony SR 4S-3263

**Louisville Symphony (#7) (3)
Louisville 56-6 (mono)

**Sonata #2 for 2 violins (3)

**Contrasts (3) Washington University
TS-XM 913/4 (mono)

BARRAQUE, JEAN

Etude (3) Barclay 89005 (mono)

BAYLE, FRANCOIS

Andromede (3)

Titan (3) Musique pour l'image
MPI/LP-105 (mono)

Lignes et points (3)

L'archipel (3)

Espaces inhavitaibles (3) Philips (Fr.)
836895 DSY

L'oiseau chanteur (3) Candide CE
31025, Philips (Fr.) 836895 DSY

*Pluriel (3) Philips (Fr.) 836894 DSY

Vapeur (3) Boite a musique BAM 5072

**BEAVER, PAUL and KRAUSE,
BERNARD L.**

Nonesuch Guide to Electronic Music (2)
Peace Three (2) Nonesuch HC 73018

BEECROFT, NORMA

*From Dreams of Brass (3)
RCA Canada CCS 1008

BEHRMAN, DAVID

Wave Train (3) Source 1 (included in
"Source" magazine #4)

BERIO, LUCIANO

*Differences (1) Mainstream MS 5004;
Time S8002

Momenti (1) Limelight LS 86047

Mutazioni (3) RAI (Fonit) (included in
"Elettronica" magazine #3) (mono)

Perspectives (1) Compagnia generale
del Disco ESZ-3

Visage (1) Turnabout TV 34046S

**Circles (3) Mainstream MS 5005;
Time S8003; Wergo WER 60021

**Rounds (1)

Rounds with Voice (1) Wergo WER 60028

**Sequenza I (1) Mainstream MS 5014;
Time S8008; Wergo WER 60021

**Sequenza III (1) Wergo WER 60021

**Sequenza IV (1) Candide CE 31015

**Sequenza V (1) Deutsche
Grammophon DGG 137005;
Wergo WER 60021

**Serenade I (3) RCA Victrola
VICS 1313

**Sinfonia (1) Columbia MS 7268

Universal Edition/Theodore Presser

BERK, ERNEST

Extracts from works (3) Conroy
International Film Library (mono)

BLACHER, BORIS

Elektronische Impulse (1) Wergo
WER 60017

Bote & Bock

BLOMDAHL, KARL-BIRGER

*Aniara (1) Columbia M2S 902

*Aniara Suite (1) Columbia MS 7176

Schott/Belwin-Mills Publishing Corp.

BOISSELET, PAUL

*Le robot (3) Societe Francaise de
productions phonetiques 30006

*Symphonie Jaune (3)

*†Symphonie rouge (3) Societe
Francaise de productions
phonographiques 30007

BONDON, JACQUES

†Kaleidoscope (3) Musical Heritage
Society MHS 988

BOUCOURECHLIEV, ANDRE

Texte I (3) Limelight LS 86048

Texte II (3) Boite a musique
BAM LD 071 (mono)

BOULEZ, PIERRE

Etude II (sur sept sons) (3)
Barclay 89005 (mono)

BOZIC, DARIJAN

*Kriki (3) Desto DC 6474-77

BRESS, HYMAN

*Fantasy (1) Folkways FM 3355 (mono)
Alpha Film Music

BRISCOE, DESMOND

Electronic Sound Picture (3)
His Master's Voice CLP 3531
(45 rpm, mono)

BROWN, EARLE

*Four Systems—Four amplified
cymbals (1) Columbia MS 7139

*Times Five (1) Boite a musique
BAM 5072

**Nine Rare Bits (1) Wergo WER 60028
Unpublished

**Available Forms I (1) RCA Victrola
VICS 1239

**Music for violin, cello and piano (1)

**Music for cello and piano (1)
Hodograph (1) Mainstream
MS 5013; Time S8007

Associated Music Publishers, Inc.

BRUN, HERBERT

Futility (3) Heliodor HS 25047

Klange Unterwegs (3)

Anepigraphe (3) Amadeo AVRS 5006
(mono)

BRUYMEL, TOM

Collage Resonance II (3)

Reflexen (3)

Relief (3) Europepe Fonoclub
EFC 2501 (mono)

BRYANT, ALLEN

*Pitch Out (1) Source 2 (included in
"Source" Magazine #4)

Composer Performer Edition

BUSSOTTI, SYLVANO

*Coeur pour batteur—Positively Yes (1)
Columbia MS 7139

Universal Edition/Theodore Presser

CAGE, JOHN

*Aria with Fontana Mix (2)

Mainstream MS 5005, Time S8003
Fontana Mix (2) Turnabout TV 34046S

Fontana Mix-Feed (2) Columbia
MS 7139; Mass Art M-133

(4 different performances, mono)

Cartridge Music (2) Mainstream

MS 5015; Time S8009

*HPSCHD (with Lejaren Hiller) (2)
Nonesuch H-71224

*Indeterminacy (2) Folkways FT 3704
(mono)

*Solos for Voice 2 (2)

Odyssey 32160156

*Variations II (2) Columbia MS 7051;

Jornadas de Musica Experimental
JME ME 1-2 (2 versions, mono)

Variations IV (2) part I: Everest 3132
part II: Everest 3230

Williams Mix (2) Avakian JCS-1

*Atlas Eclipticalis (2)

*†Winter Music and Cartridge Music (2)
Deutsche Grammophon

DGG 137 009

**Amores (2) Time S8000

**Concerto for prepared piano and
orchestra (2) Nonesuch H-71202;
Avakian JCS-1

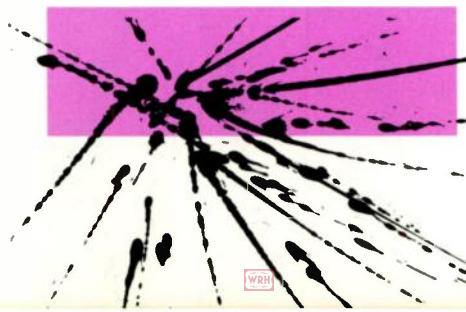
**Dance (2) Folkways FX 6160 (mono)

**Sonata for clarinet (2) Advance
FGR-4 (mono)

**Sonatas and interludes for prepared
piano (2) CRI 199 (mono);
Avakian JCS-1

**Variations I (2) Wergo WER 60033

**Variations III (2) Deutsche
Grammophon DGG 139442



CANTON, EDGARDO

Voix inoues (3) Jornadas de Musica
Experimental JME ME 1-2 (mono)

CARLOS, WALTER

*Variations for flute and electronic
sound (2)
*Dialogues for piano and electronic
sound (2) Turnabout TV 34004S

CARSON, PHILIPPE

Turmac (3) Boite a musique BAM 5072

CASTIGLIONI, NICCOLO

Divertimento (3) Compagnia generale
del Disco ESZ-3

CHARPENTIER, JACQUES

*†Lalita (3) Musical Heritage Society
MHS 821

CHEYNE, JY-VAN

*Three Chapters of Lao-Tze's Tao Teh
Ching (3) Jade JLP 1001 (mono)

CLEMENTI, ALDO

Collage II (3) Compagnia generale del
Disco ESZ-3

CONSTANT, MARIUS

*Le joueur de flute (3) Philips (Fr.)
A76. 050R (mono); Radiodiffusion-
Television Francaise (mono)

CUNNINGHAM, JAMES

Tic-Toc Fugue (2) Dunwich D-159
(45 rpm, mono)

CZAJKOWSKI, MICHAEL

People the Sky (1) Vanguard VCS 10069
Ryerson Music Publishers, Inc.

DAVIDOVSKY, MARIO

Electronic Study #1 (1) Columbia
MS 6566

Unpublished

Study #2 (1) Orpheus SN-3

Purist Ent. Ltd.

*Three Synchronisms for solo
instruments and electronics (1)
CRI SD204

McGinnis and Marx

DESSAU, PAUL

*Lukullus (Ausschnitt von 3 für
Subharcord) (3) Eterna 820423-4
(mono)

DOBROLOWSKI, ANDRZEJ

Muzyka na tasme magnetofonowa #1 (3)
Muza Warsaw Fest 211 (mono)

*Muzyka na tasme magnetofonowa i
oboj solo (3) Muza Warsaw Fest 244
(mono)

DOCKSTADER, TOD

Apocalypse (2) Owl ORLP-6;
Owl ORLP-7 (2 fragments)

Drone (2)

Water Music (2) Owl ORLP-7

Eight Electronic Pieces (1) Folkways
FM 3434 (mono)

Groton Music, Inc.

Luna Park (2)

Traveling Music (2) Owl ORLP-6

Omniphony I (with James Reichert) (2)
Owl ORLP-11

Quatermass (2) Owl ORLP-8

DONATONI, FRANCO

Quartetto III (3) Compagnia generale
del Disco ESZ-3

DRUCKMAN, JACOB

*Animus I (2) Turnabout TV 34177

DUCKWORTH, WILLIAM E.

Gambit (2) Capra 1201

**DUFRENE, FRANCOIS and
BARONNET, JEAN**

U 47 (3) Limelight LS 86047

EATON, JOHN

Prelude to "Myshkin" (2)

Piece for solo Syn-Ket #3 (2)

*Song for R.P.B. (2) Decca 710154

Soliloquy for Syn-Ket (2)

Duet for Syn-Ket and Moog
Synthesizer (2)

*Thoughts on Rilke (2) Decca 710165

ECHARTE, PEDRO

Treno (3) Jornadas de Musica
Experimental JME ME 1-2 (mono)

EGER, JOSEPH

*Classical Heads (1) Probe CPLP 4516
Crossover Music Co.

EIMERT, HERBERT

Elektronische Musik (lecture) (1)

Variante einer Variationen von
Anton Webern (1)

Zu Ehren von Igor Stravinsky (1)

Wergo WER 60006 (mono)

Epitaph für Aikichi Kuboyama (1)

Sechs Studien (1) Wergo WER 60014

Etude uber Tongemische (1)

Funf Stucke (1)

Glockenspiel (1) Deutsche

Grammophon DGG LP 16132 or
17242 LPE (mono)

Selection I (1) Limelight LS 86048

Universal Edition/Theodore Presser

EL-DABH, HALIM

Leiyala and the Poet (1)

Columbia MS 6566

Symphonies in sonic vibrations—

Spectrum #1 (1) Folkways FX 6160
(mono)

C. F. Peters Corp.

ENGLERT, GIUSEPPE

*Vagans animula (3) Deutsche
Grammophon DGG 139442

EPSTEIN, BRUNO

Essay III (3)

Essay IV (3) Paravan Synton 57357-8
(45 rpm, mono)

ERB, DONALD

*Reconnaissance (1)

*In No Strange Land (1) Nonesuch
H-71223

Unpublished

ERICKSON, ROBERT

*Ricarcar a 3 (1) Ars Nova AN 1001
ACA

FASSETT, JAMES

Symphony of the Birds (1) Ficker
FR 1002 (mono)

James Fassett Pub.

FERRARI, LUC

*Compose-Composite (3) Philips (Fr.)
836894 DSY

Etude aux sons tendus (3)

Etude aux accidents (3) Boite a
musique BAM LD 070 (mono)

Tautologos I (1) Boite a musique
BAM 5072; Gravesaner Blatter
EP ML 48

Tautologos II (3) Boite a musique
BAM LD 070 (mono)

Tete et queue de dragon (3) Candide
31025; Philips (Eur.) 835487 AY

Visage V (3) Limelight LS 86047

FONGAARD, BJOERN

Homo Sapiens for tape (3)
EMI CSDS-1088

GABURO, KENNETH

Exit Music I: The Wasting of
Lucrectzia (2)

Exit Music II: Fat Millie's Lament (2)

*Antiphony III: (Pearl-white
moments) (2)

*Antiphony IV: (Poised) (2) Nonesuch
H-71199

Lemon Drops (2)

For Harry (2) Heliodor HS 25047

GASLINI, GIORGIO

Corri, nella miniera si odono voci (3)
Voce del Padrone QELP 8086 (mono)

**GASSMANN, REMI and SALA,
OSKAR**

Electronics (1) Westminster WST 14143
E. B. Marks Music Corp.

GERHARD, ROBERTO

*Collages (Symphony # 3) (2)
Angel S36558

Mills Music, Inc.

Excerpts from "DNA in Reflection" (3)

Southern Library of Recorded
Music MQ 760 (45 rpm, mono)

GLOBOKAR, VINKO

*Discours II (3) Deutsche
Grammophon DGG 137005

GRAINER, RON

Giants of Steam (3) Decca (Eng.)
STO 8536 (45 rpm)



MAGNE, MICHEL

Carillon dans l'eau bouillante (3)
 Concertino triple (3)
 Larmes en sol pleureur (3)
 Memoire d'un trou (3)
 Meta-mecanique saccadee (3)
 Self-Service (3) Paris 313001 (mono)

MALEC, IVO

Dahovi (3) Candide 31025
 Reflets (3) Boite a musique BAM 5072
 *Tutti (3) Philips (Fr.) 836894 DSY

MALOVEC, JOZEF

Orthogenesis (3) Turnabout TV 34301
 Vyhybka (3) Supraphon DV 6221
 (mono)

MARIN, ROGER

Natural Pipes (1) Folkways FX 6160
 (mono)
 Alpha Film Music

MARTIRANO, SALVATORE

*L's GA (2) Polydor 24-5001
 *Underworld (2) Heliodor HS 25047

MATHEWS, MAX V.

Bicycle Built for Two (3)
 The Second Law (3)
 May Carol (3)
 Joy to the World (3) Decca 79103
 Cyclic Study (3)
 Masquerades (3)
 Pergolesi Development (3)
 Substitution Study (3) Gravesaner
 Blatter EP ML 372 (45 rpm, mono)
 Numerology (3) Decca 79103,
 Bell 122227 (mono)
 Three against Four (3) Bell 122227
 (mono)

MAXFIELD, RICHARD

Night Music (1) Odyssey 32160160
 Pastoral Symphony (1)
 Bacchanale (1)
 Amazing Grace (1)
 Piano Concert for David Tudor (1)
 Advance FGR-8
 Unpublished

MAYUZUMI, TOSHIRO

Campanology (1) Nippon Victor
 SJU 1515
 Mandare (3) Nippon Victor
 SJX 1004
 1964 Tokyo Olympics Music (1)
 King SKK 122
 **Bacchanale (1)
 **Phonologie Symphonique (1)
 Angel S36577
 **Mandala Symphony (1) Odyssey
 32160152
 **Nirvana Symphonia (1) Mainstream
 MS 5006; Time S8004
 **Piece for prepared piano and strings
 (1) Louisville S-636
 **Prelude for string quartet (1)
 Deutsche Grammophon
 DGG 137001
 **Samsara (1) Louisville S-666
 C. F. Peters Corp.

MAYUZUMI, TOSHIRO and MOROI, MAKOTO

Variations sur 7 (1) Nippon Victor
 SJU 1515; Universal Recording
 (Tokyo ALP 1009) (mono)
 C. F. Peters Corp.

MAZUREK, BOHDEN

Bozzetti (3) Turnabout TV 34301

MELLNAS, ARNE

Intensity 5/6 for tape (3)
 EMICSDS-1088

MERCURE, PIERRE

Tetachromie (1) Columbia MS 6763
 Unpublished

MESSIAEN, OLIVIER

*†Turangalila Symphony (3) RCA
 Victor LSC 7051
 *†Trois petites liturgies dans la
 presence divine (2) Columbia
 MS 6582; Music Guild MS 142
 †Fete des belles eaux (3) Musical
 Heritage Society MHS 821

MILHAUD, DARIUS

*La riviere endormie (3) Festival
 FLD 76 (mono)
 *†Suite for Ondes Martenot and piano
 (3) Musical Heritage Society
 MHS 821

MIMAROGLU, ILHAN

Agony (1) Turnabout TV 34046S
 Le Tombeau d'Edgar Poe (1)
 Intermezzo (1) Turnabout TV 34004S
 Six Electronic preludes (1)
 *Piano music for performer and
 composer (1) Turnabout TV 34177
 Duchess Music Corp.
 Bowery Bum (1) Turnabout TV 34004S
 Unpublished

MIYOSHI, AKIRA

Ondine (3) Time 2058

MOROI, MAKOTO

Shosanke (3) Nippon Victor SJX 1004

MUMMA, GORDON

*Mesa (1) Odyssey 32160158
 Music from the Venezia Space Theater
 (1) Advance FGR-5 (mono)
 *Peasant Boy (1) ESP Disk 1009
 The Dresden Interleaf, 13 February
 1945 (1) Jornadas de Musica
 Experimental JME ME 1-2 (mono)
 Unpublished

MUSICA ELETTRONICA VIVA

*Spacecraft (3) Mainstream MS 5002

NIKOLAIS, ALWIN

Aeolus (1)
 Eruptions and Evolutions (1)
 Fetish (1)
 Fixation (1)
 Glymistry (1)
 Illusional Frieze (1)
 Lyre (1)
 Lythic (1)
 Paraphernalia (1)
 Prismatic Forest (1)
 Shivare (1) Hanover HM 5005 (mono)
 Chrosonics Music

NILSSON, LEO

That Experiment HZS (3) Odeon
 E061-34052

NITSCHKE, MANFRED

Ferdinands Zauberhauschen (3)
 Litera (45 rpm, mono)

NONO, LUIGI

*La Fabrica Illuminata (1) Wergo
 WER 60038
 Schott/Belwin-Mills Publishing Corp.
 *Ricorda cosa ti hanno fatto in
 Auschwitz (1) Wergo WER 60038
 Sinon N. V.

NORDHEIM, ARNE

*Epitaffio (3)
 *Response I (3) Limelight LS 86061

NUOVA CONSONANZA GRUPPA

*Credo (3) Deutsche
 Grammophon DGG 137007
 *Improvisations (3) RCA Italiana
 MILDS 20243

OLIVEROS, PAULINE

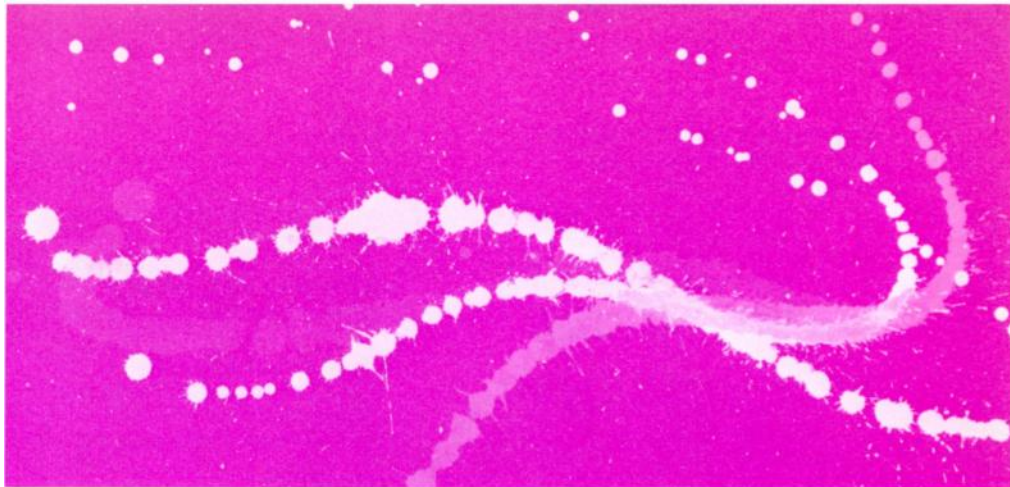
I of IV (3) Odyssey 32160160

ORAM, DAPHNE

Electronic Sound Patterns (3) His
 Master's Voice 7EG 8762
 (45 rpm, mono)

PARMEGIANI, BERNARD

Danse (3) Candide 31025
 Bidue en Re (3)
 Capture ephemere (3)
 *Violostres (3) Philips (Fr.) 836889
 DSY



PENDERECKI, KRZYSZTOF

- Psalmus 1961 (2) Supraphon
DV 6221 (mono)
**Capriccio for violin and orchestra
(2) Nonesuch 71201
**De Natura Sonoris (2) Nonesuch
71201; Philips PHS 900184
**Dies Irae (Auschwitz Oratorio) (2)
**Polymorphia (2) Philips PHS
900184
**Passion according to St. Luke (2)
Philips PHS-2-901; RCA
Victrola VICS 6015
**Psalmen Davids (2)
**Anaklasis (2)
**Fluorescences (2)
**Stabat Mater (2) Wergo
WER 60020
**Quartetto per Archi (2) Deutsche
Grammophon DGG 137001
**Sonate for cello and orchestra (2)
Wergo WER 60020 or
WER 60036
**Threnody for the Victims of
Hiroshima (2) Philips PHS 900141
or PHS-2-901; RCA Victrola
VICS 1239

PFEIFFER, JOHN

Electronomusic: 9 Images (2)
RCA Victrola VICS 1371

PHILIPPOT, MICHEL

- Ambiance I (3) Boite a musique
BAM LD 070 (mono)
Ambiance II (3) Boite a musique
BAM LD 071 (mono)
Etude (3) Ducretet-Thomson DUC 9
(mono)
Etude III (3) Candide CE 31025
Maldoror (3) Boite a musique
BAM LD 705-6 (mono)
Rhinoceros (3) Vega T 31 SP 8003
(mono)

PIERCE, JOHN R.

- Molto Amorooso (3)
Five against Seven (3)
Random Canon (3)
Melodie (3) Decca DL 79103
Stochatta (3)
Beat Canon (3)
Variations in Timbre and Attack (3)
Decca DL 79103; Bell 122227
(mono)

POPP, ANDRE

- *Helsa Popping et sa musique siderante
(3) Philips (Fr.) 680201 NL (mono)

POUSSEUR, HENRI

- Electre (1) Universal Edition
UE 13500
*Jeu de Miroirs de Votre Faust (3)
Wergo WER 60026
*Rimes pour differentes sources
sonores (3) RCA Victrola VICS 1239
Scambi (3) Limelight LS 86048
Trois visages de Liege (1)
Columbia MS 7051
**Madrigal III (1) Everest 3170
**Sept versets des psaumes de la
penitence (1) Wergo WER 60026
Universal Edition/Theodore Presser

POWELL, MEL

- Electronic Setting I (2) Son-Nova S-1
Events (2)
Second electronic setting (2)
CRI 228 USD

RAAIJMAKERS, DICK

- Contrasts (2) Limelight LS 86055

RANDALL, JAMES K.

- *Lyric Variations for Violin and
Computer (1) Vanguard VCS 10057
Ryerson Music Publishing, Inc.

REA, JOHN

- Synergetic Sonorities (1) Allied 16
Iroquois Press

REICH, STEVE

- Come Out (1) Odyssey 32160160
It's Gonna Rain (1)
*Violin Phase (1) Columbia MS 7265
Unpublished

RIEDL, JOSEF ANTON

- Daniel-Henry Kahnweiler-Erzahles
Leben (3) Deutsche Grammophon
DGG 18738-9 (mono)
Zwei Studien für elektronische Klänge
(3) Supraphon DV 6221 (mono)

RILEY, TERRY

- *A Rainbow in Curved Air (1)
*Poppy No Good and the Phantom
Band (1) Columbia MS 7315
Reed Streams (1) Mass Art M-131
(mono)
Unpublished

ROBB, JOHN DONALD

- Collage (2) Folkways FM 33436

RUDIN, ANDREW

- Tragoedia (3) Nonesuch H-71198

RUDNIK, EUGENIUŚZ

- Dixi (3) Turnabout TV 34301

SAHL, MICHAEL

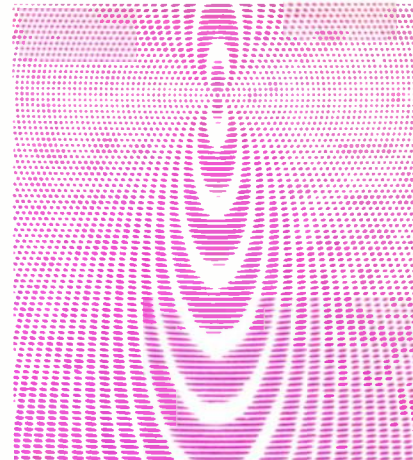
- *Mitzvah for the Dead (1) Vanguard
VCS 10057
Ryerson Music Publishing, Inc.
Tropes on the Salve Regina (3)
Lyrichord LLST 7210

SALA, OSKAR

- A fleur d'eau (3)
Der Fluch der gelben Schlange (3)
Metronome MEP 6043
(45 rpm, mono)
Berliner Kaleidoskop (3)
Das Magische Band (3)
Die Traume des Herrn Jules Verne (3)
Ici Mars (3)
Improvisation mit dem
Rauschgenerator (3)
Stahl, Thema mit Variationen (3)
Unter der Oberfläche (3) Gravesaner
Blatter ML 308 (45 rpm, mono)
Five improvisations on magnetic tape
(3) Westminster WST 14143

SALZMAN, ERIC

- *The Nude Paper Sermon (2)
Nonesuch H-71231

**SAUGUET, HENRI**

- Aspect sentimental (3) Boite a musique
BAM LD 070 (mono)

SCHAEFFER, MYRON

- Summer Idyl (with Arnold Walter and
Harvey Olnick) (1)
Dance R4÷3 (1) Folkways FSS 6301
Alpha Film Music

SCHAEFFER, PIERRE

- Etude aux animes (3)
Etude aux allures (3) Boite a musique
BAM LD 070 (mono)
Etude aux objets (3) Philips (Eur.)
835487 AY
Flute Mexicaine (3)
Etude aux tourniquets (3)
Le voile d'Orphee (3)
Etude aux chemins de fer (3)
Etude pathetique (3) Ducretet-
Thomson DUC 8 (mono)
Interlude (Phedre) (3) Groupe de
Recherches Musicales de L'O.R.T.F.
GRC 9071 (45 rpm, mono)
Les paroles degelees (3)
L'Oiseau RAI (3) Radiodiffusion-
Television Francaise (mono)
Objets lies (3) Candide CE 31025

**SCHAEFFER, PIERRE and
HENRY, PIERRE**

- Bidule en Ut (3) Ducretet-Thomson
DUC (mono), Radiodiffusion-
Television Francaise (mono)
Deux aspects de piano (3) Ducretet-
Thomson DUC 8 (mono)
Le Capitaine Nemo (3)
Orphee 51 (3) Radiodiffusion-
Television Francaise (mono)
Symphonie pour un homme seul (3)
Oiseau R.A.I. (3) Ducretet-Thomson
DUC 9 (mono)

**SCHAEFFER, PIERRE and
REIBEL, GUY**

- Solfege de l'objet sonore (3) Editions
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selections by 8 composers of
musique concrète, mono)

SCHUBEL, MAX

- f# (3)
Joyeux Noel (3) Opus One #7

SCHWARTZ, ELLIOTT

- *Aria #4 (2) Advance FGR-7 (mono)

SHIBATA, MINAO

- Improvisation (3) Nippon Victor
SJX 1004



SIKORSKI, TOMASZ

*Antyfony (3) Muza Warsaw Fest 212 (mono)

SMILEY, PRIL

Eclipse (3) Turnabout TV 34301

SOUFFRIAU, ARSENE

Extracts from works (3) Conroy International Film Library (mono)

Etude en Galvanise (3)

Etude #1 sur piano prepare (3)

Impressions sur l'Electronic 30 (3)

Video Moods (mono)

Variations sur l'Electronic 30 (#s 1 and 5) (3)

Variations sur un son de piano (3)

Variations sur un son de tambour (3) Alpha 1009 (45 rpm, mono)

SPEETH, SHERIDAN D.

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STEPHEN, VAL T.

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The Orgasmic Opus (1) Folkways FM 33436

Alpha Film Music

STOCKHAUSEN, KARLHEINZ

Gesang der Jünglinge (1) Deutsche Grammophon DGG 138811; DGG LP 16133 or 17243 LPE (mono)

Hymnen (1) Deutsche Grammophon DGG 139421/2

Kontakte (1) Deutsche Grammophon DGG 138811; Candide CE 31022

*Mikrophonie I (1)

*Mikrophonie II (1) Columbia MS 7355

*Momente (1) Nonesuch H-71157

*Prozession (1) Candide CE 31001

*Solo für Melodie-Instrument mit Ruckkopplung (1) Deutsche Grammophon DGG 137005

Studie I (1) Deutsche Grammophon DGG LP 16133 or 17243 LPE (mono)

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*Telemusik (1)

*Mixtur (1) Deutsche Grammophon DGG 137012

**Gruppen (1)

**Carre (1) Deutsche Grammophon DGG 137002

**Klavierstücke I-XI (1) CBS 32210008

**Klavierstücke VIII (1) Candide CE 31015; CBS 32110008

**Klavierstücke X (1) Mace 9091; CBS 32110008

**Kontra-Punkte (1) RCA Victrola VICS 1239

**Nr. 5 Zeitmasse (1) Odyssey 32160154

**Refrain (1) Mainstream MS 5003; Time S8001; Candide CE 31022

**Zyklus (1) Mainstream MS 5003; Time S8001; Columbia MS 7139; Mace 9091

Universal Edition/Theodore Presser

STRANG, GERALD

Composition #4 (1) Jornadas de Musica Experimental JME ME 1-2 (mono)

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STRANGE, ALLEN

Two X Two (3) Capra 1201

SUBOTNICK, MORTON

Electronic preludes, interludes to "2001" (2) Columbia MS 6167

Silver Apples of the Moon (2)

Nonesuch H-71174

Touch (2) Columbia MS 7316

The Wild Bull (2) Nonesuch H-71208

SWICKARD, RALPH

*Sermons of St. Francis (3) Orion 702

TAKEMITSU, TORU

Eurydice-La Mort (3)

Relief Statique (3) Universal Recording (Japan) ALP 1009 (mono)

Sky Horse and Death (3) Nippon

Victor SJU 1515

Vocalism Ai (1) RCA Victrola

VICS 1334; Universal Recording

(Japan) ALP 1009 (mono)

Water Music (1) RCA Victrola

VICS 1334

**Coral Island (1) RCA Victrola

VICS 1334

Metric Music, Inc.

**Asterism (1)

Green (November Steps II) (1) RCA

Victor LSC 3099

**The Dorian Horizon (2) RCA Victor

LSC 3099; Columbia MS 7281

**Ki No Kyoku (1) Columbia (Japan)

OS 373-N

**November Steps (1) RCA Victor

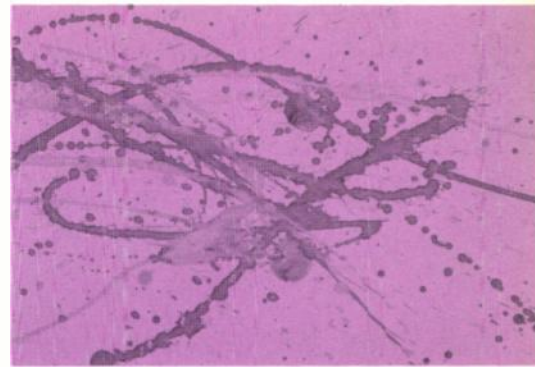
LSC 7051

**Requiem for strings (1) RCA Victor

LSC 3099; King SKF 3004

C. F. Peters Corp.

**Textures (3) Odyssey 32160152

**TALCOTT, DAVID**

Trilogy (1)

Loop Number 3 (1) Folkways FSS 6301

Alpha Film Music

TANENBAUM, ELIAS

*Improvisations and Patterns for Brass and Tape (1) Desto DC 6474-77

ACA

TENNEY, JAMES

Noise Study (3) Decca DL 79103

THIENEN, MARCEL VAN

*La relantie (3) Boite a musique BAM LD 037 (mono)

TOGNI, CAMILLO

Recitativo (3) Compagnia generale del Disco ESZ-3

TOYAMA, MICHIKO

*Aoi-no-Ue (1)

*Waka (1) Folkways FW 8881 (mono)

Alpha Film Music

TRYTHALL, GILBERT

*Entropy (1)

Golden Crest S-4085

Unpublished

USSACHEVSKY, VLADIMIR

Creation-Prologue (1) Columbia MS 6566

Metamorphosis (1)

Linear Contrasts (1)

Improvisation #4711 (1) Orpheum SN-3

Of Wood and Brass (1)

Wireless Fantasy (1) CRI 228 USD

Piece for tape recorder (1) CRI 112 (mono)

Sonic Contours (1) Desto DC 6466; Folkways FX 6160 (mono)

Transposition (1)

Reverberation (1)

Composition (1)

Underwater Waltz (1) Folkways

FX 6160 (mono)

ACA

VAGGIONE, HORACIO

Cuentos infantiles (3) Fonotex

EDD 4001-3 (45 rpm, mono)

*Sonata IV (3) Jornadas de Musica Experimental JME ME 1-2 (mono)

VANDELLE, ROMUALD

Crucifixion (excerpts) (3) Boite a musique BAM LD 070 (mono)



VARESE, EDGARD

*Deserts (1) Columbia MS 6362
 Poème Electronique (1) Columbia MS 6146
 **Ameriques (1) Vanguard Everyman S-274
 **Arcana (1) Columbia MS 6362; RCA Victor LSC 2914
 **Density 21.5 (1) Columbia MS 6146; Candide CE-31028; EMS 401 (mono); Coronet 1291 (mono); Wergo WER 60029
 **Hyperprisms (1) Columbia MS 6146; Candide CE 31028
 **Ionisation (1) Columbia MS 6146; Candide CE 31028; Urania 5106; EMS 401 (mono); Folkways FX 6160 (excerpt, mono)
 **Nocturnal (1)
 **Ecuatorial (1) Cardinal VCS 10047
 **Octandre (1)
 **Integrales (1) Columbia MS 6146; Candide CE 31028
 **Offrandes (1) Columbia MS 6362; Candide CE 31028
 Colfranc Music Publishing

VLAD, ROMAN

Ricerca elettronica (3) Compagnia generale del Disco ESZ-3

WEHDING, HANS HENDRIK

*Concertino (3) Eterna 720205 (mono)

WHITE, RUTH

Seven Trumps from the Tarot Cards (2)
 Pinions (2) Limelight LS 86058
 Flowers of Evil (2) Limelight LS 86066

WHITTENBERG, CHARLES

*Electronic Study II with contrabass (1) Advance FGR-1 (mono)
 Associated Music Publishers, Inc.

WILSON, GALEN

Applications (3) Capra 1201

WILSON, OLLY

Cetus (3) Turnabout TV 34301

WISZNIIEWSKI, ZBIGNIEW

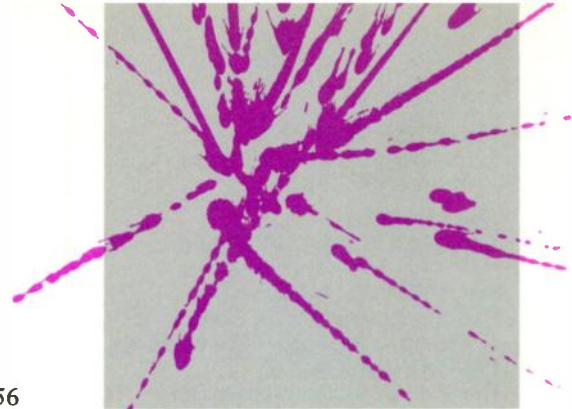
3 Postludia electrone (3) Muza Warsaw Fest 211 (mono)

WUORINEN, CHARLES

Time's Encomium (1) Nonesuch H-71225
 ACA

XENAKIS, IANNIS

Analogique A+B (3)
 Concrete P.H. (3) Philips (Eur.) 835487 AY
 Diamorphoses (3) Boite a musique BAM LD 070 (mono)
 Orient-Occident (3) Limelight LS 86047
 **Achorripsis (1) Angel S36656
 Bote & Bock
 Polla ta Dhina (3)
 ST/10 = 1-080262 (3) Angel S36656
 **Akrata (3) Angel S36656; Columbia MS 7281; Nonesuch H-71201
 **Atrees (3)
 Morisma-Amorisma (3)
 ST/4 (3)
 Nomos Alpha (3) Angel S36650
 **Herma (3) Angel S36655
 **Metastasis (3)
 Eonta (3) Vanguard VCS 10030
 **Pithoprakta (3) Vanguard VCS 10030; Nonesuch H-71201

**YUASA, JOJI**

Projection esemplastic (3) Nippon Victor SJU 1515

ZELJENKA, ILJA

Studio 0,3 (3) Supraphon DV 6221 (mono)

ZIMMERMANN, BERND ALOIS

Tratto (1) Wergo WER 60031
 Schott/Belwin-Mills Publishing Corp.

A SAMPLING OF ELECTRONIC POP**THE BEATLES**

Sgt. Pepper's Lonely Hearts Club Band (1)
 Capitol SMAS 2653

JOSEPH BYRD and the FIELD HIPPIES

American Metaphysical Circus (1)
 Columbia MS 7317

THE COPPER-PLATED INTEGRATED CIRCUIT

Plugged in Pop (1) (2)
 Command 945-S

CYRKLE

Neon (1) (2)
 Columbia CS 9432

ELECTRONIC CONCEPT ORCHESTRA

Electric Love (1) (2)
 Limelight LS 86072
 Moog Groove (1) (2)
 Limelight LS 86070

RICHARD HAYMAN

Genuine Electric Latin Love Machine (1) (2)
 Command S-947

DICK HYMAN

Age of Electronicus (1) (2)
 Command S-946

GERSHON KINGSLEY and JEAN-JACQUES PERREY
 Kaleidoscopic Variations (1) (2)
 Vanguard VSD 6525

ROLAND KIRK

Rip, Rag and Panic (1) (2)
 Limelight 86027

LOTHAR and the HAND PEOPLE

Capitol ST 2997 (1)
 Space Hymn (1)
 Capitol ST 247

J MARKS

Rock and Other Four-Letter Words (1)
 Columbia MS 7193

GIL MELLE

Tome VI (1)
 Verve V6-8744

MOOG ESPANA

RCA Victor LSP 4195 (1) (2)

THE MOTHERS OF INVENTION

We're Only in It for the Money (1)
 Verve 65045
 Uncle Meat (1)
 Bizarre 2MS 2024

VAN DYKE PARKS

Song Cycle (1)
 Warner Brothers 1727

ROBERT POZAR

Good Golly, Miss Nancy (1)
 Savoy 12189

SOFT MACHINE

Volume One (1) (2)
 Probe 4500
 Volume Two (1) (2)
 Probe 4505

SPOOKY TOOTH/PIERRE HENRY

Ceremony (1)
 A&M SP 4225

GILBERT TRYTHALL

Country Moog Switched-On
 Nashville (1)
 Athena 6003
 Nashville Gold (1)
 Athena 6004

UNITED STATES OF AMERICA

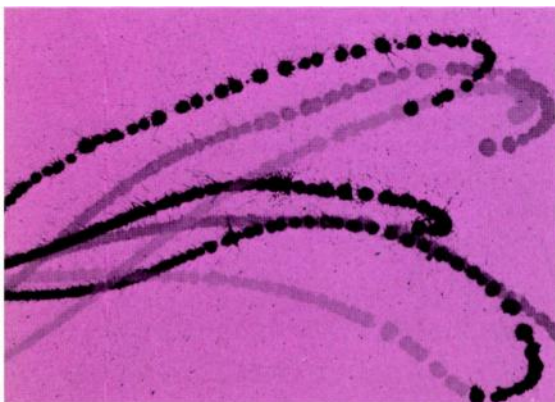
Columbia CS 9614 (1)

VELVET UNDERGROUND and NICO

Verve 65008 (1)

FRANK ZAPPA

Lumpy Gravy (1)
 Verve 6-8741





THE FUTURE STARTED HERE

BY LOUIS CHAPIN

These ten were among the innovators, the makers and shakers
—the creators of the sounds for generations to come ...

Everyone, I suppose, remembers the first time he heard electronic sounds as music. For me, it was a hot July day in 1950, sitting with a group of students in the chamber music shed at Tanglewood, our backs to the open wall and to the green Berkshire hillscape beyond, our eyes on the young composer Irving Fine. Fresh from a trip to Paris, he was full of names strange at least to me—Schaeffer, Stockhausen, Boulez, full of the brash term *musique concrète*, and full of the sudden discovery that a man called Anton Webern had lived and died and betweentimes composed a few epochal pieces of 12-tone music.

Fine played a record of that music, I think; and then I *know* that he played another on which clipped snatches of voices were chased backwards and forwards by saucepan lids cut into and out of in mid-wobble. It sounded almost as different from the Webern as from the Bach cantatas that we were singing under Koussevitzky's imperious, ardent direction ("Gentlemen," to the orchestra, "*leessen* the chorus!").

Twenty years have passed since then, and it's taken at least half of those years for the kinds of sounds we heard to make substantial impact on concert programs. Now the novelty has passed, the distinctions and even the range of

the idiom have begun to be understood, and we can find the same degree of individuality among the BMI-licensed composers discussed here as we would amongst any other group of contemporary composers. Maybe more.

Yet one of the particular characteristics of this new medium is its compatibility, both with traditional vocal and instrumental sounds and with other forms of expression. To paraphrase John Donne, "No art is an island"; and electronic music, whatever its cliché "weirdness," is at least as creatively gregarious as is any other medium. In the last three seasons, at least 15 or more dance premieres used music by some composer treated here. Then, of course, there are film and television scores galore, there's the occasional collaboration with architects—and the term "mixed-media," to the extent that it means anything any more, usually implies a reel of tape somewhere around doing its thing.

Even those who put down this music as "mere sound-effects" are pointing to everyday connotations which probably heighten acoustical relevance, though in the hands of a gifted composer they may be no more "mere" than three notes of a scale transformed to become a Bach fugue (plain or *à-la-Moog*)—or for that matter the pianis-

simo timpani rolls with which Beethoven whisks his thunderstorm into the wings in the "Pastoral Symphony."

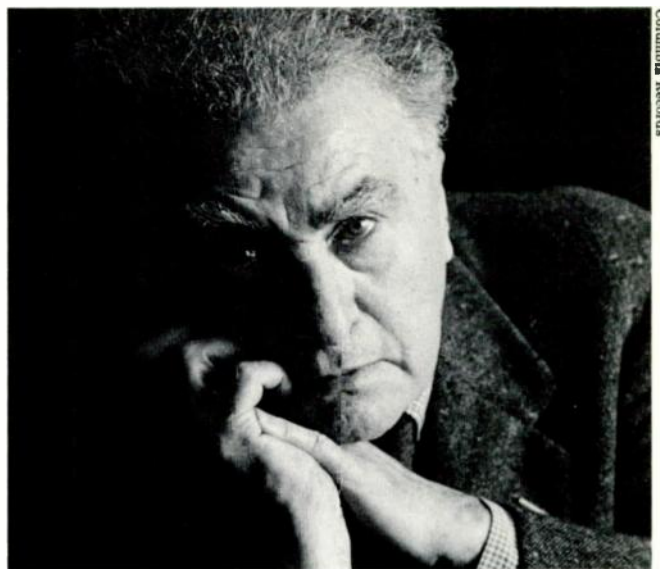
Another common characteristic of the composers who will be touched on in this article is that each emerged from an earlier career of writing for conventional instruments, and in several cases continue to cross back and forth in their work. So far, no major figure has sprung fully-clothed, so to speak, from however Jovian a recording head. Presumably the training of the electronic composer (of every composer?) will depend less and less on conventional theoretical, technical and tonal antecedents. It seems unlikely, however, that for the humanistically oriented student, these evolutionary stages will be cast off altogether—and less likely still that they'll fall into eventual disuse. As Varèse himself put it, "The electronic instrument is an additive, not a destructive factor in the art and science of music. Just because there are other ways of getting there you do not kill the horse."

Among the dimensions of music able to be controlled electronically so as to eliminate performance as a creative element, are not only the usual pitch, time, amplitude and timbre, but also that more elusive dimension involving space, size, intimacy and so forth. It has sometimes been exploited for its stagey, gee-whiz effects of contrast and stereophonic flux. Yet it also has become, to different degrees, a factor of form as well as of drama. Tonal ideas can dart tellingly from side to side as well as from second to second. In this way drama can be totally linked to music. It happened in Beethoven's drumrolls. Giovanni Gabrieli, 200 years before that, was thinking stereophonically as he set up his choirs and orchestras in St. Mark's Cathedral so as to bounce sound around the galleries.

He probably would have put a tape recorder to work, had he been able, as quickly as did that French-American giant Edgard Varèse (1883-1965) when, in 1953, he was given an Ampex and started work on the remarkable, stripped, interior tonal landscape for tape, winds and percussion that was to be "Déserts." This Varèse followed in 1957 with "Poème Electronique," which upstaged St. Mark's by swinging its sound through 425 loudspeakers around the inside of Le Corbusier's Philips Pavilion at the Brussels Fair.

Varèse had been doing his formidable best to break the sound-barrier of the orchestra ever since his youth, when he studied mathematics and science and dreamed of "a music made of sound set free." A later and more explicit dream was of "instruments obedient to my thought and which, with their contribution of a whole new world of unsuspected sounds, will lend themselves to the exigencies of inner rhythm." In keeping with this was a lifelong love of medieval and renaissance style and his decision at the age of 20 to think of music "only as spatial." An early admirer was the writer Andre Maurois, who described Varèse as "a Beethoven painted by Giorgione."

Among other friends and teachers of Varèse were



Columbia Records

Varèse

D'Indy, Roussel, Fauré and, later, an intrigued Debussy; but the most sympathetic to the tonal dreams was Ferruccio Busoni, who declared in 1907 that "music is born free; and to win freedom is its destiny. In the new great music, machines will also be necessary." And again, four years later: "We have divided the octave into 12 equidistant degrees. Yet nature created an *infinite gradation*—infinite! Who still knows it nowadays?"

Varèse certainly knew it, and was exploring the existing instrumental means to demonstrate it. These were often percussive, and in them he established silence as a signal resource. Around it he insistently anticipated the instrumental use of tape: sirens in the "Offrandes" of 1922 for soprano and chamber ensemble; among his percussive splendors a "lion's roar"—a bucket with a hole in the bottom and a rope to pull gratingly through it, in the "Hyperprism" of 1924; "Ionisation," in 1931, for percussion alone; and three years later, in "Ecuatorial," a percussion and vocal group which included two specially built Theremin electronic instruments.

Then, after reducing his forces to a solitary, unaccompanied flute in the "Density 21.5" of 1936 came 14 years of silence, until the tape recorder gave him the voice he needed for the final works. Besides "Déserts" and "Poème Electronique," these included "Nocturnal" in 1961 and a piece called "Nuit" which has recently been completed by Chou Wen-chung.

In 1950, this courteous, patient revolutionary had been sent by the United States State Department to Darmstadt in Western Germany to conduct master classes for young experimental composers. At the same summer school he learned from the physicist Werner Meyer-Eppler and from Robert Beyer of the Cologne Radio about new developments in electronic technique. He took new tone-manipulating possibilities back to New York. He was ready for that tape recorder.

But the experimentation, Varèse made clear, was all done *before* he wrote his music. “Afterwards,” he would tell you politely, “it is the listener who must experiment.” And to another young audience, at Yale in 1962, he admitted that, “This new art is still in its infancy; and I firmly believe, now that . . . music is again linked with science as it was in the Middle Ages, that new and more musically efficient devices will be invented.”

The size of that word “efficient” was implied by Wilfrid Mellers, writing in *The Composer* his tribute to Varèse: “I can’t think of any composer who made a greater difference to history with fewer works.” Stravinsky had earlier suggested one of the reasons: “There is nobility in his noise and he himself is a noble figure in our music.”

Though it is impossible to consider later composers without remembering over and over what standards of skill and integrity were set by this one epochal career, the very loneliness of Varèse’s eminence ruled out any personal domineering on his part—even had he been inclined that way. Perhaps it was the insistence on space within his music which also left room around it and somehow freed others to find their own paths in the new medium.

In the late 50’s, Milton Babbitt (b. 1916) was just as ready for an electronic instrument as Varèse had been before him—but for different reasons, involving a different instrument, and with sharply different results. Varèse was hungry for new sound-sources; Babbitt, who thrives on mathematical, verbal and musical complexities and was already distinguished for his elaborate 12-tone permutations, was even more concerned with exactly, compactly organizing sound than he was in prospecting for it. His former pupil, the critic Benjamin Boretz, explains that Babbitt gives every musical event “a multiple function, and the resulting syntax is so efficient that a single sound may convey as much information (i. e., musical action) as, say, a whole section of a Mozart symphony.” (This accounts for technique-bogging difficulties which the New

York Philharmonic found in his “Relata II,” commissioned for the orchestra’s 125th anniversary.)

Babbitt saw in the electronic medium, then, two powerful assets: precision in the tight fitting-together of detail (including especially pitch and rhythm); and, by eliminating the middleman performer, the fixing of that precision for all time.

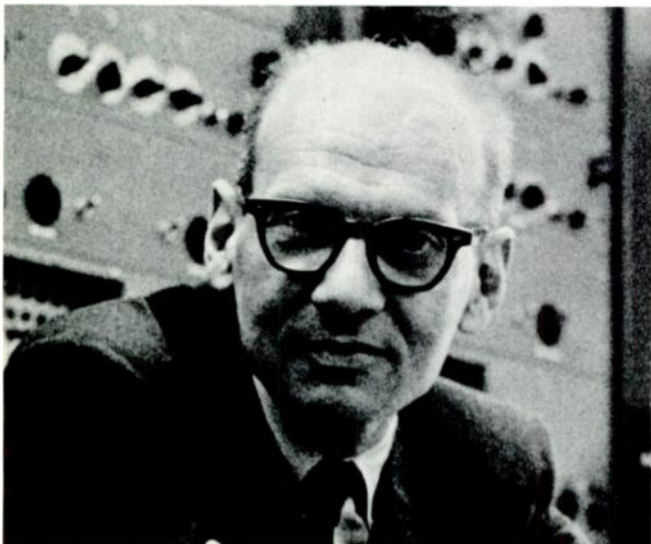
This composer’s chosen instrument, however, has not been the tape recorder itself, but that quarter-million-dollar Mark II music synthesizer constructed, with Babbitt’s consultative help, by the David Sarnoff Research Center of RCA, and installed, over 10 years ago, at the Columbia-Princeton Electronic Music Laboratory in New York. His access to the synthesizer brought forth “Vision and Prayer” in 1961 for soprano and synthesized sound, followed in 1964 by “Philomel,” in which the legend of girl-in-the-woods-become-nightingale is acoustically and dramatically ramified by adding Bethany Beardsley’s recorded voice—at times becoming a full mixed quartet—to the live one. Howard Klein, in *The New York Times*, found “the effect of the work startlingly original,” and Benjamin Boretz (*The Nation*) said, “There will still be new things to hear in ‘Philomel’ as long as tape machines and singers like Bethany Beardsley are produced.”

The producer of this formal and acoustical tour-de-force has been close to both music and mathematics most of his life, studying the former privately under Roger Sessions, following college, while writing criticism for the *Musical Leader*, and giving himself to the latter during World War II. An active scholar and teacher, he is a professor of music at Princeton and has been a director of the Columbia-Princeton Center since its inception.

At about the same time as “Philomel,” there appeared a revised version of the “Ensembles for Synthesizer,” a typically prismatic gathering together of tiny pitched notes into a commanding whole. At the farthest possible point from a dial-spinning electronic orgy, it makes a convincing case for the use of this instrument by this man. Babbitt put his preference in straightforward terms to editor Charles Fowler of the *Music Educators Journal*: “[Splicing tape] is a laborious, tedious method of setting one event against the next event by purely mechanical means. With the synthesizer, the composer punches in his specifications [on digital tape], and therefore makes musical continuity and musical specification of all these events a very simple manual operation. Above all, it makes anything possible.”

For no one else has the monster synthesizer been quite that “simple”—or the results so lucidly complicated.

It might be said that the first two composers in this survey came to the electronic medium with a technical apparatus that was already prepared. The next two, with the sometimes linked names of Ussachevsky and Luening, turned actively toward tape at about the same time as Varèse and with comparable eagerness, yet with a different

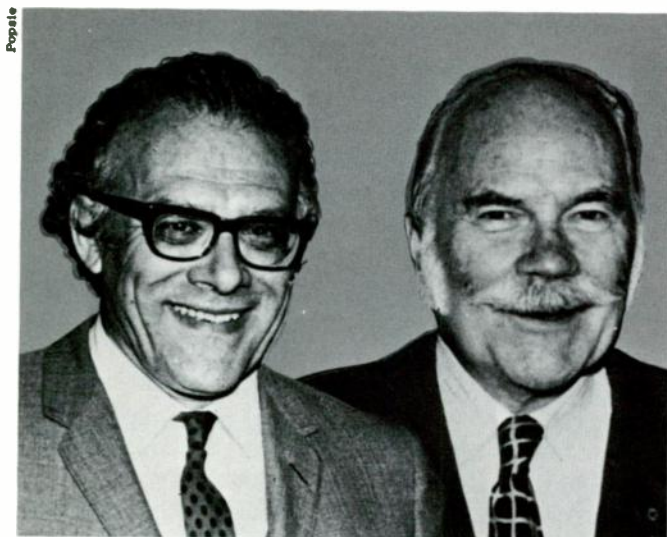


Babbitt

kind of negotiation. For one thing, each brought with him a more conservative tonal idiom.

Vladimir Ussachevsky (b. Manchuria, 1911) was raised in a consistently musical Russian family, and took up formal music study at Pomona College in California after coming to the United States in 1930. Later work at the Eastman School of Music was followed briefly by teaching, then by Army service during World War II, and thereafter by his enrollment at Columbia—where he soon became an instructor—in a composition seminar taught by Otto Luening.

It wasn't until four years later, after Ussachevsky had begun experimenting with a university tape recorder and had offered the results at a Composer's Forum in the Mc-Millin Theater, Columbia, in 1952, that the seeds of musical affiliation were planted.



Ussachevsky and Luening

Luening himself, born in Milwaukee in 1900, had by 1952 already filled out a productive and many-faceted career as composer, opera conductor, flutist and accompanist—to mention just the main categories. He, like Varèse, had been awakened by Busoni (with whom he studied from 1918-1920) to possibilities of new acoustic ranges, and had done some probing into them.

Excited with the 1952 Composer's Forum, he invited Ussachevsky to Bennington College to show a summer conference what he was up to. By the conference's end Luening was up to it, as well. "Equipped with earphones and a flute," he recently recalled in the *Music Educators Journal*, "I began developing my first tape recorder composition. Both of us were fluent improvisers and the medium fired our imaginations. We played several tiny pieces informally at a party. A number of composers almost solemnly congratulated us, saying, 'This is it' ('it' meaning the music of the future)."

Next was a more formal appearance, sponsored by BMI, at a concert directed by Leopold Stokowski at the Museum

of Modern Art in New York. It was the first public tape concert in the United States.

"Music and the machine are now wed," reported Jay Harrison in the *New York Herald Tribune*. "The result is... vaporous, tantalizing, cushioned. It is in the room and yet not part of it. It is something entirely new. And genesis cannot be described."

It could, however, be propagated. Dave Garroway put the men and their music on the *Today* show, Stokowski featured a 2½-minute piece for his CBS *Twentieth Century Concert Hall*, and in late 1953 the two undertook their first major commission, for the Louisville Orchestra, which resulted in "Rhapsodic Variations."

In this, and such other relatively early tape work as the "Concerted Piece" (premiered by the New York Philharmonic in 1960) and "Poem in Cycles and Bells," the orchestra part has distinct tonality and acts as a kind of friendly host for the tape passages, whose "strangeness" is enhanced even as it is unfolded. These passages are at times somewhat block-like—organ-like, perhaps, and yet in other streams of warm color suggest the experience of both men in vocal writing.

Coming nearer the present, Luening's "Synthesis for Orchestra and Electronic Instruments," commissioned by BMI in 1960, brings about a more complete integration of sounds, as though the instrumental style had become wilder from its brush with the electronic, and at the same time had taught the electronic an easier lyricism. Since then, Luening has worked both with and without tape. Flutes are seldom far away; they are the sound-source for "Moonflight," in 1968, and in "Canon for 2 Flutes and 37 Recorded Flutes" two or more live players may enjoy the company of the others.

An abundant dramatic flair showed up early in the incidental music which Luening and Ussachevsky both provided for Orson Welles' *King Lear* at City Center in 1956, and Ussachevsky has taken the same gift to film music (including Sartre's *No Exit*) as well as to such short tape pieces as "Wireless Fantasy," a charming "Parsifal"-festeemed tribute to the broadcast pioneer Lee De Forrest.

At the furthest distance from De Forrest's beginnings, Ussachevsky has since 1967 spent some time with computer composition at the Bell Laboratories in New Jersey, where he found the computer not only acting as composer (subject to his instructions) and performer, but even as critic. Ussachevsky's first piece was rejected by the machine seven times. Undaunted, man and machine completed a work which became the subject of Lloyd Williams' film, *Two Images of a Computer Piece*.

Ussachevsky is chairman of the triumvirate—including Babbitt and Luening—which directs the Columbia-Prince-ton Center, and may, I suspect, have been looking for a computer that would mastermind the recent 10th anniversary celebrations there.

The extraordinary, innovative musicianship of Karl-



Stockhausen

Heinz Stockhausen (b. near Cologne, 1928) is grounded on studies with Frank Martin and Olivier Messiaen.

In 1953, after introducing Stockhausen to the *musique concrète* headquarters in Paris, the critic Herbert Eimert set up an electronic studio in Cologne. There the tall, intense young man delved into the further reaches of theoretical physics, acoustics and phonetics. (Since 1963, Stockhausen has been director.)

The composer also found a new direction in the 12-tone music of Anton Webern, and his "Kontrapunkte" for 10 instruments of about the same period was, according to a *London Times* critic in 1956, "a more logical, more mathematical development from Webern; the work was organized with the utmost brilliancy of technique and clearly points the path the composer has since trod..."

One might have expected Stockhausen's electronic path to have continued with a crystalline, cerebral serialism comparable to Milton Babbitt's. But they are men of different profundities; and Stockhausen's has required projection toward, and a mystical, provocative indentification with, a restless universe of his own.

His first major electronic work, and still his most popular, is the "Gesang der Jünglinge" ("Song of the Youths") of 1956, a hauntingly lyrical enfoldment of vocal and purely electronic sounds. Since then, the general scale has expanded. "Hymnen," from the mid-60's, runs to 113 minutes of what might superficially be described as bad shortwave reception with blurred snatches of national anthems. The factor of chance has moved in: "Mikrophonie I and II," not taped, develop for more than 20 minutes of performance each the random permutations possible when the scratching, rubbing and hitting of a big gong, for instance, is picked up through moving hand-held mikes and fed through filters and potentiometers under the director's control.

"Kontakte" is a tape work filled with instrumentally derived "sound-objects," ingeniously percussive in effect and allowing for actual percussion instruments to take part. "Momente" is not only an hour-long piece for soprano solo, four choral groups (whose members serve, among other things, as percussionists) and 13 instrumentalists (including, electronically, a Hammond organ). It is also a term to identify Stockhausen's concept of "moments," transitory sound-events available for flexible, interchangeable realization. Drama is "momentously" realized, with compelling, brilliant writing for soloist and chorus.

Stockhausen's boyish seriousness, his matter-of-fact tradition-toppling, has no doubt swelled the liveliest worldwide following of any avant-garde composer (electronic techniques of his have rubbed off on the Beatles and on the Rolling Stones). But his reassessments of music have bitten deep into the very nature of tone, pitch, rhythm and intensity, fissioning these electronically and fusing them serially, and thereby exploding them (at least theoretically) into new "parameters" to be applied to larger forms. The difference of his demand on the serious listener has not just been a difference of degree, but of kind. Robert P. Morgan visualizes this composer, in *High Fidelity*, as "swimming about in an enormous uncharted sea, taking various routes of 'escape' as they present themselves to him. If we as listeners are apt to be conscious of the dangers of such a course, we should also keep in mind the enormous excitement it entails."

Such excitement, as we've seen, can be contagious. At that historic Luening-Ussachevsky concert in 1954, a young composer from Italy, Luciano Berio, sat amazed at the possibilities, and within a year had co-founded the Studio Fonologia Musicale in Milan as an electronic laboratory. Berio moves easily, and to an extent equivocally, in and out of the electronic, and he is particularly responsive to literature and to the vocal articulation of it.

For this reason his "Visage" and "Omaggio a Joyce,"



Berio

P. Rotondo

two works of the mid-60's, are just as essentially vocal pieces as they are electronic. "Visage," in the recording I have heard, carries Cathy Berberian's voice through a vivid succession of moods on a mere syllable or two of text; while the "Omaggio" shatters the first 40 lines of Joyce's *Ulysses* into what Alfred Frankenstein described in *High Fidelity* as "a rich, elaborate, and dramatic polyphony of pure sound." In a recent conversation, Berio spoke of the voice as "a direct line to meaning. Through music we should be able—perhaps starting with the voice—to integrate many things not usually considered musical elements; body attitudes, many aspects of reality."

He feels a particular interest in television: "The possibilities are immense, since the visual elements can be *composed* along with the music." Most recently, "This Means, That..." has included in its psychological, structural and acoustical excursions a juggling *commedia del' arte* troupe. He sees the interplay of electronic and other elements as "a kind of collage."

Born near Genoa in 1925, Berio worked at the Milan Conservatory and later with Dallapiccola at Tanglewood under a Koussevitzky Foundation scholarship. He now teaches on the Juilliard faculty.

Perhaps his most noticeably successful work so far, one whose collage includes the electronic to the extent of a controlled amplification of voices and orchestra, is the "Sinfonia" which was commissioned for the New York Philharmonic's 125th anniversary. Making use of the Swingle Singers, this work discusses its own experience ("so there *is* an audience") on many levels of legibility and degrees of intimacy. Harold Schonberg wrote of "Sinfonia" in *The New York Times* that it "never lets the attention

a major career writing for more conventional instruments. This change occurred soon after his arrival in the United States in 1959 under a Rockefeller study grant.

Arel, a bustling, genial man, thinks of himself as a kind of medieval craftsman, enjoying the "old-fashioned" splicing of tape for its correlations with the fitting together of mosaic or stained glass pieces—correlations not offered in the same way by either the synthesizer or the computer. It may or may not be coincidental that he recently composed an electronic prelude and postlude on commission from the Methodist Church Organization at the University of Illinois, Urbana.

His "Stereo Electronic Music #1" (Arel doesn't bother with descriptive titles—"in the clouds they don't have labels") was written in 1963 for five channels. Yet even in the stereo, two-channel disk I found a compelling use of space to relate and evolve ideas formally.

This composer, who generates all his tone electronically, likens his development of articulated signals to the growth of the branches of a tree. "Art without drama," he says, "is unnecessary to me."

At one of the Columbia-Princeton studios, where Arel is another staff member, he played me a tentative four-channel section of his "Stereo Electronic Music #2," in process of composition for one of the May concerts ("tomorrow it may be in the wastebasket"), and the four channels further enhanced the qualification of space. The canonic interplay of ripples, raps and burbles was intriguing in a way comparable to the twinkling, programmed lights on a kinetic sculpture by his friend James Seawright.

Arel and Seawright, in fact, have collaborated on a film of dancers, the score of which is labeled "Capriccio for TV" by the composer. When the Mimi Garrard Company danced to the music in front of the film at a March, 1969, Columbia concert, Theodore Strongin wrote in *The New York Times* of "patterns and colors" which "reacted over the dancers' bodies in close response to the music. It was a highly successful and pleasing combination of media." Bulent Arel, in his way, has proved the hospitality of the electronic medium.

A distinctly different but no less sympathetic approach to the creative interaction of media is that of Earle Brown (b. 1926), who remarked during a 1963 interview in the *New York Herald Tribune*, "A composer in the future will try to bring about a total involvement of the listener's senses. In my own music I have... aimed for [Alexander] Calder's mobility and changing forms and [Jackson] Pollock's spontaneousness."

Other important influences in Brown's career have been his undergraduate engineering studies in Boston; his later study and teaching of the highly organized Schillinger techniques of composition; his touring as a jazz-band trumpeter; his association with John Cage and John Tudor, for a while, in electronic production; and his work as a recording engineer and director, currently supervising

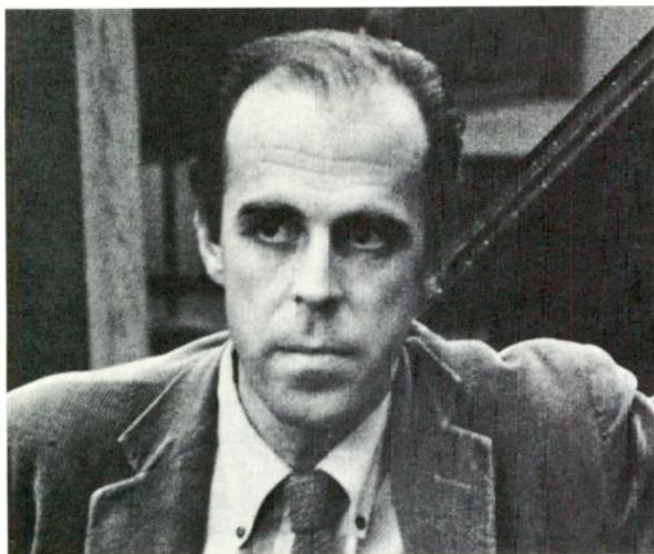
Poppo



Arel

down. It is a synthesis including serialism, Dada, electronic and... aleatory. It marks the beginning of consolidation."

Bulent Arel (b. Constantinople, Turkey, 1918) is another composer who arrived at the electronic medium after



Brown

the *Contemporary Sound Series* for Time Records.

The result is a composer who finds electronic sound, as he put it to me, “a fantastic medium,” and yet is too “interested in live people” to stay with it continually. And his strongest stylistic interest is in what is sometimes called “chance” or “aleatoric” music—composing with a degree of option and indeterminacy for which he prefers the term “open form.” It appeals to him partly because “rather than making compositions I am making conditions of involvement of a group of people.”

So, in such non-electronic pieces as “Available Forms I and II” he provides the players with specific ideas from which they choose under the conductor’s guidance. The important degree of control distinguishes Brown’s music from the “chance” pieces, for instance, of Cage.

Brown’s early electronic pieces were for tape alone, such as “Octet I and II” in the mid-1950s, for eight channels each and of indefinite length. “Light Music,” in 1961, included not only a full orchestra but lights as well—a move toward that “total involvement of the listener’s senses.” Most recently, “Times Five” combines flute, trombone, harp, violin and cello, in a spreading texture, with four tracks of tape whose sound begins rather brightly but darkens and deepens in color. The response of the “open form” instruments to this fixed element comes across as meaningful interchange. After a performance at the Second Hellenic Week of Contemporary Music in Athens, George Leotsakos wrote in *Ta Nea Enimerotes*: “This is the apotheosis of an ‘informal’ style which is completely realized in itself.”

Since 1967 Brown has occupied a chair of composition at the Peabody Conservatory in Baltimore. After receiving an honorary doctorate from there this June, he began a year’s residence in West Berlin as guest of the Berliner Künstlerprogramm, managed by the Ford Foundation.

There is a special quality of intensity in the music of

Mario Davidovsky (b. 1934), a native of Argentina who first came to the United States in 1958, under a grant from the Koussevitzky Foundation, to study with Aaron Copland at Tanglewood.

Davidovsky, another non-exclusive electronic composer, came to the Columbia-Princeton Center (where he is now an associate director) when in 1960 he took up permanent United States residency. The concentration communicated both personally and musically when we met at the center and he played his “Electronic Studies Nos. Two and Three” through the required four channels. I had previously heard his “Electronic Study No. One.” The three pieces illustrate his keen interest in formal yet subjectively convincing relationships, working less for the dramatization of space than for the integrity of “what can be built inside the loudspeaker limitation”—part of which, as he pointed out, is the impossibility of synthesizing electronically the kind of chordal texture and spread acoustically available from other instruments.

The third “Study” was also limited in the palate and the size of the tones, resulting in a disciplined, constantly moving “chamber music” distribution sometimes reminiscent of Milton Babbitt’s precision.

But in another facet of his composing Davidovsky has become absorbed in the instrumental dialogue: his several “Synchronisms” are written for tape and (mostly single) instruments, such as cello, flute and soon the piano. He



Davidovsky

succeeds with grace and inventiveness in his stated purpose: To introduce the electronic part “as an extension of the other instrument, rather than opposing it.”

One near-necessity for composers is the profession of teaching—for which, happily, the ones we have been discussing seem to show an affinity. Since 1967 Davidovsky has been on the composition faculty of the Manhattan School of Music in New York. And Istvan Anhalt (b. Budapest, Hungary, 1919) has been teaching at McGill

University in Montreal since shortly after his arrival in Canada under a foundation grant in 1949. He now is chairman of McGill's theory department and directs its Electronic Music Studio.

Having composed a symphony in serial technique in 1958, Anhalt moved his center of interest from conventional instrumentation to the electronic. A series of pieces with perhaps the most austere titles of all—"Electronic Music Compositions Nos. 1, 2, 3, and 4"—appeared between 1959 and 1961. For the third, Anhalt used sine waves exclusively, with the help of equipment designed by Dr. Hugh Le Caine in the Electronic Music Laboratory of the National Research Council of Canada. The fourth of these, however, appeared just after a summer visit to the Columbia-Princeton Center in New York, and includes passages produced on the RCA synthesizer.

More recently, like Brown and Davidovsky, Anhalt has preferred combining synthetic with "live" sounds, and with most notable success in the "Cento" on Eldon Grier's poem, "An Ecstasy." This vocal-electronic piece, for two-



Anhalt

channel tape and a mixed speaking chorus of 12 voices, was commissioned for Canada's Centennial in 1967. It includes a complex, often fragmented interplay of voices on tape and on stage, and the composer has used various degrees of comprehensibility (like Berio in the "Sinfonia") "to embody," as his notes explain, "the manifold ways in which the human mind works: sometimes in the form of mental speech in correct syntax, and at other times through sudden insights, feelings, etc." In the same year, Anhalt completed a "Symphony of Modules" for full orchestra and four electronic tracks. And a new piece entitled "Foci," a companion voice study to the "Cento," was premiered last December in Buffalo. "By presenting a voice," the composer has explained, "in certain ways, contexts, and in certain relationships to other voices, one should be able to induce one to focus on, and understand, the unique-

ness and character of a person and/or of a relationship."

Jacob Siskind, critic for the *Montreal Gazette*, affirms Anhalt to be "an incurable romantic." Be that as it may, this composer has clearly translated from Hungarian to Canadian his own colorful, variegated musicality.

In a recent magazine interview he looked ahead: "I wonder what talented people will do next with the enormous potential inherent in music as it is understood today. For example, the combination of such machines as the violin and the electronic music studio, or combining the worlds of Western and non-Western music, or by thinking about how one perceives musical structure. Another is thinking about and bringing about musical environments."

There are one or two other questions, as well, which come to mind in thinking about the work and the influence of these composers. Any ear to the ground that is properly hooked up will report the first stirrings, at least, of what could become a vast grass-roots interest in compose-it-yourself electronic music—the biggest thing, as some have said, since Gutenberg invented printing. The technical knowhow is there, the manufacturers are there, the leisure time is there, and the musical training—well, it perhaps doesn't *need* to be there in quite the same way as it does for conventional composing.

Obviously, music of real consequence will still be as rare, relative to the whole output, as literature of consequence—and, for that matter, as photography of consequence. But the creative fallout since George Eastman propagated the camera has been immeasurable, and so might it be with this exploding use of the tape recorder.

Undoubtedly, for those whose ambitions reach beyond a thousand-dollar home kit, the universities will increasingly provide centers of production, of stimulus, of scholarship and of criticism. Yet in Europe—notably in Cologne and Milan—the radio stations (government-funded, of course) have been the main patrons.

It is tempting to speculate, given the increase in popular interest now indicated, whether at some point it may become not only worthwhile but even profitable for radio in the United States and Canada to expand into electronic production and dissemination.

And in that case, these composers, with their extraordinary inventiveness, individuality, skill and experience, could be pointing toward a new worldwide Elizabethan Age of musicality, boasting a synthesizer (rather than a lute) in every barbershop. Assuming, of course, that we still have barbershops.

Art and theater, dance and music critic Louis Chapin has been published in High Fidelity, The Christian Science Monitor, Musical America and Christian Herald. He has taught at two colleges and been a director in radio (CBS) and dance and theater critic on TV. He also is an organist and composer.

GLOSSARY OF ELECTRONIC TERMS

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acoustics. The study of production, transmission, and reception of sounds. Psychoacoustics deals with the effects of sound on humans.

amplifier. A device used to increase the power, voltage, or current of a signal.

amplitude. Usually equated with loudness; it refers to the maximum value of a power, voltage, or current during a single cycle of a wave.

amplitude modulation. The periodic variation of amplitude, or the process by which this is achieved. It refers to the alteration of signal amplitude to affect loudness, usually, in electronic music, in the nature of a tremolo whose periodicity and amplitude alternations are exactly controllable by studio equipment.

analog computer. A computer in which computation is effected by measuring and processing physical priorities such as voltages, whereas in digital computers, numbers or numerical representations are manipulated to effect computation. The analog computer deals with continuously variable information rather than with digital information.

analog tape. A magnetic tape on which information is stored in continuous form as magnetic densities. The common tape used in a tape recorder is an analog tape.

attack. Those amplitude characteristics having to do with the beginning of a sound or signal (sometimes called growth).

audio generator. Strictly speaking, an electronic device that produces complex (that is, nonsinusoidal) signals at frequencies between 20 and 20,000 Hz. The terms oscillator and generator are frequently used interchangeably, but correct usage is that oscillator refers to a generator of sine waves, whereas generator refers to a device that produces other than sine waves.

audio oscillator. A device that produces sinusoidal signals at frequencies between 20 and 20,000 Hz, normally for purposes of sound synthesis or testing.

audio spectrum. The entire range of oscillations that can be heard by the human ear. The extreme limits of human hearing are about 20-20,000 Hz.

band-elimination (reject) filter. A filter that attenuates a particular band of frequencies, while permitting other frequencies to pass and be heard. (See, filter.)

band-pass filter. A filter that attenuates all but a particular band of frequencies. The opposite of a band-elimination filter. (See, filter.)

binary input language. A two-character language used to convey instruction to electronic equipment. A convenient language to use since the two characters may be represented by the two states of a switch (on or off), the presence or absence of a hole in a paper tape, and so on.

contact microphone. A microphone that must be placed in physical contact with a vibrating body (violin, guitar, cymbal, and the like), thereby transforming vibrations into electrical signals.

conversion. The process by which digitally stored information is transformed into analog information or vice versa.

decay. Those amplitude characteristics having to do with the ending of a sound or signal.

digital tape. Magnetic tape on which information is stored in discrete, numerical form (as differentiated from analog tape).

drift. Any gradual, unintentional shifting away from a desired value due to equipment shortcomings. In electronic music, reference is generally to oscillator frequency drift.

echo. The discernible replication of sounds usually at a lower amplitude. (See, reverberation.)

electronic switch. A device used to produce a periodic interruption of a signal.

electrosonics. A term covering the whole field of electronically produced sounds, whether they represent sonic experiments, sound effects, or music.

envelope. Those characteristics of amplitude that determine the growth and decay of a signal. The contours of a sound or sounds include such variables as rate of attack time, attack height, frequency, timbre, sustain level, rate of initial decay, and also the rate of final decay.

equalizer. A device for increasing or decreasing signal strength in selected portions of the audible spectrum. Certain frequencies may be strengthened in amplitude while others may be diminished. (See, Fletcher-Munson curve.)

erase head. The leadoff head of a tape recorder that erases previously recorded material on the tape prior to its passing the record head.

event. A single, perceptually separable musical entity in all of its dimensions; that is, pitch, duration, loudness, timbre, and so on.

feedback. The reaction of the output or part of the output of an amplifying device upon the input to secure

- either reinforcement (positive feedback) or reduction (negative feedback) of the original input. The term, as commonly used in electronic music, refers to the practice of sending a portion of the playback signal from a tape recorder back around to the input while the machine is running in the second mode. The playback signal is re-recorded and again played back, and so on, but often at an interval of time corresponding to the distance between the record and playback heads, and the speed of the tape. The effect is that of a series of echoes of the original sound, either dying away or increasing to an avalanche of sound, depending on the loop gain of the feedback system.
- filter.** A device that permits the selective transmission of certain frequencies of the input signal by the attenuation of undesired frequencies. (See, band-pass filter, band-elimination filter.)
- Fletcher-Munson curve.** A diagram of equal contours that displays the relationship between intensity and loudness (perceived intensity) at varying (sinusoidal) frequencies. A group of sensitivity curves made of the human ear showing its characteristic for different intensity levels between the threshold of hearing and the threshold of feeling.
- four-track tape.** Recording tape on which four separate sound paths can be utilized at the same time for recording and playback. (See, quarter-track recorder.)
- frequency.** Vibrations per second of a signal. The frequency of a signal usually determines its pitch.
- frequency counter.** A device that measures the frequency of a signal by literally counting the individual oscillations that occur during a precisely determined time interval.
- frequency modulation.** The periodic variation of signal frequency affecting pitch. (See, amplitude modulation.)
- frequency shift.** A change in frequency of an input signal accomplished by a multiplier-type modulator or frequency shifter (*Klangumwandler*).
- gain.** A quantity expressing the degree of amplification of an amplifier or device. Gain may be positive or negative, although negative gain is usually referred to as loss.
- gate.** A device for controlling the amplitude (loudness) of a signal path. Voltage-controlled amplifiers are sometimes called gates.
- half-track recorder.** A tape recorder that records and plays on half of a one-fourth-inch magnetic tape. Two-track or stereo recorders are sometimes referred to as "half-track" if the width of each channel is actually one-half of the tape width. Generally, however, half-track recorders are monaural.
- half-track heads.** The heads on a half-track tape recorder.
- harmonic.** An overtone, or frequency component present in complex sounds. The frequency of a harmonic is an integral multiple of the fundamental frequency, which is the lowest frequency partial present in a given sound. All harmonics are necessarily partials.
- Hertz.** A term used internationally in place of "cycles per second." Hertz (Hz) derives from the name of the German scientist Heinrich Rudolph Hertz, who was first to detect, create, and measure electromagnetic waves.
- input.** A signal fed into a circuit or device.
- input language.** The code employed to convey instructions when programming an electronic device. An encoding language such as Fortran or Cobol.
- jack.** A plug-in type terminal such as is found on telephone switchboards. A socket-type connector to which temporary connections may be made with patch cords.
- key punch.** A device for punching information on computer data cards.
- Klangfarbenmelodie.** A succession of musical events usually having different instrumental timbres associated with each event. The use of timbre as the primary compositional material; timbre used thematically.
- Klangumwandler.** A ring modulation-like device (see below) in which one set of resultant frequencies is suppressed.
- linear controller.** A device for continuously varying properties of sound. As manufactured by the R. A. Moog Company, fingertips are moved along gold contact wires to vary electrical current.
- magnetic tape.** Iron-oxide-coated plastic tape used in magnetic recordings. Standard widths are one-quarter, one-half, and one inch.
- mixer.** A device for combining several input signals by algebraically summing their instantaneous amplitudes.
- modulation.** The process in which a characteristic of a waveform is (usually periodically) varied. (See, amplitude modulation; also, frequency modulation.)
- monitor.** A device used for checking audio signals, usually during the recording process.
- musique concrète.** Music that is constructed from recorded sound sources, other than purely electronic.
- mutation.** The transformation of sound by radical change.
- noise.** Undesired sound. (See, white noise.)
- oscillator.** (See, audio oscillator; also, audio generator.)
- oscilloscope.** An instrument that reproduces on the screen of a cathode-ray tube a graphical representation of signals as voltages with respect to time. Used to determine amplitude, frequency, and other waveform characteristics.
- output.** The signal that comes out of a circuit or device.
- parameter.** A variable quantity that can be measured.
- partial.** A frequency component, not necessarily harmonically related to other components.
- patch cord.** A cord with a plug at both ends used to establish a temporary connection between two jacks, usually between an output and an input.
- peak.** The maximum value of amplitude, or a momentary value considerably higher than the average.
- permutation.** The alteration or changing of variables in sounds or structures.
- pitch succession.** The consecutive sounding of two or more tones.
- potentiometer.** A device used for the precise measurement of voltages by comparison of an unknown voltage with a reference voltage. Often commonly used to denote a volume control on audio equipment (abbreviated "pot").
- programming.** The directions for the sequential behavior of an electronic system, particularly a computer.
- punched paper tape programmer.** An instrument that stores information by means of coded holes in a paper tape.
- quarter-track recorder.** A tape recorder that uses one-quarter (rather than one-half, or all) the width of the tape for each recording. Stereo recording requires simultaneous recording on two of the four tracks. Many "four-track" recorders should properly be called quarter-track, as a four-track machine must be capable of simultaneous use of all four tracks on the tape.
- recording head.** An electromagnetic transducer used to implant magnetized patterns on recording tape.

The playback head "reads" the results of such arrangements.

reverberation. Repetitions of sound that are so closely spaced in time that they cannot be distinguished individually. The effect produced by multiple overlapping echoes in a room or concert hall. (See, echo.)

reverberation unit. A device that artificially produces the effect of reverberation upon signals passed through it.

ring modulator. An analog multiplier circuit used to combine signals in such a way that the output consists of sums and differences of all the input frequency components.

sawtooth wave. A signal consisting of a fundamental frequency and all harmonics, with the intensities of the harmonics inversely related to frequency. (See, waveform.)

Sel-sync. In a normal, three-head, multi-track tape recorder, the signal played back during monitoring is delayed by an interval of time corresponding to the distance between the recording and playback heads, and the speed of the tape. If it is desired to record a signal on a second track while listening to the first track as a guide for synchronization it will be found that the time delay error is about one-tenth of a second (at 15 ips.) and the second track will be out of synchronism by that amount. In order to avoid this, circuits have been developed to allow the playback from the first track (or any track) to be made from the recording head, by using it as a playback head. The sound heard will then be synchronous with the recording of another signal on another track, as the record heads are all in line vertically with each other. Of course there are problems in so using the second head as a playback head; only in the finest machines is the signal quality usable at all for other than the crudest guide to synchronization. The term Sel-sync* refers to such a system.

sequencer. A device that is used to produce a preset voltage sequence for the purpose of controlling a series of events with voltage-controlled equipment.

signal. Electrical analog of sound.

signal generator. The source of sound; an oscillator or, even a tape recorder in a very general sense.

sine wave. The waveform corresponding to a single frequency oscillation.

sound. Pressure waves of a frequency audible by the human ear. The properties of sound are frequency, amplitude, duration, and timbre or waveform. When frequency of vibration is regular or stable, pitch results; when unstable, noise results.

sound-on-sound. A method of recording a second signal on top of a previously recorded track of a tape. The erase head of the tape recorder must be disconnected or disabled to prevent erasure of the first signal during the process of recording the second. The results are usually quite poor in terms of signal quality.

sound wave. The periodic compression and rarefaction of the atmosphere at frequencies discernible to the human ear.

source. The entity that supplies signals.

spectrum. A frequency representation of the (audio) signal which plots amplitude against frequency; the conversion from the waveform to the spectrum representation is achieved mathematically by a Fourier transformation.

splice. The connection of two segments of magnetic tape, usually with the help of special splicing tape

that is adhered to the glossy back surface.

square wave. A signal consisting of a fundamental frequency and all odd-numbered harmonics with the intensities of the harmonics inversely related to frequency.

steady-state. That portion of a sound or signal that lacks significant perceived variations.

synchronization. Coordinating with regard to time one set of events with another.

synthesizer. A system of electronic instruments for the production and control of sound.

tape deck. The tape transport and heads portion of a tape recorder. Sometimes preamplifiers are included, but not power amplifiers and speakers usually present in portable machines.

tempophone. A device used in tape recording to increase or decrease performance speed without altering pitch. The reverse operation is also possible and pitch may be altered without altering speed.

timbre. Tone-color. Timbre is the complex function of the relative amplitudes and frequencies of the frequency components.

timbre modulation. The alteration of the amplitudes and frequencies of frequency components to affect perceived tone-color.

transient overtones. Overtones (harmonics) momentarily present, usually during the attack of a sound. (See, steady-state.)

transistor. A device made from semiconductor materials that can act as an electrical insulator or conductor, depending on the electrical charges placed upon it. Transistors are used in amplification and oscillation as a substitute for vacuum tubes.

variable speed unit. A device used to control the speed of a tape recorder motor. Professional tape recorders are driven by a synchronous motor whose speed is dependent on the frequency of the AC power to it. Most variable speed units consist of an oscillator that furnishes a frequency between, roughly, 30 and 40 Hz, and a power amplifier that amplifies this signal to a level of 117 volts at a power sufficient to drive the motor. Variation of the oscillator within this frequency range will affect the speed of the motor over a three to one range, usually without ill effects.

variac. A variable AC transformer, sometimes used to control the speed of a tape recorder motor by reducing the 117-volt line voltage. This method will usually shorten the life of the motor.

vocoder. Developed in the early 1950's to break down complex vocal sounds into digital bits of information for transmission over narrow bandwidths by wire or by radio. Used as a mutation device in electronic music composition.

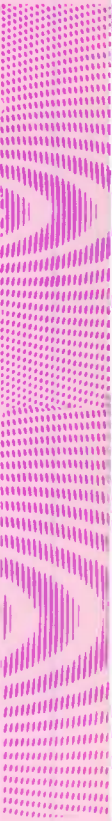
voltage-controlled amplifier. An amplifier whose gain may be varied by means of a change in a control voltage.

waveform. The shape of a wave in the sense of a graphical representation showing variations in amplitude versus time.

white noise. By analogy with light, a signal that may be considered to contain all audible frequencies, with amplitudes randomly distributed. Colored noise, analogously, is noise in which a band (or bands) of frequencies is suppressed. The audible effect of white noise is like that of escaping steam.

wye (Y) connector. A device having the appearance of the letter "Y"; at the arms and bottom of the stem are three connectors, all connected in parallel at the intersection. Should not be used for mixing signals, but for dividing a signal to send it to more than one place.

* Trademark, Ampex Corporation





Harold Moon, Lonnie Johnson, Ed Cramer

Joe South, Bill Lowery, Tommy Roe



Thelma Hoover



Ivory Joe Hunter with BMI's Cramer and Zavin

BMI News

AWARDS IN CANADA

Sixty Canadian songwriters and 36 Canadian music publishers were honored May 6 in Toronto for their contributions to Canadian music. The second annual Awards Dinner to honor the writers and publishers of 54 songs in the pop music

field was held by BMI Canada Limited at the Royal York Hotel. Among the BMI officials present were president Edward M. Cramer and William Harold Moon, general manager, BMI Canada.

It was during Cramer's visit to Toronto that he and Moon met with the legendary **Lonnie Johnson** to present him with BMI's Commendation of Ex-

cellence for "long and outstanding contribution to the world of rhythm and blues." (Johnson died June 16.)

POP AWARDS DINNER

The 132 writers and 69 publishers of 94 songs licensed for public performance by BMI received Citations of Achievement for the most performed songs in the BMI

Thelma Hoover



Thelma Hoover



Ed Cramer congratulates Motown group: Frank Wilson, Patrice Holloway, Herb Eiseman and Robert Gordy

Bobby Hebb and Ed Cramer

Si Simon, Wayne Carson, John and Bill Denny



Paul Anka

repertoire for the calendar year 1969. In addition, a special citation was presented to John Hartford, the writer, and Glaser Publications, Inc., the publisher, for "Gentle on My Mind," the most performed BMI song during 1969. The awards were presented at Los Angeles' Century Plaza Hotel on May 19, by BMI president Edward M. Cramer, with the assistance of mem-

bers of the firm's Writer and Publisher Administration division, of which Mrs. Theodora Zavin is senior vice president. The top 1969 writer-award winners are John Lennon and Paul McCartney, each with five awards. The leading publishers are the Bill Lowery Group with seven awards, and Maclen Music, Inc. and Screen Gems-Columbia Music, Inc., each with five awards.

Other leading writer-award winners include Perry Buie, James B. Cobb Jr., Bobby Goldsboro, Barry Mann, Paul Simon, Joe South and Jimmy Webb, all with three awards each. Winners of two awards include Paul Anka, Steve Cropper, John Fogerty, Mark James, Tommy James, Laura Nyro, Teddy Randazzo, Cynthia Weil and Bobby Weinstein. Multiple publisher-award recipients





Julie Chester, Booker T. Jones and Ed Cramer

include Jobete Music Co., Inc., four awards; Charing Cross Music, Rivers Music Co. and Unart Music Corp., each with three awards; and Big Seven Music Corp., Cedarwood Publishing Co., Inc., Detail Music, Inc., Duchess Music Corp., East/Memphis Music Corp., Irving Music, Inc., Jondora Music, MRC Music, Inc., Elvis Presley Music, Inc., Press Publishing Co., Inc., Spanka Music Corp. and Vogue Music, Inc., all with two awards each.

A complete list of the 1969 BMI award winners is on page 47.

On May 21, a reception and dinner honoring BMI-affiliated writers and publishers, whose principal activity is the creation of music for motion pictures and television, was held in Los Angeles.

AWARDS TO STUDENT COMPOSERS

Eighteen young composers from the United States and Canada shared a total of \$12,950 in the 18th annual BMI Awards to Student Composers (SCA) competition, which is sponsored annually by BMI. The award recipients this year range from 15 to 24 years of age. Six of them have been previous SCA winners. This year's awards, BMI president Edward M. Cramer announced, bring to 153 the number of talented young people in the Western Hemisphere who have been presented with BMI Student Composers Awards to be applied toward their musical education.

1969 BMI Awards to Student Composers were made to the following: Robert Boury, age 23, of Wheeling, W. Va., a student at the University of Michigan; Humphrey Evans III, age 21, of Washington, D.C., a student at Yale

University Graduate School. This is Mr. Evans' third SCA award; Daniel Foley, age 17, of Jacksonville, Fla., a student at the North Carolina School of the Arts. This is Mr. Foley's second SCA award; Andrew Frank, age 23, of Philadelphia, Pa., a student at the University of Pennsylvania; Stephen Hartke, age 17, of New York City, a student at the United Nations International School; Jeffrey Jones, age 22, of Los Angeles, Calif., a student at Brandeis University; Daniel Kessner, age 23, of Los Angeles, Calif., a student at the University of California, Los Angeles; Jeffrey Kresky, age 21, of Passaic, N. J., a student at Princeton University; Gerald Levinson, age 18, of Westport, Conn., a student at the University of Pennsylvania; Denis Lorrain, age 21, of Montreal, P. Q., Canada, a student at the Universite de Montreal; Howard Lubin, age 16, of Merrick, N. Y., a student at the Juilliard School Preparatory Division. This is Mr. Lubin's third SCA award; John David Mann, age 15, of Westfield, N. J., a private student of Dr. Alfred Mann; Peter Salemi, age 21, of Urbana, Ill., a student at the University of Illinois; Walter Saul, age 15, of Chevy Chase, Md., a student of Grace Newsom Cushman, at the Jr. Conservatory Camp in Vermont. This is Mr. Saul's second SCA award; Daria Semegen, age 23, of Haganan, N. Y., a student at Yale University. This is Miss Semegen's second SCA award; Donald Steven, age 24, of Montreal, P. Q., Canada, a student at McGill University; Preston Trombly, age 24, of Danbury, Conn., a student at Yale University, and Hugh M. Wolff, age 16, of Washington, D.C., a student of Grace

Newsom Cushman, at the Jr. Conservatory Camp in Vermont. This is Mr. Wolff's second SCA award.

Established in 1951 by BMI in cooperation with music educators and composers, the SCA project annually gives cash prizes to encourage the creation of concert music by student composers (under the age of 26) of the Western Hemisphere and to aid them in financing their musical education. All awards are made on the basis of creative talent evidenced by original manuscripts which are submitted and judged under pseudonyms.

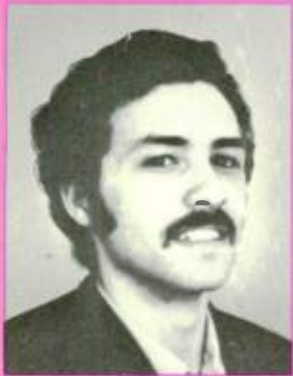
Prizes totaling \$15,000 and ranging from \$250 to \$2,000 are awarded at the discretion of the judges. The judges have the right to determine the amount of each award to be given and the number of such awards to be made. In the event that the judges consider that the quality of the entries does not warrant the awarding of any prizes or of prizes totaling the full amount of \$15,000, the judges have the right to make no awards or to make awards totaling less than such full amount and to recommend to the National Chairman that the amount not awarded be added to the total of available awards for the following year's competition.

The permanent chairman of the judging panel for BMI Awards to Student Composers is William Schuman, distinguished American composer. Others who served as judges in the 1969 competition were Chou Wen-chung, Felix Greissle, Ronald Herder, Udo Kasemets, Otto Luening, Gustave Reese, Nicolas Roussakis and Vladimir Ussachevsky.

The 1970 Student Composers Awards competition will be announced in the fall, at the beginning of the next school year. Inquiries regarding rules and official entry blanks should be addressed to Oliver Daniel, Director, BMI Awards to Student Composers, Broadcast Music, Inc., 589 Fifth Avenue, New York, N. Y. 10017.

To honor the winning student composers BMI gave a reception for them at the Waldorf-Astoria Hotel in New York City, May 26. The young creators were presented their awards by BMI president Edward M. Cramer, following a short speech by William Schuman. Some of the music community's leading names attended the gathering.

winning student composers



Salemi



Jones



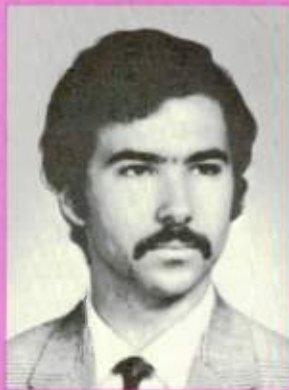
Saul



Kessner



Lubin



Kresky



Levinson



Trombly



Hartke



Lorrain



Frank



Steven



Wolff



Boury



Foley



Semegen



Evans



Mann

Opera

Butterfly Window, a one-act, three-scene spoof of a Taoist legend by **Isang Yun**, was given its first American performances by the Northwestern University Opera Workshop. Robert Gay translated the Harald Kunz libretto from German.

Mr. Gay staged the work, which was conducted by Bernard Rubenstein. The performances took place, February 27 and March 1, in Cahn Auditorium on the Northwestern campus in Evanston. On March 9, the same forces introduced *Butterfly Widow* at Chicago's Civic Opera House. The occasion: the Music Educators National Conference.

The story centers on Tschuang-tse, the Taoist sage who dreams he is a butterfly and then wonders whether he is a man who had dreamed he is a butterfly, or vice versa. The opera makes comment on the brevity of widows' grief: ♦ *End of a World*, a one-act opera by **Hans Werner Henze**, staged and conducted by Robert Lawrence, was presented by the Peabody Conservatory of Music's Opera Department, March 13 and 14. The site of the performances: Peabody Concert Hall on the conservatory's Baltimore campus.

The opera involves a very special world: the decadent, free-loading coterie surrounding the Marchesa Montetrasto, owner of a palace on a man-made island in the Adriatic near Venice. The time: about 1950.

The work is published in the U.S. by Schott/Belwin-Mills Publishing Corp.

'Butterfly Widow'

♦ *The Fisherman and His Wife*, a new opera with **Gunther Schuller's** music, set to "an excellent libretto" by John Updike, had its first performances, May 6-10, at the Savoy Theater in Boston.

Based on a fairy tale by the Brothers Grimm, this work, commissioned by the Junior League of Boston in 1967 as a 60th anniversary gift for the children of the city, was performed by the Opera Company of Boston, under the artistic direction of Sarah Caldwell.

The story centers on the boundless greed of the fisherman's wife. Her husband catches a fish who is really an enchanted prince. He promises to throw the fish back if the fish-prince grants his wife three wishes. The wife pushes her luck, asking for a castle, then expresses her desire to be king, emperor, Pope and finally Lord of the Universe. In disgust, the fish-prince returns the couple to their original squalor.

"An opera for children is a risky project," *The New York Times'* Raymond Ericson pointed out. "To be worth doing it has to find the right balance between simplicity for the young and at least some sophistication for parental endurance.... To a large extent, it succeeds in its aim."

Updike's "language is clear and singable, lightly touched with poetry and wit," Ericson added. Schuller's score, written for a relatively small orchestra, incorporates elements of jazz and rock and places emphasis on instruments familiar to schoolchildren of the current generation. Free performances are planned for Boston schoolchildren.

♦ *Karl V*, the **Ernst Krenek** opera, had its first Swiss performance, March 21. It was presented at the Zurich Opera House by the resident company. Completed shortly before the ascension of Hitler to power in Germany, the work is quite outspoken and anti-Nazi in feeling.

The opera takes a definite political position by praising the universality of the Medieval Catholic empire, contrasting it with the decomposing powers of nationalism, materialism and religious indifference.

Karl V is published in this country by Universal Edition (Vienna)—Theodore Presser Company.

♦ **Hermann Reutter's** *The Death of Empedocles*, after the fragment of a tragedy by Friedrich Hoelderlin, was presented, March 21, by the Wurttemberg State Opera in Stuttgart. The performance was in celebration of the 200th anniversary of Hoelderlin, the famed German poet.

The work is published in this country by Schott/Belwin-Mills Publishing Corporation.

♦ **Richard Rodney Bennett's** *Victory*, his third full-length opera, had its world premiere, April 13, at London's Covent Garden. Commissioned by the Friends of Covent Garden, it has a libretto by Beverley Cross, who frequently collaborates with the composer—e.g. *The Mines of Sulphur*.

Based on the Joseph Conrad novel, *Victory* centers on a Swedish recluse from aristocratic background who has sought and found refuge from the world on a Polynesian island. The story as it develops shows that even a drop-out cannot escape the consequences of his acts.

When lead character Axel Heyst goes to "civilization"—Surabaya—for supplies, he becomes involved with Lena, a singer with a ladies' band at a local hotel. He returns with her to his island in the Java Sea, but intruders motivated by greed and jealousy bring both the recluse and his lady love to a tragic end.

"Helped by Beverley Cross' highly professional libretto, Bennett has created an opera where as in Verdi the complications of the story never get in the way of basic emotional relationships," the *Manchester Guardian's* Edward Greenfield declared.

Desmond Shawe-Taylor, of the *Sunday Times* (London), commented: "Ben-





Houston Rogers/Courtesy of Royal Opera House

'Victory'

nett has planned his musical scheme intelligently and quite elaborately...with different types of note-row to suggest the opposing worlds of the drama."

"Bennett has conceived the action on three interlocking planes," Peter Heyworth reported in *The New York Times*. "First, there is the violent, dangerous outer world of the hotel and the gangsters, evoked in hard, percussive music that is sharply defined rhythmically. In contrast, there is the inner world of Heyst's island retreat, mirrored in sumptuous string sonorities. And finally, there is the ladies' orchestra, whose blithe, genteel numbers provide a macabre contrast to the rough trading station of Surabaya....Bennett succeeds...in characterizing these three planes of the drama."

The opera, dedicated by the composer to Hans Werner Henze, "was admirably performed," the *Financial Times'* Andrew Porter reported. "The

performance, on all levels highly accomplished, is a splendid achievement by both composer and company."

Colin Graham staged the work and Edward Downes conducted. Donald McIntyre sang the role of Heyst and Anne Howells was Lena.

All the King's Men, another Bennett-Cross operatic collaboration, this time in one-act, was given its first United States performances, March 19 and 20. A work for children, it was presented by the Ninth Grade Class of Potomac School, McLean, Va., with students from the fourth through eighth grades. The site of the presentation: the Potomac School.

The Washington Post's Paul Hume said: "Under the direction of Dingwall Fleary and Robert Henderson, with David Long as producer, Bennett's opera about the episode that gave birth to Humpty-Dumpty during the British Civil War of 1643 comes off nicely. It

is unpretentious yet full of good tunes."

Both Bennett operas are published in this country by Universal Edition (London)-Theodore Presser Company.

◆ The New York premiere of the Stanley Silverman opera, *Elephant Steps*, was given at the Hunter College Opera Theater in New York City, April 24. An Opera Theater Production presented by the Hunter College Opera Association, "it is a mixed-media extravaganza, using singers, dancers, a small chorus, films, graphics, a rock group, electronic sound, incense, and strong lights shining into the eyes of the audience," Harold C. Schonberg explained in *The New York Times*.

Silverman collaborated with author Richard Foreman on this melange of "crazy words" and music in multiple varieties. The work centers on elephants, elephant angels and a mysterious man named Reineheart. Obscurity runs rampant.

"...in its crazy way, *Elephant Steps* keeps moving along, and the eclecticism, the wonderful irreverence of the music, provides a perfect commentary," Schonberg added. "In this work, surrealism lives. Maybe it does not have to have a meaning, no more than life has to have a meaning.

"...it was quite an evening, in all. How can Mr. Silverman ever top it?"

New York magazine's Alan Rich concluded: "...avant-garde as hell and also beautiful....it was the best piece of new music I've heard in concert all year."

Silverman



Carl Samrock

Theater

ON THE BOARDS

The Me Nobody Knows, based on the book *Voices From the Ghetto* by Stephen M. Joseph, opened at New York's Orpheum Theater, May 18. *Voices* was a collection of poems, songs, anecdotes and stories all written by schoolchildren, most of them black or Puerto Rican, ranging in age from 7 to 18.

Reviewing the show for *The Record* of Bergen, N. J., Emory Lewis wrote:

"Composer Gary William Friedman, lyricists Herb Shapiro and Will Holt, choreographer Patricia Birch and director Robert H. Livingston have taken this rich, affecting material and turned it into a stunning, bold, loving rock musical happening."

Clive Barnes (*The New York Times*) called the show a "dark and lovely rock-folk musical" and found it "vivid and honest" and Friedman's music "eloquent." He noted: "...as I left, the audience was cheering and it was not cheering gloom, but the victory of the human spirit over circumstances. For the slums these kids find themselves in may be squalid, but the kids are beautiful. And the show, assertive and passionate, reflects that beauty."

◆ A revival of *Beggar on Horseback* opened May 14 at New York's Vivian Beaumont Theater in Lincoln Center for the Performing Arts. Starring Leonard Frey in the role of a struggling composer tempted to marry a rich girl to subsidize his writing of the great symphony, the play was written by George S. Kaufman and Marc Connelly. It was originally seen in 1924. The current version features accompanying music by Stanley Silverman, who also teamed with John Lahr to write several songs.

◆ *Mod Donna*, with book and lyrics by Myrna Lamb and music by Susan Hulsman Bingham, opened May 3 at New York's Public Theater. Directed by Joseph Papp, the musical deals with a *ménage-à-trois*. Reviewing in *Newsweek*, Jack Kroll wrote: "*Mod Donna* is not about the women's lib movement but touches a lot of the psychic and social nerves that have triggered it. Writer Myrna Lamb is tough, smart, bitter and tender; she has a fine sense of how vulnerability becomes perverted



'The Me Nobody Knows'



'Beggar on Horseback'



'Mod Donna'



'Androcles and the Lion'



'Park'

power (women) and how power can be perverted vulnerability (men)." *Time* found playwright Lamb "a deft lyricist with barbed wit and a no-nonsense lucidity about contemporary man-woman relationships." The play starred April Shawhan, Larry Bryggman, Peter Haig and Sharon Laughlin.

◆ A musical version of *Androcles and the Lion*, written by Richard Stockton, with music by Sheldon Markham and lyrics by Annette Leisten, is a current offering of the National Theater Company. Since opening December 1, the show, which features live actors, projected slides and an orchestrated tape, has played in schools and colleges throughout the Middle Atlantic States and as far west as Detroit. It is one of

six current productions offered by the National Theater Company playing to audiences of nearly a million each season.

◆ *Park*, a musical with book and lyrics by Paul Cherry and music by Lance Mulcahy, opened April 22 at New York's John Golden Theater. The four-character cast starred Joan Hackett, Julie Wilson, David Brooks and Don Scardino. Played in a park setting, the musical concerns four strangers who meet, exchange confidences, discover they have common needs and then part. The show was staged by John Stix.

Variety, discussing the songs, wrote: "Perhaps the best, at least in terms of stage performance, is 'He Talks to Me,' in which the woman encourages the man to tell about himself in dialogue while she comments in song. Also good is the boy's touching theme number, 'All the Little Things in the World Are Waiting' and the girl's romantic 'I Want It Just to Happen.'"

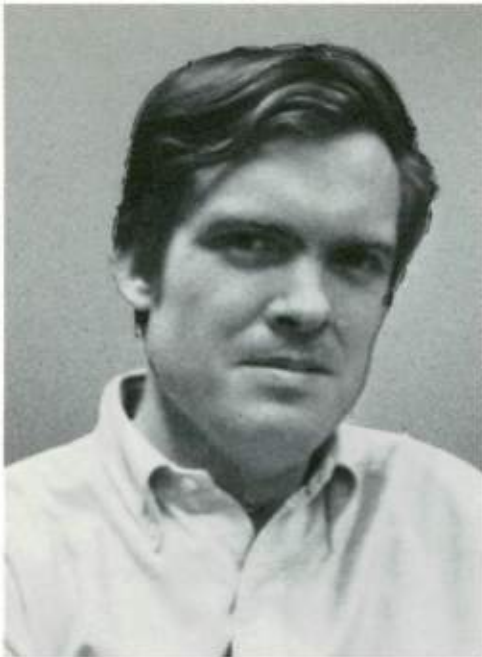
◆ *The Rise and Fall of the City of Mahagonny*, by Bertolt Brecht and Kurt Weill, in a new adaptation by Arnold Weinstein, opened April 28 at New York's Anderson Theater.

With Estelle Parsons, Barbara Harris and Frank Porretta in the leading roles, the production was conceived and directed by Carmen Capalbo. The fantasy deals with a city, founded by three criminals, which is dedicated to the material and steeped in vice. Money and property are sacred, so when the hero goes broke and cannot pay the \$100 he owes for whiskey, he is executed.

Clive Barnes, reviewing for *The New York Times*, noted that Weinstein's English adaptation and Samuel Matlovsky's orchestrations deserve "high praise." Questioning whether the work should be treated as a musical or as an opera, he concluded:

"It is, after all, a musical of sorts, and those sorts are those of excellence."

◆ *Arena Conta Bolivar*, a presentation of the Arena Theater of Sao Paulo, Brazil, opened March 30 at New York's Public Theater. With music written by Theo Barros, Gilberto Gil, Sidney Muller and Caetano Veloso, the musical, sung and narrated in Spanish, Portuguese and mockingly accented English, tells the story of Bolivar and his fight against Spain. Augusto Boal wrote the text and directed the company.



Reck



Earls

Haden



Charles Stewart

CHARLES WUORINEN TIME'S ENCOMIUM

for synthesized & processed synthesized sound

realized at the Columbia-Princeton Electronic Music Center, New York



Concert Music

John Simon Guggenheim Memorial Foundation Fellowships for 1970 have been awarded to Paul Earls, associate professor of music, Duke University, and research fellow—Center for Advanced Visual Studies at the Massachusetts Institute of Technology; Charlie Haden, prominent jazz bassist and composer, and David Reck, composer, currently studying in India on a grant from the Rockefeller Foundation.

PULITZER PRIZE

Charles Wuorinen's name was added to the ever growing list of BMI-affiliated composers who have been singled out to receive the Pulitzer Prize. The announcement of his selection, following the recommendation of the advisory board on Pulitzer Prizes, was made early in May. The composer was honored for "Time's Encomium," an electronic composition written specifically for records without a live auditorium performance in mind.

A 32-year-old New Yorker, who first

composed at age 5, Wuorinen received graduate and undergraduate degrees from Columbia University. He has composed in excess of 75 works. A highly accomplished pianist, he has earned a significant number of awards, commissions and honors from such sources as the Ford, Koussevitzky and Fromm Foundations, the National Institute of Arts and Letters and the Tanglewood Festival.

At present, Wuorinen is an assistant professor of music at Columbia.

NATIONAL INSTITUTE AWARDS

Morton Feldman was one of the creative award winners recently named by the National Institute of Arts and Letters. The composer received a citation and a \$3,000 prize.

The first recipient of the newly instituted National Institute of Arts and Letters Charles E. Ives Scholarship award is Joseph Schwantner. The scholarship was created by a bequest conferred on the Institute by the widow of Ives. It provides for an annual scholarship of \$5,000 to be given to a young composer for continued study in composition, and a like amount for the furtherance of Ives' music.

BRANDEIS AWARDS Brandeis University presented its 1970 Creative Arts Awards Medals and Citations during the 14th annual awards banquet, May 17, at the Whitney Museum of American Art in New York City.

The Creative Arts Awards Medal for Music, in recognition of a lifetime of distinguished achievement, was presented to **Milton Babbitt**. In addition to receiving the medal, the composer was given a \$1,000 stipend.

Charles Wuorinen was the recipient of the Citation for Music, which also was accompanied by a check for \$1,000. Citations are conferred on particularly talented artists actively engaged and/or in mid-career.

PREMIERES **Milton Babbitt's** "Quartet No. 3," written for the Fine Arts Quartet, following a specific commission from the Fine Arts Foundation of Chicago, was programmed for the first time in New York City, May 13.

The Fine Arts Quartet included this work in a concert, entirely comprised of commissions, at Alice Tully Hall, Lincoln Center.

"...its continuity was inescapable and at one point there was an evocative section for the sombre viola against considerable pizzicato and short bowings," Harriett Johnson reported in the *New York Post*.

◆ **Conrad Beck's** "Fantasia for Orchestra" had its world premiere on March 19. It was performed by the Basel Chamber Orchestra under the direction of Paul Sacher at the Casino Hall in the Swiss city.

The work is published in this country by Schott/Belwin-Mills Publishing Corporation.

◆ The American premiere of "The Grand Inquisitor," an oratorio for chorus, baritone solo and orchestra by **Boris Blacher**, took place on April 5. The Schola Cantorum Chorus (132 voices) and Orchestra (40 pieces) under Royal Stanton, with baritone soloist Roger Ardrey, played the work in the Foothill College Gymnasium (Los Altos Hills, Calif.).

Written in 1942 and dealing with the hypothetical return of Christ to earth during the Spanish Inquisition, the oratorio "emerged as a major choral

work—one deserving of a much wider hearing in this country," the *Palo Alto Times'* Paul Emerson declared.

The work, which ran an hour, was sung in German. It is published in this country by Schott/Belwin-Mills Publishing Corp.

◆ A concert of electronic music put on by the Columbia-Princeton Electronic Music Center was given May 6. Presented at the McMillin Theater on campus, the recital had the assistance of the Alice M. Ditson Fund of Columbia in cooperation with the music departments of Columbia and Princeton Universities and the Group for Contemporary Music at Columbia. Included during this evening was the world premiere of **Charles Dodge's** "Changes" (1970).

◆ The 75th anniversary concert of the Third Street Music Settlement in Alice Tully Hall at Lincoln Center, April 29, was the occasion for the first New York performance of **Morton Feldman's** "False Relations and the Extended Ending." The performers included three pianists, one of which was the composer, a violinist, cellist, trombonist and a player of chimes.

◆ The premiere of two movements from **Miriam Gideon's** "Of Shadows Numberless," a suite for piano based on Keats' "Ode to a Nightingale," took place, April 12, at the Museum of the City of New York. Esperanza Herzano was at the piano.

◆ Mills Concert Hall on the University of Wisconsin campus was the site of the world premiere of **Bernhard Heiden's** "Concerto for Horn and Orchestra." Commissioned by the university in observance of the dedication year of the new Humanities Building, it was performed, February 22, by the University of Wisconsin Symphony Orchestra, Otto Werner Mueller conducting. The soloist: John Barrows.

"...it is persuasive and friendly music," the *Wisconsin State Journal's* Carmen Elsner declared. "With only two movements, the concerto combines a smooth and graceful prelude and a more biting set of variations. But all is outgoing and, as one listener remarked, 'good listening.'

"Barrows gave it a loving performance, visibly delighting Heiden, who had come from Bloomington, Ind. [he's on the Indiana University faculty], for

the occasion," Miss Elsner added.

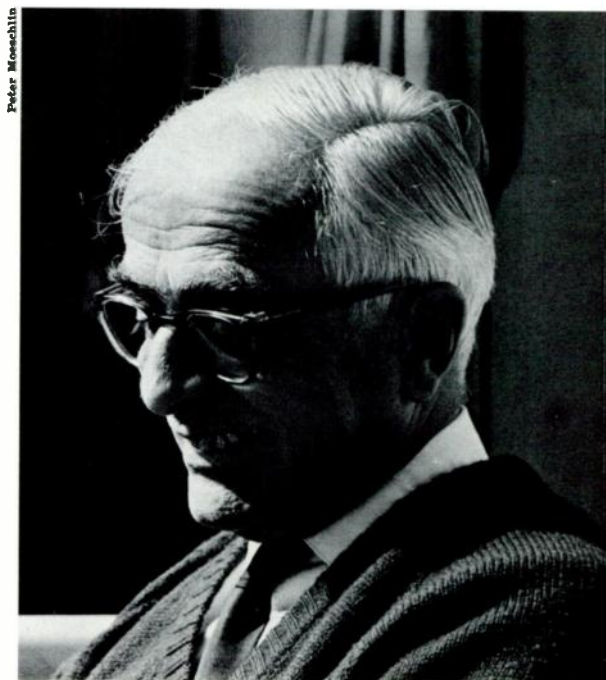
The composer's "Solo for Alto Saxophone and Piano" (1969) had its initial performance, December 16 last, at the First World Congress of Saxophone Players in Chicago. The piece, dedicated to Eugene Rousseau, featured that artist.

◆ To celebrate the first year in its new headquarters, the Manhattan School of Music has been presenting the world premieres of works by five American composers. The latest: "Concerto for Piano and Orchestra" by **Robert Helps**, commissioned by the Thorne Music Fund for the MSM.

The composer played the solo part. The Manhattan Orchestra was conducted by Giampaolo Bracali during this concert, held April 23, in Borden Auditorium on campus.

◆ "Concert Music for Band, No. II" by **Michael M. Horvit** was given its world premiere by the University of Houston Wind Ensemble, James Matthews, conductor, March 12, at the University of Houston Symposium of Music. The piece is dedicated to Professor Matthews.

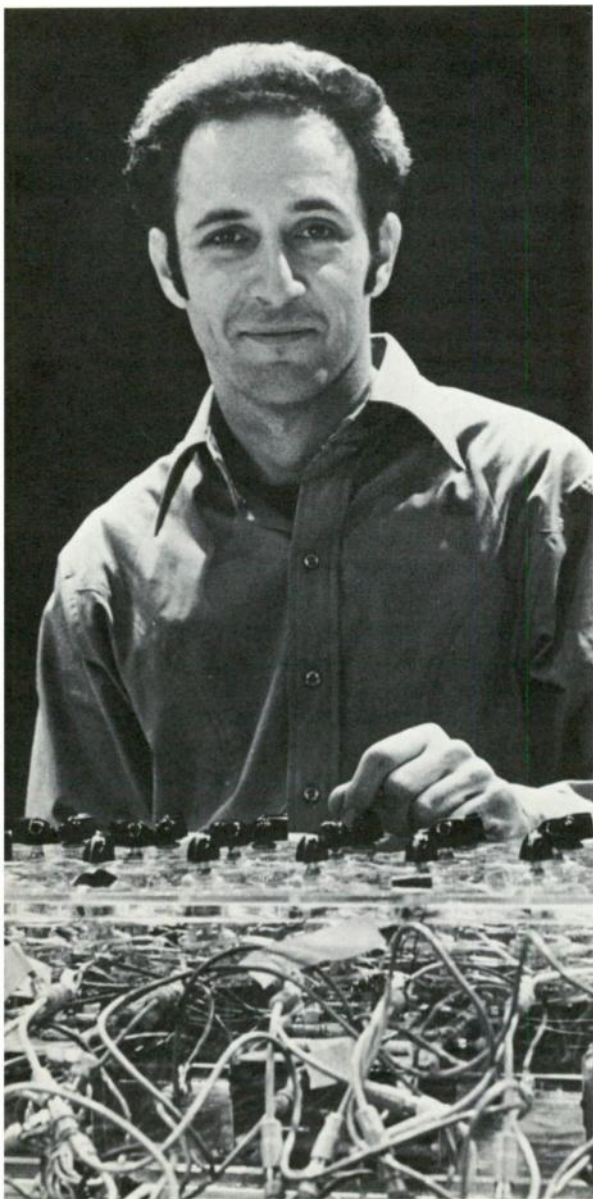
The composer's "Brass Quintet," commissioned by and dedicated to the Omicron Upsilon Chapter of Phi Mu Alpha Sinfonia, had its first performance, April 21. The Houston Brass Ensemble programmed it during a concert held in Arnold Hall on the Uni-



Beck



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versity of Houston (Texas) campus.

Ann Frohbieter introduced Horvit's "Meditation" for organ at Congregation Emanu El in the Texas city, May 1.

◆ The spring concert of the Columbia University Glee Club, Bruce Trinkley, director, included the initial New York performance of Alan Hovhaness' "Protest and Prayer." The May 2 event was held in Alice Tully Hall at Lincoln Center for the Performing Arts.

◆ Karel Husa's "Quartet No. 3," which won the Pulitzer Prize last year, had its New York premiere, May 13, at Alice Tully Hall—Lincoln Center. Commissioned for the Fine Arts Quartet by the Fine Arts Foundation of Chicago, it was performed by that unit.

◆ The world premiere of Scott Huston's "The Song of Deborah," a cantata for narrator, chorus and orchestra, took place, April 24, at Cincinnati's Plum Street Temple. The work was commissioned by the city's Isaac M. Wise Temple to honor its retiring organist, Dr. C. Hugo Grimm.

Dr. Huston conducted choirs from three local churches, additional singers from the University of Cincinnati College-Conservatory of Music and an orchestra made up of members of the Cincinnati Symphony. Dr. Lewis E. Whitehart was choirmaster. The narrator on this occasion: Justin Friedman.

◆ The Wisconsin College-Conservatory New Art Ensemble, Barney Childs, director, introduced "Graphic Mobiles" (1970), April 9. The M. William Karlins work was one of seven performed during the seventh "Now 70" concert at Schmitt Academic Center, De Paul

University, in the city of Chicago.

Earlier this year, on January 11, the composer's "Music for Cello Alone" (1967) was performed along with the initial performance of "Music for Cello Alone No. 2" (1969). Joel Krosnick included the pieces in his program for unaccompanied cello, a Curtis-Zimbalist concert, at Senior Center, Bowdoin College, Brunswick, Me.

◆ The Boston Philharmonia under the direction of Leon Kirchner presented the composer's "Music for Orchestra" in its new chamber version, March 20. The site of the performance: Sanders Theater in the Massachusetts city.

"...an extroverted, exciting piece, full of interesting sonorities and rhythmic figurations," *The Boston Globe's* Craig Smith said.

◆ Pasadena (Calif.) City College was the site of the world premiere of Ellis Kohs' "Suite for Cello and Piano," April 30. The performers: Joanna de Keyser and Marilyn Neeley.

◆ Ernst Krenek's "Six Profiles," a work commissioned by the Fargo-Moorhead Symphony Orchestra, was introduced by the North Dakota/Minnesota community organization, March 14. Sigvald Thompson conducted. The concert, attended by the composer, took place locally in the Center for the Arts Auditorium.

◆ Robert Moran was saluted in recognition of his great contribution to the character and vitality of new music in the San Francisco area. Bay city radio station KPFA presented a series of three programs concerned with his thoughts and music. The last of these was a live quadraphonic broadcast from Grace Cathedral, April 24.

The San Francisco Conservatory New Music Ensemble and guest artists—the San Jose State Brass Ensemble—performed an entire evening of Moran music, including the world premiere of "Silver and the Circle of Messages." The composer conducted the premiere.

"Quieter instruments—strings, winds, vibraphone, chimes—took over the scene in 'Silver and the Circle of Messages,'" the *San Francisco Examiner's* Alexander Fried noted. "As their tones floated over the church, they were so pervasive and subtle that they became a tonal equivalent of incense."

Heuwell Tircuit, writing in the *San Francisco Chronicle*, added: "...Moran

has apparently forsaken the mixed-media happening of old—which really is passé by now—for a more direct concern with music as sound.”

◆ “*Utrenija—The Interment of Christ*” by **Krzysztof Penderecki**, a work for soli, two choirs and orchestra, commissioned by West German Radio, had its world premiere, April 8. The concert, during which it was heard, took place in the Cathedral of Altenberg near Cologne, under the sponsorship of West German Radio.

Andrzej Markowski conducted the Cologne Radio Orchestra, Cologne Radio Choir and the Choir of the North German Radio. The soloists were Stefania Woytowicz (soprano), Krystyna Szczepanska (mezzo), Louis Devos (tenor), Bernard Ladysz (bass) and Boris Carmeli (basso profundo).

The composition is published in the United States by Schott/Belwin-Mills Publishing Corp.

◆ “**Steve Reich**, a composer in his mid-30’s, has for some years been trying to evolve a music based on the relationships of pulses and on drones,” *The New York Times*’ Donal Henahan noted.

Insight into Reich’s methods and general posture was provided by two evenings of music. They were presented by the Guggenheim Museum on its New York premises, May 7 and 8.

Two Reich efforts, “Phase Patterns” and “Four Organs,” had their first performances. The participating musicians: Steve Chambers, Jon Gibson, Art Murphy, the composer (electronic organs, “Phase Patterns”); Chambers, Philip Glass, Murphy, the composer (electronic organs, “Four Organs”). Gibson played maracas on the latter work.

◆ Pianist Leonid Hambro introduced **Harold Seletsky**’s “Feelings” at a May Day Festival Concert (May 1). The site of the performance: the Composers Theater in New York City.

◆ “*Nueve—A Ritual for Double Bass and Orchestra*” (1970) by **Jose Serebrier** had its world premiere, April 19. Commissioned by the Plainfield (N.J.) Symphony in celebration of its 50th anniversary, it was programed in that city by the orchestra, the composer conducting, during a gala concert, supported by a grant from the New Jersey State Council on the Arts. The soloist

was Gary Karr, a well-known virtuoso.

“Unlike any other double bass concerto written before, this one included poetry readings, choirs, screens, projections, strobe lights, jazz drummers and audience participation,” Serebrier said. “While this is my first multi-media work to come to life, it is not my first try....My interest with multi-media comes from a very simple principle, trying to involve the audience from every possible angle, and attacking all the senses at once. It also has to do with bringing people back to the concert halls. Many passages were conceived especially because of the effect they would have on the speed, color and intensity of the Synchroma images. I find it impossible to describe the marvel of finding one’s aural perceptions literally translated into images on the screen.”

◆ “...his content dominated his clear form; that is, what he said developed spontaneously out of it,” the *New York Post*’s Harriett Johnson commented, following the New York premiere of **Seymour Shifrin**’s “Quartet No. 4.”

The work, commissioned by the Fine Arts Foundation of Chicago for the

Fine Arts Quartet, was offered at an Alice Tully Hall concert at Lincoln Center, May 13, by that esteemed string quartet.

◆ The Northwestern University School of Music presented a Student Recital, featuring pianist Milton Granger, in Lutkin Hall on the Evanston, Ill., campus, April 2. Included in the program was the world premiere of **Alan Stout**’s “Two Studies” (1967).

Another concert, this time of music for the church, was held under the same auspices, April 12, in Alice Millar Chapel. On this occasion, the composer’s “Mass No. 2” (1955-57; Revised in 1961) received its initial performance in this version. Thomas Brantigan conducted the University Chapel Choir.

◆ The Music in Our Time concert, April 26, at the 92d Street “Y” in New York City, took a relatively new form. It marked the second time in this series that music was presented in gallery form. Each work was performed in its own room and repeated five times during the evening. The audience had the privilege of entering and leaving the



Moran





Zappa and Mehta

room whenever they wished to do so.

On this occasion, **Lester Trimble's** "Panels I" for 10 players, conducted by the composer, was given its introductory performances in Warburg Lounge.

◆ "Avant Garde III," the Third Evening of Contemporary Music, Art and Drama at Nashville's First Unitarian Church, April 4, had as one of its highlights the world premiere of a new work. Titled "Gamerom," this **Gilbert Trythall** creation, with text by the composer and Donald Goss, is for tape, lights, Moog synthesizer and audience.

◆ **David Ward-Steinman's** "Grant Park," a musical setting of three short poems by Emmett Jarrett from *Suite for an Afternoon Walk in Grant Park (Chicago)*, was given its world premiere, March 16. Jack Graham conducted an ensemble of eight musicians and baritone Fritz Moses in the Music Hall on the University of Northern Iowa Campus in Cedar Falls. The work was commissioned by the Beta Nu Chapter of Phi Mu Alpha, which presented the concert.

Exactly a month later, at San Diego State College, the composer was the pianist in the initial presentation of his "Duo for Cello and Piano" (1964-65). The cellist: Edgar Lustgarten.

◆ The late **Karl Weigl's** "Ein Stelldichein" received its first public per-

formance, January 24. It was included in the Fifth Annual Vocal Chamber Music Concert at Town Hall. The performers: Rosalind Rees (soprano) and a string sextet.

◆ **Vally Weigl's** "To Emily," subtitled "Adagietto for Strings," a work inspired by Emily Dickinson poems, and her "Songs of Remembrance" for mezzo-soprano and string quartet were introduced at New York's Town Hall, April 4. A quartet of Juilliard School of Music students performed both works. Linda Eckard was the vocal soloist on the latter piece, originally composed for flute, piano and voice.

A benefit concert of choral music for relief of victims of war in Vietnam and Biafra took place at St. Paul's Chapel Center of Columbia University, April 17. Presented under the auspices of "Arts for World Unity" and Earl Hall, it had as one of its prime features the world premiere of Mrs. Weigl's choral setting of Kenneth Boulding's peace poem, "A Shelter for All." Clara Longstreth conducted the Master Institute Chorus.

◆ The Music in Our Time concert in gallery form, given April 26, at New York's 92d Street "Y" included the first performances of **Charles Wuorinen's** "Nature's Concord" (1969). The featured musicians were Ronald Ander-

son (trumpet) and Robert Miller (piano). The performances, which numbered five during the evening, took place in the Kaufmann Art Gallery.

The New Jersey Percussion Ensemble, Wuorinen conducting, programmed the composer's "Ringing Changes" (1970) for the first time in New York, May 4. The concert, the seventh of the season in the Group for Contemporary Music at Columbia University series, was held at McMillin Academic Theater on campus.

◆ The season's final Evenings for New Music program, given April 30, at Carnegie Recital Hall, included the first New York performance of **Isang Yun's** "Loyang." The piece, published in this country by Bote and Bach/AMP, was interpreted by a group from the Center for the Creative and Performing Arts, the University of Buffalo, Lukas Foss, director.

◆ **Frank Zappa** and the Mothers of Invention combined with the Los Angeles Philharmonic under Zubin Mehta in a Contempo '70 concert, May 15, at Pauley Pavilion on the U.C.L.A. campus.

One of the highlights of the evening was the world premiere of excerpts from "200 Motels," a Zappa work put together over several years during the Mothers' road trips. The Philharmonic and the Mothers jointly performed the hour-long work.

The work "reveals the rock matriarch as a serious craftsman of undeniable skill and imagination," *Los Angeles Times* music critic Martin Bernheimer reported.

◆ The Cincinnati Symphony Orchestra, Erich Kunzel conducting, programmed **Bernd-Alois Zimmermann's** "Music for the Suppers of King Ubu," April 24, at its home base, Music Hall in the Ohio city. It marked the first time that the Zimmermann work, originally for a ballet, was heard in the United States.

"...a contemporary piece of music that is full of satire, wayward and willful, a 'Valkyrie' with wrong notes, a grab bag of musical laughs," *The Post & Times-Star* (Cincinnati) critic Eleanor Bell reported. "Even the musicians grinned as they played."

The work is published in this country by Schott/Belwin-Mills Publishing Corporation.

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