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SOFTWARE FOR PEOPLE

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DIRECTOR

JANUARY 1979

UNIVERSITY OF CALIFORNIA AT SAN DIEGO La Jolla, California 92093 714-452-4383 My paper will consist of four parts. First some very general impressions to create a context for some speculations on the future of music. Second a brief personal history to illustrate my concerns for this context and my relationship to this context. Third some analysis and theory concerning my software for people. And fourth some illustrations consisting of exercises we can do together for experiential understanding of this theory.

I

It is my first time to be in Mexico City. I am very impressed with its multiplicity and grandeur. There is much here to enjoy! There is much to wonder and marvel about. But, like all big cities of the world, where so many millions of people are gathered together, one finds different cultural groups in varying states of co-existence. The people of any one cultural group may find themselves living in parallel, overlapping, blending peacefully or colliding violently with the people of other cultural groups. The results of such co-existence are reflected in multitudinous different ways. I will only give a very few examples of such results in order to develop a point: Human values may clash, conflicting needs arise, new values appear, what is valued by one group may oppress some other group, social orders appear and disappear, new structures may be imposed, or replace old ones, artificial environments, replace natural environments, natural forces interfere with artificial environments, people may be displaced, people maybe reassimilated into new groupings, and so on. Such social problems, of course, are not new for the world. The point I wish to make, is that, what is new, is the accelleration in the rate of change made possible by technological innovation. There are two universal and archetypical responses to change. These two complementary responses, or reactions, which are both necessary to survival, are adherence to tradition (old ways), as opposed to flexible adaptation (new ways). These two complementary archetypical responses can enhance and promote each other. The seeds of old ways and the seeds of new ways can be found in old ways. That is why the listener, performer, or composer of the new music must have some relation to traditional music. In times of change and innovation, there is a tendency toward extremes in the expression of these archtypes. Some people cling harder to the old ways, some cling harder to new ways, both for better or worse, each, refusing to compromise.

The inappropriate over-emphasis of either archetype can lead to destruction. For instance, a society which admits no new ways maybe subject to decay, or a society which has no tradition may be subject to continual upsets and lack of stability. The archetypes of the old and the new must work in collaboration for the best interests of the world, for groups of people, and the individual. I believe that the rapid rate of change now possible is unprecedented in the history of the world and will affect the immediate future enormously and more specifically the future of music.

There has never before been a time with so many musicians, so much music, and so much access to the music.

II

Now I will speak of my own personal history, my relationship to this context and my concerns. As I have grown in life to my 46th year, I have witnessed and participated for better, or worse, in this atmosphere of accellerating change brought on by technology. It has greatly affected my life and work. When I first began my composing at age 19, the world moved at a much slower pace. There was not so much access to information as there is today. The media and greater mobility, obviously accomodate access to more and more information, but not necessarily more wisdom. At age 19, I had not the slightest notion of the existence of so many different manifestations of the phenomena one recognizes as music. I was raised on Western European Classical and Romantic Music, especially piano and orchestral literature, accordion transcriptions of the Classics and Romantics, Popular Music, Jazz, Dixieland and Country Western. I only vaguely understood that there was other music. Mozarts' Turkish Rondo and Listzs' Hungarian Rhapsodies were only faint clues. I was always interested in whatever I heard. All of music speaks to me as music, no matter how diverse, no matter what its function might be, no matter how apparently simple, or complex, no matter how it affects me emotionally, or intellectually, and no matter what its origin whether human, animal, artificial, or extra-terrestial. No matter how much I might like or dislike something I hear, I cannot deny that it is music. Above all I believe passionately that I must respect each music in terms of its own context. For me this is one of the first steps in learning to understand and to interact appropriately with any music alien to my own culture. If nothing else, music in any of its multitudinous manifestations, is a sign of life. Sound is intelligence. Today, I can easily tour much of the worlds' music through my own record collection in the comfort of my living room. I can listen to, and be at home with a Balinese Gamelan, or Ituri Forest music, the Persian Santur, or a Navajo Healing Chant, a Brazilian Street Band, or a Japanese Gagaku orchestra, Western European Symphonic Music or computer generated music, Whale Song, Wolf Song, a Gibbon sunrise ritual chant or what have you? Fortunately, I can be comfortable at home, but unfortunately the recordings often divorce the music from its own context. I am left to struggle for context, unless with effort and money, I can go to the source in order to experience it first hand. I do this when I can. The availability of such recordings, from more and more remote areas, is also rapidly increasing. I am still always interested in music new to me. But its availability is rapidly overtaking my possibility to actually experience all of it. At some point I will probably be forced to be bounded rather than open. To reverse Vareses' famous viewpoint, that is, I will have to narrow down my interests. Nevertheless, there may be a way to

reconcile all of this multiplicity of manifestations we know as music and life. I believe that humanity has been forced to the edge of a new frontier by the accellerating rate of change instigated by technology. This frontier is the exploration of consciousness: all forms of consciousness and expecially human A commonality might be found in the sensory and consciousness. attention processes which enable humans to perceive, organize, interpret and interact with the intelligence that is music. It is no longer sufficient to dwell only on the music, the perceiver must be included. The analysis, understanding and possible expansion of such sensory and attention processes, as distinguished from the content or results, with, and without the aid of technology, will greatly influence the future of music. I believe, that through the exploration of (human) conciousness, we will reach a new understanding of what music can be, and how we can, and do interact with it. I will return to this speculation in part IV.

My own music has passed through several stages in the 25 years that I have been composing - these stages, which have sometimes overlapped, or blended, before ending, have been Traditional, Improvisational, Electronic, Theatrical and the present is Meditational, now moving into what I call software for people. My materials have come from four major sources:

- 1. All the music I have ever heard.
- 2. All the sounds of the natural world I have ever heard including my own inner biological sounds.
- 3. All the sounds of the technological world I have ever heard.
- 4. All the sounds from my imagination.

My music is the result of the processing of these materials by my own attention and perceptual organization in interaction with traditional ways, or models, as well as new ways made possible by technology.

My childhoodin a rural area of Texas, sensitized me to sounds of the elements and animal life. There was wind and rain, cows, chickens and wild life. I loved to hear them. There were only occasional motor noises, not the constant drone that we experience in the cities today. We owned a radio which we sometimes listened to at night. I loved the static and tuning whistles to be found in between the stations. My mother and grandmother taught piano lessons. So musical sounds were also part of my early life. I learned to play the accordion and later the French Horn. In the 1940's my musical world began to expand with the advent of the LP record. I would spend hours listening to the same record at some juke box in a cafe. Soon we owned a record player. I would write down music from records to play on my accordion. My mother bought

a wire recorder in 1948. I learned faster from the feedback of recordings of my own playing. In the 1950's my mobility began. I moved to San Francisco. My musical world expanded more. I came into contact with new music, and musicians who played it. And for the first time I found composers in my peer group who were as serious as I was. (Loren Rush, Terry Riley, Morton Subotnick, Ramon Sender, La Mont Young and Stuart Dempster to mention a few. We became involved in individual and group improvisation through the encouragement of Robert Erickson who taught many of us. My first experiences with group improvisation were with Rush and Riley. We simply sat down and played together without prior discussion, recorded, and listened to the results. At first, we were amazed at the spontaneous organization in the music. We learned from the recorded feedback how to listen as we played. Our discussions always took place after listening to the playback. The discussion and feedback taught us how to redirect our attention from concern for how, or what we were playing individually, to how what we played affected the group sound. We soon took organization for granted, but worked continually for effective balances within the group. We all felt that our hearing was expanded by the simple process of: 1) throwing oneself into spontaneous music making, 2) getting immediate feedback in the form of recording and 3) discussion of the process and results.

By the end of the 1950's, I was also working with electronic means and the whole field of time and sound became my material, as John Cage predicted for composers in his Credo of 1937.

A most important discovery and a major influence on my work occurred about 1958. This discovery came with the aid of technology. I simply put a microphone in my window and recorded the sound environment until the tape ran off the reel. When I replayed the tape, I realized that although I had been listening carefully while I recorded I had not heard all the sounds that were on the tape. discovered for the first time, how selectively I listened, and that the microphone discriminated much differently than I did. From that moment, I determined that I must expand my awareness of the entire sound field. I gave myself the seemingly impossible task of listening to everything all the time. Through this exercise, I began to hear the sound environment as a grand composition. The rhythms and relationships that occurred began to enter my work consciously. To this day, I continue to remind myself of the task of listening to everything all the time when I find that I have not been doing it, because in not doing it, I am causing gaps in the grand composition. (I have to mention here that I have the painful realization that the artificial environment and its wastes are snuffing out what must be a world symphony of natural sounds if one listens to it that way.)

With my newly developing perceptual skills, I found that I began to hear tones as composites; that is, I heard the overtone structure and partials at will instead of always resolving the tones to single pitches. Since I was a French Horn player, I began tuning consiously to the overtones as I changed from pitch to pitch. This exercise deepened my continuing interest in sound quality and the delightful ambiguity between pitch and sound. My electronic music reflected these interests. The time scales from the rhythms of the

environment influenced the organization of the sounds. textures fluctuated between discrete pitches, and narrow to wide band sounds. The attempt to listen to everything all the time (at times very painful) taught me that it was possible to give equal attention to all that entered the sound field. This kind of attention is diffuse, open and non-judgemental as compared to focused selective attention which is narrow, clear, and discriminatory but limited in capacity. I discovered it was possible to utilize both modes of attention simultaneously - to remain aware of all that could be heard while focussing in on specific sounds. I had a very good opportunity to exercise these attention processes when I arrived in Mexico City. Julio Estrada kindly took us to hear the Mariachis in Garibaldi Plaza. This crowded plaza is the gathering place for perhaps a hundred differnt Mariachi bands. They all play, not together but contemporaneously. With so many groups playing simultaneously, one has marvelous choices in how to listen: it is possible to enjoy the unity of the sound field created by the Mariachi style, by employing diffuse attention, and also to focus in on a particular group while wandering around. I suddenly found myself wishing to float above it all and to be able to focus in any direction without having to move. I needed a long distance ear. Perhaps, this is the solution to my dilemna of wanting to hear so much of the worlds music. If I could get into outer space and hear it all simultaneously, diffusely and focus in on the most attractive, my life might be long enough.

In the mid 1960's my interests again widened. I wanted to include visual, kinetic and dramatic elements in my music. I began to feel continuities in sonic, visual and kinetic music. These elements then began to be interchangeable for me. A sonic rhythm could be continued or played against a visual or kinetic rhythm. My works became theater pieces. My perceptions of the visual environment became as interesting to me as the sound field. My grand composition became a grand theater piece. I charged myself to be aware of everything all the time. Sound-sight, movement, all, that the range of the sensory system can tune to. I became my own Zen Master without belonging to the tradition. By the end of the 1960's, I had moved into my work of the last ten years which I call Sonic Meditations. I became more and more interested in listening to sounds rather than in manipulating sounds. I discovered that interesting changes occurred in long sounds if they were present long enough. Not only that, I could feel my physiology responding in ways that I liked. I began to be calmer in the midst of the terrible effects of violence in the world. I somehow realized that I was crossing into new territory. I started to work with breath rhythms and long tones. It occurred to me that this was meditation. At the same time, I began to connect with some of the new research on human consciousness such as the work of Robert Orstein in the Psychology of consciousness and Alyce and Elmer Green in Biofeedback and creativity. In 1972, I led a research project at the Center for Music Experiment at the University

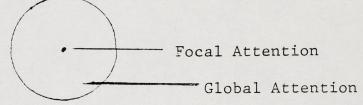
of California, San Diego where I teach. I worked for nine weeks, two hours a day with 20 people doing relaxation, meditation exercises and experimenting with my own Sonic Meditations. I was encouraged by the results. (On Sonic Meditation and Meditation Project: A Report are available from the Archives, at the Center for Music Experiment) If I could not change the world I could at least change myself through this work. By this time, I felt somewhat alienated from the musical community. I was no longer interested in making the electronic music and theater pieces I had become known for. The simplicity of my new approaches appeared to be opposed to the performance practices my friends knew and loved. I completely abandoned notation for oral tradition. went under ground and worked alone. In 1974, I began to let the work out. I started in Berlin during the Metamusik Festival. I led a ten-day seminar in Sonic Meditations and performed a program of my works. By this time there seemed to be a new climate for the acceptance of my work. I received some commissions and began to compose with my mediatations each of which emphasized different processes, to make my compositions. I began to meet with less and less resistance from performers and audiences. My meditations had allowed me to work with a wide range of people including nonmusicians. In 1976, I received a commission for Willowbrook Generations and Reflections* from the Willowbrook High School Band in Northern Illinois. I wanted this piece to encompass my current interests and to expose their own attention processes to the players in order to challenge them.

*Smith Publications, 2617 Gwyndale, Baltimore, Maryland 21207

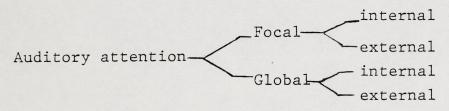
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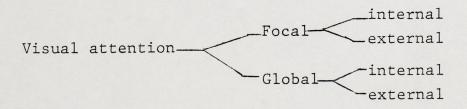
I now want to analyze a part of Willowbrook Generations and Reflections for you, which brings me to part III of my paper. But first a little theory. You have heard about my personal experience with diffuse and focused attention. From my research in human consciousness, meditation and martial arts I want to show the two major modes of human information processing as Attention Archetypes. These two modes are sequential, or linear processing, which involves focal attention, and parallel, or non-linear processing, which involves global, or diffuse, attention. These attention archetypes are complimentary processes. Both modes are necessary for survival and for success in our activities. These two attention modes interact with all the information which comes from the sensory systems, memory, and imagination.

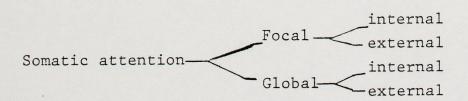
This symbol represents the attention archetypes:



Following is the organization of attention: using the three sensory systems most important to my work.







Attention can be attracted by stimuli or directed to stimuli. This direction, or attraction, may be caused by internal stimuli from memory, or imagination, or stimuli from the external environment. There are many possible combinations with this map of attention: one's auditory attention might be turned inward in the focal mode with the global attention taking in external stimuli. Simultaneously visual attention might be global, or focal, internal, or external. Focal attention is of limited capacity, as all of us who try too many things all at once readily find out. Global attention is of unlimited capacity and can be of great help in relieving the focal mode.

Now, before we try some exercises to pick up some feelings for these attention states, I will analyze some processes in Willowbrook Generations and Reflections which you heard on Monday night. The brass group is called the generating group. The six players faced each other in pairs of like instruments. There was a conductor for each group. The reflecting group surrounded the players at a distance and a third conductor worked with them. The program, or software for the generating group, was as follows: on cue from the conductor play a very short tone. The player's partner then tries to react with the exact same pitch as fast as possible. Both players must be open to each other, as well as the conductor, in order to accomplish this task. Either player might receive a visual cue, from the respective conductor, or an auditory cue, from the respective partner. The ideal attention state for the player is global, which would be characterized as readiness to move, or respond, without being committed to a particular response until the cue comes. When a visual or auditory cue comes, the stimulus takes two neural pathways. One impulse goes to the brain, the other goes to the motor center. The shorter path is the motor center. The player can react, because of pre-programming, before the brain is aware of the reaction and identifies the reaction with focal attention. If either player is distracted by internal auditory attention before either of the possible cues come, his reaction time will probably be delayed at least 50% of the time. If he is holding a pitch in mind (focal internal), it will delay his response if his partner receives a cue and plays a different pitch. He must then drop the mental pitch and pick up the partner's pitch. If instead he receives a cue from the conductor he could immediately play the pitch he has in mind. But since reaction time is most important, such focal mode attention is inappropriate prior to the cue. So the best state for the player is to have nothing in mind. The player reacts from his global attention mode and uses focal attention to identify that the response was In this case the players can achieve the effect of reverberation in milliseconds if the pitch response is accurate. If the pitch is not accurate, the player has at least fulfilled the requirement to respond as fast as possible. Although the given task appears to be very simple, to actually maintain the appropriate attention states requires a lot of training. I consider Willowbrook to be a

kind of training piece. Although I want the players to be accurate, the mistakes that are made through lapses in attention are not necessarily unmusical. Any pitch from the generating group may be picked up and prolonged by the reflecting group. So my program allows for failures in the system to have a positive function. Since an exhaustive analysis of Willowbrook would take too much time here, I want to move on to Part IV of my paper.

IV

The exercises I want to invite you to try are intended to help you experience directly some of the theory I have been talking about. First I want to lead a relaxation and breathing exercise to serve as a bridge between all of this talk and the meditation exercises.

First be sure you are comfortable and your posture adjusted.

The breathing exercise will be as follows:

Inhale hold exhale on cue 4 times, quickly.

Then inhale hold exhale to a count of 4 for inhale, 4 for hold, and 20 for exhale. Exhale slowly through pursed lips in order to create back pressure on the lungs. This will give you feedback on how much air you are getting out.

First the short breaths on cue:

Next to the count:

Inhale 2, 3, 4 Hold 2, 3, 4 Exhale 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Now continue 2 more times on your own count.

Allow 15 seconds between each question.

Can you imagine the distance between your eyes?*

Can you imagine the space inside your nose?

Can you imagine the distance between your ears?

Can you imagine the space inside your throat?

Can you imagine the distance from your eyes to the tip of your chin? Can you imagine the space inside your lungs as you inhale and exhale?

Can you imagine the distance between your shoulders?

Can you imagine that the region between your shoulder blades and chin is filled with space?

Can you imagine that the region between your ribs is filled with space?

Can you imagine that your stomach is filled with space?

Can you imagine the distance from the top of your head to the bottom of your feet?

Can you imagine that your whole body is filled with space?

Can you imagine the space surrounding your whole body?

Can you imagine that the boundaries of your body are dissolving?

Can you imagine that the space inside and ouside your body is the same?

Can you imagine giving equal attention to all that you sense in this unified space?

*These questions are adapted from Open Focus Training by Lester G. Fehni.

Now continue to allow yourself to listen to all that can be heard in the external environment and within your own internal environment, including real and imaginary internal sounds. In a few minutes, on cue, without committing yourself before the cue, lock on to a sound you are hearing and sing it immediately. The most important thing is to react as instantaneously as possible. The cue will be a loud hand clap. Let the sound you sing last only for one breath.

The above exercise demonstrates, dramatically, the shift from global to focal attention. In order to respond correctly one must remain open, expansively, in order to hear receptively. Any prior commitment to a sound before the cue will narrow one's focus. The cue serves to focus one's attention instantaneously with a subsequent reopening of focus as one becomes aware of the group sound being made.

Good attentional flexibility is essential for participation in music no matter what one's role is. Along with the traditional focus on what to listen for in music, listeners could be trained to greater awareness, with exercises which expose their processes, and also teach them how to listen. Performers and composers of course could also benefit in similar ways, thus greatly affecting the future of music.

center for music experiment and related research

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Delivered at the International Studies Siminar on Musical Creation t titure, Universitad Wacronal Artonoma de Mexico, December 1978. Writhen during a plugback of Stockhausen's Hymnen. Cred: I to Lester Ingber, president of the Institute My paper will consist of four parts. First some very general impressions to create a context for some speculations on the future of music. Second a brief personal history to illustrate my concerns for this context and my relationship to this context. Third some analysis and theory concerning my software for people. And fourth some illustrations consisting of exercises we can do together for experiential understanding of this theory.

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A most important discovery and a major influence on my work occurred about 1958. This discovery came with the aid of technology. simply put a microphone in my window and recorded the sound environment until the tape ran off the reel. When I replayed the tape, I realized that although I had been listening carefully while I recorded I had not heard all the sounds that were on the tape. discovered for the first time, how selectively I listened, and that the microphone discriminated much differently than I did. From that moment, I determined that I must expand my awareness of the entire sound field. I gave myself the seemingly impossible task of listening to everything all the time. Through this exercise began to hear the sound environment as a grand composition. rhythms and relationships that occurred began to enter my work consciously. To this day, I continue to remind myself of the task of listening to everything all the time when I find that I have not been doing it, because in not doing it, I am causing gaps in the grand composition. (I have to mention here that I have the painful realization that the artificial environment and its wastes are snuffing out what must be a world symphony of natural sounds if one listens to it that way.)

With my newly developing perceptual skills, I found that I began to hear tones as composites; that is, I heard the overtone structure and partials at will instead of always resolving the tones to single pitches. Since I was a French Horn player, I began tuning consiously to the overtones as I changed from pitch to pitch. This exercise deepened my continuing interest in sound quality and the delightful ambiguity between pitch and sound. My electronic music reflected these interests. The time scales from the rhythms of the

environment influenced the organization of the sounds. textures fluctuated between discrete pitches and narrow to wide band sounds. The attempt to listen to everything all the time (at times very painful) taught me that it was possible to give equal attention to all that entered the sound field. This kind of attention is diffuse, open and non-judg@mental, as compared to focused selective attention which is narrow, clear, and discriminatory but limited in capacity. I discovered it was possible to utilize both modes of attention simultaneously -- to remain aware of all that could be heard while focusing in on specific sounds. I had a very good opportunity to exercise these attention processes when I arrived in Mexico City. Julio Estrada kindly took us to hear the Mariachis in Garibaldi Plaza. This crowded plaza is the gathering place for perhaps a hundred differnt Mariachi bands. They all play, not together but contemporaneously. With so many groups playing simultaneously, one has marvelous choices in how to listen: it is possible to enjoy the unity of the sound field created by the Mariachi style, by employing diffuse attention, and also to focus in on a particular group while wandering around. I suddenly found myself wishing to float above it all and to be able to focus in any direction without having to move. I needed a long distance ear. Perhaps, this is the solution to my dilemna of wanting to hear so much of the worlds music. If I could get into outer space and hear it all simultaneously, diffusely, and focus in on the most attractive/, my life might be long enough.

In the mid 1960's my interests again widened. I wanted to include visual, kinetic and dramatic elements in my music. I began to feel continuities in sonic, visual and kinetic music. These elements then began to be interchangeable for me. A sonic rhythm could be continued or played against a visual or kinetic rhythm. My works became theater pieces. My perceptions of the visual environment became as interesting to me as the sound field. My grand composition became a grand theater piece. I charged myself to be aware of everything all the time. Sound-sight, movement, all, that the range of the sensory system can tune to. I became my own Zen Master without belonging to the tradition. By the end of the 1960's, I had moved into my work of the last ten years which I call Sonic Meditations. I became more and more interested in listening to sounds rather than in manipulating sounds. I discovered that interesting changes occurred in long sounds if they were present long enough. Not only that, I could feel my physiology responding in ways that I liked. I began to be calmer in the midst of the terrible effects of violence in the world. I somehow realized that I was crossing into new territory. I started to work with breath rhythms and long tones. It occurred to me that this was meditation. At the same time, I began to connect with some of the new research on human consciousness, such as the work of Robert Orstein in the Psychology of Consciousness and Alyce and Elmer Green in biofeedback and creativity. In 1972, I led a research project at the Center for Music Experiment at the University

the field of

of California, San Diego where I teach. I worked for nine weeks, two hours a day with 20 people doing relaxation, meditation exercises and experimenting with my own Sonic Meditations. I was encouraged by the results. (On Sonic Meditation and Meditation Project: A Report are available from the Archives, at the Center of for Music Experiment) If I could not change the world I could at least change myself through this work. By this time, I felt somewhat alienated from the musical community. I was no longer interested in making the electronic music and theater pieces I had become known for. The simplicity of my new approaches appeared to be opposed to the performance practices my friends knew and loved. I completely abandoned notation for oral tradition. went under ground and worked alone. In 1974, I began to let the work out. I started in Berlin during the Metamusik Festival. I led a ten-day seminar in Sonic Meditations and performed a program of my works. By this time there seemed to be a new climate for the acceptance of my work. I received some commissions and began to compose with my mediatations, each of which emphasized different processes, to make my compositions. I began to meet with less and less resistance from performers and audiences. My meditations had allowed me to work with a wide range of people including nonmusicians. In 1976, I received a commission for Willowbrook Generations and Reflections* from the Willowbrook High School Band in Northern Illinois. I wanted this piece to encompass my current interests and to expose their own attention processes to the players in order to challenge them.

*Smith Publications, 2617 Gwyndale, Baltimore, Maryland 21207

III

I now want to analyze a part of <u>Willowbrook Generations</u> and <u>Reflections</u> for you, which brings me to part III of my paper. But first a little theory. You have heard about my personal experience with diffuse and focused attention. From my research in human consciousness, meditation and martial arts, I want to show the two major modes of human information processing as attention archetypes. These two modes are sequential, or linear, processing, which involves focal attention, and parallel, or non-linear, processing, which involves global, or diffuse, attention. These attention archetypes are complimentary processes. Both modes are necessary for survival and for success in our activities. These two attention modes interact with all the information which comes from the sensory systems, memory, and imagination.

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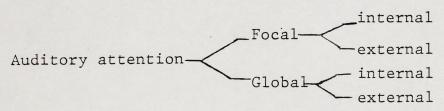
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This symbol represents the attention archetypes:

Focal Attention

Global Attention

Following is the organization of attention (, using the three sensory systems most important to my work:



Visual attention—Focal—external

Global—internal
external

Somatic attention——Focal——internal external flobal—external

Attention can be attracted by stimuli or directed to stimuli. This direction, or attraction, may be caused by internal stimuli from memory, or imagination, or stimuli from the external environment. There are many possible combinations with this map of attention one's auditory attention might be turned inward in the focal mode with the global attention taking in external stimuli. Simultaneously, visual attention might be global, or focal, internal for external. Focal attention is of limited capacity, as all of us who try too many things all at once readily find out. Global attention is of unlimited capacity and can be of great help in relieving the focal mode.

Now, before we try some exercises to pick up some feelings for these attention states, I will analyze some processes in Willowbrook Generations and Reflections which you heard on Monday night. The brass group is called the generating group. The six players faced each

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other in pairs of like instruments. There was a conductor for each group. The reflecting group surrounded the players at a distance, and a third conductor worked with them. The program, or software for the generating group, was as follows: on cue from the conductor play a very short tone. The player's partner then tries to react with the exact same pitch as fast as possible. Both players must be open to each other, as well as the conductor, in order to accomplish this task. Either player might receive a visual cue, from the respective conductor, or an auditory cue, from the respective part-

respective conductor, or an auditory cue, from the respective partner. The ideal attention state for the player is global, which would be characterized as readiness to move, or respond, without being committed to a particular response until the cue comes. When a visual or auditory cue comes, the stimulus takes two neural pathways. One impulse goes to the brain, the other goes to the motor center. The shorter path is the motor center. The player can react, because of pre-programming, before the brain is aware of the reaction and identifies the reaction with focal attention. If either player is distracted by internal auditory attention before either of the possible cues come, his reaction time will probably be delayed at least 50% of the time. If he is holding a pitch in mind (focal internal), it will delay his response if his partner receives a cue and plays a different pitch. He must then drop the mental pitch and pick up the partner's pitch. If instead he receives a cue from the conductor he could immediately play the pitch he has in mind. But since reaction time is most important, such focal mode attention is inappropriate prior to the cue. So the best state for the player is to have nothing in mind. The player reacts from his global attention mode and uses focal attention to identify that the response was

correct. In this case the players can achieve the effect of reverberation in milliseconds if the pitch response is accurate. If the pitch is not accurate, the player has at least fulfilled the requirement to respond as fast as possible. Although the given task appears to be very simple, to actually maintain the appropriate attention states requires a lot of training. I consider Willowbrook to be a

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kind of training piece. Although I want the players to be accurate, the mistakes that are made through lapses in attention are not necessarily unmusical. Any pitch from the generating group may be picked up and prolonged by the reflecting group. So my program allows for failures in the system to have a positive function. Since an exhaustive analysis of Willowbrook would take too much time here, I want to move on to Part IV of my paper.

IV

The exercises I want to invite you to try are intended to help you experience directly some of the theory I have been talking about. First I want to lead a relaxation and breathing exercise to serve as a bridge between all of this talk and the meditation exercises.

First be sure you are comfortable and your posture adjusted.

The breathing exercise will be as follows:

Inhale / hold / exhale on cue 4 times, quickly.

Then inhale hold exhale to a count of 4 for inhale, 4 for hold, and 20 for exhale. Exhale slowly through pursed lips in order to create back pressure on the lungs. This will give you feedback on how much air you are getting out.

First the short breaths on cue

Next to the count:

Inhale 2, 3, 4 Hold 2, 3, 4 Exhale 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Now continue 2 more times on your own count.

Allow 15 seconds between each question.

Can you imagine the distance between your eyes /*

Can you imagine the space inside your nose?

Can you imagine the distance between your ears? Can you imagine the space inside your throat?

Can you imagine the distance from your eyes to the tip of your chin?

Can you imagine the space inside your lungs as you inhale and exhale?

Can you imagine the distance between your shoulders?

Can you imagine that the region between your shoulder blades and chin is filled with space?

Can you imagine that the region between your ribs is filled with space?

#

Setting instructions

Can you imagine that your stomach is filled with space?

Can you imagine the distance from the top of your head to the bottom of your feet?

Can you imagine that your whole body is filled with space?

Can you imagine the space surrounding your whole body?

Can you imagine that the boundaries of your body are dissolving? Can you imagine that the space inside and ouside your body is the same?

Can you imagine giving equal attention to all that you sense in this unified space?

*These questions are adapted from Open Focus Training Lester G. Fehri, Biofeedback Computers, Inc., Princeton, N.J., 1977.

Now continue to allow yourself to listen to all that can be heard in the external environment and within your own internal environment, including real and imaginary internal sounds. In a few minutes, on cue, without committing yourself before the cue, lock on to a sound you are hearing and sing it immediately. The most important thing is to react as instantaneously as possible. The cue will be a loud hand clap. Let the sound you sing last only for one breath.

The above exercise demonstrates, dramatically, the shift from global to focal attention. In order to respond correctly one must remain open, expansively, in order to hear receptively. Any prior commitment to a sound before the cue will narrow one's focus. The cue serves to focus one's attention instantaneously with a subsequent reopening of focus as one becomes aware of the group sound being made.

Good attentional flexibility is essential for participation in music no matter what one's role is. Along with the traditional focus on what to listen for in music, listeners could be trained to greater awareness, with exercises which expose their processes, and also teach them how to listen. Performers and composers of course could also benefit in similar ways, thus greatly affecting the future of music.

2

Octavio Paz Levma 143 (apt. 601) Mexico 5, D.F.

D. Rosen boom Il one way memory storage" ISOTROPIC privace of the past has moved through many stages and served many different functions. St has reflected the needs of the associated Patterns Pennaug societies. The same is true today and will likely be tone tomorrow and in the distant future. Rhytery Generate streams of data Ao cultures collide many musics become Chards of Nelation slups endangered species. heroms system Sur portant influence in my work = collaboration Suteraction with others. Doean journal beginning 1971 _ Current projectis detector Trate of change Rosenboom trying to become more like the confuter Software for people - I musitation thereincent Source lecture with Source Meditation Listen their forces on signal - Ready to more - for Program - Information focus on signal - Analyze Willow brook generations

Direct Mirowing (Intention for reaction longer delay = linear Mnowing - (Tulking to animals in dreams) Attention Blackboard Selection Attention modes Sample structures - give feedback on states of consciousness -Sam building yer formance fractice for the future -Auditory int Visual int Auditory fanitosis Guided imaging Somation int-*Chur you imagine & familier sound? Can you hold this sound in mind? Can you let it go and bring it back? (over) Global + Foral Sut Serrory Vou are the green of the LAW of ofposites.) I thunk I system short Showld brut needles into my feet lie on leave tobbe, you cover all out feet. No Make for breathing 2 much machinery, Feet a woman for breathing. 2 much machinery, Feet a woman

Expercising the four functions Sensation, intuition thinking feeling I What can you know about this sound? So it loud a soft, So it clear? So it simple or complex? So it high or low long or short. Les it common or unusual? What other things can you know about this sound? I topin just listen to the sound. How does this sound affect you emotionally. So this always true? Could other feelings be associated with this sound? III Again just listen to the sound. Can you imagine a meta plus to describe this sound? It Again Just listen to the sound - how can you innagine this sound in a new context, different than you have wer experienced before? Hayain just listen to the sound - Can byon imagine this sound in the most begare context possible. Hyain just listen to the sound, Can you imagine this your first listen to the sound. Can you imagine this yound? How do these sounds compare? how can you unagine a third sound which is a composite of these two sounds? 12 A 13 C 14 Im interested in people because they have good memores + pattern recognition + Direct knowing can S make an auditory? (Pitch - sound) the purpose of minimateors of small changes.

I have di communations of small changes.

Muscianship defends of or very minute discommunations largely not conscious, bross changes much small changes or absorb food attention

Soft ware In People

Pauline Olivero

It is my first time to be in mexico Cety. & am very impossed with its multiplicity. There is much here to enjoy! There is much to wonder and marvel about. But, like all big cities of the world, where so many millions of feople are gathered together, one finds cultures in following varying states of many in co existence. The people of one culture bind themselves living in colliding with the people of other cultures.

Collision. The results are reflected with make my point many different ways. A very few examples to better or worse many different ways. Conflicting needs.

The clashing of human values, the appearance or disappearance of social orders, new structures imposed on, or replacing old structures, the reshaping of environments, the displacement and reassing ilation of peoples and so on.

such social problems are of course,

This state of affairs its not new for the world. What is new, is the accelleration of the

odapting to the over emphasis on either way can be dangerous in for survival although one how reaction must be proofered than the other defendition on the strainless. The two reactions are actually compenion tary and interdependent, on the strainless.

The two reactions are actually compenion tary and interdependent, on the strainless.

The two reactions are actually compenion tary and interdependent, from the strainless.

Two important responses to change Two yourte through technology. Clinging to old ways but complementary in the face of such rapid change as happens reactions to Change are today, can be more dangerous than comforting the adherence to tradition unless one is cloistered mi a frotected enas opposed to flexibility and adaptation, viron ment with others of like values. Other wise Bith are necessary change ones ways. The inherent dangers of stains and adaptability change ones ways. for survival. But in our time of such interfaced, technological there is a tenderry As I have grown in life to my 46th year, to an affirementy I have witnessed and franticipated, in this of extremes. The more refud the change the harder row ching at mosphere of accellerating change. It has to ald way, or the way of the some of the some of the sound greatly affected my life and work. When I first began my composing at age 19, the woold moved at a much slower pace. There was not there with the so much access to information as one has possible there with the media and greate mobility, obviously accommodate access to more more duming maintaining today. This access comes not only from the first with the first only from stability the media, but from faster and greater smobility. At age 19, 5 had not the slightest

a new understanding of what runsie can be.

notion of the existence of so many different manifestations of the phenomena one recognizes as music. Whereas today, I can easily tour the worlds music through my record collection in the comfort of my living room. I can listen to and be at home with a Balmine Camelan, or Ituri Forest Music, The Persian Santur, or a Navajo Healing Chant, a Brazilian street band, or a Japanese Gagaku orchestra, Western European Symphonic Music or Electronically Generated housic, Whale Song, Wolf Song, a bibbon Retual or what have you? With more effort and ninny, S Can likely go to most parts of the world to listen first hand.

All of husic speaks to me as music, no matter how diverse, no matter what its function might be, no matter how, simple or complex, no matter what how it affects me emotionally or intellectually,

Interconnection with alien artificial serving systems can broaden the spectrum available for processing no matter what its origin. he matter how much S might like or dis like something S hear, & cannot deny that it is music. Above all & feel that & must respect each music in terms of it own context. For me, this is the first step ian understanding and learning to interact appropriately with any music alien to my own culture. Sporothing else --The one common thread in all the multiplicity that is music and life, is the surroug, and especially the sensory and attention processes which enables one to ferceive, organize, interpret and interact with the standile called music. The analysis, understanding and possible expansion of these processes with and without the aid of technology will greatly in fluence the future of music. I believe that through the exploration of (human) consciousness, we will reach

that the fiture of music sierce be dishanced determined influenced, why argumes the trust the fiture of music has fraged through several stages in future of music. I have been 3 major influences:

1. All the music of have were heard; of have were heard including information of the seminal of the music of the matural of FASEO DE LA REFORMA NO. 240

2. All the sounds of the natural of FASEO DE LA REFORMA NO. 240

3. All the sounds of the technology FET. 511-98-40 MEXICO 6. D. F. the mixing organizing of these materials through organizing of these materials through organizing of these materials through frocesses. My childhood in a round area of Texas sentitlyed me to sounds frocesses. They diedhood in a rural area of Texas sentaitized me to sounds of the elements, and animal life. There were only occasional motor morses. We owned a vadio and I liked the static and tuning whistles between stations. My mother and grand mother taught france lessons daily. So musical sounds were also familiai -Som the 1940 - my musical world began to expand with the advent of the LP record. Som the 1950 - my own mobility (moving to California) expanded my world more, & came in contact with new music and musicions who flaged it. By the end of the 1950 2 & was working with electronic means and the whole field of time and sound became my material as John Cage fredicted for composers in his Credo of 1937. But the most important discovery for me at the end of the 19502 came with the aid of technology: for my simply put a microphism in my window and recorded the sound environment until the tape van of the reel. When S listened to what S had recorded I discovered for the first time how selectively I listened, because the microfhone does not discriminate in the same way. There the microphone does not discriminate in the same way. There were sounds on the tape which I had not heard while in the process of recording. From that moment, I determined that I gave must expand my awareness of the sound birthet. I gave must expand my awareness of the sound birthet. I gave must be seemingly impossible task of listening to went thing all the time. To with this impossible to rentime to rentime more self of the task when I find that I have given give equal attention is all that is in the sound field in an open state although it all that is in the sound field in an open state although it all that is in the sound field in an open state although it all that is in the sound field in an open state although it all that is in the sound field in an open state although it all that is in the sound field in an open state although it all ditails. Tradicional corresia En UN AMBIENTE COLONIAL MEXICANO

SOBRE REFORMA, EN LA ZONA COMERCIAL DE LA CALLE NIZA.

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It is my first time to be in mexico City and I am very impressed with its multiplicity. There is much here to enjoymuch to wonder and marvel about. But the all big cities of the world where so many millions of people are gathered together, one finds cultured in collision, the result of such collisions are reflected in many different ways: botty printively and negatively. hew buildings are constructed over old ones. Social orders disappear have and interfered environments repeace the natural world. The matural would be the ability to change and adapt means survival. Clinging to all ways in the face of change and classes in group interferences in a protected survivous with the face of change takes thormous strength matural is after dangerous and a survivous with the face of change takes provided in group interpretation is a feter dangerous and taken part in changes which have contained in frequency. When S first began my work as a composer at 19, the When & first began my work as a composer at 19, Othe world moved at a much slower place. There was not so much acces to information as we have today. This acces comes not only from the media but from greater mobility. At 195 had not I the slightest notion of the existence We recognize as music. Today & can easily tour the world through my record collection in the comfort of my living room. Scanbe at home with a Balmere Gamelan or Sturi forest music, The Persian Santur of a havafo healing chart, a Brazilian street band ritual what soons, workersons, a guton will of a Japanesse Gagaku orchestra, or what there you? All of music ofeaks to me as music no matter what its music ofeaks to me as music no matter what its function might be no matter how diverse, seemlingly simple or complex, no matter nets effect on me emotionally or intellectually, no matter how of might like what s intellectually, ho matter how of might like of dislike what s intellectually, ho matter how of might like of a sound of put that it is music and S a music frespect with mine of the ore common through the middle seen were so common to music and so a music with it with must be interest with its mustificity, is the sensory and attention processes which enables this multiplicity, is the sensory and attention processes which enables one to perceive, and or sensory and attention processes which enables

Seminario Internacional de Estudios en Creación Musical y Futuro

International Studies Seminary on Musical Creation and Future

Séminaire International D'Études en Création Musicale et Futur

4 al 8 de diciembre de 1978

4th to 8th of December 1978

4 au 8 décembre 1978



COORDINACIÓN DE HUMANIDADES / UNAM INSTITUTO DE INVESTIGACIONES ESTÉTICAS PROYECTO CREACIÓN MUSICAL Y FUTURO



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Coordinador de Humanidades:

Dr. Leonel Pereznieto Castro

Director del Instituto de Investigaciones Estéticas:

Mtro. Jorge Alberto Manrique

Proyecto Creación Musical y Futuro:

Julio Estrada

LUNES 4 Monday Lundi

10 horas INAUGURACIÓN
Inauguration
Inauguration

music *

11 horas David Rosenboom (Canadá)
INTERFASE MUSICAL CON EL SISTEMA NERVIOSO HUMANO

Musical interface with the human nervous system

Interface musicale avec le système nerveux humain

12 horas David Rosenboom / Julio Estrada
CONVERSACIONES CREATIVAS SOBRE EL FUTURO DE LA MÚSICA *
Creative conversations on the future of

Conversations créatives sur le futur de la musique *

* LAS CONVERSACIONES SERÁN ILUSTRADAS CON GRABACIONES

The conversations will be illustrated with tapes

Les conversations seront illustrés avec des enregistrements

MARTES 5 Tuesday Mardi

10 horas Jorge Sarmientos (Guatemala)

RAÍCES Y FUTURO EN LA MÚSICA DE GUATEMALA Y DE LATINOAMÉ-RICA

Roots and future in the music of Guatemala and Latin America

Racines et futur dâns la musique du Guatemala et de l'Amerique Latine

11 horas Bertrand Turetzky (E. U. A.)

EL NUEVO INTÉRPRETE Y LA MÚ-

SICA DE HOY Y DE MAÑANA

The new performer and the music of today and tomorrow

Le nouveau interprète et la musique d'aujourd'hui et de demain

12 horas Jorge Sarmientos / Julio Estrada
CONVERSACIONES CREATIVAS SO-

BRE EL FUTURO DE LA MÚSICA

Creative conversations on the future of music

Conversations créatives sur le futur de la musique

MIÉRCOLES 6 Wednesday Mercredi

10 horas Pauline Oliveros (E. U. A.)

SOFTWARE PARA PERSONAS

Software for people

Software pour les gens

11 horas Hans Peter Reinecke (R. F. A.)

LA MÚSICA COMO FACTOR EMOCIONAL Y RACIONAL EN LA DINÁMICA DE INTERACCIÓN SOCIAL

Music as an emotional and rational factor in the dynamics of social interaction

La musique comme un élément émotionnel et rationnel dans la dinamique de l'interaction sociale

12 horas Pauline Oliveros / Julio Estrada

CONVERSACIONES CREATIVAS SOBRE EL FUTURO DE LA MÚSICA

Creative conversations on the future of music

Conversations créatives sur le futur de la musique

JUEVES 7 Thursday Jeudi

10 horas Iannis Xenakis (Grecia-Francia)

NUEVAS PROPOSICIONES Y REALIZACIONES EN MATERIA SONORA A PARTIR DE COMPUTADORA: MICROESTRUCTURAS (SÍNTESIS DE SONIDOS) Y MACROESTRUCTURAS

New propositions and achievments on sonorous matter with the help of computers: microstructures (sound synthesis) and macrostructures

Nouvelles propositions et réalisations en matière sonore à partir d'ordinateur: microstructures (synthèse de sons) et macrostructures

11 horas Ivanka Stoianova (Bulgaria-Francia)

SEMIOLOGÍA DE LA MÚSICA Y PRÁCTICAS MUSICALES ACTUALES. PROBLEMAS DEL ANÁLISIS MUSICAL Y DEL ENFOQUE LINGÜÍSTICO

Semiology of music and musical practices of today. Problems of musical analysis and linguistic approach

Sémiologie de la musique et pratiques musicales actuelles. Problèmes de l'analyse musicale et de l'approche linguistique.

12 horas Iannis Xenakis / Julio Estrada

CONVERSACIONES CREATIVAS SOBRE EL FUTURO DE LA MÚSICA

Creative conversations on the future of music

Conversations créatives sur le futur de la musique

VIERNES 8

Friday Vendredi

10 horas Julio Estrada (México)

REALIDAD Y MÚSICA FICCIÓN; DISTANCIA ENTRE FUTUROS

Reality and music fiction; distance between futures

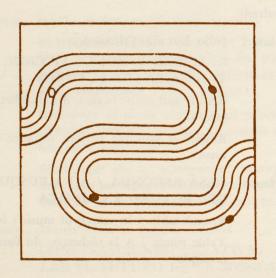
Réalité et musique fiction: distance entre futurs

11 horas MESA REDONDA / A LA BÚSQUEDA DEL FUTURO EN MÚSICA

Round table / In search of music's future Table ronde / A la récherche du futur en musique

12 horas CLAUSURA
Closing ceremony
Clôture

DEL LUNES 4 AL VIERNES 8 DE DICIEMBRE DE 1978 DE LAS 10 A LAS 13 HORAS AUDITORIO DEL PISO 14 DE LA TORRE DOS DE HUMANIDADES (ex torre de Ciencias)



What are you working on at fresent? I ATTITUDE - Have you held a consistent attitude about your work? (why do you do what you do?) II Philosophy - Have you a philosophical prosition? How has it changed during your career? III EMOTIONAL IV Skills How did you acquire?

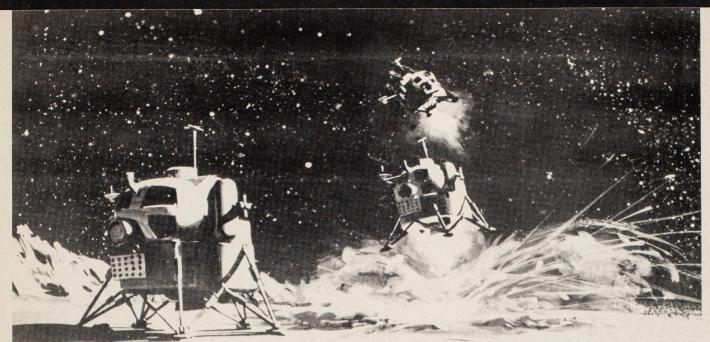
Ritch seuse intonation whythem tempo?

What Basic skills are central & your work? I CREATIVITY Kno do you do it? IV ATTENTION If you could change your frowers I attention - what would you like to be able to do?

Automation Phes Alienation "There are less bad prices than bad performances" Software for People I Some General Juspressions Toditional I Some personal history Suprovisational Electronic Some software for freople Relaxation analysis of willow brook Theater meditations The more suphisheated Meditations a) the computer the 4) caries the access ie. simple program) hope There is a certain de pais in the Science Fiction fantary that there may be extra terrestral beings who are wises than we,

I had ample offrontinity to exercise thisse processes we I wandred through varibaldi Pluza Salerday night lestening to the mariachis. With so many groups playing simultaneously one has mawelous choices in how to listen; It is possible to enjoy the unity of the sound field created by the mariachi style then focus in on a particular group of style then focus in on a particular group of to be able to focus in any direction with out having to move. I meeded a long distance ear, with my newly developing grence, trial skills S found that I began to hear tones as structure that is I heard the overtone structure unstead of resolving the tones to a single fitches. Since & was tuning to the overtone as S changed from jutch to jutch, this exercise deepened my continuous interest in sound quality and the delight ful am bignitiz between jutch and sound. My electronic runsie reflected these interests. The time scales from the shifthen of the en-Monment in fluenced the organization letween discreet fitches and marrow to wide

band sounds. I'm the mid 1960's my interests widered. S wanted to include visual and dramatic elements in my music . S began to see continueties in some visual and linetic religions. These elements were enterchangeable for me. A some shighten could be Continued of played against a visual became theater pieces. my perceptions of the visual environment became as unteresting as the sound field. My grand comportion became a grand theater frece. S charged myself to be aware of everything all the thing - Sound, sight, movement all the sensory my stem can provide. S became my own Len master. without belonging to the tradition. Shelring that the exploration of human courcions was with the aid of technology will continue nytil we reach a new understrunding of what runic can be.



Artist's visualization of Lunar Exploration Module in landing stages, Alpha Photo Associates.

"Is Anybody Out There?"

The Search for Intelligent Life in the Universe . . . Should It Go On?

THERE ARE SOME scientists who have a breathtakingly optimistic vision of the human race in the 21st century.

On the earth, science and technology have met the major challenges facing humanity. Famine has been held off, overpopulation has been checked, energy supplies are ample. Terrestrial affairs are run with the help of computers whose power is greater than that of the human brain. Humanity is extending its powers by symbiosis with machines and computers. The human race has achieved a level of well-being never before possible because of science and technology.

With its home base secure, humanity is advancing into space. There is a small but growing colony on the moon, where the techniques of lunar mining have been mastered. Several thousand people live in a self-contained space colony, and lunar ores are being processed to build more space islands. Mars has been thoroughly explored by unmanned rovers, and the first manned Martian colony is being planned. Scientific teams are working on long-term programs to transform Mars from a bleak and inhospitable desert to a planet that is suitable for human habitation.

Almost—but not quite—forgotten in this period of busy extraterrestrial growth is a decades-old project in which teams of scientists from every nation on earth are methodically searching for signals from other civilizations in the universe. It is a program that is being carried on both on earth and in outer space using the earth's best minds

and its most complex technology. Advanced computers working at the biggest astronomical facility ever built are automatically scanning millions of radio frequency channels from star after star. Hundreds of thousands of stars have been scanned over the decades. Aside from a faint twitch now and then, the results have been negative.

Then, one day, the computers detect signs of organization in one of the channels they are scanning. The vision is that of Frank Drake, an astronomer at Cornell University, who is one of the leading figures in the search for extraterrestrial life:

"... a signal is received from a direction fixed among the stars. Its frequency never changes. Thus, it must be of artificial origin. Its creator has corrected for the Doppler shift at the orbital motion of the object from which the signal comes. Only now is it noticed that every 10 minutes the phase of the electrical vector which describes the signal is precisely inverted.

"This is absolutely conclusive evidence of the intelligent origin of the signal. The signal is carrying a message in binary code, a message that will be received for a year before the scientists understand the format of the message and recognize it as the song of people who have been alive, every one of them, for a billion years. They are sending the information which will make this same immortality possible for all the creatures of earth.

"As never before, the people of earth now hold their destiny in their own hands"

That is the dream of the scientists who have created the field that is sometimes called exobiology and sometimes called SETI—the search for extraterrestrial intelligence. It is a vision of the human race enriched and even transformed by the wise use of tech-

EDWARD EDELSON

nology and by contact with older and even wiser civilizations.

SETI is a young concept, but it is old enough to be suffering through its first crisis. The crisis is due to the close relationship between SETI and big, complex technology.

The idea of communication with civilizations elsewhere in the universe came of age in the 1950s and 1960s, a time when big technology was in its fullest flower. There seemed to be no



"IS ANYBODY OUT THERE?" continued

limit to the growth of technology, especially space technology. Project Apollo had placed men on the moon. An ambitious program for reconnaissance of the solar system had been conceived and was to be largely carried out in not much more than a decade. Even more ambitious space programs were proposed.

Scientists in the field got used to thinking big, in billions of dollars and hundreds of millions of miles—not out of bravado, but because the vastness of the solar system and of the universe demands it. And inevitably, the scientists who are working to make contact with other civilizations think big because their subject demands big technology.

The elementary calculations in SETI indicate that to make contact with another advanced civilization we must either be very lucky or else use big machines for a long period of time. Modern technology may seem impressive but if we compare the search for extraterrestrial civilizations to a poker game, the human race now has roughly the equivalent of one blue chip—a technology that barely gives us the ability to get into the game. Maybe we will be lucky enough to win the pot with our first ante, but the odds appear to be against us. The assumption in SETI is that we must start with today's technology and move up tenfold, a hundredfold, a thousandfold.

That sort of technological extrapolation was unchallenged in the 1960s, when all the arrows pointed up. But the 1970s have seen the rise of a different spirit. The 1960s were the decade of growth and expansion, of "bigger is better" and "the sky's the limit." The ideas that seem to have captured the public imagination in the 1970s are "small is beautiful" and "the limits to growth." A decade ago, only the benefits of big technology got consideration. Today, for an influential minority at least, only the dangers of big technology seem evident, and there is a feeling that rather than exploring the universe, humanity would be better off tending its walled-in garden.

The scientists in SETI are keeping the technological faith, but they are very much aware that the issue is in doubt. In the complex formula by which the scientists attempt to esti-

Continued on page 82

GREAT NEWS FROM THE GREAT INNS.

Portland. What would you do if your guests kept praising the spectacular view of the Columbia River they get from the Thunderbird Motor Inn at Jantzen Beach? If you were the Thunderbird/Red Lion people, you'd build another Inn with the same view—the new Red Lion Inn at Jantzen Beach.

Together, the Thunderbird and the new Red Lion offer you the largest hotel convention facility in the Northwest. (And one of the best views anywhere.)

Sacramento. After last year's additions, the Sacramento Red Lion Inn wound up with two new wings, two swimming pools, and a two-story convention center.

After this year's complete renovation, the Sacramento Inn (just across the freeway from the Red Lion) wound up as one of the area's most beautiful hotels.

Either one is a great place for your group to wind up when you're planning a convention, meeting or banquet.

Seattle. The new 300-room tower added to the Red Lion Inn/Sea Tac is out of this world. The Universe Ballroom on the first floor can hold 2,000 people. There are no less than 13 smaller Mercury meeting rooms on the second floor. And if you shoot for the sky in one of the four outside elevators, you'll dine 15 stories up.

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"IS ANYBODY OUT THERE?"

Continued from page 20

mate the number of advanced civilizations in our galaxy, perhaps the dominant factor is the lifetime of a technological society. One possibility is that a society such as ours will neither wipe itself out with nuclear weapons nor poison itself with pollutants but will simply turn its back on technology.

Some scientists and philosophers say that European civilization, which first came to dominate the earth and then pushed into space, is unusual in the relatively brief history of human civilizations. We assume that the urge to explore and conquer is a basic attribute of human beings, but this may not be so. The Western idea of progress, which implies continued growth and expansion, and a continually increasing control over nature is not the standard pattern on earth. Most civilizations have thought in terms of living in balance with nature, not of conquering it. Instead of a future of open-ended expansion, they have thought of recurring cycles, motion without progress. Instead of putting their hopes in the future and in progress, other civilizations have tended to look backward to a golden era of the past.

In the West, the idea of stasis is gaining ground, but the issue is by no means decided. Ten years from now, we may see the first years of space exploration as the promising but crude forerunner of true conquest of the universe, or we may look back on our space adventure as an entertaining but essentially extraneous episode in humanity's earth-bound future. The matter is being decided right now, not in any sweeping, grand debate, but in the more prosaic arena of budget hearings. Engineers, scientists and other believers in SETI talk mostly to each other. So do the anti-technologists. Meanwhile, Congress (and its Soviet counterpart) wrestles with this great subject in terms of money. Do we spend the half-billion dollars or more needed to send rovers to Mars in the 1980s? Do we allow an appropriation for studying the feasibility of a multi-billiondollar radio telescope facility devoted to SETI? Will we spend the money for rockets that could let us build space colonies? Do we appropriate a few



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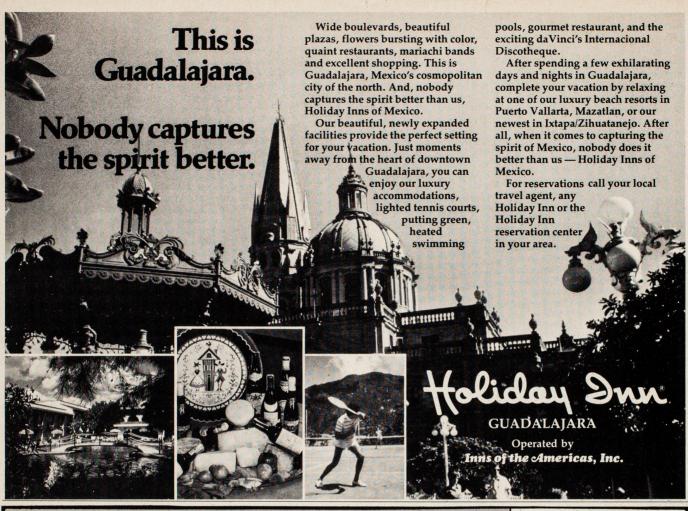
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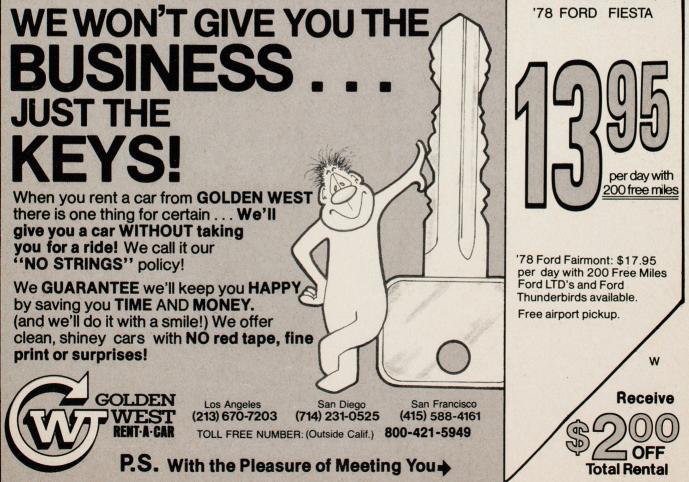
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million dollars so that radio telescopes can begin a search for extraterrestrial signals?

It may seem absurd to reduce something as meaningful as SETI to haggling over money, but the method makes sense. By and large, Congress will do what Americans want it to do. If our faith in space exploration and its technology is alive, we will continue to push out into the solar system and beyond. If we turn thumbs down on technology, space exploration and the search for extraterrestrial intelligence will either limp along marginally or fade away. If we give up, we save fairly large sums of money but lose the chance of being inducted into a galactic civilization whose capabilities could be beyond human understanding. Admittedly, it is a relatively slim chance, but those in SETI believe that it is worth the effort, even at great cost. Opposing that view is the thought that humanity should first see to its own basic needs, using the simplest possible technology, rather than building expensive space cathedrals while people starve.

The debate could be settled in a simple, catastrophic way. The big technology option could be closed because the earth suffers a global breakdown in any one of the many ways that pessimists describe in vivid detail. We could starve ourselves out of existence, upset the planetary balance and make the earth unliveable or use all the nuclear weapons that have been perfected and distributed by political leaders. The survivors would then know with some certainty the expected lifetime of a technological civilization on earth. The knowledge would not do them much good, but it would settle a main point of debate in SETI.

Sometime in the next few decades, we will find out whether there is intelligent life on earth. At that point, the search for life elsewhere in the universe may begin in earnest. And here is the paradox: The fact that the search has begun here will be a good sign for its success. We will then know that one technical society, ours, has begun an effort to contact others. That knowledge will give grounds for believing that the same decision has been made elsewhere in the universe.

For those who believe that humanity's future is tied to large-scale technology, the very existence of a search for extraterrestrial life will be a hopeful indicator for the human race. For them, the choice is between the earth

and stagnation, or outer space and continued expansion. The question of spending a few million dollars for an organized, continuing search for extraterrestrial signals thus becomes one of the great decisions of our time.

If you pare away the externals, the issue seems clear cut. But the externals never are pared away. The decision about a search for signals from an extraterrestrial civilization will be made against a kaleidoscopic backdrop of conflicting interests: public

interest in the technology of space, public demands for less federal spending, a fascination with unidentified flying objects by most nonscientists, skepticism about UFOs by most scientists, trust of scientists as the bringers of progress, distrust of scientists as the creators of technological monsters, and more.

It is hard to predict what the search for extraterrestrial intelligence will look like next year or 10 years from now, but it can be said that the swift

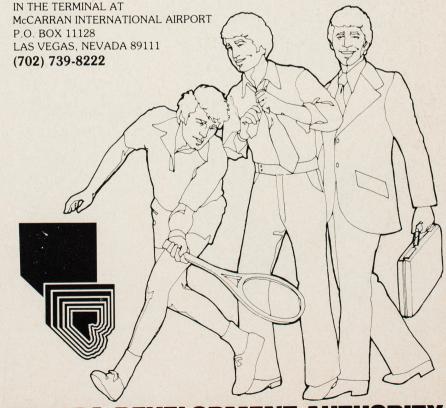
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"IS ANYBODY OUT THERE?" continued

rise of this new discipline to scientific respectability is one of the more interesting phenomena of our time. Because of SETI, the human race can look at itself, its star, its planet, its solar system and its galaxy in a different light. Science has changed mankind's place in the universe drastically. From a species that bestrode creation. we have become just one product of evolutionary forces on a minor planet of a mediocre star. Now science offers us the hope of moving back toward galactic importance, if not on our own. at least in cooperation with other species who share an intelligent mastery of technology. To pioneers in search of extraterrestrial intelligence, this prospect is the most exciting one that the human race can have.

Already we have passed one milestone: We have gone off the earth to look for life on another planet. The Viking mission of 1976 snuffed around for life on Mars. Its findings, like most other data in SETI, were indefinite, provocative and subject to debate. But

the truly important point about the Viking mission was that it was accepted as a normal step in the exploration of space, even though the principles behind the mission would have been regarded as impractical dreams a few decades ago. Viking meant that exobiology is in the mainstream of science. The human race went a long way both physically and psychologically when life detection instruments began operating on Mars. Viking is a good place to begin our search for life elsewhere in the universe. ①

Edward Edelson is Science Editor of the New York Daily News.





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A MESSAGE COULD PLUNGE US INTO CULTURE SHOCK

Listening In on Outer Space May Be Risky

BY MICHAEL W. THACHER

Day after day, astronomers in observatories in the United States, Canada and the Soviet Union scan the skies with listening devices, hoping to hear radio messages from civilizations in outer space. It is one of the most exciting experiments of modern science, and possibly one of the most dangerous. Although rich in promise, the search for extraterrestrial intelligence also threatens to plunge us into a deadly kind of culture shock.

So far, radio astronomers have listened to only a few hundred of the billions of stars in the Milky Way galaxy. And, so far, they haven't heard a whisper.

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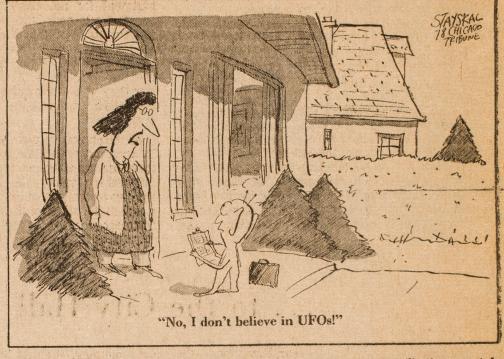
er."

Last winter, the National Aeronautics and Space Administration requested \$2 million from Congress to begin a far more thorough search. Although the proposed program was rejected, NASA is expected to renew its request when Congress convenes again in January. Meanwhile, other searches continue.

Why spend millions of dollars to listen? Because we might learn the "one great truth" that civilizations can survive the perils of their own technology for thousands of years, says Philip Morrison, a physics professor at the Massachusetts Institute of Technology. That lesson might renew our hope in the future and deflate the fashionable doomsayers among us who warn that overpopulation, industrial pollution and a host of other ills will soon destroy our civilization. And such a message from outer space might even teach us how to avoid self-destructive social organiza-

The nearest civilization is almost certainly thousands of years old and hundreds of light years away. (A light year is the distance that light travels in one year—some 6 trillion miles.) By beaming radio pulses into space, aliens from another civilization could transmit detailed messages in mathematical code. Even zipping along at the speed of light (roughly 186,000 miles per second), however, radio signals would take centuries to reach us here on earth. Nevertheless, it is likely that such a message would contain more than a simple "hello." It is possible that the message would describe the culture of such an advanced civifization in wondrous detail.

The danger of such contact with a presumably superior civilization is that it might teach us too much, too soon. The likelihood of hearing from beings thousands of years ahead of us in science and technology has caused Carl Sagan, the noted astronomer, to crack: "The



smart guys talk to the dumb guys." We'd probably receive a supercivilization's version of the Encyclopaedia Britannica. What might we discover? Energy sources that dwarf nuclear power? Mesmerizing religions or philo-

Morrison claims that we would need decades, even generations, to understand such a message. "It won't be like a recipe for making corn flakes," he says. Scholars all over the world will have to grapple with its complexi-

Michael W. Thacher is the managing editor of Human Behavior magazine. He is also an amateur astronomer.

ties. Results will trickle out, year after year. We'll have plenty of time to worry about it, once we have received such a message.

Perhaps. But once people start thinking that extraterrestrials are the key to superweapons and wonder drugs, Congress will shell out billions of dollars for a crash program to decipher the message. A decoding race with the Soviet Union seems an ominous possibility. Revolutionary advances in technology could spill out in a few years. Before long, we'd be deep in cosmic culture shock.

On earth, when advanced civilizations meet simple societies, invariably the latter are annihilated or absorbed. Indians, Africans, native South Americans-it's a long list.

Morrison, Sagan and other scientists do not seem to fret about such precedents. To have

lasted millennia, supercivilizations must be tolerant and wise, they say. If not, aliens have no practical reason to exploit us. Travel between the stars is far too expensive and timeconsuming to make an invasion profitable, even for advanced technologies. Besides, they don't even know where we are.

Not all scientists are so sure. Freeman Dyson, a physicist at Princeton University, warns that alien civilizations may be a kind of "technological cancer" that spreads wildly through the galaxy. Harvard biologist George Wald worries that an extraterrestrial message could become "the most highly classified and exploited military secret in the history of the

Unfazed, many radio astronomers continue their search. Strange that the astronomical community, which put the first moon rocks in strict quarantine and carefully sterilized the Viking probes to Mars, now seeks to make contact with alien, possibly superior, civilizations so imprudently. They almost seem too

When asked about the possibility of culture shock from an interstellar message, Cornell University astronomer Frank Drake said, "Oh, I don't know anything about that." Why should he? Drake is not a sociologist. That's the scary part—only astronomers and physicists have thought deeply about the social repercussions of such contact.

It is high time, then, that Congress and the rest of us start to contemplate the potential dangers of interstellar communication.

ig 2 Honorable Men

He could st honest to see a weuld

not go smoothly for Hoover in his dealings with Justice. "Your father was the only man I ever saw stand up to Hoover in person," an agent once told me. Later, when Chief Justice Earl Warren wanted to make the old man general counsel to his commission on the John Kennedy assassination, my father paid the ce. Hoover scrawled "Horrible" across his nd Warren bod to withdraw it.



music of past and the function of music church Court Popular untertain ment Personal history - brief -Smmediate future The function of music in the future - To spiritualize -Sembiosis of man + machine stimulus to consumer Extumples 7 husic as expression of cerestion in in frotect ion with Gods or bridge from men to gods
in in controller of elements
in in expression of the harmony efetween man & mature.

In in pleasure or entertain ment intellectual pleasure
in connection to the spiritual contact with other cultures cauces break in values -Breakdown of current culture caused by technology-Reconciliation of hatme + artificial environment. "The only common denominator is man hunself." The future city (artificial environment) may be inhabited by attificial in telligence. Pobots.

Dissorrance is now between matural + lechnology Exploring limits of intelligibility Tool for minidiate feed back - self improvement

from simpler infints or more informations from more complicated infint. Alien Forms might hear through a far greater range or much less-Alien Forms might discriminate finer différences or only gross différences. (melodies might have a micro tonal range or a macro tonal range-) Alein Jorns might have a more linear ear Alien Forms might have a more developed information processes. Alien Forms might have a greater dynamic range - or less -Alleis Jorns might be able to discriminate more changes in timbre-Alien Forms might have more ears than we do

most of it imitation of past models. The futine of music is more music. More music than ever before. There is already more music than ever before. So one of the many problems is how to deal with a sheer quantity in the future. But what about quality? Polish hute younger composers today are dealing with the cross cultural impact. They are borrowing, assimilating and integrating styles from the world repetoire. German polha How could S illustrate hot only composers from the Western tradition but consposers from Eastern traditions as well. this? on the future of music: Can you imagine composing for Artificial Entelligence? Can you imagine itistening to music made by aitificial intelligence? This is already true some what. Can you imagine comporing for Alien life forms of extra-terrestial orilgin? Can your dinagine listening to music of alien life forms? We don't un derstand the nature of our own intelligence clearly enough yet? The future of music is in human potential. Parteral Voice of hature vs. Voice of Fechnology

The age of the Univirse is meanly 20 Bellion years. Life on earth has only existed for about 4 billion years, that means there may be other worlds besides ours - and if they are older, they would have time to wolve higher life forms - What would the music of higher life forms be like?

The future of music his in human kinds ability to process and interact appropriately with information.

The fiture of music lies in the exploration of human consciousness.

there is no study more important or more pressing them the nature of human consciousness. When focal auditory attention is employed details are clear such as fitch. Global after auditory attention is employed for more diffuse activitity such as attending to the contour of a melody.

These attention anche types are complementary, processes and both are necessary for survival. in all that we do. interact with are informations these two attention modes formers the informations from the sensory systems, and the which comes unaguration. med be concerned with this symbol represents
organization of attention Fock Clubal organization of attention auditory ? INTERNAL = IMAGINATION Visual. THE OUTSIDE WORLD EXTERNAL = INT Attention can be attracted by stimuli Sometic INT or directed to sterruli. There are many prossibilities in the organization of attention: One's auditory EXT SMELL TASTE attention can be directed or attracted EXT Su Willowbrook. The Generating group of brass players were constantly emphasizing one or the other modes of attention in order to play as one becomes familian with certain stimuli through foral mode attention the responses can be maintained through global mode attention.

Soft ware For Reople

huxico City Dec, 6, 1978

My fraper will consist of the parts. First some very general impressions to create a context for some speculations on the future of music. Second a brief fersonal history to illustrate my relationship to this context. third some analysis and theory concerning my soft ware for people. And fourth some illustrations consisting of exercises we can do together for experiential understanding of this theory.

St is my first time to be ian Mexico City.

S am very impressed with it multiplicity.

and grandour. There is much here to enjoy!

There is much to wonder and marvel about.

But, like all big cities of the world, where so

many millions of freople are gathered together,

one finds different cultural groups in varying states of co-existence. The feefle of any one cultural group may find themselves living in farallel, over laffing, blending freacefully or colliding violently with the people of other Cultural groups. The result of such coexistence are reflected in multituslinous different ways. I will only give a very few examples of such results in order to develof a froint: Human values may clash, conflicting needs arise, new values what is valued by one group may offres someother group, appear, , a social orders appear and disappear, man be new structures are imposed, or replace old ones, artificial en viron ments, reflace
matural forces interpre with artificial empirenments
matural en viron ments n, freofile and displaced, people are reassimilated into new groupuigs, and so on. Such social

froblems, of course, are not new for the world. The point & wish to make is that, I what is new, is the accelleration in the rate of change made frossible by technological innovation. There are two universal and archetypical responses to change. These two complementary responses, which are both necessary to survival, or reactions, are adherence to tradition (old ways) as offored to flexible adaptation (new ways) These complementary architypical responses renhance and from to each other. The seeds of old ways can be found in new ways and the seeds of new ways can be found in old ways. * In times of Change and in novation, there is the tendency to wextremes in the expression of these wochtypes. Some people cling harder to the old ways, some cling harder to new way. both for belly or worse.

That is why
the performer of,
new must have
relation to old
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expertending.

The nover emphasis of wither archetype can lead to destruction. For instance a society which admits no new ways may be subject to decay, or a society which has no tradition may be subject to continual upsets and lack of student work in stability. The archetypes , must p collaboration for the best interests of the world, for, groups of free fle and the individual. S believe that the rapid rate of change now possible is un frecedented in the history of the world and will affect the in mediate future unormously.

> how I will speak of my own freezonal history, any relationship and concerns about this context. As I have grown in life to my 46th year, I have witnessed and participated for better, or worse in this at mosphere of accellerating

fromfit on by technology. Change A St has greatly affected my life and work. When & first began my composing at age 19, the world moved at a much slower face. There was not so much acces to miformation as there is today. The media and greater mobility, obviously accomodate access to more and more information. At age 19, I had not the slightest notion of the existence of so many different manifestations of the ephenomena one recognizes as music. I was raised on Western European Classical and Romantic husic, especially frais and orchestral literature, accordion transcriptions of the classics and romantics, popular music, Jazz, Dixieland and country Western. Sorry vaguely understood that there was other music. Mozaits Turkish Rondo und

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Mesearch on human consciousness such as the work of Robert Omstein in the Psychology of consciousness and Alyce and Elmer Green on Bio feed back and creaturity. Su 1972 S led a research project at the Center for housie Experiment at the University) California in San Diego where I teach. I worked for 9 weeks two hours a day with 20 people doing relaxation, and meditation exercises and experimenting with my own Souic meditations. S was encomaged by the results. (A report is available from CATE)
By this time & felt some what alrenated works
from the musical community. S was no longer interested in making the electronic music and theater freces I had become known for. & the simplicity of my new approaches appeared to be opposed to the performance fractices my friends knew and loved, sometimes about and worked alone. Swent under ground and worked alone.

Sm 1974 S began to let the work out. I started in Berlin during the metamusik Festival. Sed a 10 day semuias in Sonic meditations and performed a program of works. By this time there seemed to be a new climate for the acceptance of my work. I received

some commissions and began to comprove with my meditations. I found that I could combine meditations which emphasized different processes to make my composition. I began to meet with less and less resestance from performers and audience. My meditations had allowed me non prusicion. Sobeyan to find ways.

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non-prusicions. Sn 1976 S received the commission for Willow brook Generations and Reflections. from the Willow brook High School Band in horthern Illinois.

S now want to analyze this piece for you which brings me to part III of my paper, But first a little theory. But first a little theory personal experience you have heard about my personal experience with diffuse and focused attention. From with diffuse and focused attention, muy research in human consciousness, meditation my research in human consciousness, meditation and martial arts S want to show the and martial arts S want to show the and martial arts S want to show the and major modes of human information processing two modes as Attention Arche types. These two modes are the sequential attention and parallel or mon-linear processing which involves focal attention and parallel or mon-linear processing which involves global or diffuse attention:

These attention archetypes are complementary processes. Both modes are necessary for survival and success in our activities. These two attentions modes interact with all the information which comes from the sensory systems, memory and unagination. This symbol refresents the attention anchetypes! FOCAL ATTENTION

GLOBAL ATTENTION Following 18 THE organization of attention:
using the three sensory organization of attention:
to my work.

Foal _ invernal
external
external Visual attention _ Focal _ internal external external Somatic attention _ Foral _ internal external external Smell attention can be attracted by stimuli or directed by stimuli. This direction Taste or alteraction may be caused by witermal stimuli from memory or imagination or stimuli from the external environment. It is for there are many possible combinations with this anap of attention; One's auditory attention

might be turned in ward in the focal mode with the attention taking in external stimuli. Simultaneously visual attention, might be global or foral internal or external and somatic attention, global or focal internal or external. Focal attention is of limited capacity as all of us who try too many things all at once, readily find out, Olobal attention is of un limited capacity and can be of great help in relieving the focal mode. how before we try some exercises to frick up some feelings for these attention states, Swill analyze the reprocesses in Wellow brook Generation and Reflections which you heard on Monday night The brass group is called the generating group. The six flayers faced each other in fraits of like instruments. There was a conductor for each group. The reflecting group surrounded the players at a distance and a third conductor worked with them. The frogram 1 or soft ware for the generating group was as follows; On one from the conductor play a very short tone. The players part mer then trus to react with the exact same fitch as fast as possible. the conductor in order to accomplish this task.

Either player might receive a visual are from the respective conductor or an auditory one from the respective partner. The ideal attention state for the player is global, which would be characterized as readmers to move or respond with out doing Committed to a fasticular response until the cue comes. When a visual or auditory are comes, the structus takes twon pathways. One empulse goes to the brain, the other goes to the motor center. The shorter path is to the motor center. The player can react, because of fre-programming prefore the brain is aware of the reaction and identifies the reaction. with a force attention.

If either player is distracted by internal auditory attention before cether of the possible cues come his reaction time will probably be delayed at least If he is holding a fitch in mind (Focal internal) St will delay his response if his partner receives a one and plays a different fitch. He must then drop the mental fitch and fick up the partners fitch. If instead he receives a cue from the conductor he could un mediately play the futch he has in mind. But since reaction time is most important, such focal mode attention is inappropriate prior to the cue. So the best state for the player is to have nothing in mind. The player reacts from his global attention mode and uses focal attention to

identify that tottet the response was correct. In this case the players can achieve the effect of reverberation in milli seconds if the fitch response is accurate. If the fitch is not accurate the player has at least fulfilled the requirement to sespond as fast as possible. Although the given task appears to be very simple, to actually maintain the appropriate attention state requires a lot of training. S consider Wellow brook to be a build of training piece. Although of want the players to be accurate, the mistakes that are made through lapses in attention are not un musical. Any jutch from the generating group may be ficked up and probonged by the reflecting group. So my program allows for failures in the system to have a positive function. Since an exhaustive analysis of willow trook would take too much time here, I want to move on to Part It of my praper.

The exercises S want to mivite you to try are intended to help you experience directly some of theory S have been talking about. First S want to lead a relaxation and breathing exercise to serve as a bridge between all of this talk and the meditation exercises. First be sure you are confortable and your posture adjusted.

The breathing exercise will be as follows:

Inhale hold exhale on me 4 times. Then Su hale hold exhale to a count of 4 for inhale, 4 for hold and 20 for exhale, Exhale slowly through fursed lips in order to create back pressure on the lungs to get more air out. First the short breaths on cue: Inhale - hold - ex hale (Refreat 4 turies) hext to the count: Inhale 2, 3, 4 Hold 2, 3, 4 Exhale 2, 3, 4, 5, 6 7,8,9,10,11,12,13,14,15,16,17,18,19,20. how continue 2 more times on your own court. Can you imagine the distance between your eyes? Can que magne the distance between your ears? you unagine the space unside your throat? Can you magine the distance from your eyes to the tip of your clair?

21

Can you unagine the dest

 Pauline Oliveros
SOFTWARE FOR PEOPLE

dashes - two hyphers, no extra spree & double space between paragraphs

My paper will consist of four parts. First, some very general impressions to create a context for some speculations on the future of music. Second, a brief personal history to illustrate my concerns for this context and my relationship to this context. Third, some analysis and theory concerning my software for people. And fourth, some illustrations consisting of exercises we can do together for experiential understanding of this theory,

T

It is my first time to be in Mexico City. I am very impressed with its multiplicity and grandeur. There is much here to enjoy! There is much to wonder and marvel about. But, like all big cities of the world, where so many millions of people are gathered together, one finds different cultural groups in varying states of co-existence. The people of any one cultural group may find themselves living in parallel, overlapping, blending peacefully or colliding violently with the people of other cultural groups. The results of such co-existence are reflected in multitudinous different ways. I will only give a very few examples of such results in order to develop a point: Human values may clash, conflicting needs arise, new values appear, what is valued by one group may oppress some other group, social orders appear and disappear, new structures may be imposed or replace old ones, artificial environments replace natural environments, natural forces interfere with artificial environments, people may be displaced, people may be reassimilated into new groupings, and so on. Such social problems, of course, are not new for the world. The point I wish to make is that what is new is the acceleration in the rate of change made possible by technological innovation. There are two universal and archetypical responses to change. These two complementary responses, or reactions, which are both necessary to survival, are adherence to tradition (old ways), as opposed to flexible adaptation (new ways). These two complementary archetypical responses can enhance and promote each other, The seeds of old ways and the seeds of new ways can be found in old ways. That is why the listener, performer, or composer of the new music must have some relation to traditional music. In times of change and innovation, there is a tendency toward extremes in the expression of these archetypes. Some people cling harder to the old ways, some cling harder to new ways, both for better or worse, each refusing to compromise.

The inappropriate over-emphasis of either archetype can lead to destruction. For instance, a society which admits no new ways may be subject to decay, or a society which has no tradition may be subject to continual upsets and lack of stability. The archetypes of the old and the new must work in collaboration for the best interests of the world, for groups of people and for the individual. I believe that the rapid rate of change now possible is unprecedented in the history of the world and will affect the immediate future enormously - and more specifically the future of music. There has never before been a time with so many musicians, so much music, and so much access to the music.

11

Now I will speak of my own personal history, my relationship to this context and my concerns. As I have grown in life to my 46th year, I have witnessed and participated for better, or worse, in this atmosphere of accelerating change brought on by technology. It has greatly affected my life and work. When I first began my composing at age 19, the world moved at a much slower pace. There was not so much access to information as there is today. The media and greater mobility obviously accomodate access to more and more information but not necessarily more wisdom. At age 19, I had not the slightest notion of the existence of so many different manifestations of the phenomena one recognizes as music. I was raised on Western European Classical and Romantic Music, especially piano and orchestral literature, accordion transcriptions of the Classics and Romantics, Popular Music, Jazz, Dixieland and Country Western. I only vaguely understood that there was other music. Mozart's Turkish Rondo and Listz's Hungarian Rhapsodies were only faint clues. I was always interested in

whatever I heard. All of music speaks to me as music, no matter how diverse, no matter what its function might be, no matter how apparently simple, or complex, no matter how it affects me emotionally, or intellectually, and no matter what its origin, whether human, animal, artificial, or extra-terrestrial. No matter how much I might like or dislike something I hear, I cannot deny that it is music. Above all I believe passionately that I must respect each music in terms of its own context. For me this is one of the first steps in learning to understand and to interact appropriately with any music alien to my own culture. If nothing else, music in any of its multitudinous manifestations is a sign of life. Sound is intelligence. Today, I can easily tour much of the world's music through my own record collection in the comfort of my living room. I can listen to, and be at home with, a Balinese Gamelan or Ituri Forest music, the Persian Santur or a Navajo Healing Chant, a Brazilian Street Band or a Japanese Gagaku orchestra, Western European Symphonic Music or computer generated music, Whale Song, Wolf Song, a Gibbon sunrise ritual chant, or what have you? Fortunately, I can be comfortable at home, but unfortunately the recordings often divorce the music from its own context. I am left to struggle for context, unless with effort and money I can go to the source in order to experience it first hand. I do this when I can. The availability of such recordings, from more and more remote areas, is also rapidly increasing. I am still always interested in music new to me, But its availability is rapidly overtaking my possibility to actually experience all of it. At some point I will probably be forced to be bounded rather than open. To reverse Varese's famous viewpoint, that is, I will have to narrow down my interests. Nevertheless, there may be a way to reconcile all of this multiplicity of manifestations we know as music and life. I believe that humanity has been forced to the edge of a new frontier by the accelerating rate of change instigated by technology. This frontier is the exploration of consciousness: all forms of consciousness and especially human consciousness. A commonality might be found in the sensory and attention processes which enable humans to perceive, organize, interpret, and interact with the intelligence that is music. It is no longer sufficient to dwell only on the music; the perceiver must be included. The analysis, understanding and possible expansion of such sensory and attention processes, as distinguished from the content or results, with and without the aid of technology, will greatly influence the future of music. I believe, that through the exploration of (human) consciousness, we will reach a new understanding of what music can be, and how we can, and do, interact with it. I will return to this speculation in part IV,

My own music has passed through several stages in the 25 years that I have been composing. These stages, which have sometimes overlapped, or blended, before ending, have been Traditional, Improvisational, Electronic, Theatrical, and (at present) Meditational, moving now into what I call software for people. My materials have come from four major sources:

- 1. All the music I have ever heard.
- 2. All the sounds of the natural world I have ever heard including my own inner biological sounds.
- 3. All the sounds of the technological world I have ever heard,
- 4. All the sounds from my imagination.

My music is the result of the processing of these materials by my own attention and perceptual organization in interaction with traditional ways, or models, as well as with new ways made possible by technology.

My childhood in a rural area of Texas sensitized me to sounds of the elements and animal life. There were wind and rain, cows, chickens and wild life. I loved to hear them. There were only occasional motor noises, not the constant drone that we experience in the cities today. We owned a radio which we sometimes listened to at night. I loved the static and tuning whistles to be found in between the stations. My mother and grandmother taught piano lessons. So musical sounds were also part of my early life. I learned to play the accordion and later the French Horn. In the 1940's my musical world began to expand with the advent of the LP record. I would spend hours listening to the same record at some juke box in a cafe. Soon we owned a record player. I would write down music from records to play on

my accordion. My mother bought a wire recorder in 1948, I learned faster from the feedback of recordings of my own playing. In the 1950's my mobility began. I moved to San Francisco. My musical world expanded more, I came into contact with new music, and musicians who played it. And for the first time I found composers in my peer group who were as serious (Loren Rush, Terry Riley, Morton Subotnick, Ramon Sender, La Mont Young and Stuart Dempster to mention a few.) We became involved in individual and group improvisation through the encouragement of Robert Erickson, who taught many of us. My first experiences with group improvisation were with Rush and Riley. We simply sat down and played together without prior discussion, recorded, and listened to the results. At first, we were amazed at the spontaneous organization in the music. We learned from the recorded feedback how to listen as we played. Our discussions always took place after listening to the feedback. The discussion and feedback taught us how to redirect our attention from concern for how, or what, we were playing individually, to how what we played affected the group sound. We soon took organization for granted, but worked continually for effective balances within the group. We all felt that our hearing was expanded by the simple process of: 1) throwing oneself into spontaneous music making, 2) getting immediate feedback in the form of recording, and 3) discussion of the process and results.

By the end of the 1950's, I was also working with electronic means, and the whole field of time and sound became my material, as John Cage predicted for composers in his Credo of 1937. A most important discovery and a major influence on my work occurred about 1958. This discovery came with the aid of technology. I simply put a microphone in my window and recorded the sound environment until the tape ran off the reel. When I replayed the tape, I realized that although I had been listening carefully while I recorded I had not heard all the sounds that were on the tape. I discovered for the first time how selectively I listened, and that the microphone discriminated much differently than I did. From that moment, I determined that I must expand my awareness of the entire sound field. I gave myself the seemingly impossible task of listening to everything all the time. Through this exercise I began to hear the sound environment as a grand composition. The rhythms and relationships that occurred began to enter my work consciously. To this day I continue to remind myself of the task of listening to everything all the time when I find that I have not been doing it, because in not doing it, I am causing gaps in the grand composition. (I have to mention here that I have the painful realization that the artificial environment and its wastes are snuffing out what must be a world symphony of natural sounds if one listens to it that way.)

With my newly developing perceptual skills, I found that I began to hear tones as composites; that is, I heard the overtone structure and partials at will instead of always resolving the tones to single pitches. Since I was a French Horn player, I began tuning consciously to the overtones as I changed from pitch to pitch. This exercise deepened my continuing interest in sound quality and the delightful ambiguity between pitch and sound. My electronic music reflected these interests. The time scales from the rhythms of the environment influenced the organization of the sounds. The textures fluctuated between discrete pitches and narrow to wide band sounds. The attempt to listen to everything all the time (at times very painful) taught me that it was possible, to give equal attention to all that entered the sound field. This kind of attention is diffuse, open and non-judgmental, as compared to focused selective attention which is narrow, clear, and discriminatory but limited in capacity. I discovered it was possible to utilize both modes of attention simultaneously--to remain aware of all that could be heard while focusing in on specific sounds. I had a very good opportunity to exercise these attention processes when I arrived in Mexico City. Julio Estrada kindly took us to hear the Mariachis in Garibaldi Plaza. This crowded plaza is the gathering place for perhaps a hundred different Mariachi bands. They all play, not together but simultaneously. With so many groups playing at the same time, one has marvelous choices in how to listen: it is possible to enjoy the unity of the sound field created by the Mariachi style by employing diffuse attention, and also to focus in on a particular group while wandering around. I suddenly found myself wishing to float above it all and to be able to focus in any direction without having to move. I needed a long distance ear. Perhaps this is the solution to my dilemma of wanting to hear so much of the

world's music. If I could get into outer space and hear it all simultaneously, diffusely, my life might be long enough.

In the mid 1960's my interests again widened. I wanted to include visual, kinetic and dramatic elements in my music. I began to feel continuities in sonic, visual and kinetic music. These elements then began to be interchangeable for me. A sonic rhythm could be continued or played against a visual or kinetic rhythm. My works became theater pieces. My perceptions of the visual environment became as interesting to me as the sound field. My grand composition became a grand theater piece. I charged myself to be aware of everything all the time. Sound-sight, movement, all that the range of the sensory system can tune to. I became my own Zen Master without belonging to the tradition. By the end of the 1960's, I had moved into my work of the last ten years which I call Sonic Meditations. I became more and more interested in listening to sounds rather than in manipulating sounds. I discovered that interesting changes occurred in long sounds if they were present long enough. Not only that, I could feel my physiology responding in ways that I liked. I began to be calmer in the midst of the terrible effects of violence in the world. I somehow realized that I was crossing into new territory. I started to work with breath rhythms and long tones. It occurred to me that this was meditation. At the same time, I began to connect with some of the new research on human consciousness, such as the work of Robert Ornstein in The Psychology of Consciousness and Alyce and Elmer Green in the field of biofeedback and creativity. In 1972, I led a research project at the Center for Music Experiment of the University of California, San Diego, where I teach. I worked for nine weeks, two hours a day, with 20 people doing relaxation, meditation exercises and experimenting with my own Sonic Meditations. I was encouraged by the results, (On Sonic Meditation and Meditation Project: A Report are available from the Archives at the Center for Music Experiment.) If I could not change the world I could at least change myself through this work. By this time I felt somewhat alienated from the musical community. I was no longer interested in making the electronic music and theater pieces I had become known for. The simplicity of my new approaches appeared to be opposed to the performance practices my friends knew and loved. I completely abandoned notation for oral tradition. I went underground and worked alone. In 1974, I began to let the work out. I started in Berlin during the Metamusik Festival, I led a ten-day seminar in Sonic Meditations and performed a program of my works. By this time there seemed to be a new climate for the acceptance of my work. I received some commissions and began to use my meditations, each of which emphasized different processes as modules, to make my compositions. I began to meet with less and less resistance from performers and audiences. My meditations had allowed me to work with a wide range of people including non-musicians. In 1976, I received a commission for Willowbrook Generations and Reflections* from the Willowbrook High School Band in Northern Illinois. I wanted this piece to encompass my current interests and to expose their own attention processes to the players in order to challenge them.

III

I now want to analyze a part of <u>Willowbrook Generations and Reflections</u> for you, which brings me to part 111 of my paper. But first a little theory. You have heard about my personal experience with diffuse and focused attention. From my research in human consciousness, meditation and martial arts, I want to show the two major modes of human information processing as attention archetypes. These two modes are sequential, or linear, processing, which involves focal attention, and parallel, or non-linear, processing, which involves global, or diffuse, attention. These attention archetypes are complimentary processes. Both modes are necessary for survival and for success in our activities. These two attention modes interact with all the information which comes from the sensory systems, memory, and imagination.

Attention can be attracted by stimuli or directed to stimuli. This direction, or attraction, may be caused by internal stimuli from memory, or imagination, or stimuli from the external environment. There are many possible combinations with this map of attention. One's auditory attention might be turned inward in the focal mode with the global attention taking in external stimuli. Simultaneously, visual attention might be global or focal, internal or external. Focal attention is of limited capacity, as all of us who try too many things

* fresh

all at once readily find out. Global attention is of unlimited capacity and can be of great help in relieving the focal mode.

Now, before we try some exercises to pick up some feelings for these attention states. I will analyze some processes in Willowbrook Generations and Reflections, which you heard on Monday night. The brass group is called the generating group. The six players faced each other in pairs of like instruments. There was a conductor for each group. The reflecting group surrounded the players at a distance, and a third conductor worked with them. The program, or software for the generating group, is as follows: on cue from the conductor play a very short tone. Each player's partner then tries to react with exactly the same pitch as quickly as possible. Both players must be open to each other, as well as to the conductor, in order to accomplish this task. Either player might receive a visual cue from the respective conductor or an auditory cue from the respective partner. The ideal attention state for the player is global, which would be characterized as readiness to move, or responds, without being committed to a particular response until the cue comes, When a visual or auditory cue comes, the stimulus takes two neural pathways. One impulse goes to the brain, the other goes to the motor center. The shorter path is to the motor center. The player can react, because of pre-programming, before the brain is aware of the reaction and identifies the reaction with focal attention. If either player is distracted by internal auditory attention before either of the possible cues come, his reaction time will probably be delayed at least 50% of the time. If he is holding a pitch in mind (focal internal), it will delay his response if his partner receives a cue and plays a different pitch. He must then drop the mental pitch and pick up the partner's pitch. If instead he receives a cue from the conductor, he could immediately play the pitch he has in mind, But since reaction time is most important, such focal mode attention is inappropriate prior to the cue. So the best state for the player is to have nothing in mind. The player reacts from his global attention mode and uses focal attention to verify that the response was correct. In this case the players can achieve the effect of reverberation in milliseconds if the pitch response is accurate. If the pitch is not accurate, the player has at least fulfilled the requirement to respond as fast as possible.

Although the given task appears to be very simple, to actually maintain the appropriate attention states requires a lot of training. I consider <u>Willowbrook</u> to be a kind of training piece. Although I want the players to be accurate, the mistakes that are made through lapses in attention are not necessarily unmusical. Any pitch from the generating group may be picked up and prolonged by the reflecting group. So my program allows for failures in the system to have a positive function. Since an exhaustive analysis of <u>Willowbrook</u> would take too much time here, I want to move on to Part IV of my paper.

IV

The exercises I want to invite you to try are intended to help you experience directly some of the theory I have been talking about. First I want to lead a relaxation and breathing exercise to serve as a bridge between all of this talk and the meditation exercises,

To begin be sure you are comfortable and your posture adjusted.

The breathing exercise will be as follows:

Inhale / hold / exhale on cue 4 times, quickly.

Then inhale / hold / exhale to a count of 4 for inhale, 4 for hold, and 20 for exhale. Exhale slowly through pursed lips in order to create back pressure on the lungs. This will give you feedback on how much air you are getting out.

First the short breaths on cue.

Next to the count:

Inhale 2, 3, 4 Hold 2, 3, 4 Exhale 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Now continue 2 more times on your own count.

Allow 15 seconds between each question.

Can you imagine distance between your eyes?*

Can you imagine the space inside your nose?

Can you imagine the distance between your ears?

Can you imagine the space inside your throat?

Can you imagine the distance from your eyes to the tip of your chin? Can you imagine the space inside your lungs as you inhale and exhale?

Can you imagine the distance between your shoulders?

Can you imagine that the region between your shoulder blades and chin is filled with space?

Can you imagine that the region between your ribs is filled with space?

Can you imagine that your stomach is filled with space?

Can you imagine the distance from the top of your head to the bottom of your feet?

Can you imagine that your whole body is filled with space?

Can you imagine the space surrounding your whole body?

Can you imagine that the boundaries of your body are dissolving?

Can you imagine that the space inside and outside your body is the same?

Can you imagine giving equal attention to all that you sense in this unified space?

Now continue to allow yourself to listen to all that can be heard in the external environment and within your own internal environment, including real and imaginary internal sounds. In a few minutes, on cue, without committing yourself before the cue, lock on to a sound you are hearing and sing it immediately. The most important thing is to react as instantaneously as possible. The cue will be a loud hand clap. Let the sound you sing last only for one breath.

The above exercise demonstrates, dramatically, the shift from global to focal attention. In order to respond correctly one must remain open, in order to hear receptively. Any prior commitment to a sound before the cue will narrow one's focus. The cue serves to focus one's attention instantaneously with a subsequent re-opening of focus as one becomes aware of the group sound being made.

Good attentional flexibility is essential for participation in music no matter what one's role is. Along with the traditional focus on what to listen for in music, listeners could be trained to greater awareness through exercises which expose their processes and also teach them how to listen. Performers and composers of course could benefit in similar ways, thus greatly affecting the future of music.

^{*}Smith Publications, 2617 Gwyndale, Baltimore, Maryland 21207.

^{*}These questions are adapted from Lester G. Fehmi, Open Focus Training, Biofeedback Computers, Inc., Princeton, N.J., 1977.

1 Kept with me the other 2 copies