

PROPOSAL FOR A BIOFEEDBACK
ART INSTALLATION
FOR
MEDTRONIC ARCHIVE

by

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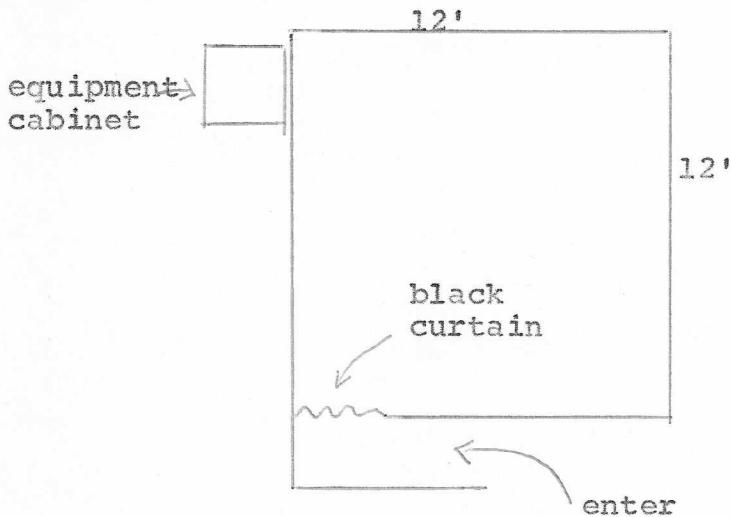
PROPOSAL I
BIOFEEDBACK MEDITATION SPACE

In February of 1973, I constructed an installation at the Vancouver Art Gallery, titled, Vancouver Piece, which involved the construction of a small, light-tight, sound isolated room in which programs of sound and light events, coupled to and controlled by the brain signals of people in the space, took place, (see appendix items). This installation opened a new avenue of possibilities for display of participatory events associated with the new field of biofeedback and its relationship to aesthetic experience, (see ARTS CANADA article in appendix). This event followed approximately five years of work by the author/artist in the development of methodology for the use of biofeedback in the arts. This proposal is for a second generation installation of this type that develops the ideas pioneered in that Vancouver exhibition further than ever before.

Included among the programs that activated the space was one in which two subjects sat on the floor on opposite sides of a two-way mirror-optics system. When one person produced high-amplitude, alpha brain waves, his face would become illuminated and he would see his reflection in the mirror surface. The other person, his partner, would also see his face. If the partner produced high-amplitude, alpha brain waves, the same thing would happen to him. If, however,

both persons produced alpha brain waves of equal amplitude at the same time, they would see eachother's faces superimposed on eachother's shoulders. In addition, a number of sound programs would activate the space and some "horizon-line light-whisps" would dance around the room, (see description in appendix).

The proposed installation for the MEDTRONIC ARCHIVE would involve the construction of a room, 12'x12'x12' in size, cubical in shape, with a special entry way, (see diagram).



The room may be constructed from inexpensive room divider or wall board materials, but must be light-tight and somewhat sound isolated. This can be accomplished by installing sound absorbant material, such as insulation material, on the inside of the walls and ceiling and some type of carpet on the floor. The room may also be made smaller if space limitations dictate, however, the cubical shape should be maintained. A smaller room will simply result in increased restriction on the number of people that may enter at any one time to experience the programs which will be described later. All of these room

activation programs will remain substantially unchanged, however.

People will be directed to remove their shoes upon entering the space. Audio speakers and light transmittion devices will be installed in the ceiling and walls to implement the programs described. If the museum has a workshop and some assistants who could help in the construction, the room could be constructed to fit custom specifications on the spot at the time of the installation.

The following are the types of programmed experiences that are proposed for the space.

A. VISUAL EVENTS

1. In constructing the room it is possible, with careful methods, clever painting techniques and control of lighting to elliminate or minimize the feeling that one is inside a space that has definition or limitation. In other words, to remove the feeling of being inside a cube. When none of the event programs are being activated, the participant has the feeling he is in an undefined space. In response to the production of certain brain waves by the participant, however, plastic light transmitting devices installed on the inside surfaces of the room will create quickly moving, faint, "light-whisps". The image persistance characteristics of the visual system will turn these "light-whisps" into traces of lines that give definition to the space in different ways. Thus, the feeling of spatial definition in the room is altered

and changed in time by the participants' brain wave activity. With some practice, the subjects may learn to bring this activity under active conscious control. The relationship of perception of space and certain types of brain wave activity has been shown to be a very interesting area for exploration and experience.

2. In the center of the room will be a two-way, mirror-optics system. Two subjects may be seated on the floor on either side of this system. Electrodes are attached to monitor their brain activity. When one person, person A, produces a particular kind of activity of some required intensity, (for example, alpha, beta, or theta activity may be chosen at will), his face is softly illuminated by either a green or a red light. His face will then appear in the mirror-optics system. The partner will also see person A's face on his side of the system. When the partner produces the required brain activity his face is similarly illuminated by either a soft red or green light and will become visible to both participants. (When one person is being illuminated by red, the other will be illuminated by green.) When person A and person B produce the same type of brain activity, at the same time, with similar intensity, their faces will superimpose on eachother's shoulders. Thus, a very personal image-identification feedback system for "dual-contingent", synchronous, brain wave activity by two people is implemented. This process has been explored in our laboratory and often results in the partners becoming quite friendly after the experience.

3. Included in the optics system will be an adaptation of a piece by artist, Jacqueline Humbert, (who works in our

LABORATORY OF EXPERIMENTAL AESTHETICS), titled, Alpha-Etch-A-Sketch. This event involves the making of a line drawing under control of the intensity variations of two people's alpha brain waves. Simultaneously with the collage of faces that fade in and out according to program 2, a spot of light moves around, tracing out a drawing. The motion of the spot along the X axis of the surface is controlled by the intensity variations of person A's alpha, while its motion along the Y axis is controlled by person B's alpha. This drawing functions as a very interesting, constant, feedback indicator of the ongoing activity. In addition, certain exercises in control, such as trying to draw circles, may be attempted by the participants, who will experience an intensely beautiful feeling if they are able to accomplish this. A display of information on the outside of the space can be used to explain what the various programs do and to give suggestions for exercises of this type that will enhance the experiences. This will also provide something to do for those persons waiting in line for their turn to enter and try the system.

There are various ways of implementing this line drawing program. It is desirable to have a system for storing the traces of the light dot so that a final drawing will result. This requires the use of some image persistance device, such as a storage oscilloscope or other system, that can be quite expensive. The best possible system that can be accomplished within the budget will be implemented.

B. SOUND EVENTS

1. The most important sound program will be an extension of the system used in my brain wave musical composition, Portable Gold and Philosophers' Stones (1972). It involves an elaborate sound synthesis program which is best represented by a tape recording of one of its performances. I have included a copy of this recording for you to listen to. The equipment used includes sine wave generators, voltage controlled frequency dividers, voltage controlled filter-resonators, a corelation function computer, etc. I will construct all of these devices in my studio. They can then be installed in a small cabinet located outside of the room. The various elements of the sound, (the tape recording is only stereo), are best presented in a situation that can be highly controlled spatially. For that reason, six medium sized loud speakers, (size of speakers will be finally chosen after the size of the room is established), one in each wall and two in the ceiling, will be installed.

2. Two other sound programs may also be implemented. One involves the tuning of regular sound energy, in the form of sine waves, in response to brain signals and the other involves alteration of random sound energy, in the form of white noise, in response to brain signals. These are especially useful when it is not possible to have an attendant on hand to assist in attaching electrodes to the participants.

C. GENERAL INFORMATION ABOUT THE PROGRAMMING

I would like to include in the installation the capability to monitor and control events in response to changes in brain wave activity, galvanic skin response (GSR), and body temperature of a minimum of two and a maximum of four participants at one time. The final number will be chosen according to the budget limitations. During specified hours, when the exhibition is open for active participation, it will be necessary to have an attendant on hand to attach electrodes to the participants. There is no way, unfortunately, to insure that this can be reliably accomplished by the participants themselves. However, when it is not possible to have such an attendant on hand, it will be possible to activate the space by playing back recordings of the experiences of previous participants. In this mode of operation, the room and its system will operate just as if active participants were "wired-in" to the system. Spectators may then enter and experience something quite substantial, although the room will not be operating under their influence. This type of "non-wired-in" display will be activated simply by inserting a cassette tape into the system and turing the room on. It will be quite easy to train one or more attendants to attach electrodes, however.

Materials to be constructed in my studio and transported to Minneapolis for final installation:

- 6 medium sized speakers
- 6 small power amplifiers
- 2-4 brain wave amplifiers
- 2-4 GSR detectors
- 2-4 Body temperature monitors
- 2-4 Multiple band EEG filters, envelope follower-integrators, audio triggers and gates
- x Plastic light transmitting materials
- x Two-way mirror and optics system
- 4 Voltage controlled frequency dividers
- 4-6 Voltage controlled filter-resonators
- x Waveform generators
- 6 SCR light controllers
- x light fixtures and electrical parts

Materials for room construction to be obtained in Minneapolis:

- x wood
- x wallboard material
- x sound insulating material
- x carpet for floor

(Cost of these items will be determined by size of room.)

COST

It is expected that the cost of materials and installation and artists' fees for this proposal will be between \$4,000.00 and \$5,000.00. In addition to this, a budget for transportation of the materials and the artists from Toronto to Minneapolis for installation and per diem expenses during an approximately one week period covering the installation process should be budgeted for.

PROPOSAL II

BIOFEEDBACK MUSIC AND VISUAL DISPLAY

This is a proposal for a free-standing installation of a biofeedback music device with visual display. The idea for the music part of the display is similar to that for sound event program 1 of proposal I, BIOFEEDBACK MEDITATION SPACE, and is represented by the recording of my composition, Portable Gold and Philosophers' Stones (1972), which is included with this proposal package. It will be designed for from two to four participants, depending on budget. In addition, some elements of the visual parts of proposal I will be adapted, if possible, so that a meaningful visual feedback indicator is included. Ideally, the Alpha-Etch-A-Sketch idea would be adapted, but this may or may not be possible within the budget.

It is estimated that this display, which will be designed in a sculpted plexiglass enclosure, would cost between \$2,500.00 and \$3,500, including artists' fees. In addition, transportation of the equipment and the artists must be budgeted for.

PROPOSAL III

PORABLE BIOFEEDBACK MUSIC DEVICE

This is a proposal for a portable music demonstration and performance device for one or two participants. The sound program is an extension of that represented by the recording of my composition, Portable Gold and Philosophers' Stones (1972), which is included with this proposal package. The tape, however, was produced by four participants and this new system would have to be modified slightly in order to obtain rech results from one or two participants. The system would be mounted in a portable case for ease of transporting and it is estimated that it would cost between \$2,000.00 and \$3,000.00, including artist's fee.

PROPOSAL IV

BOOKS, SCORES AND RECORDINGS

It is possible that the MEDTRONIC ARCHIVE may be interested in providing some of the information and program materials associated with the artist's work in biofeedback and aesthetics for sale. Included among these items are a new book-form anthology of articles about early work in biofeedback and the arts, assembled by the author, limited edition records and/or tapes and cassettes of brain wave music, personally made and signed by the artist, and limited edition scores of brain wave music by the artist. All of these items are being released through the LABORATORY OF EXPERIMENTAL AESTHETICS and by the author/artist. Quantity prices can be negotiated.

APPENDICES

- Appendix A List of publications by D,
Rosenboom concerning research
in Experimental Aesthetics.
- Appendix B Other publications in which
this work is discussed.
- Appendix C ARTS CANADA article about
Vancouver show of Vancouver
Piece by D. Rosenboom
- Appendix D Description of Vancouver Piece
- Appendix E Other miscellaneous materials
describing related work.