

Bob Rauschenberg's collaboration with Teledyne began in September, 1968, after a tour of the company in Los Angeles, has continued over a two-year period, and is at present still in the final stages of completion. It has perhaps been longer in process than any other project in the A & T program, and has been characterized by brief moments of intense interaction between Bob and Teledyne personnel (principally Frank LaHaye, Vice-President [1 at right], and Lewis Ellmore, Director of Special Programs) and long intermittent periods of inactivity or company fabrication in the artist's absence. There was never an extended residence period by the artist. The reason for this slow evolution was not, however, due to lack of enthusiasm by anyone involved. From the start Teledyne was eager to accommodate Rauschenberg and his project proposals; for his part, Bob was always willing to make himself available when some aspect of the project required his attention.

In a series of meetings during Rauschenberg's initial visit in September, 1968, the artist was introduced to several key executives at Teledyne's head office in Century City—George Roberts, President, and Vice-Presidents Frank LaHaye and Berkeley Baker, all of whom were acquainted with Bob's work. At this time the company agreed to accept the artist in residence, and additional meetings were held with Lewis Ellmore, who was asked to assist in the collaboration. Ellmore later recounted

this first interview with Bob in a letter to us dated November 12, 1970:

We had an absolutely fascinating discussion over lunch, and both Bob and I became entranced with the possibilities available. We really had not the slightest idea as to what form the project should take, but Bob's thesis was that, after all, art is creative manipulation of materials and processes, and there appeared to be a great many new developments in technology to be exploited. All this sounded quite good; the difficulty seemed to lie in the fact that the typical artist had neither access to, nor full understanding of advanced technology and the artistic ability of the average technician or scientist is vanishingly small. Thus, the combination of Bob and me with the resources of Teledyne.

At that first luncheon it became obvious that Bob was certainly not a typical artist, and I grew increasingly enthusiastic; more, I suspect, about the prospect of working with Bob than about the project in general, since it seemed to me that any contribution I could make would be insignificant compared to the artistic creativity injected by Bob. It also appeared that we could work together easily since we shared a . . . sincere belief that although life was pretty grim, it was possible to improve it. So, amidst a pledge of assistance and dedication of resources from Teledyne,



we parted, the first step to be the exchange of letters between Bob and me, each expressing an initial viewpoint.

In December, LaHaye and Ellmore met again with Bob in his New York studio, visited the Museum of Modern Art to see Rauschenberg's piece *Soundings* currently on exhibition there, and resumed their discussion on the project. In the same letter cited above Ellmore recapitulated this and subsequent meetings:

The meetings we had were refreshingly informal and a genuine pleasure. Bob's goal was to create a dynamic work, which not only would stimulate more than just the visual senses, but would in fact interact with the observer. He had pioneered in this field and was at that time exhibiting his *Soundings* at the New York Museum of Modern Art. He felt that that represented a direction to be further pursued, and we, over the next several months, exchanged many thoughts and ideas. Fundamentally, Bob wanted to escape from the limitations of two dimensions and to couple the work, in a way yet to be defined, to the observer. My role in all this was really as technical censor, if you will, serving only to comment on the technical feasibility of what Bob wanted to do . . . .

We considered many types of three-dimensional displays ranging from mixing air currents made visible by thermal differentials, to closed loop machining systems where the output of the machine was subsequently modified and fed back into the input. We considered fluids of various types flowing, mixing, and in general doing all sorts of things. We considered different geometries, materials, methods of manipulation and alteration, and, overall, just about everything one can conceive of. We thought about the types and forms of energy, which could be sensed and used to activate and regulate the dynamics of the work. Again, everything from deliberate and direct observer control to purely random processes. We included sound, light, motion, odor, etc., etc. At one time we looked into actually being able to sense the mental state of the observer, but while theoretically possible, it seemed to be a bit advanced in terms of actually implementing it.

We went on to explore ways of stimulating the observer, not only visually, but with both audible and non-audible sounds, pressure differentials and so on. Finally, we looked into means of selectively creating emotional responses in an observer and, in fact, of using these emotions to further modify the art.

We had, by this time, started to vaguely define the limits within which we would operate, and started to formulate ideas in terms of the materials and technologies needed. In recalling this phase, it was certainly

one of the most stimulating of my experience. We literally were unfettered conceptually, limited only by Bob's imagination, which appears to be boundless.

Sometime during the course of this series of interchanges, which extended through the Spring of 1969—at exactly what point it is not altogether certain—it became clear to Rauschenberg what the piece should actually be. According to the artist's own account, he was lying on the beach when it occurred to him spontaneously to use mud and to reproduce the bubbling activity of the "paint pots" at Yellowstone National Park; sound stimuli would be channelled to directly generate the mud movement. He conveyed this notion to Ellmore and other engineers at Teledyne who began to investigate the feasibility of activating mud by sound waves. It was quickly determined that the level of sound required to cause by itself any movement or bubbling effect in an expanse of viscous material would deafen the human ear. Again, Ellmore summarized for us this stage of research:

The visual mechanism chosen by Bob was to be a large tank of viscous liquid through which a less viscous liquid or a gas would be released; the control of such release to be governed by the sensing and processing of selected elements of the environment. Simultaneously this was to be accompanied by a similarly processed acoustic display.

We found rather rapidly that the constraints of reality were upon us. For example, following a meeting with one of the Teledyne Companies engaged in the manufacture of viscous liquid, Bob, after due experimentation, discovered the combination of chemicals, which would yield the desired effect. Alas, the cost [would have been] monumental and it was some time before it was realized that simple drilling mud was actually superior. Similarly we decided on injecting air into the mud and planned on using a valve which would release air in direct proportion to the applied electrical signal. It required some experimentation before we found that controlling the duration of one of three constant pressure sources gave nearly equivalent results at a cost reduction of about 99%. There were many many such examples, stemming, I suspect, largely from the space age environment within which the various contributing companies were accustomed to operating. In short, there was no incentive to do other than pursue the most technically convenient path . . . .

In the fall of 1969 we considered the possibility of including Rauschenberg's piece, tentatively titled *Mud-Muse*, in the Expo show. After informing Teledyne of this, they agreed to build a small model to test the system. Work on a square eighteen inch prototype tank began immediately at Teledyne's Torrance division, Sprague Engineering, supervised by George Carr. The

model was finished in January, 1970 and functioned satisfactorily. However, because of delays in obtaining the necessary fabrication materials for the full-scale version, the Expo deadline could not be met.

The pressure to finish *Mud-Muse* for the Expo show and the construction of the prototype served to bring into focus several problems of mechanical design which were then resolved. The piece would be a nine by twelve foot tank. Bob had originally conceived of it as measuring sixteen by twenty-one feet, but the scale was reduced in accordance with the maximum size capacity of an airplane, in anticipation of shipping the piece at the last possible moment to Japan. The tank would appear to be free-standing, being elevated three inches off the ground, and would have a two foot aluminum skirt to hide the electrical and pneumatic mechanisms. Above the metal base would be thirty inch high plexiglass sides; the tank would have no cover, so that the mud would be exposed to top view. (For structural reasons glass was later substituted for plexiglass.) The tank would contain a high viscosity, high density (100 pounds per cubic foot) derivative of driller's mud, light brown in color and extremely soft to the touch. This material was acquired from Teledyne Movable Offshore in LaFayette, Louisiana. At a later stage of its design Frank LaHaye wrote a description of the piece which states in part,

In the bottom and hidden sides of the tank there are located approximately thirty-six compressed air inlets. Each inlet is connected to three manifolds by low pressure tubing. The manifolds are maintained at three different pressures (2-6-12 PSI). Each line of tubing contains an electronically operated 'on-off' valve.

In operation, the effect is a continuous and random boiling eruption of different intensity at different locations. Selection of location and intensity will be done electronically using three or four microphones dispersed at random, either near the piece or at a random location. If located near the piece, the microphones would have to be hung from the ceiling or from a side wall.

It is also planned, though the details have not been resolved, to have a number of special sound tracks playing from under the piece. Selection of one or more of the sound tracks would tie in with the electronic selector system controlling the pneumatic valves. Typical sounds might include the surf, an owl, the wind, musical notes, etc. [2]

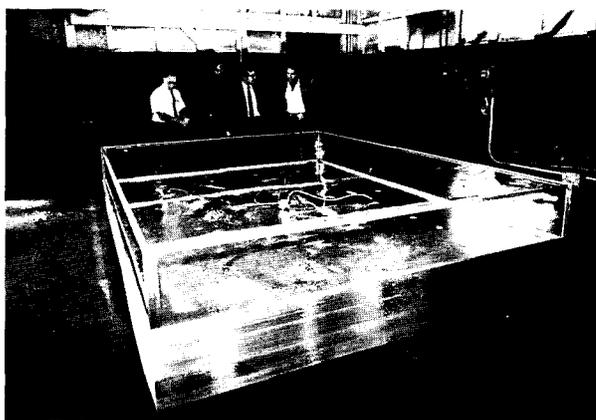


By June, 1970, the design of the electronic and pneumatic systems had been resolved, and fabrication began in earnest at Teledyne's Aero-Cal division near San Diego where Jim Wilkinson, Chief Engineer, supervised the operation, and Carl Adams coordinated the actual construction.

By October construction of the tank was sufficiently completed to allow preliminary testing of the mud movement through mechanical means; the sound system was still unfinished. Rauschenberg, MT and JL were present at Aero-Cal for this long-awaited event. Twenty 50-gallon drums of mud were poured by hand into the tank, and it heaved and bubbled impressively. Bob was delighted. The final stages of the project will take place in December, 1970 when the valves will be fully operable and the electronic system installed. By that time, Rauschenberg will have recorded the soundtrack he wants—a combination of jumbled, incoherent or semi-coherent man-made noises, and sounds from nature.\* These will be incorporated into the system to interact with the random action of the mud controlled by sounds from microphones located in diverse parts of the exhibition area or Museum proper.

In an interview with MT and GS in October, 1970, Rauschenberg commented on *Mud-Muse*, and reflected upon his experience in the A & T program, on the general phenomenon of art and technology, and the differences between A & T and E.A.T., which he helped found.

My piece is not the work of a magician. It only exists in sensation and it is exactly what I thought was missing from the phenomenon of art and technology, because usually whatever the artist does in relationship to technology tends most often to look like exploitation of technology, or what he does is so primitive and simple in depth [compared] to the profound qualities of technology. Like most technological art, this [program] is a beginning, and you can't expect one of the most sophisticated forms to be able to actually emerge overnight. But one of the big problems is the whole social problem, sociological problem—the wooing of industry to even care. Then again, most often the artist himself is so seduced by the simple marvels of science that are really just utilitarian for the scientists and for the industrial world, that the art concept doesn't match, it doesn't even compare to it because the artist usually incorporates the phenomenon. He is seeing a *fact* as a romantic phenomenon, as filled with beauty, and if he touches it and says that's it, then that's his work. Whereas what you really have is a bunch of very old hydraulic ideas, things that we didn't probably pay much attention to when we were going to school, as a thing of beauty. So either it should be just that and left, or you have to take it for granted and move from there and not have the art part of it being a kind of cosmetic for technology because it doesn't need rouging up. Technology has not been unsuccessful . . . . The temptation for industry is to take the artist



\*Petrie Mason acted as Sound Collaborator with Rauschenberg.

in superficially as the artist is appearing to them. If they can get just a little company color out of the collaboration, that is all they want *really* in most cases. They would do it rather than recognize this [broader] collaboration that Frank La Haye has talked about, where it is essential that humanities are considered in industry.

The thrill of making another dollar has carried us so far out of our lives and any real sense of what technology is about and what it does mean to us; what its influences are. We are so busy progressing that we have absolutely lost any realistic sense or even need for it. You can't trust that to a few Ford Foundation grants, for some people who go off and make a bunch of surveys and come back with some figures. It's got to be something really in practice. You were talking about the fact that industry needs a conscience, and it seems to me that the artist is the only person to hire because nearly every other phase of the professional world is already caught up in it, and the artist is the last, freelance professional person. The reason he is not involved, hasn't been involved, is because of the sense of dealing with the totality instead of a specialization. He is dealing with an intangible. With even the most successful artists, it would cost you more to keep him from doing what he wants to do next, if he wants to do it, than it would for you to support him. Now that's sure unique . . . We are suffering a really serious hangover with technology. Taken abstractly, you can be anything but extremely proud of its accomplishments. I think we are still medieval about our uses of it. Applying technology is on the sunny side of witch-craft. It's all tricks, and so therefore we have an extremely serious waste. Technology isn't going to suffer, because technology doesn't have to have a heart or anything. Technology will probably work just as well in polluted air as not. In fact, there could be new developments where polluted air would be more advantageous to certain technological things; but not to people . . . I think you *immediately* get involved with *Mud-Muse* on a really physical, basic, sensual level as opposed to its illustrating an interesting idea, either successfully or unsuccessfully, because the level of the piece, on the grounds of an idea, is pretty low . . . There is no lesson there . . . It was to exhibit the fact that technology is not for learning lessons but is to be experienced. I've done technical pieces before and there is a much more self-conscious use of technology . . . In *Soundings* I tried to start that out by just using the single image of the chair. And I took all the photographs myself and kept turning the chair, so there was no entertainment, supposedly. It's an entertaining piece, but there again I was working to *not* educate anyone. I wanted them to have the sense that *they* were half of the piece and so there was a

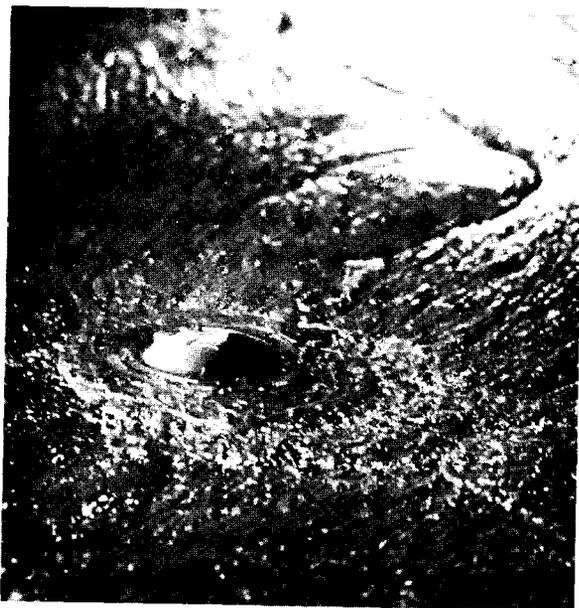


one-to-one response. If you walked in the room silently, soundlessly, then nothing would happen, you wouldn't see anything except your own reflection. That's already a kind of idea. But *Mud-Muse* doesn't have an idea like that because *Soundings* already had a *lesson* and this is a very difficult area: it is hard not to try to build in a lesson for me because I really care so much about this whole area. We're really going to be lost if we don't come to terms. The statistics on how many years we have to live are frightening; they are being printed every day, and we are learning. That information is so much more available than it was, even a year ago, but our rate of doing anything about it is so much slower. This has absolutely to do with our relationship to technology—our idea about the world as being this great big apple or something which is put here for us and if we get in trouble God is going to take care of all that. God's not going to let anything happen to his world because after all, he made us. That's a lot of bull . . . . But there's not that moral content in *Mud-Muse* . . . . Pure waste, sensualism, utilizing a pretty sophisticated technology . . . . I did earth paintings, [1953 or 1954] before the peak of abstract expressionism. [3] Bill deKooning still wasn't selling anything; he was showing in one of the only five galleries in New York City that would show modern Americans, and I went into these earth things. There again, I didn't want to make a big thing about that, but those paintings were about looking and caring. If somebody had a painting they would have to take care of it. It is just as simple as that. I don't care what the motivation is, selfishly, unselfishly, if they're taking care of it because they're thinking more about the other person or they're taking care of it only because they're thinking about themselves, the result is the same, that they're taking care of it. And those were pieces that would literally die if you didn't water them. They were growing art pieces on the wall, not on the ground, and I said this is art, too . . . .



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I don't see that A & T and E.A.T. are in competition, so comparison doesn't say anything interesting except on any level other than trying another way to arouse people's sensibilities about the problem that is all too obvious, only to people who know about it, who unfortunately have to be in the minority . . . . I think that what you are doing here is interesting in the respect that E.A.T. has to play from guts. The mere fact that E.A.T. has survived this long with so many people still involved in it, means that it is a success. It was an idea before its time, even though it was a little late. It still didn't come from any vogue. You started from the idea of art, and the fact that you were proposing it, guaranteed a level of encounter that E.A.T. isn't interested in because we had to do just the opposite and say that we are not involved in



esthetics. We are not censors, we are not talent scouts. Anyone who needs help, technological help, ought to have it available for them, and we are catalysts who not only provide that help but excite other people, and an organization could get to them where an individual couldn't. We have really been criticized. Our biggest enemy are people who say, 'Now what is wrong with a Rembrandt?' You started from the other end, and because of your endorsement and the fact that you provided the possibility of a guarantee of a showing, it meant that if they committed themselves, then they would have to do it well, which we couldn't do. All of our things begin at one end and either die before they get to the other end or the work is finished. You started at the art end and drew all of these things to that, using the fact and your influence that the end result would be art. In E.A.T. we say, we can get something started but we can't promise you anything. You can only do what you did, by setting those limitations, saying that there is going to be an exhibition; the work will be shown and by such and such a time. But we couldn't do that sort of thing and just go on year after year changing . . . I don't think your problems, though, have been any different from ours in spite of the different approach because we ran into the same thing—skepticism, patronizing. Then it is about the middle-management guy who is afraid even though the boss has told him that we are doing this. He can't believe the boss will admit it when he sees it . . . The research people are at the bottom of all industry. The research people immediately get interested. Those guys were able to watch air passing through mud and were involved. There was no esthetic judgment there about whether somebody ought to be doing this or not be doing this—with those people that you really rely on to do the work, and so does the company. The top guy is always just a little bit interested. If he is interested at all, he is excited by the prospect that there is going to be this collaboration which is unique, but the problem is the middle-man. When he gets home his wife is going to say, 'what did you do today dear,' and he will lose face unless he says, 'there's this funny-looking guy who came in today, God knows where from, and he talked strange, had some funny ideas, and asked me to do some strange things!' That does nothing for his status.

*Mud-Muse* starts from sound: An impulse is turned into electrical signal and then spreads out into three other breakdowns, depending on its dynamics. Then each one of those splits off in three ways. I don't want it to have a one-to-one relationship to the spectator. It is primitive but I hope in being primitive that it can be simple and the intent be legible. It is an existing fact that the world is interdependent. The idea of art very often tends to illustrate some solitary

independent concern recognized as isolation. It celebrates most often a kind of withdrawal or self-concern; and it's unrealistic. Even works that are about the other thing usually have a short life because they too get included in this other very precious work.

Gail R. Scott