

WRITINGS ON DANCE #5
MELBOURNE
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WARREN BURT / ANNE THOMPSON

Fair Exchanges

3DIS Computer/Dance/Music Project

HEAR THE DANCE, SEE THE MUSIC - 'Fair Exchanges' was a collaborative large scale dance/music work made between October 1988 and March 1989 by Ros Bandt, Warren Burt, Shona Innes, Sylvia Staehli and Jane Refshauge, using Simon Veitch's 3DIS computer vision control system. Earlier, in February 1988, Shona Innes and Warren Burt had made 3 very short dances using the system as a demonstration of its capabilities for Veitch's company, Perceptive Systems, and the Channel 7 TV program Beyond 2000.* From this work, it was decided that the system had enough potential that serious works of art could be made with it, and an application was made to the Performing Arts Board of the Australia Council for funding to develop a larger scale work with the system. Funding was approved, and work on the project began in late October at Extensions studio in Carlton, with performance at St. Martins Theatre in South Yarra from March 15-18, 1989, aided by further funding from the Victorian Health Promotion Foundation and Diabetes Australia.

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1 WARREN BURT

3DIS (Three Dimensional Interactive Space) is a generalised computer vision system which analyses information from different kinds of inputs and makes decisions and controls other machines on the basis of the information it receives. For our purposes, the input devices were four small television cameras (each about the size of two matchboxes), and the output devices were musical synthesizers and samplers. The operation of the system is based on extremely simple principles. The users of the system look at a live picture from one or more of the cameras, processed by the



computer. With a computer control device called a mouse, they indicate on the TV screen which particular area of the screen they wish the computer to be aware of. The computer then calculates, 30 times a second, the average brightness level of that particular area. If the area indicated was, for example, a black vase, and a pale-skinned person put their hand on the vase, the computer would register a great decrease in light level. What it would do now would be up to the users. They could, as one possible option, indicate via the program to the computer that each time the brightness of the vase changed even a little bit, the computer should send a signal to a synthesizer to play, for example, a high Bb with a piano-like tone. Or, the changes in brightness might control the changing speed of a prerecorded melody. In fact, any signal possible with MIDI (the industry standard for sending musical information between computers, synthesizers and other musical devices), can be sent by 3DIS, so that virtually any mapping of changing light levels into musical information will eventually be possible with the system.

Each area one isolates out from the view of the TV cameras is called a 'gang' and with the present system, one can have up to 99 separate areas like this. Each 'gang' may be active on up to four cameras, so that if two or more cameras look at the same space from different angles, one could define space from multiple perspectives, resulting in a truly three dimensional definition of space. With this system, one can define an entire space consisting of areas with separate musical functions, creating a conceptual equivalent of 'keyboards' which consist not of physical objects, but of invisible but sensitive shapes in space. This development is part of the massive redefinition of the concept of 'keyboard' that has been occurring throughout the musical instrument field in the past decade. Briefly, a 'keyboard' today can be thought of as any collection of control devices (which may or may not be switches, or even traditional 'keys') which can trigger off any musical events in any way. All sorts of devices have been developed recently, from devices which ape traditional musical functions (MIDI wind instruments, guitar controllers, and percussion pads) to those based on new concepts (gloves with many small mercury switches in them, each of which produces a computer signal based on the orientation of the hands in space). 3DIS stands out among these systems as being the most versatile, and the one least attached to the concept of physical contact with an object producing musical information.

This makes it both ideally suited to dancer control and yet simultaneously makes it conceptually one of the most difficult of new controllers to come to terms with. In addition, although the concept of dancers working with technology is not a particularly new one (Oskar Schlemmer's Bauhaus dances, the work of Australians Phillipa Cullen and Greg Schiemer, the work of American composer Joseph Pinzaronne, and the Merce Cunningham/Gordon Mumma *Re-run* are all examples which spring immediately to mind), this particular application of technology forced both dancers and musicians to re-evaluate their traditional roles. Traditionally, all musicians, except perhaps unamplified solo singers have relied on some sort of external technology to make their music. Even such a simple device as a drum can have an enormously complex technology behind it. (For an example of Native American musical instrument technology see "Making a Cree Drum," by Albert Davis and Tina Pearson in *Musicworks* No. 37, Winter 1987, Toronto). In the end, musicians are largely dependent on their body-external tools. Dancers, on the other hand, though usually surrounded in performance by all the sophisticated technology of the modern theatre, are not actually dependent on any body-external tools or props, unless they consciously choose to use them.

*These dances are described in Warren Burt's article, "The 3DIS System," in *Sounds Australian* No 19, available from the Australian Music Centre, PO Box 49 Broadway NSW 2007. 1e

In the end, the solo body, unadorned, is the basic stuff of which dance is made.

For this project, those conditions would not necessarily apply. If the dancer's movements were actually responsible for the sound, the dancer's function vis-a-vis music had changed. In essence, the dancer now was the musician. And the composer, who might usually give very precise instructions (notation) for performers to interpret (through that's not the usual way either Ros or I compose) was here faced with a different task: that of defining a system of spaces and sounds in conjunction with a dancer in such a way that both sequences of movement and the resulting sounds might have some sort of artistic potential.

In addition to making work which developed the latent artistic potential of this new technological system, we conceived, from the outset, of the project also having social and political briefs. Too often, technology is thought of an exclusive 'male' preserve, a 'hard' area of knowledge placed dialectically in opposition to 'soft', 'female' areas of work, such as dance. The logic used by computer programming is a paradigm of the hierarchical, sequential, positivist logic so typical of patriarchal power systems. In this project, we wanted to do more than simply give women already involved in experimental thinking about the arts access to this technology; we wanted for the work process itself to be co-operative; for the dealing with the system and the making of each work to be done by the group in communal, non-aggressive, non-hierarchical ways. We wanted to have the project, and the 3DIS system, function as liberating environments and tools, rather than as constraining ones. This process proved to be very difficult. We spent fully as much time dealing with the social dynamics of our group as we did in dealing with the technology or in making art with it. The social, technological and artistic processes were all new here, and we found that slowly we were able to approach each other, the technology, and the making of the works in a way consistent with our ideological goals. Many of the tensions we felt during the project were the direct result of placing a non-hierarchical consensus-based structure into contact with institutions (the business world and its demands for a kind of publicity we felt inappropriate to our work, the technical demands of a traditionally constituted theatre space, etc.).

The problem the 3DIS system raises most immediately is one which is central to much post-modern dance: the relationship between sound and movement. As implied above, in using this system, composers could not think in purely sonic terms, and choreographers could not think in purely kinesthetic ones. Rather, we found it necessary to surrender the integrity of our specialist art forms in order to evolve a working method that would address both our needs and the capabilities of the system in a more holistic manner.

This also, of course, creates problems for the viewer. If the rules are changed for us, they are also changed for the viewer. The work demands to be perceived differently from either silent dance work or work where music is used as either accompaniment or decoration.

Each of the pieces was developed to explore both a different relationship of sound and movement and to explore a different way of using the 3DIS system. In *awaywithwords*, the opening work, ten 'gangs' were placed at the edges of the space in two groups of five. Each gang triggered off a recording of a different single word. These words were chosen from a vocabulary of words mostly common to both dance and computer languages, with a few words thrown in that were common to neither. The dance began with a silent duet between Shona and Sylvia. They crossed the space until they crossed the gangs and triggered off the words. At this point their dancing changed. They used the words as triggers, or instructions, for improvising movement. In some cases, the relations to the words were quite direct and humorous. In others, they were more oblique. A series of duets and quartets followed, with Ros and myself also triggering off the words with our movements. In this way, we hoped to establish the contrast between musicians' (untrained) movement, which was almost always

directly concerned with making sound, and dancers' movement, which might or might not be directed, in this case, to sound production.

For *Percy Grainger and Burnett Cross*, the second work, had a direct historical basis. The Australian composer Percy Grainger spent much of the last 30 years of his life, from 1931-1961, developing instruments to play his 'free music', a music consisting of gliding tones and beatless rhythms. He was aided in this quest by the then young scientist Burnett Cross. One of the instruments they built in the early 1950s was called the 'reed-box tone-tool', a collection of pump organ reeds, tuned to 36 notes to the octave, and played by revolving a large paper roll into which they had cut patterns, just like a player piano roll. With this machine, they could at least simulate the glides that Grainger was interested in hearing. Their later experiments led them to develop a prototype of the voltage-controlled synthesizer, but we felt the reed-box concept left open possibilities they had not explored, and so the 3DIS system was set up to provide an S-shaped invisible 'keyboard' stretched across the dance floor playing just two octaves of Grainger's 36 tone scale, using the sampled sounds of the actual 'reed-box' itself, now on display at the Grainger Museum. The dancers' movements along and across this 'keyboard', played music directly related to the Grainger-Cross 'gliding-tone' work. In some cases, movement material came directly out of dealing with the nature of sound production. For example, Sylvia observed that more than one person moving along the S-shaped path to produce the counterpoint of glides Grainger wanted invariably meant that meetings and partings would occur. Meetings and partings, so much a part of behaviour in formal Edwardian England, were therefore incorporated as a major motif in the piece. In other cases, movement came out of a desire to subvert the system, such as the silent waltz (away from the sound producing path) done by Shona and Jane, which is immediately followed by the same waltz in the opposite direction, (now along the sound making path), which produces a music of brief glides and abbreviated musical gestures. In this piece, the struggle was to find movements which produced interesting music faithful to the Grainger/Cross investigations which also made sense both dramatically and as part of an absurdist narrative.

In *Inside/Out*, the areas of space around Jane, the solo dancer, were set up so that drum-kit sounds were played. In effect, she was surrounded by an invisible drum-kit suspended in space. It was here that the limitations of the system were most apparent. One of the problems of working with invisible areas of space as sound triggers in comparison with making music with physical objects is the lack of kinesthetic feedback. Even the most insensitive synthesizer or organ keyboard allows one to feel physical contact when a sound is produced. In the case of percussion instruments, the feedback is even more pronounced, as the physical nature of playing the instrument defines much of the player's movement. In *Inside/Out* the contradictions inherent in triggering percussive sounds with non-percussive gestures were explored, making a dance/music which used the seeming contradictions and limitations of the system. This was especially clear in the last section when the sound was suddenly switched off in the busiest part of the piece, leaving Jane to bring the energy level of the piece down, using gestures she had developed to make sound, gestures which now suddenly functioned quite differently as movement.

In the first three pieces, the 3DIS system was used in a very simple way, with one gesture in one area producing one predictable musical or verbal event. In the last three pieces, other ways of using the system were explored. *Free Trade Zones*, a solo for Sylvia, was a political piece.

A text was printed in the program. This text was not an ornament – it was an essential part of the piece. The piece was not just a dance/music composition, but was intended to be viewed by an audience that had knowledge of the text. The perception of the dance was to be conditioned by the text- it formed the essential political and moral environment within

which the dance/music occurred. The text:

Labour costs in Hong Kong and Taiwan, the new bases for Atari production, have been estimated at one fifth the wages earned by non-union American employees.

Female migrants and urban working class women are channelled into labour intensive jobs in foreign industries. These international high-tech corporations treat the majority of their labour force (female production workers) as a labour reserve whom they employ as disposable temporaries, poorly paid and given no social security. Fresh single women from the countryside provide a constant flow of replacements.

The third most dangerous industry, in terms of exposure to cancer-causing substances, is electronics. Throughout the production process electronics workers in the Philippines are exposed to acids, solvents and gases which have various physically damaging effects, causing, for example, eye defects, cancer, lung disease, and liver and kidney troubles.

In one soldering job, every girl gets sick from the smells after a year of work, but the company forbids transferring to another work unit... Often, women displaced from assembly plants are forced to seek work in hotels and brothels.

As members of a Western society, we are all involved in a consumptive lifestyle which exploits others. We must be aware of the flaws in our tools, which contradict our efforts at positive change.

- BASED ON WRITINGS OF AIHWA ONG AND SISTER MARY SOLEDAD PERPINAN

Seven areas were defined, each of which played a recording of a quotation from a performance by a master world musician. Music from China, Upper Volta, Laos, Japan and Zaire was used. Sylvia's movement around the space produced a mixing and overlapping of these loops of musical quotations.

However, a random time-delay was built into the triggering-on of each sound, and the sensitivity of the areas was set very low, so that there was as great a chance that a sound would only begin some time after Sylvia had gone through its area, or even that she would turn on, and then turn off, a sound, before any actual sound had been heard, as there was that a sound would turn on when she actually went through the gang. This created an unpredictable mix of fragments of third world music where the presence of the dancer created the probability of a particular music happening, but not, perhaps, its actuality. It effectively divorced the locating of an individual sound at an individual point in space triggered off by an individual movement. Only if one knew the functioning of the system very well was it possible to follow the logic of Sylvia's movements.

Mungo was conceived from the beginning as a piece which dealt with the system in a more oblique, or "poetic" way. The main sound in the piece, in fact, was not produced by either the dancers' movements or 3DIS at all. It was a recording of a wind-driven aeolian harp, an original sound sculpture made in Red Cliffs, Victoria, by Ros Bandt and Steve Naylor. This recording formed the sonic 'bed' for the rest of the piece, a journey through time and space inspired by the interior landscape of the ancient dry salt Lake Mungo, NSW. The gangs contained sounds assembled from natural and fossilized materials such as rocks, shell wind-chimes, snail shells, quandongs and the like. The placement of the gangs was traditional (one gang in one place produces one sound), but the ways they were used was not. For example, both Sylvia and Jane had solos in the gang that produced the shell wind-chime sounds at different times in the piece. In each case, the solo was completely different in character, although the sounds produced were similiar. The idea here was to blur the edges and the character of the gestures that produced the sound as much as possible. Another example was Shona's solo in the stone wind-chime gang. While she was performing that, Jane was



ABOVE: *Fair Exchanges*

PHOTO REPRODUCED COURTESY OF THE AGE

producing snailshell sounds in her gang, but Shona would respond to Jane's sounds, and dance to them, while continuing to produce her own sound. In this way, a richer relationship than the normal one was set up between sound and movement.

In addition, the theatrical lighting was constantly changing. Since the 3DIS system is triggered off by changes in light level, this meant that in addition to the dancers' movements, many of the sounds would be triggered off at 'random' times, whenever the rate of the changing light levels exceeded the present thresholds. This created a system where the dancers' movements were only part of the activity creating the sounds, and tended to focus attention away from the utilitarian nature of their sound producing gestures. Each dancer created their own movement sequence/identity independently. These independent sequences were then brought together and tailored to fit the work. A polyphony of choreographic identities was thus created, contributing another layer of complexity to a very slow, and richly multi-layered environment.

Random, the final piece, was the most extreme use of the system. In this piece, random fluctuations of light levels played a texture of music boxes, water samples and bird calls. The presence of performers increased the probability of sound happening, but did not directly trigger it. This freed the dancers from the necessity of making gestures which triggered

sound, but still made their presence necessary for the overall effect. The feeling here was one of liberation. After a program of works where precise positioning of the body was very important, a final work where one could move freely provided a great sense of release.

This was further accentuated by the nature of the movement itself, freely improvised swinging on three suspended ropes. Various choreographic strategies for this piece were tried and discarded. It was found that only improvisation, with all its pitfalls and dangers, could produce the feelings of release and freedom this piece seemed to call for. Another element of the piece were the costumes by Sharon Muir, which were made with a semi-random drip-screening process. The luminous colouring of the silk used for these was enhanced by the lighting changes (which also affected the mix of sounds the system was producing), which turned the blue and green patternings into phosphorescent shades of silver.

The 3DIS system here functioned as one voice in a three voice improvisation texture. I played keyboard synthesizer, and Ros played Casio Digital Horn, a new electronic wind instrument (yet another new kind of musical controller) with quite a nice tone. Here, dancers, musicians, designers, lighting personnel and the electronic system were all freed to produce independent activities which nonetheless influenced each other, creating a counterpoint of activity. It is this kind of use of the 3DIS system that, it seems to me, offers the most possibilities for the future, in that it opens the way for dancers to move about with their accustomed freedom, but allows that freedom to influence the musical course of events. Future uses of the system I would be interested in would have 3DIS used as control input into a program that composes musical events in real-time, so that the dancers' positions influenced the logic or the structure of the piece, but not its moment to moment details. This kind of work would, it seems to me, take the work we have already done in this project to another level of sophistication, one that I would be most eager to explore.

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2 ANNE THOMPSON

An edited interview with Shona Innes, Jane Refshauge and Sylvia Staehli

THOMPSON: What relationships to sound or uses of sound have you explored in past work?
What relationships to or uses of sound emerged to be of interest to you in this project?

INNES: For a while I have been faced with the dilemma of wanting to work with music but not wanting the dance to be dictated by it. In my early choreographic work where the movement was set I most often danced *to* the music. The music and the idea for a dance piece came together. The movement expression followed. Gradually I began to experience this way of working with sound as too prescriptive. As I began working from a kinetic impulse, with a kinetic focus, I stopped using sound. It seemed impossible to use sound without losing the integrity of the movement quality and sequencing I was finding. This shift occurred around the time I was working with Russell Dumas. In order to be totally committed to the movement that needed to happen there could be no outside interference or input. This was a time of internal focus - no audience, no mirrors, or music, no dance partners. The silence became very alive and became the kind of sound context required for me to find where my movement was coming from and where it wanted to go.

As this became clearer, over a period of a year or two, I began to return to my interest in music. This seemed possible only after I had found my dance. The music I chose then provided a context for the dance. Still I was unable to work with other dancers, costumes or audience awareness. Dancing, at this time, was moving with a clear connection to the source of moving. Sound supported and/or highlighted some aspect of the dance. The dances were improvisations and this is still the way I am most happy performing dance. In time I was able to maintain the integrity of the movement and listen to the music almost at the same time. I began to be able to slide between following the movement and following the sound in performance. Now when I use music in improvisations I play with oscillating between a movement focus and a sound focus. I work at this oscillation becoming quicker and quicker until both the sound and the movement are equally the focus. I build the context in which I dance – establish the internal foci, then add sound and then consider the physical environment.

In this project I was interested in placing myself in relation to sound and in shaping and moulding the sound environment through moving. Because the system did not respond to changes in movement quality, (the sound came on or went off) I worked rhythmically. I played with triggering the sound in ways that I found rhythmically interesting. The time spent between gangs was important in terms of the dancing. In this time I could play with dynamic and qualitative changes in the movement. When I wanted to trigger sound my focus shifted from these aspects to body part and whole body position in space.

I am still interested in working with a computer system which is responsive to human movement and which registers this response as sound; in controlling/influencing the sound environment by the way I move. A system of this sort could become a responsive musical partner, a form of biofeedback.

STAEHLI: Like many other contemporary dancers and choreographers the exploration of the relationship of sound to movement has been an ongoing focus for me. Each new dance piece that I've made has explored a different relationship between sound and movement. I've used taped sound collages created independently from the same idea which generated the movement to create juxtaposition of rhythmically disconnected and sometimes contrasting elements. Other pieces have been made and performed in silence, using image-based, visual, functional, and emotional motivations for the movement. In one section of a dance I used the rhythmic and tonal qualities of spoken language (only audible to me as played through head-phones) to move to. I have also enjoyed performing with live musicians where the interaction was conversational and responsive – where an idea, motif or quality might be initiated by either dancer or musician, and developed within certain structural limitations. Generally, I've established flexible structures to allow the sound and the movement the liberty of separate logics of progression.

In this project, the music was 'played' by the movement, and the resulting sound in turn affected the moving. What was novel was that the music was articulated in spatial zones. Floor pattern became the starting point for the moving. That is to say that the movement became a reaching out towards a sound, or, travelling along and between sound events. It was an unusual experience. We were making movement choices in order to compose sound. Not being a composer I found this relationship very challenging - to have to 'listen' physically and musically simultaneously. A difficulty I experienced was that movement quality did not affect sound quality in any way. Interestingly, the sound in a sense was subservient to the movement, and yet as dancers, our main focus in performance was on composing.

REFSHAUGE: I've danced in silence mostly - working from a visual imagery or movements derived from feeling. When I danced with Deborah Hay in her company the musicians workshopped the choreographic images she presented along-side the dancers, and then found musical expression for that imagery. Both the music and the movement were responses to the same images.

I am not an experienced choreographer but when I do choreography my work has tended to have a strong theatrical focus. I work with non-linear narratives - images clashing against each other, juxtapositions from a variety of sources. This way of working was introduced to me by Valerie Kirwan when I was involved choreographically with her production of 'The Art of Lobster Whistling'. In it there was an interplay between theatrical action and dance. In creating the soundscape for this play it seemed to me Valerie experimented with nonsense and combinations of sounds and language strung together in meaning units. She also transferred sound from object to body to voice. The sound production would generate movement. When I previously worked with Warren Burt I used a combination of these two approaches to produce a sound/movement relationship.

I found working with the 3DIS system frustrating because sound composition was limited to turning pre-selected sound on and off. Whether you walked up and down in a pedestrian fashion or danced an intricate movement phrase the sound generated would be the same. I found the movement of the musicians in the space determined by 3DIS more interesting to watch choreographically than that of the dancers because the musicians moved from their ears. They moved in space according to a compositional impulse. They endeavoured to create what they wanted to hear by moving through the space to 'play' 3DIS. You could see them hear a sound possibility and move in order to realize it and then you'd hear what you saw them perceive. I found that very exciting. I could experiment with sound but musical composition was a different story! I found it difficult to establish what my impulse to move was. It took me a long time to be able to surrender my own desires in relation to moving and begin to hear sounds and allow those sounds to move me through space. Even then I'd often judge the resulting choreography and feel uncomfortable with it. I had to work from sonic and kinesthetic sources simultaneously before movement with the system made sense to me.

THOMPSON: Did working with a visual field triggering the sound lead you to dance with stronger spatial intent?

INNES: The project made me conscious of space in two ways. Working with other people in a space defined a space and the 3DIS system made me conscious of my kinesphere. It was necessary to know where the centre was in relation to the gangs. Was the gang arm's reach away or just out of arm's reach? It was very difficult to carry this sense of spatial relationship to the gangs into working with other people. I found it difficult to engage with other performers because I was focussed on achieving a musical response which was unpredictable. I expected that the system would expand my sense of space but it did not. It forced my attention to remain confined to my kinesphere.

When you played in the space and were not seeking to create a musical composition, working with the system heightened proprioceptive awareness (where your bits were in relation to other bits). This is what excited me about the system initially but this interest could not be developed because of the primitive nature of the system at the time.

STAEHLI: The system brought the boundary between self and space into focus - where does my body finish and the gang begin? The gangs both defined and confined the movement in space. I felt limited by the responsibility of having to compose the sound - not the content but the

rhythm and flow of the established content - but I enjoyed the challenge of finding moves that would resolve the spatial demands in a musically and visually satisfying way.

REFSHAUGE: Working with the system made me aware of how unrefined my kinesthetic sense was. The system required precise spatial accuracy when 'hitting a gang' in order to produce the music. It was incredibly difficult to hit the same spatial placement twice in a movement sequence. The system was so sensitive that it became unpredictable. The system worked from sensitivity to light and so if light was reflected from a belt buckle or you wore different coloured clothes to the day the music was programmed the sound might not be triggered when previously it had been. I found that arcs and 'flailing' movements maximized my chance of hitting a gang on cue.

After the project was finished, Shona and I had a chance to play with the system when it was programmed to be responsive to sound frequency, pitch, volume and so on. Moving with this programming of 3DIS was terrific; it required the skill of a dancer to move in very subtle spatial pathways. This experience made sense of the project to me: made sense of using dancers to compose sound.

I think the musicians approached the project with the thought, 'Great! The dancers are going to be the musicians in this process'; and the dancers approached the project with the thought 'Great! the musicians are going to be the choreographers in this process'. This simply wasn't possible. The dancers needed to both choreograph and compose. However, because of the sensitivity of the system, it wasn't possible to play a specific musical composition. With *Inside/Out*, the piece I choreographed based on a drum kit programmed in a grid around me, I listened to a lot of drumming until I found a drum sound that I could inhabit as a dancer. The musical composition was translated into a movement rhythm. Then an exciting thing happened for me in working with this piece. My body began making sound composition decisions. To do this I had to know in my body the exact placement of the 27 gangs and the sound that resulted from triggering each gang. The programme had to be memorized by my muscles. It took 3 months to programme these 27 gangs to set the sound I wanted for a 5 minute piece. In the end I felt able to meet the demands of improvised composition with this work.

THOMPSON: Why didn't you choreograph a dance that triggered a specific musical composition? Why did you work with purely improvised dancing, given that improvised sound composition was difficult for you?

STAEHLI: The chances of achieving a pre-set sound score were very slim as it was impossible to eliminate the lighting variables which made the system's response unpredictable. We worked with open compositional form because we couldn't articulate sound production in a reliable and specific way. However, two of the pieces, *Mungo* and *Percy*, were mostly choreographed. In *Random* we chose to make a virtue of the system's unpredictability.

THOMPSON (to Staehli): What was your attitude to and involvement in technology prior to participating in this project? Did working in this project affect your thinking about technology and/or interest in it?

STAEHLI: I originally trained as a computer programmer but I have always been somewhat suspicious of technology and its place in our society. I find the whole notion of progress for progress' sake questionable. The 3DIS project involved understanding the system and developing 'games' to play with it. The technology was a fact and we had the responsibility of justifying that fact. It had not been developed from our needs. However I am interested

in how technology can extend our experience and would like to work further with the system (were it less expensive and more accessible) so as to better understand its limitations and potential uses.

THOMPSON: Technology is traditionally an assumed 'invisible' element in dance performance (lighting and recorded sound). Have you ever focussed on the relationship between technology and the human performer in your work?

STAEHLI: I have, in the past, used technology (film, video, lighting, tapes, and computer generated music) in my work, but I have only once articulated my relationship to it as content in a performance. "And Now For The News In Briefs" was concerned with the manipulation of information, and therefore of meaning, by the use of technology. The piece involved a 'technician' wearing head-sets and shifting "bits of technology" around the performance space while the dancer continued to perform as though only she were visible - a kind of conspiracy of silence.

REFSHAUGE: Once I began to work with the 3DIS system I began to develop an intuition about further possibilities regarding programming although I am not literate in computer language and could not program the computer myself. I think we, the dancers, articulated the possibilities of the computer beyond what had been articulated prior to the project.

It required patience to work with such sophisticated technology in the early stages of production. Sometimes it took hours to program the computer to try out a fairly simple idea, sometimes the computer broke down and we had to wait days for parts or we lost programs because of a malfunction.

INNES: I didn't find the system at all intimidating. I'm interested in how the chips work, how the hardware works. I have since learned some fundamental concepts about how these things work but I would have liked to have had this understanding in place prior to the project. If I could have comprehended how the system made sound, I could then have related this knowledge to how I make movement happen. I am interested in technology because it is an expression of our experience, a version of reality.

I wanted to do a piece which illustrated the workings of the system but it never got off the ground because I didn't have enough information. I was interested in 'breaking the system open' because I do think a lot of people are intimidated by technology.

STAEHLI: I came to the 3DIS project wanting to raise the question asked in the text of *Free Trade Zones* - the fact of the exploitation of the Third World labour market for the production of technology. What are the real costs of our 'playing' with sophisticated gadgetry? To me this is a crucial question and I would have liked to articulate more clearly the socio-political implications of technology in the performance. But our lack of experience with the system forced the technology to become the major focus of the project and other issues to become secondary.

REFSHAUGE: I think we all wanted to focus on the social and political issues arise from considering the computer industry. For me the making of political theatre is very problematic - I couldn't locate a way to make a political statement through performance that didn't come across as being didactic. The project was about something else for me. It was an interface system; it was the performance of the interface of five artists coming to terms with each other and 3DIS.

INNES: Other questions hit me. When I considered that other industries such as the textiles industry exploit third world labour, the presentation of the computer industry in this light

no longer became a simple action.

The project for me was a process of working with others with very different motivations for making art and modes of expressing themselves from mine. My ability to ask artistic questions in the project was restricted by my lack of knowledge of the technology. For me, understanding the fundamental nature of what you are working with is artistic food - questions like 'What is sound? How do I perceive sound? What does sound have in common with moving? How does sound move? What is a computer? What does this computer do? What was Simon thinking of when he made the system?' I am asking these questions now. I didn't then. I was too occupied with group dynamics, finding a way to begin and keep working together.

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