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To: DAJ, PAT
Ballet Proposal Draft

A unique performance of music and dance is planned for a September concert
of the Center for Computer Research in Music and Acoustics (CCRMA) at
Stanford. A musical composition by Michael McNabb conceived in the ballet
form will be performed by live musicians with computer synthesis. Dance
will be performed by the Oberlin Dance Collective, with choreography by
their director, Brenda Way. The ballet will include a truly novel
element, the performance of integral dance movement by sophisticated
robotic devices.

The music will be performed by three musicians, accompanied by both
digitally-recorded computer synthesis, and live synthesis controlled by
electronic interfaces to the acoustic instruments. The work will consist
of 5 contrasting movements, with a total length of approximately 40
minutes. Each movement will consist of a different combination of the
musical, dance, and robotic elements.

The robots, an arm and a mobile base, are part of a collaborative
project underway between Stanford and the Veterans Administration
Rehabilitation Research and Development Center in Palo Alto. This project
aims at the development of an intelligent manipulation aid for severely
disabled people. Programming the robots to dance is seen as a natural
extension of a concern for the quality of their movement. The dance
choreographer is challenged to explore the potential of these machines for
artistic expression.

As we see it now, an articulate machine intelligence is neither threat nor
saviour, but rather a current medium with great potential for expressing the most
humane values and concerns. The role of the artist is crucial in shaping
not only works of value but also the tools needed to direct this
intelligence toward humanistic ends.

UNTITLED

Robot Ballet

Composer: Michael McNabb
Choreographer: Brenda Way
Dancers: ODC/San Francisco
Robots: Veterans Administration

presented by:

Center for Computer Research in Music and Acoustics, Stanford University

The Lively Arts at Stanford

ODC/San Francisco

Rehabilitation Research and Development Center, Veterans Administration

PREMIERE PERFORMANCE

Saturday, October 12, 1986

Memorial Auditorium, Stanford

8:00 P.M.

THE PROJECT

A unique performance of music and dance is planned for an October premiere
performance at Stanford University. The performance will be made possible
through the collaboration of composer Michael McNabb, the Center for Computer
Research in Music and Acoustics (CCRMA) at Stanford, The Lively Arts at
Stanford, ODC/San Francisco, the Rehabilitation Research and Development Center
of the Veterans Administration Medical Center in Palo Alto and the Mechanical
Engineering Department at Stanford University.

A musical composition by Michael McNabb conceived in the ballet form will
be performed by ODC/San Francisco, with choreography by their artistic director,
Brenda Way. The ballet will include a truly novel element, the performance of
integral dance movement by sophisticated robotic devices.

The music will be performed by two musicians performing on piano and
saxophone, accompanied by a digitally-recorded orchestra of computer synthesis
instruments and modified environmental sounds. The sounds of both the live
instruments and the recorded synthesis will be transformed onstage by digital
signal processors, and amplified by a state-of-the-art sound reinforcement
system. The work will consist of 5 distinct movements, with a total length
of approximately 40 minutes. The movements will be highly contrasting in style,
rhythm, and color, and are designed to play a highly interactive role with the
dance.

The robots, an arm and a mobile base, are part of a collaborative project
underway between Stanford and the Veterans Administration Rehabilitation
Research and Development Center in Palo Alto. This project aims at the
development of an intelligent manipulation aid for severely disabled people.
Programming the robots to dance is seen as a natural extension of a concern for
the quality of their movement. The dance choreographer is challenged to explore
the potential of these machines for artistic expression.

This performance will be the first time robotic devices will be used
in a public dance performance. The full work, with robots is scheduled to go
on tour with the ODC/San Francisco Company during their 1986-87 touring season.

COMPOSER MICHAEL MCNABB

Michael McNabb was born in Salinas, California, in 1952. He holds a
doctorate in composition from Stanford University where he studied with Leland
Smith and John Chowning. He also studied with Betsy Jolae at the Paris
Conservatory.

In addition to the National Endowment for the Arts Fellowship in composition
which Michael received for the creation of the music for this ballet, he has
received numerous other awards. In addition to a second National Endowment for
the Arts award in composition he has also received the Electroacoustic Music
Festival of the Groupe de Musique Experimentale de Bourgee Award (twice), the
National Composer's Competition of the League of Composers/International Society
for Contemporary Music Award and the Georges Lurcy Trust Award.

McNabb's computer music is performed and broadcast regularly world-wide.
A digital recording entitled "Michael McNabb - Computer Music" is available on
1750 Arch records, number S-1800, and on compact disc from Mobile Fidelity Sound
Labs, number MFCD-818. The compact disc is the first music recording ever
produced in a entirely digital form from start to finish. The concerts and
recordings have received numerous enthusiastic reviews.

McNabb began working at CCRMA in 1976, when composers and programmers were
still laying the groundwork for computer music. He has taught courses in music
theory and computer music at Stanford and has composed computer music for films
and modern dance. He continues to work at CCRMA as a guest composer and
contributing programmer, while also holding a position as a knowledge engineer
at IntelliCorp, an artificial intelligence software company.

Quotes:

Andrew Porter, The New Yorker:

> "Michael McNabb's very attractive "Dreamsong" ... has become something like
> a classic of the genre."

Alan Rich, Newsweek:

> "McNabb ... uses his electronic helpmate in a wide variety of shapely
> pieces, some quite witty, all aglow with light and color."

Hewell Turciut, San Francisco Examiner:

> "McNabb's highly imaginative juxtaposition of recognizable materials, tonal
> images, and pure computer sonics proved to be the evening's great hit.
> ... What one experienced was McNabb's keenly artistic levels of taste
> and proportion.

CENTER FOR COMPUTER RESEARCH IN MUSIC AND ACOUSTICS
(CCRMA)

CCRMA is an interdisciplinary facility where composers and researchers work together using the computer as a new musical and artistic medium and as a research tool. Areas of ongoing research and development at CCRMA include: digital synthesis, signal processing, psychoacoustics, interactive composition, graphics, digital recording and editing, and musical intelligence.

Work in computer music began at Stanford University in 1964 by John Chowning. Initial funding for the Center for Computer Research in Music and Acoustics was received in 1975 with a joint grant from the National Science Foundation and the National Endowment for the Arts. This funding supported initial equipment acquisition and research support for a small research staff which included faculty members John Chowning and Leland Smith and research associates John Grey, James A. Moorer and Loren Rush.

Funding for ongoing work at CCRMA has been received from the California Arts Council, the National Endowment for the Arts "Centers for New Music Resources" program, the National Science Foundation, the Rockefeller Foundation, the System Development Foundation, Yamaha, and from private gifts. These grants have provided technical support, research support, support for visiting composers, and additional equipment.

The center has close ties with, and has served as the prototype or impetus for computer music facilities at Columbia, Colgate, Clark, Carnegie-Mellon, Michigan State, MIT, U.C. San Diego, Queen's University (Kingston, Ontario), Lucasfilm, Ltd (Marin County), and Yale University. A close association with IRCAM (Paris, France) was proposed as early as 1974 by its director, Pierre Boulez. It has developed into strong and fruitful interactions through the exchange of research ideas, results and personnel.

CCRMA has become one of the major centers for computer music in the United States. Currently there are 56 active users at CCRMA including: 18 faculty, staff and research associates, 21 graduate students, and 15 foreign and domestic guest composers/researchers. Activities at CCRMA include teaching, research, composition, interactive performance, workshops, presentations, concerts, and recordings.

CHOREOGRAPHER BRENDA WAY

Ms. Way began her dance training at the New York City School of American
Ballet and Ballet Arts. Important modern dance influences include Jean Erdman,
Eric Hawkins and Twyla Tharp. She has taught ballet and modern dance in Europe
at Le Centre Americain in Paris, France, and in colleges and universities across
the United States. Ms. Way also holds a Ph.D. in aesthetics.

In 1971, while a Professor of Dance at the Oberlin College and Conservatory
of Music, she founded the Oberlin Dance Collective as a touring outlet for new
performance work developing among her students and colleagues. In 1976, Ms. Way
and the Oberlin Dance Collective relocated to San Francisco to establish permanent
residence. Here Ms. Way continues to teach the ODC technique that is the result
of her extensive training in both ballet and modern dance.

Recipient of numerous choreographic fellowships, awards and Commissions,
Ms. Way has produced thrity-five dance works over the last fourteen years. Her
choreographies have gained national exposure through the extensive touring
schedule of ODC/SF, commissions and the Company's participation at important
arts festivals such as the Los Angeles Olympics and the Spoleto Festival U.S.A.

She continues her commitment to the development and production of work
that is characterized by a rigorous concern for form, an athletic movement
style, and a delight in the unconventional. While much of her work can be
viewed as "post-modern", her interest in experimentation has not dimished
her demand for technical excellence or her concern for the audience; she
produces dance work that is challenging as well as appealing. European
audiences will have the opportunity to see Brenda Way's artistry during
ODC/SF's planned tour of France and Italy in the Spring of 1986.

Brenda Way currently sits on the Dance Panel of the California Arts
Council, the Community Arts Distribution Committee of the Zellerbach Family
Fund and the Technical Assistance Panel of the Yerba Buena Project. She
has previously served on the Dance Panel of the National Endowment for the Arts.

ODC/San Francisco was founded as the Oberlin Dance Collective in 1971 by Brenda Way. The company served as a performing outlet for dancers, musicians and visual artists at Oberlin College and gradually built a national and local reputation for adventure and excellence. The company's professional stature and artistic aspirations soon outgrew the esthetic limitations and critical isolation of a Midwestern college town. In the spring of 1976, the Oberlin Dance Collective relocated in San Francisco hoping to become part of the city's broader and more challenging artistic community.

Soon after arriving in San Francisco, the ODC took its place in the city's dance and performance world by establishing a full teaching curriculum, an interdisciplinary performance series, an arts journal, a regular Bay Area performance schedule and by opening its performance space to other local and visiting performers. The company continued to build its recognition as an important contemporary dance company through the Dance Touring Programs of the NEA and CAC. This reputation continues to grow as the company and its four choreographers are invited to special events and festivals in California and on the East Coast.

In July, 1979, the ODC purchased the building and adjacent lot at 3153 17th Street in San Francisco, making a more permanent commitment to the city of San Francisco and becoming one of very few dance companies to own its own facility. In 1982, a two-story office and studio annex was completed, and the ODC sold partial ownership of the facility to the Margaret Jenkins Dance Company. The two companies contracted management and operations of the facility to the New Performance Gallery, Inc. with the intention that the building house both companies and continue the ODC tradition of presenting a diverse program of new performing arts to San Francisco audiences.

This action permitted both the staff and the Board of Directors of ODC to focus energy on support and development of the creative and performing activities of the company. In 1983, and again in 1984, the company presented major home seasons on proscenium stages which permitted new artistic exploration to ODC choreographers and dancers at the same time that it expanded Bay Area audiences.

As a final commitment to its identification as part of the San Francisco cultural community, in 1984 the Oberlin Dance Collective changed its name officially to ODC/San Francisco.

Today ODC/San Francisco continues annually to perform two Bay Area seasons which premiere the new work of its four choreographers, Brenda Way, Katie Nelson, Kimi Okada and Pam Quinn, and to tour nationally five to seven weeks each year. In 1984 tour bookings increased 500% and included a 14 day tour of Alaska.

The company's mission, as stated in its long range plan, is "to generate, under the guidance of the artistic director, a creative, flexible and stable environment in which its choreographers may explore, develop and realize their art by developing a fully professional, trained company with which to perform the works of the choreographers, building committed audiences for the company locally, nationally and internationally and by providing an institution foundation capable of managing and supporting the programs of the organization."

Recent company engagements include the Joyce Theatre in New York City, a four performance run at the Herbst Theatre in San Francisco, the San Francisco Symphony's Black and White Ball, Ford's Theatre in Los Angeles and the Spoleto Festival, USA.

The robots playing in this performance are part of a research project funded by the Veterans Administration in collaboration with Stanford's Mechanical Engineering Department under the direction of Professor Larry Leifer. This project aims at the development of an intelligent manipulation aid for severely disabled individuals. The robot being developed would be able to fetch, grasp, carry and serve objects which are inaccessible to a high-level quadriplegic "for example". The Robotic Aids Project has supported informal explorations by designers and choreographers into the expressive potential of the robot arm since the project began. The first piece of "robot ballet" was programmed in 1978, and now there are several choreographers working with the machine.

This exploration is valuable to the Robotic Aids Project because

- it addresses qualitative issues in the design of the robotic aid. The way this machine moves is very much a part of its character as a personal "living aid."
    (The comprehensive design of any product would naturally attend to the quality of its form, scale, finish and even sound. In the robot we have a product which also moves, and the quality of its movement is an especially important design concern. We look to choreographers for their expertise in quality of movement.)

- it gives potential users a way of seeing the robot as something positive and it supports acceptance of this machine as an assistive device.

- it demonstrates the robot's potential as an expressive tool for someone having very limited means of non-verbal expression.
    (Who has not, at one time or another, expressed frustration or excitment through the simple act of setting down a cup? Individuals with a high level of disability have few such means of non-verbal expression.)

- it challenges the capabilities of the human interface to the robot and provokes innovative thinking about how to command robot movement.

The Robotic Aids Project is based at the Rehabilitation Research and Development Center, Veterans Administration Medical Center, Palo Alto. This research project supports development of the collaborative music and dance performance by providing access to hardware and technical advice.

THE LIVELY ARTS AT STANFORD

The Lively Arts at Stanford is organized to offer professional performing arts presentations featuring the finest musicians, actors and dancers. The program is committed to performing a more serious public service than entertainment. The offerings are recreation in the true sense of the word, designed not only to entertain, but also to educate and to awake a deeper appreciation in the audience.

The Lively Arts, as the major presenter in the Midpeninsula, is a community resource not offered by other groups. The professional artists, serving as performers and educators, complement the amateur and participatory local groups. There is a deliberately broad mix of performers, to further diversify the available cultural activities. The Lively Arts includes not only popular performers presenting familiar works, but also young artists and companies, and those whose art is less widely accepted.

The Lively Arts presents 35-45 performances, serving a total audience of over 38,000. Approximately 60% of the audience are community residents, rather than faculty, students, or staff. Ticket prices cover only about 60% of costs.

To further involve the community with the Lively Arts, both as participants in activities and as a base of support, the Community Outreach Program was established in 1977 with a grant from the San Francisco Foundation. The outreach effort brings "artists-in-residence" to the community schools and centers to work more closely with smaller groups in a participative style that seeks to convey more directly elements of the creative and artistic process. The program is administered by the Community Outreach Coordinator. By working carefully with artists, managers, community and school leaders, the coordinator ensures that each artist is placed in the situation which will yield the greatest educational results. The coordinator meets regularly with the Senior Coordinating Council, the Master Class Committee, the Advocates for School Arts Programs, and the University Resident Assistants, to plan and evaluate activities. The coordinator prepares inservice materials which teachers use to integrate the mini-concert into the regular school curriculum.

SUPPORT RECOGNITION

The unique concept of robot dancing has already begun to stir
great interest in the press. Pre-performance publicity in the
form of new releases, in-progress updates of the production,
and feature stories with the composer, choreographer and robotic
research team will give opportunities to publicize Foundation
and Corporate sponsors of the project. Discussions with KQED-9,
Public Television are in progress with the potential of production
and performance coverage being developed for broadcast. Scholarly
papers in the areas of computer music research, computer research
and mechanical engineering research are also currently in discussion.

Rudolf 'Robot' Nureyev?

Mechanical marvels may soon be dancing the night away

By Paul Hertelendy
Mercury News Dance Writer

THE world of automation is attempting something long regarded as nutty or unlikely: teaching robots to dance and move, but gracefully.

The dance debut of the robot in concert could be as early as October right here in the Bay Area, under the auspices of Stanford University's Lively Arts. According to Lively Arts representative Lois Wagner, another $30,000-$45,000 remains to be raised toward the necessary $70,000 of the total budget. The expenditure involves everything from (live) dancers' fees to robot-programming to costuming the automatons.

The dancing robots are commercial models, on loan from a research group at Palo Alto's Veterans Administration Hospital. The live dancers collaborating are the San Francisco Oberlin Dance Collective. And the electronic music accompaniment — you wouldn't expect a robot to keep time without music, would you? — would be original computer-music

Gayle Curtis find robots a bit disarming

■ Cover Story

Robots may soon bolt across the dance scene

compositions created at Stanford by Michael McNabb, who received a $10,000 National Endowment for the Arts grant.

Choreographing the collaboration of live dancers and robots will be Brenda Way, veteran director of the Oberlin group. Way hopes to take the new work on tour, both in the U.S. and in Europe next season, with her seven live dancers and three robotic devices.

The modus operandi of the robotic ballet is to program the robots to move not only gracefully, but also in synchronous motion with the beat of the music. The feasibility of this to piano music of Chopin has already been shown in video

tapes prepared at the hospital's Rehabilitation Research and Development Laboratory.

These demonstrations are dazzling in the poetic movement of the robot arm, geared to the tempo of the music. Gayle Curtis, research biomedical engineer at the laboratory and programmer of these devices, essentially can give the robot for each move a Position A, a Position B, and a set time span to move from one to the other. The robot then in effect takes a straight-line route between A and B, without missing a step.

It's much too early to order tickets for these mechanical Pavlovas. "All three phases of this project (programming, composition and choreography) are in develop-

ment," cautions Curtis.

If fund-raising is far enough along, he plans to start formally on July 1. As for choreographer Way, before she begins on this five-part, 45-minute piece she will have to bring her live troupe back from a Midwestern tour and complete the May 29-June 2 performances in San Francisco's Herbst Theater.

Curtis' lab is unaccustomed to
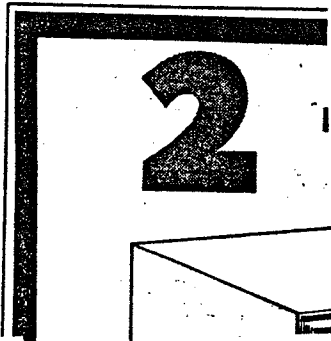
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dabbling in dance, working mainly in devices to assist the severely handicapped. He sees a natural tie-in of robotic dance, however.

"Quality of movement is a factor, especially if we have robots as living aids in the home. A high quality of movement gains acceptance among the disabled. In this area the experts are the choreographers.

"Finally, the research is geared to total movement (i.e., shaping), rather than just the point-to-point approach."

All these human engineering questions have great relevance for robotic design. And who knows? Perhaps the little home robot that you have in the year 2001 for your grocery-shopping and emptying your garbage will also be able to

dance an evocative Isadora Duncan impression at the press of a button.

It's a distant dream still. Even the smaller programmable robot arms cost $40,000 today. Research, however, is making the robot not only more versatile, but more human, and therefore more acceptable among skeptical humans.

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nlike the parquet deformations, which change with time, Golomb's aster changes with distance.

ACCORDING to Huff, the raster xplores the discrepancies between ne world as it is and the world as e perceive it. He points out that in ay-to-day life it is important for us) make instantaneous decisions ased on how we perceive reality. /e must do this in order to survive.

"But," Huff notes, "these deciions aren't 100 percent correct. here is a discrepancy. That's the ind of problem I explore in terms f perception."

The raster uses such discrepanies to create shifts in the viewer's erception of it. Such a design calls ttention to what Huff calls "the ap between the physical and the erceptual."

Architect and designer William uff is also a teacher, and the paruet deformation, the raster, and ne other exercises from his course : Basic Design are fascinating aching tools. They teach the elefents of design and, perhaps more nportantly, they teach students ow to observe and evaluate visual aaterial and how to think through esign problems by putting geomeies together, a skill that, in Huff's ords, calls for "a special magic."

And by studying these finished orks, the viewer also learns someing about how the human eye ies and how the human mind iinks.

's a Star

Avant-artists Keith Haring and nny Scharf left their colorful arks on various walls, but the b is about fashion — not art, usic or dancing.

What effect will it have on New rk night life? Says designer Bety Johnson, "I'm going to have to v more clothes."

Robot Dancing Class May Benefit People

By PAUL HERTELENDY
Knight News Service

SAN JOSE, Calif. — The world of automation is attempting something long regarded as nutty or unlikely: teaching robots to dance and move, but gracefully.

The dance debut of the robot in concert could be as early as October in the San Francisco Bay Area, under the auspices of Stanford University's Lively Arts. According to Lively Arts representative Lois Wagner, another $30,000-$45,000 remains to be raised toward the necessary $70,000 of the total budget. The expenditure involves everything from (live) dancers' fees to robot programming to costuming the automatons.

The dancing robots are commercial models, on loan from a research group at the Veterans Administration Hospital in Palo Alto, Calif. The live dancers collaborating are the San Francisco Oberlin Dance Collective. And the electronic music accompaniment — you wouldn't expect a robot to keep time without music, would you? — would be original computer-music compositions created at Stanford by Michael McNabb, who received a $10,000 grant from the National Endowment for the Arts.

Choreographing the collaboration of live dancers and robots will be Brenda Way, veteran director of the Oberlin group. Way hopes to take the new work on tour, both in the United States and in Europe next season, with her seven live dancers and three robotic devices.

THE ROBOTS will not resemble "Star Wars'" C3PO. But two of the models bear a crude similarity to R2D2, barrel-sized "mobile bases", rolling about silently on three wheels each, with instructions prestored in their memories as well as transmitted by radio antenna. The second model type is a 67-inch-long arm with six "joints" or axes known commercially as Unimation Corporation's PUMA 560, with each of the axes' moves precisely programmable on a computer.

The modus operandi of the robotic ballet is to program the robots to move not only gracefully, but also in synchronous motion with the beat of the music. The feasibility of this to piano music of Chopin has already been shown in videotapes prepared at the hospital's Rehabili-

tation Research and Development Laboratory.

These demonstrations are dazzling in the poetic movement of the robot arm, geared to the tempo of the music. Gayle Curtis, research biomedical engineer at the laboratory and programmer of these devices, essentially can give the robot for each move a Position A, a Position B and a set time span to move from one to the other. The robot then in effect takes a straight-line route between A and B, without missing a step.

It's much too early to order tickets for these mechanical Pavlovas. "All three phases of this project (programming, composition and choreography) are in development," cautioned Curtis. "And part of it will be to develop sophisticated (robotic) choreography."
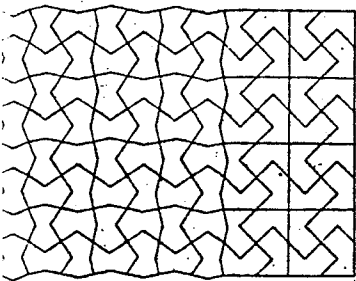
If fund-raising is far enough along, he plans to start formally on July 1. As for choreographer Way, before she begins on this five-part, 45-minute piece, she will have to bring her live troupe back from a Midwestern tour.

CURTIS' LAB is unaccustomed to dabbling in dance, working mainly in devices to assist the severely handicapped. He sees a natural tie-in of robotic dance, however.

"Our charter calls for humane applications of technology; designers need to consider human values," he said. "Quality of movement is a factor, especially if we have robots as living aids in the home. A high quality of movement gains acceptance among the disabled. In this area, the experts are the choreographers. Finally, the research is geared to total movement (i.e., shaping), rather than just the point-to-point approach."

All these human engineering questions have great relevance for robotic design. And who knows? Perhaps the little home robot that you have in the year 2001 for grocery-shopping and emptying your garbage will also be able to dance an evocative Isadora Duncan impression at the press of a button.

It's a distant dream still. Even the smaller programmable robot arms cost $40,000 today. Research, however, is making the robot not only more versatile but more human, and therefore more acceptable.

■ Dance Review

Katie Nelson, Robert Moses Jr. of ODC/San Francisco

'Robot' troupe proves very lively indeed

By Paul Hertelendy
Mercury News Dance Writer

SAN FRANCISCO

THE people who will perform in Stanford's robotic dances — tentatively set for October — aren't robotic at all. Their current performances at Herbst Theater show them getting a kick out of dance, without mechanism, without anxiety, without cramps, without remorse.

The troupe is ODC/San Francisco, formerly known as the Oberlin Dance Collective. Its modern dances are human, ingratiating and nicely curved, with symme-

nothing of the post-modern minimalism that seems to be the reigning fad.

Choreographer-director Brenda Way, who founded this troupe in Ohio 15 years ago before bringing it permanently to San Francisco, is nobody's copycat. Her nine-member company is marvelously disciplined and their coordinated moves are so cohesive that each leads naturally to the next.

On stage, the dancers form a well-adjusted society of interactive people harmonizing and celebrating the harmony with a serene, well-channeled vitality. It's supremely refreshing, after all the

■ Dance Review ■

It's a troupe that's ready for touring

angst and alienation flaunted on the dance stage by others.

The current program has at its focus Way's new "Natural Causes," a piece somewhat in the Alvin Ailey mold, performed by an almost-all-white ensembl.. Way gently tweaks the nose of convention; when she does a segment for two couples, they are not only interracial, but one is boy-boy, the other girl-girl. And they are like freely interchangeable parts.

In last year's "Entropics," being revived on this program, Way comes up with a Caribbean milieu piece and an ingenious two-edged title. Steel-drum music and overhead fans set the scene for a warm-hearted, full-company interplay. The commissioned (recorded) score by Andy Narrell was adroit, leaving latitude for northern-latitude moods along with the Caribbean sunniness.

Katie Nelson's new "Wild Card" had a purposeful, jerky nuttiness that struck me as a lot of frenzy with little effect. She had zany automatons trying to act human (a study for the robotic dances, perchance?) and a dreadful commissioned score by Bobby McFerrin, consisting largely of rhythmic Bronx cheers and razzberries.

This is decidedly a high-quality, touring-caliber troupe, with a grand sense of ensemble and a captivating spirit. Brenda Way can move the dancers about artfully, and I love to watch them, particularly given the lighting design (K.H. Elliott) and sets (by various people).

For jazz fans at Wednesday night's opening, there was even a live jazz-scat-blues-gospel singer named Rhiannon (from the group Alive!) doing her compositions, sometimes under a bigger spotlight than the dancers themselves had.

ODC/SAN FRANCISCO, dance troupe of nine, Brenda Way director-choreographer. Program being repeated nightly through Saturday, 8 p.m. (but Rhiannon live only Saturday night), Herbst Theater, 401 Van Ness, San Francisco. $7.50-16. Call (415) 392-4400, Teletron or Bass.

PRODUCTION SCHEDULE

July 22-27, 1985   Brenda Way and dance experimentation with robots and work with programmer on current robotic capabilities.

August 1-31, 1985   Full company into rehearsal for creation of the work

September 1-30, 1985   Complete programming of robots

October 7-11, 1985   Final production work, rehearsals and dress rehearsals

October 12, 1985   World Premiere of work

PROJECT BUDGET

EXPENSES

Composer Michael McNabb	$10,000
Choreographer Brenda Way	5,000
Computer Programmer	8,000
Computer Hardware Development	4,000
Costume Designer	2,000
Lighting Designer	2,000
ODC/SF dancers development and rehearsals	21,240
ODC/SF performance fee	4,000
Production Stage Manager	2,100
ODC/SF Administrative	1,240
ODC/SF Mileage costs, choreographer & dancers	1,360
Costume and lighting designers travel & per diem	2,500
Dancer costumes	3,150
Robot Costumes	1,500
Lighting/production supplies	1,000
Computer Hardware	
Mobile mount for robot	1,200
Audio Synchronization System	600
Software Development System	7,000
Promotion	6,000
Local Production Costs	10,000

Total Expenses $93,890

INCOME

Ticket Sales	14,400
National Endowment for the Arts	10,000
California Arts Council	13,500
Foundation and Corporate Contributions	55,990

Total Income $93,890

STANFORD UNIVERSITY
STANFORD, CALIFORNIA 94305

DEPARTMENT OF MUSIC
CCRMA

May 21, 1984

Apple Computer Inc.
Corporate Offices
20525 Mariani Ave.
Cupertino, CA.

Attention: Mr. Steven Jobs and Mr. Steven Wozniak

Dear Steven Jobs and Steven Wozniak: *a well-known composer*

    Several months ago, Mike McNabb and Gayle Curtis presented to me an idea
which I found utterly compelling and timely. (Mike received his degree in
composition at the Center for Computer Research in Music and Acoustics (CCRMA)
several years ago and Gayle his in Engineering.)   The idea:

    Computer Music composed for a dance piece choreographed for industrial
robots interacting with dancers.

    The accompanying page "Machine Choreography" explains the idea in a bit
of detail, and the short video tape and recording give some idea as to the
materials from which such a piece would be composed. *We have had discussions
with the well-known "Oberlin Dance Collective", who are enthusiastic about the project*
    We would like to give the first public performance of this piece in
Paris in October of this year. During this time Pierre Boulez, director
of IRCAM, is hosting the International Computer Music Conference. There is
good reason to present the piece at this conference as it will have the
greatest artistic impact. We would also be able to present it in both
Cologne and Berlin later in October.

    We believe that we can borrow the robots from Datamation but we need
a PC (MacIntosh?) for programming the robots and a sponsor to cover the
expenses. The total costs, including preparation, production, artists' fees
and European tour are between $70,000 and $80,000. Might Apple be interested
in such a project? In exchange for such support we would give the first
performance for Apple employees in early October and a substantial amount
of "interesting" press both in this country and abroad.

    As Brenda Way, director of the Oberlin Dance Collective, is holding dates
and there is a great deal of work to do, we must know whether or not we can
proceed in the very near future.

    We would be very happy to meet with you or your designates to discuss
the project further should there be any interest.

    I ask you to keep the recordings, but please return the video tape.

Sincerely,

John Chowning

JC/hk   John Chowning
Enclosures: Record, cassette   Professor of Music
                                                            Director, CCRMA

Machine Choreography:
Exploring the Expressive Potential of the Robot

Gayle Curtis, M.S.
Rehabilitation Research and Development Center
Veterans Administration Medical Center, Palo Alto

The industrial robot is a fascinating thing to watch. Moving through its programmed routine on the factory floor, it often seems to "dance" incongruously as it welds or sprays paint. Now, with current research in interactive robotics, people having a broad range of humanistic concerns are exploring this technology. One question arising out of this exploration is whether the robot which sometimes *seems* to dance can actually be *made* to dance. Can the robot be intentionally programmed to serve an aesthetic purpose? Can the machine whose movements are precise and articulate be made accessible to artists who would expand the domain of choreographic expression?

Work is currently underway to explore the expressive potential of an industrial manipulator. This effort proceeds as part of a collaborative research project between Stanford University and the Veterans Administration. This collaborative project aims at the development of an intelligent manipulation aid for severely disabled individuals. Explorations in the qualitative character of the robot's movement are a valuable part of designing the robotic aid. How the robot moves, in qualitative terms, becomes a significant issue in developing such a personal living aid.

The first piece of "robot ballet" was choreographed and realized in 1978 by a graduate student in Product Design. A Ph.D. candidate in Physical Education (Dance) is now continuing the effort. Both choreographers programmed pieces using a robot arm of the Unimation PUMA 250 series. With present hardware and software, movement sequences are programmed by defining specific arm positions and specifying the speed with which the arm is to move between these positions. The sequence is paced and timed to execute in synchronization with a selected musical accompanyment.

A more extensive collaborative work of music and dance is now in development. Composer Michael McNabb is writing the music, using facilities at the Stanford Center for Computer Research in Music and Acoustics (CCRMA). This composition is a work for computer-synthesized sound and live instrumentalists. Choreographer Brenda Way of the Oberlin Dance Collective (ODC) in San Francisco is developing a dance piece. The dancers are to be five people and two robots: a five-foot high electromechanical "arm" and a prototype omnidirectional mobile-base. The development of this collaborative work will culminate in a series of live concert performances. A targeted collaboration of this scale is seen as timely now to clarify the needs, values and issues surrounding the use of the robot as an expressive tool.

Technical development is needed in several areas. First, the choreographer's interface must facilitate the design of movement in familiar choreographic terms. Initial efforts will focus on a graphic interface, a means of programming movement by direct manipulation of images on a high-resolution display screen. Another approach would involve real-time position tracking, enabling the robot to mimic and remember the movements of the choreographer. Further development might focus on a programming language based upon a high-level symbolic description of movement (including gesture and affect). Work in this area could lead to a broad-based symbolic notation for describing choreographic work in general.

The value of this endeavor is seen first in the kind of amazement and delight which greets performances of video segments showing the "robot ballet." Audiences of all kinds seem to enjoy the sight of these machines dancing, and often report a positive change in feeling toward the robot after viewing these segments. (The actual effects and changes in attitude here are the subject of a current study.) In a broader cultural sense, the value will be found in the contribution of the artist. The development of workable tools for choreographing these machines would expand access to a new medium of expression, and works of movement and vision which might otherwise be lost could then be realized.

Music/Composers

Individual Grant Application Form NEA-2 (Rev.)

This completed original and two copies must be sent to: Grants Office/COMP, National Endowment for the Arts, 1100 Pennsylvania Avenue, N.W., Washington, D.C. 20506.

1. Name (last, first, middle initial)

McNabb, Michael D.

4. Category under which support is requested:

[X] Composers Fellowships
[ ] Collaborative Fellowships

2. Present mailing address/phone

1011 Berkeley Avenue
Menlo Park, CA 94025
(415) 326-1381 / 328-4870

5. U.S. Citizenship
[X] Yes   [ ] No   (Visa Number:_____)

6. Professional field or discipline:

Composer

3. Permanent mailing address/phone

SAME

7.

July 5, 1952
Birth date

Salinas, CA
Place of birth

8. Period of support requested:

Starting Jan. 1 85
month day year

Ending Dec. 31 85
month day year

9. Description of proposed activity (Complete in space provided. DO NOT continue on additional pages.)

Composition of a ballet (dance suite), for soprano voice, solo soprano instrument, percussion, piano, and computer-generated stereo tape. The composer will play soprano saxophone in the initial performances, but the soprano instrument part will be written so that other melodic instruments which include the same range can be substituted. The computer part will be done at the Center for Computer Research in Music and Acoustics, (CCRMA) Stanford University. There will be five movements of varying lengths and instrumental forces, totalling about 30 minutes in length. The music will be composed so that a conductor is not required. Movements will alternate between contrasting rhythmic and impressionistic textures.

All instruments will be amplified, and reverberated through a high-quality digital reverberation unit along with the digital tape playback. This will substantially improve the live instrument / synthesis blend in performance. The composer is already expert in the production of high quality expressive digitally synthesized music. Other real-time digital processing may be used as available, since exploring the use of this new equipment in a performance context is one of the goals of the project.

10. Amount requested from National Endowment for the Arts: $ 15,000

Allocated as follows: Time $ 10,000   Materials $ 5,000   Travel $_____

11. Career summary or background (Complete in space provided. Resumes should be sent only as supplemental material.)

The composer holds a Doctor of Musical Arts degree (1981) from Stanford University, where he also did his undergraduate work. His primary teachers were Leland Smith and John Chowning. He spent a year at the Paris Conservatory studying analysis and composition with Betsy Jolas. He has taught theory at Stanford, as well as several computer music classes and workshops. His computer compositions have been played repeatedly around the world, and a commercial recording is due to be released in February of 1984. The composer has received past awards from The League/ISCM, The Bourges ElectroAcoustic Music Festival (twice), NEA, and the Georges Lurcy Trust. He has composed music professionally for dance, film, and video.

He is currently a guest composer and researcher at CCRMA, where he continues to expand and refine his own extensive software system for creating music with the Systems Concepts Digital Synthesizer.

(Please see accompanying list of performances and publications)

SEP 21 1984

Mr. Michael D. McNabb
1011 Berkeley Avenue
Menlo Park, CA 94025

Dear Mr. McNabb:

It is my pleasure to notify you that you have been awarded a
National Endowment for the Arts Composers Fellowship Grant in
the amount of $10,000 through the Music Program.

These awards are made by the Endowment to individuals in the
field of music composition as a reflection of its desire to
recognize America's outstanding individual musicians. The
Endowment is pleased to be able to support your work in this way.

It is my hope that this assistance from the National Endowment
for the Arts will be of great value in furthering your work and
in adding to our country's musical heritage.

Sincerely,

F.S.M. HODSOLL
Chairman

Reference: Grant No.:   41-3112-0908
           Application No.: A84-040238

Enclosures:
1. Fellowship Acceptance Agreement
2. General Information and Instructions
3. Return Envelope