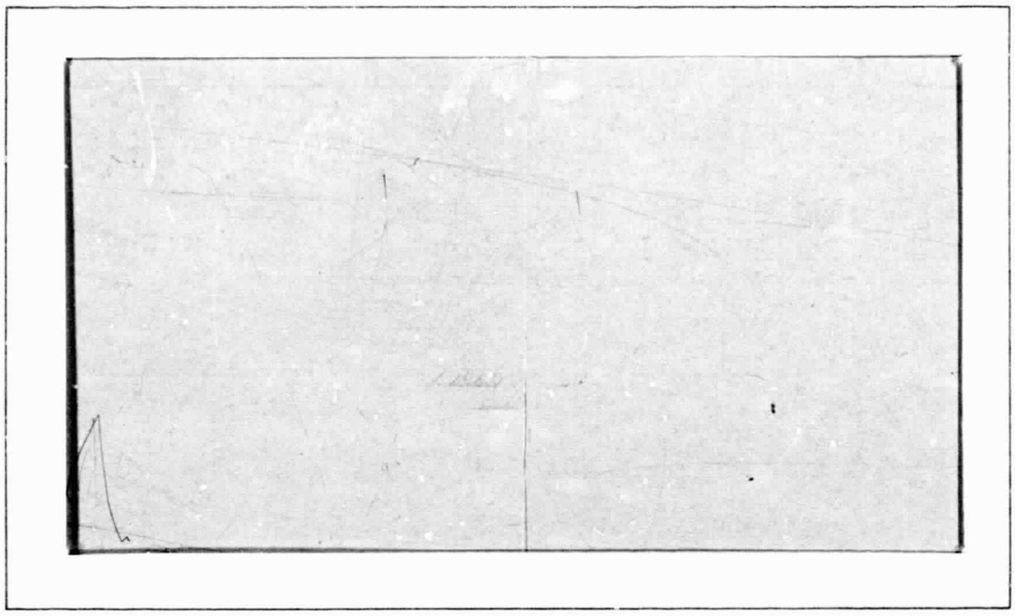

Drexel University

Center for the Study of Environment

RESEARCH AND EDUCATION IN MANAGEMENT OF LARGE-SCALE TECHNICAL PROGRAMS

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APPENDIX A

USES AND MISUSES OF COMPUTERS IN URBAN AFFAIRS

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"I place a great deal of emphasis
on people really listening to
each other."

Eldridge Cleaver
in Soul on Ice

***

The title of this paper was selected too soon. The magnitude of the problem facing us in the urban environment, and in the more general interface between man and his technology does not permit us the luxury of dwelling upon "misuses" of computers. Instead I shall discuss just one possible "use" and its ramifications: computer gaming.

That there is a pressing need for reconciliation between technology and society is a commonplace. My fellow panelists have dealt with the need for increased dialog between computer professionals in particular and members of the larger community as one means for bringing about this reconciliation. Since there is so much recognition of the need why don't we go ahead and create a humane technological society? As Erich Fromm has recently pointed out, we know everything about "system optimization" except how to optimize for the system, Man. It is the position of this paper that a part (but only a part) of the need for increased dialog can be served by that ultimate symbol of the dehumanizing potential of technology, the computer itself.

Manuscript prepared for the Panel Discussion, "Urgent--Increased Dialog with Society," 1969 Spring Joint Computer Conference, May 14-16, 1969 Boston, Massachusetts)

Let us accept as a temporary working hypothesis the notion that technologists are both willing and able to implement the dictionary definition of engineering which includes the phrases, "properties of matter and sources of power in nature . . . made useful to man." This assumption avoids questions concerning the psychological orientation of engineers toward things, rather than people, the use of power in the economic and social order, etc. It simply defines a task: find improved mechanisms for translating the true wishes of society (the "useful to man" part of the definition of engineering) into the necessarily complex decisions which must be made in a technological environment.

This paper proposes the use of the computer, specifically the role playing computer game, as a possible effective interface for meeting the above need. In a computer game situation it is possible for a group to deal with far more complex tasks than would be possible through ordinary conversational interaction. The decisions required in a properly designed game, and the results obtained, although "unrealistic" to some degree, force a very high degree of communication on matters ranging from the concept and philosophy of a technical project to detailed design tradeoffs, budgeting, etc.

As an example, perhaps one of the most important interactions between technology and society is in the area of community planning: the creation of a humane environment. Here, there is truly a need for increased dialog with society, since each technical decision taken may directly affect the life experience of thousands of people. Furthermore, people must of necessity "consume" the environment, rather than having a choice as with a conventional engineering product.

Preliminary experience with role-playing computer games for urban planning suggests that they provide an extremely useful mechanism for enabling people in the community to make valid inputs to the planning process at a technically sophisticated level. A new community development simulation game called "BUILD" is now being developed for this purpose at Drexel. It incorporates the following roles at the present time: technical planner, social planner, community businessman, national businessman, mayor, federal administrator, police and fire commissioner, school board, city planning board, health and welfare board, labor, parents, conventional political organizations, and militant community groups.

Implementation of meaningful technical-social dialog at this level is known as "advocacy planning." In addition to this valuable function computer gaming may provide the intellectual tool for helping us to formulate better hypotheses about the functioning of the urban system. In some cases this development may come about through quantitative correlation between simulated and measured variables. With the present state of the art, however, "intellectual bootstrapping" is much more likely to be via heuristic feedback from the game players themselves in the form of verification or rejection of trends and mechanisms which become apparent during the course of play. An even more important role for the game may be the revelation and resolution of the extremely complex psychological and social relationships of the individuals involved. In this way games may serve as a means for people to communicate with one another on the "gut-level" issues of race, economic and political power, etc.

It was suggested above that computer gaming is a part (but only a part) of the need for increased technical-social dialog. The parenthesized phrase should now be emphasized. The ultimate answer is, in Cleaver's phrase, "people really listening to each other." It is my belief that this is possible, and that we are truly capable of creating a humane tech-

nological society. It will require a radically new concept of engineering, and here I am not referring to "social engineering" or "human engineering." These imply manipulation, and adaptation of man to the machine. Instead we need a concept which begins with man and adapts the machine to serve his needs. Perhaps we should call it "humane engineering." In any case, the prerequisite for implementing such a concept is the human function of communication, or as this session calls it, "dialogue with society."

APPENDIX B

"BUILD" -- A Community Development Simulation Game

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Gaming and simulation have a long tradition as tools for policy making professionals. War games, logistics games, and business games are examples. The advent of the digital computer greatly enriched the possibilities, and there has been a proliferation of simulation games in the last ten years. A recent development is the appearance of computer based urban decision-making games. These include the Cornell Land Use Game (CLUG) created by Allan Feldt; METRO, by Richard Duke of The University of Michigan; GSPIA Decision Game by Hendricks and Rogers of The University of Pittsburgh; and CITY by House and Patterson of Envirometrics, Washington, D.C. The emphasis in these games is on technical decision making about the incremental development and expansion of a real or hypothetical city. A game experience typically introduces the participant to the richness and complexity of urban decision making and to phenomena of group interaction such as value conflicts and clashes of personalities.

It is obvious that the urban system is quite different from the directly competitive nature of warfare and business. The "enemy" is a collection of economic, technical, political, social and other constraints rather than a collection of other players seeking the well defined goal of "winning." Of course, players in the real or simulated urban world often decide to act competitively from narrow economic or political bases. This fact of life, along with the relatively non-heirarchical decision-making structure shifts the emphasis in urban affairs toward negotiation and compromise away from the structured decision-making found in military and business operations.

Manuscript prepared for the 36th National Meeting, Operations Research Society of America, November 10-12, 1969, Miami Beach, Florida.

It is our position that these facts have not been adequately recognized in urban simulation and gaming and that the method has not yet extracted itself from the older tradition. In addition the techniques associated with computer implementation appear to incorrectly present the urban problem as a primarily technical and managerial one, rather than a political, social, psychological, and even cultural one. In addition, we find that existing games tend to be heavily oriented toward management by professionals of large-scale established urban complexes rather than redevelopment of existing small communities by the members themselves, an increasing real world trend. Starting from this background our specific goals in writing BUILD were the following:

1. To allow maximum expression of value positions by participants through resolution of intense, task-oriented conflicts.
2. To heuristically gather information on both the technical and social functioning of the city through feedback from participants.
3. To provide community participants with access to technical expertise in urban decision making, and to expose professionals to the value positions of the community.
4. To lay the groundwork for eventual development of an actual policy making tool. Considering the present state of our knowledge this goal appears somewhat distant. We have, however, structured the game so that it can be made specific to a given area through incorporation of local data. Thus, the theoretical potential exists for decision makers themselves to use this tool as a supplement to the conventional ones of staff studies, memoranda, committee meetings and so forth.

***

We have found that aside from stating a general position as above it is relatively ineffective to talk <u>about</u> a game. Like sex, it is an intense

experience which can only be truly appreciated by doing it. Hence, the remainder of this paper consists of a brief description of the roles, sample input/output formats, an initial scenario, and information on accessing the game through a time-sharing system. BUILD can presently be played from any telephone using a teletype unit and accoustic coupler. Some of the future technological steps which suggest themselves are to utilize low-cost video terminals and graphic display of layouts . No amount of exotic space-age gadetry, however, can substitute for the realization of human values by actual humans. The dangers of becoming fascinated by technique are real and ever present. Despite some opinion to the contrary we feel that computer-based simulation gaming has humanizing potential. When this ceases to be true it will be time to change to another game.

ROLES

Mayor - the mayor must set tax rates and department budgets for each year. He is responsible for all borrowing decisions. The mayor can also change the tax rate on any particular business property.

Zoning and City Planning - This department is responsible for construction of highways, peirs, parks and playgrounds. It can set all zoning requirements and must approve development plans. Zoning and City Planning must also maintain a city map.

School Board - The school board can increase or decrease the size of the teaching staff as well as teacher salary. It is responsible for pre-school and adult education programs. The school board can construct schools as needed.

Health and Welfare - This department sets the payment schedules for the employed, and dependent children allowances. It also is responsible for job training programs. Health and welfare can construct community health service centers or clinics.

Police - The department sets size and salary of police force. It is also responsible for construction of new stations.

National Business - National business can invest either in the city or the outside economy. It can invest in production, technical, warehouse, or office units. It can sponser job training programs and elect to use lower skilled community labor on the work force.

Local Business - Local business can only invest in the community, and only in either retail or service establishments.

Planner - the planner is responsible for developing land development plans for community people.

Agitator - the agitator applies what ever pressure he can to better the position of community people.

People - the people (Parents & Labor) must use whatever influence they can to control the city redevelopment as they want it.

SOCIAL PARAMETERS REQUESTED BY 'MAY '

CRIME RATE IS 17 CRIMES/1000 PEOPLE.
A TOTAL OF 1241 CRIMES WERE REPORTED.

SCHOOL DROP OUT RATE IS 17%.

SCHOOL TRUANCY RATE IS 9%.

AVERAGE EDUCATION LEVEL IS 8.4 YEARS.

PER CAPITA INCOME IS $1025.

UNEMPLOYMENT RATE IS 13.0%.

A TOTAL OF 0 JOBS ARE AVAILABLE.

GENERAL MAINTENANCE LEVEL IS FAIR

74% OF PEOPLE ARE REGISTERED TO VOTE.
58% ACTUALLY DID VOTE.

NET MIGRATION FOR THIS YEAR IS 3900 INTO NEIGHBORHOOD.

POPULATION DENSITY IS 19109 PEOPLE/SQ. MILE.

MEDIAN AGE IS 25 YEARS.

AVERAGE FAMILY SIZE IS 5.6 PERSONS.

WORKING DATA FOR MAYOR

ESTIMATED TAX BASES FOR YEAR 1971
TOTAL EXPECTED TAXABLE INCOME IS $ 120000000
TOTAL SALES EXPECTED IS $ 75000000
TOTAL TAXABLE PROPERTIES VALUED AT $ 725000000

ESTIMATED INCOME FOR NEXT YEAR
$ 3600000 FROM INCOME TAX
$ 4500000 FROM SALES TAX
$ 14500000 FROM REAL ESTATE TAX.
$ 12000000 FROM FEDERAL GOVERNMENT
$ 34600000 TOTAL

ACTUAL EXPENSES FOR YEAR 1970 WERE $ 23281000
ACTUAL INCOME WAS $ 22600000
DEFICIT FOR YEAR IS $ 681000

BORROWING DATA
AUTHORIZED BORROWING LIMIT IS $ 25000000
$ 12000000 BORROWED TO DATE

BORROWING COSTS
PRINCIPAL, $ 480000
INTEREST, $ 600000

```
PLEASE INPUT PLAYER ID?MAY


INPUT TAX RATES FOR THE YEAR 1973
SALES TAX RATE IS (%)?6
INCOME TAX RATE IS (%)?3
PROPERTY TAX RATE IS (%)?2

INPUT DEPARTMENT BUDGETS FOR YEAR 1973
ZONING AND CITY PLANNING BUDGET IS($)?265000
SCHOOL BOARD BUDGET IS ($)?8100000
HEALTH AND WELFARE BUDGET IS ($)?9500000
POLICE BUDGET IS ($)?5100000
ARE THERE ANY PROPERTIES WHOSE TAX RATE IS TO CHANGE
ANSWER 'YES' OR 'NO'?YES
PRODUCTION
INPUT NUMBER OF PROPERTIES TO BE CHANGED?1
INPUT LOCATION AND TAX RATE?E 9 1
TECHNICAL OPERATION
INPUT NUMBER OF PROPERTIES TO BE CHANGED?0
WAREHOUSES
INPUT NUMBER OF PROPERTIES TO BE CHANGED?0
OFFICE BUILDINGS
INPUT NUMBER OF PROPERTIES TO BE CHANGED?0
```

WORKING DATA FOR ZONING AND CITY PLANNING

APPROVED BUDGET IS $ 241000

LAND USE SUMMARY
RECREATION 3%
HOUSING 62%
INDUSTRIAL 16%
GOVERNMENT 6%
VACANT 12%
OTHER 1%

COST OF HIGHWAY CONSTRUCTION IS $ 750000 PER MILE

COST OF MAINTAINING 2 MILES OF HIGHWAY AT $5500 PER MILE
IS $ 11000

EXPECTED CONSTRUCTION COSTS FOR NEXT YEAR.

COST OF FIRE STATION IS $ 400000
COST OF POLICE STATION IS $ 650000

COST OF A HEALTH CENTER IS $ 1210000
COST OF A HEALTH CLINIC IS $ 475000

COST OF A PLAYGROUND IS $ 230000
COST OF A PARK IS $ 295000

COST OF PIER RECONSTRUCTION IS $ 3100000 PER BERTH.

LOCATION OF PIERS
B- 9
C- 9

```
PLEASE INPUT PLAYER ID?ZD


IS ANY HIGHWAY CONSTRUCTION BUDGETED?
ANSWER 'YES' OR 'NO'?YES
INPUT NUMBER OF MILES OF CONSTRUCTION?2

ARE ANY PIERS TO BE BUILT?
ANSWER 'YES' OR 'NO'?YES
INPUT NUMBER OF PIERS TO BE BUILT?1
 INPUT LOCATION?D 9

ARE ANY PARKS TO BE BUILT?
ANSWER 'YES' OR 'NO'?NO

ARE ANY PLAYGROUNDS TO BE BUILT?
ANSWER 'YES' OR 'NO'?YES
INPUT NUMBER OF NEW PLAYGROUNDS?3
 INPUT LOCATION?B 1
 INPUT LOCATION?J 9
 INPUT LOCATION?J 2
```

WORKING DATA FOR SCHOOL BOARD

APPROVED BUDGET IS $ 7700000

THERE ARE 610 TEACHERS
AVERAGE TEACHER SALARY IS $ 8100

THE NUMBER OF CHILDREN IN PRE-SCHOOL TRAINING IS 250
AT A COST OF $1500 PER CHILD

NUMBER OF ADULTS IN SCHOOL IS 50 AT A COST OF $ 750 PER PERSON

TRUANCY RATES
LOWER SCHOOL 6%
MIDDLE SCHOOL 9%
HIGH SCHOOL 13%

DROP-OUT RATE IS 17%

COST OF A LOWER SCHOOL IS $ 2970000
COST OF A MIDDLE SCHOOL IS $ 6200000
COST OF A HIGH SCHOOL IS $ 14430000

REQUIRED MAINTENANCE COSTS $ 2350000

COST OF BUSSING 0 CHILDREN IS $ 0

LOCATION	CAPACITY	ENROLLMENT	TYPE	MAINTENANCE LEVEL
A- 1	960	900	LOW	GOOD
A- 4	960	1000	LOW	GOOD
C- 2	960	1100	LOW	FAIR
B- 8	960	1200	LOW	FAIR
D- 5	960	1200	LOW	FAIR
G- 3	960	1100	LOW	FAIR
G- 6	960	1200	LOW	POOR
A- 2	1650	1750	MID	GOOD
D- 3	1650	2050	MID	FAIR
B- 6	3500	3900	HIGH	GOOD

```
PLEASE INPUT PLAYER ID?SCH

DO YOU WANT TO CHANGE THE NUMBER OF TEACHERS?
ANSWER 'YES' OR 'NO'?YES
ENTER THE CHANGE IN THE NUMBER OF TEACHERS?56
DO YOU WANT TO CHANGE TEACHERS' SALARY?
ANSWER 'YES' OR 'NO'?YES
ENTER NEW SALARY (PER YEAR)?8550
HOW MANY CHILDREN IN PRESCHOOL PROGRAMS?
INPUT NUMBER?350
HOW MANY ADULTS IN SCHOOL?
INPUT NUMBER?150
ARE ANY SCHOOLS BUDGETED FOR CONSTRUCTION?
ANSWER 'YES' OR 'NO'?YES
INPUT NUMBER?1
INPUT SCHOOL LOCATION?E 7
ENTER SCHOOL CAPACITY?1650
ENTER SCHOOL LEVEL
LOWER='LOW'
MIDDLE='MID'
HIGH='HIGH'?MID
ANY SCHOOLS BUDGETED FOR PLANNING?
ANSWER 'YES' OR 'NO'?YES
INPUT NUMBER?2-
```

WORKING DATA FOR HEALTH AND WELFARE

APPROVED BUDGET IS $ 9750000

NUMBER OF ADULTS RECEIVING PAYMENTS IS 3403
NUMBER OF CHILDREN RECEIVING PAYMENTS IS 1950

COST OF JOB TRAINING IS $ 750 PER PERSON

PARK LOCATIONS
A- 7
PLAYGROUND LOCATIONS
B- 1
B- 3
F- 7
HEALTH CENTER LOCATIONS
B- 3
HEALTH CLINIC LOCATIONS
D- 9

```
PLEASE INPUT PLAYER ID?HW

DO YOU WANT TO CHANGE UNEMPLOYMENT PAYMENT RATE?
ANSWER 'YES' OR 'NO'?YES
ENTER NEW WEEKLY PAYMENT?48

DO YOU WANT TO CHANGE CHILD ALLOWANCE?
ANSWER 'YES' OR 'NO'?YES
ENTER NEW ALLOWANCE PER CHILD?11

HOW MANY PEOPLE WILL BE ON JOB-TRAINING PROGRAMS?
INPUT NUMBER?150
ARE ANY HEALTH CENTERS TO BE BUILT?
ANSWER 'YES' OR 'NO'?YES
ENTER NUMBER OF NEW HEALTH CENTERS?1
 INPUT LOCATION?I 8

ARE ANY HEALTH CLINICS TO BE BUILT?
ANSWER 'YES' OR 'NO'?NO
```

```
 WORKING DATA FOR POLICE CHIEF

APPROVED BUDGET IS $      4510000

POLICEFORCE CONSISTS OF    360 MEN
AVERAGE SALARY IS $ 9200

REQUIRED MAINTENANCE COSTS $      1200000
   LOCATION OF POLICE STATIONS
    C- 5
    J- 5
```

```
PLEASE INPUT PLAYER ID?POL


 DO YOU WANT TO CHANGE THE NUMBER OF POLICE?
 ANSWER 'YES' OR 'NO'?YES
 WHAT IS THE CHANGE?
 INPUT NUMBER?-60

 DO YOU WANT TO CHANGE POLICE SALARY?
 ANSWER 'YES' OR 'NO'?YES
 ENTER NEW SALARY?9850

 ARE ANY POLICE STATIONS TO BE BUILT?
 ANSWER 'YES' OR 'NO'?YES
 ENTER THE NUMBER OF NEW STATIONS?2
  INPUT LOCATION?A 8
  INPUT LOCATION?G 9
```

WORKING DATA FOR NATIONAL BUSINESS

TOTAL ASSETS ARE NOW $ 350000000
$ 77500000 INSIDE CITY
$ 272500000 OUTSIDE CITY

RETURN ON INVESTMENT
6% INSIDE CITY
9% OUTSIDE CITY

$ 19000000 AVAILABLE FOR INVESTMENT NEXT YEAR

BUILDING COSTS

PRODUCTION PLANT	$	22500000
TECHNICAL OPERATION	$	25000000
WAREHOUSE	$	500000
OFFICE UNIT	$	10000000

SKILL LEVEL OF COMMUNITY LABOR IS 56

	BUSINESS LOCATION	SIZE
PRODUCTION PLANTS		
	E- 9	1500
	H- 9	750
NO TECHNICAL OPERATIONS		
WAREHOUSES		
	C- 8	50
	E- 6	20
	E- 8	30
	H- 5	40
	F- 1	60
NO OFFICE UNITS		

SIZE OF STANDARD BUSINESS UNITS
750 PRODUCTION
500 TECHNICAL OPERATION
10 WAREHOUSE
500 OFFICE UNIT

```
PLEASE INPUT PLAYER ID?NBUS

DO YOU WANT TO FINANCE A JOB TRAINING PROGRAM?
ANSWER 'YES' OR 'NO'?YES
HOW MANY PEOPLE ON THE PROGRAM?250

HOW MUCH ADDITIONAL IS TO BE INVESTED INSIDE THE COMMUNITY?25000000
DO YOU WISH TO BUILD ANY PRODUCTION PLANTS?
ANSWER 'YES' OR 'NO'?NO
DO YOU WISH TO BUILD A TECHNICAL OPERATION SITE?
ANSWER 'YES' OR 'NO'?YES
HOW MANY PLANTS?1
ENTER LOCATION AND SIZE?F 8 500

DO YOU WISH TO BUILD WAREHOUSES?
ANSWER 'YES' OR 'NO'?NO
DO YOU WISH TO BUILD OFFICE BUILDINGS?
ANSWER 'YES' OR 'NO'?NO
DO YOU WISH TO USE COMMUNITY LABOR?
INPUT % OF WORKING FORCE FROM LOCAL COMMUNITY?20
```

WORKING DATA FOR LOCAL BUSINESS

TOTAL ASSETS ARE $ 3300000

RETURN ON INVESTMENT IS 4%

$ 55000 AVAILABLE FOR INVESTMENT NEXT YEAR

BUILDING COSTS
RETAIL UNIT $ 250000
SERVICE UNIT $ 150000

	BUSINESS LOCATION	SIZE
RETAIL ESTABLISHMENTS		
	C- 1	25
	D- 5	15
	I- 6	20
SERVICE ESTABLISHMENTS		
	E- 2	10

SIZE OF STANDARD BUSINESS UNITS
5 RETAIL
5 SERVICE

```
PLEASE INPUT PLAYER ID?LBUS


HOW MUCH ADDITIONAL IS TO BE INVESTED INSIDE THE COMMUNITY?0
DO YOU WISH TO BUILD RETAIL UNITS?
ANSWER 'YES' OR 'NO'?NO
DO YOU WISH TO BUILD SERVICE UNITS?
ANSWER 'YES' OR 'NO'?NO
```

WORKING DATA FOR PLANNER

COST OF FIRE STATION IS $ 400000
COST OF POLICE STATION IS $ 650000

COST OF A HEALTH CENTER IS $ 475000
COST OF A HEALTH CLINIC IS $ 1210000

COST OF A PLAYGROUND IS $ 230000
COST OF A PARK IS $ 295000

COST OF PIER RECONSTRUCTION IS $ 3100000 PER BERTH

SAMPLE INITIAL SCENARIO

"River City" is a four square mile section of one of the oldest East Coast metropolitan areas. It is bounded by a major river along which are found a large number of vacant or run-down factories and warehouses. The southern portion is what is often called a "slum," although the people who live there are proud of their home, and intensely interested in improving conditions. The northwest corner is a stable middle class community of long standing. River City is now deeply troubled over three major issues:

- De facto segregation of schools.
- A proposed East-West expressway.
- A proposed industrial park along the river bank.

In addition, a large block of Federal money has just become available for redevelopment. As the game begins the Mayor is under pressure to develop a program which can unify the community.

***

COMPUTER IMPLEMENTATION

BUILD is presently available on the General Electric Mark II time sharing system. It can be accessed from any standard teletype unit through the telephone system. The simulation itself consists of 15 programs totalling 100,000 words and utilizes chaining. Once the Executive Program is executed no further program calls are required. All player decisions are made directly to the computer via the teletype. Program tapes and further information are available from the authors on request.

ACKNOWLEDGMENT

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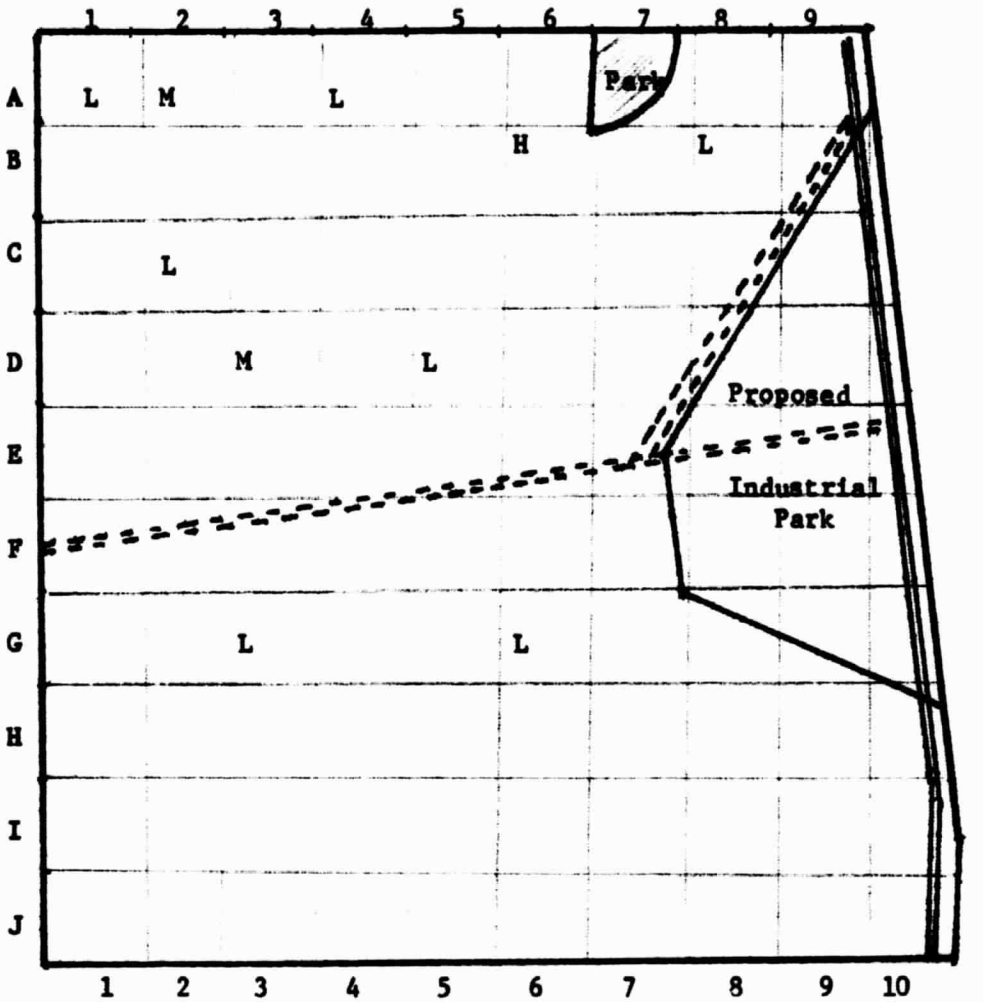

RIVER CITY

Schools L = Low
M = Middle
H = High

Highway

Proposed Highway

Scale 1" = .4 mile

Appendix C

DREXEL INSTITUTE OF TECHNOLOGY

NASA Grant -- Technology and Management of Large-Scale Programs

Urban Simulation and Gaming:

Preliminary Experience and Perspectives

by
Arthur B. Shostak
Associate Professor of Sociology
and
Research Consultant -- NASA Grant

If, as Jacob Riis observed years ago, "the slum is the measure of civilization," our post-industrial, neo-cybernetic futuristic American civilization is seriously jeopardized by its own persisting contradictions.[2] We advance unevenly and haltingly, our record in urban reform lagging far behind our achievement record in scientific and technological matters. Invaluable, accordingly, is the concrete demonstration of interest in urban reform possibilities evidenced in recent years by the National Aeronautics and Space Administration.

With the financial and intellectual aid of N.A.S.A. a team of student researchers assisted Drexel sociologist Arthur B. Shostak in a three-month, Summer 1969 exploration of gaming as applied to urban problems. What follows hereafter is a report on the Summer's work, and a series of recommendations that may help guide the warranted efforts of others in and outside of the N.A.S.A. network to further explore the application of scientific gaming to the solution of some of America's urban problems.

The report takes the form of answers to these three questions:

1. What do we mean by "simulation" and "gaming?"
2. What can one learn from conducting a typical urban affairs game?
3. What kinds of improvements are usefully introduced into a typical urban affairs game?

This work was supported under NASA Grant NGL 39-004-020, "Technology and Management of Large-Scale Programs" during the Summer of 1969. The views expressed are solely those of the author, and not of the National Aeronautics and Space Administration.

It cannot be stressed too soon or too often that this is an interrim report of a research endeavor the end of which is nowhere in sight. While the primary investigator, Dr. Arthur B. Shostak, author of this report, has returned to his full-time teaching responsibilities he continues his research and field experiments into the subject, and looks forward to the time when he may again work full-time on the subject.

I. Gaming and Urbanology. Evident in a wide range of applications (role playing, economic modeling, scenario construction, contingency planning) is the effort men make to turn the symbolic into the iconic, thus giving form and substance to what is illusive and invisible. We seek bridges to help us move from the simple, the concrete, and the specific, to the complexities and abstractions with which we wish to grapple. We find, in our simulations and games, the tools most appropriate to these conversion-and-bridge needs of ours.

A simulation is a special kind of model, a dynamic kind that incorporates not only a model of system structure but also system processes. We build simulations for reasons that have to do with economy, visibility, reproducibility, and safety. Still other reasons for using simulations involve the quality of heightened involvement of the subjects, and the opportunity simulations offer to stage "future events" so that they may be analyzed and "played through.

Simulations today are "in" for several good reasons:

"Greater emphasis on rationalized decision-making procedures;

Dramatic advances in machine computational and analogizing capabilities;

Increased recognition that understanding social phenomena requires examing complex systems of interaction rather than isolated entities;

A growing tendency to approach problems from the perspective of several disciplines simultaneously; and the -

> Increased popularity of a philosophy of the social sciences that insists on multi-variate analysis, rigorous specification of assumptions and relationships, and theories that are temporally dynamic rather than static."[3]

Social scientists also value simulations for their ability to serve as an "early warning system," a cheap form of experiment to help alert us to the implications of theoretical and applied undertakings. Progressive teachers value simulations for their ability to "turn students on," even as men in general welcome simulation as an activity offering an intellectual challenge second to none, a gripping, exciting, and enthralling activity.

The "gaming" approach to simulation, the approach that occupied the Drexel research team, is one sometimes referred to as "messing around" in science, a legitimate approach thought by some sounder and potentially more productive than the more traditional approaches. In this approach there is considerable leeway with respect to analogical consistency and strictness. The rules for translating "real life" variables into simulation variables are less demanding, and researchers can "play around" a bit and "make do."

As might be anticipated by now, a game, per se, is a special kind of simulation. The more informal and tentative the model, and the more it relies on human participants as an intrinsic component in its operation, the more likely the model will be called a game. Games in turn can be used as "pre-simulations" -- as a means of elaborating and refining theory that can then be embodied in a more formal and explicit simulation devoid of human participants -- or, games may be used as a laboratory for studying the behavior of human subjects.

At Drexel this past Spring we were interested in using social science games for both purposes - to develop insight into urban affairs, and to shed light on the behavior of urban actors (in their primary urban, as well as in their "put-on" game-playing roles). We were committed to the free-wheeling gaming approach, in part out of our brash newness to the subject field, and

in part out of our conviction from research in related efforts that the approach actually worked! Overall, we looked forward to the eventual development - through a beginning in gaming -- of a "gaming simulation," or, the merger of a game with computer simulations in one vehicle.[4]

It was our tentative hunch at the time - and is our established understanding today - that such an exploration of gaming would add substantially to our efforts as urbanologists. That is, we saw gaming as a critical breakthrough in our focus on the urban milieu, its social structure, its main drift, and how we might get leverage on that drift for planned social change. Our Drexel research team especially sought new insights into the interaction of policy decisions, public programs, and social forces.

Our position in this regard has been put most competently by political scientists Ray and Duke:

> 1. The scope of urban problems is so vast that a major coordinated effort must be made to get people who can define them in such a way that they are soluble problems;
>
> 2. These problems can be well represented in gaming simulations;
>
> 3. The current technological revolution, which promises much for urban affairs, has left most decision-shapers far behind so that their skills must be extended (with gaming being one of a battery of techniques) to administer radically new approaches or to evaluate their effectiveness.[5]

Believing this we sought a test case, or a typical urban affairs game, to experiment with, and went on to secure the results discussed below.

II. Methodology and Lessons. Available to the Drexel research team from the outset was a very popular, inexpensive (one dollar), readily learned and played game called "The Cities Game" (Psychology Today Magazine, July 1968, by David Popoff). The Game defines itself as follows:

> "The Cities Game is a game of negotiations. There are four power roles - Business, Government, Slum Dwellers, and Agitators. The object of the game is to acquire as much money power as possible. ...Like it or not, the players are a coalition.

> They must cooperate if the city is to be rebuilt. The alternatives are riot or impredictable change. ...The interplay is terrific and exciting. In the early stages of the game, most of the negotiations are likely to be conducted openly. As the game progresses, secret deals become more prevalent. Under the table payments will be made. A player may double-cross his partner for a bribe. Promises to pay later will be broken. But throughout it all, the players bargain, argue, threaten, and eventually reach some agreement - just as in life."

The Game was played on six occasions, each playing occupying three hours, and involving six to sixteen players. Students and urban affairs professionals (such as staff members of the Philadelphia Council on City Planning) were drawn in as players, as were also members of both races and both sexes.

Six insights, or lessons, especially stand out:

Conservatism comes increasingly to characterize the strategy of all players as the conclusion of the Game (the 10th round) approaches. However "radical" the political philosophy and related negotiations of a team at the Game's outset the acquisition of "wealth" during the Game's progress, and the on-rush of the Game's explicit end encourages ever-safer and more modest ways of playing.

Inflexibility and Confusion ensue when a stereotyped team (such as "Agitators") regularly digresses from the conventional behavior expected of it. In one game, for example, "Agitators" gave all winnings immediately to "Slum Dwellers;" the teams representing "Business" and "Government" were dumbfounded and angered by this unswerving altruism. Rigidities in role expedations and responses run deeper than research team members had realized.

Ignorance of one another's urban reality is drama - tically underlined by the play of any random collection of urbanites. Few game players can demonstrate anything but stringent and hackneyed familiarity with the bargaining goals, rhetoric, and practices of different types of urban agents.

Cynicism is more rampant than many members of the research team had suspected. The goal of "Future City" has very limited drawing power as many game players find it hard to take seriously the prospects of a New Dawning for the city. Similarly, the savage distrust of other teams is quickly and firmly established, the game players finding little odd in the Game's description of urban reality in terms of a fierce jungle of atavistic animals.

This is, perhaps, to swell on the bleaker side of our learning gains, and two more positive lessons should be cited to correct somewhat this imbalance:

> Prejudice proved susceptible to sharp reduction in the "heat and noise" of the game itself. Race and sex differences seemed to scale back insignificance as game players related to one another both as players and as incumbents of new roles ("Business," etc.)
>
> Inventiveness about the immediate environment (the Game), if not inside of Game roles, characterized every round of play. Ideas for improvements in the Game, and often, for related improve- in real urban life, came from nearly every game participant - and impressed all involved with the wellsprings of creativity that gaming can readily tap.

The Drexel research team continues to sift through field notes and observers' reports in its effort to draw still additional insights from the six Summer playings. Additional playings of the revised Game described below will enable the team to further test and refine these preliminary findings.

III. Reforms in the Cities Game. The usefulness of a particular game for a given research purpose can be judged by four criteria:

1. The game provides a realistic environment in which to place the subjects for research.
2. The game is based on structural assumptions that conform to accepted theory or real-world data.
3. The game induces processes from participants that conform to accepted theory or real-world data.
4. The game can be used either to recapitulate historical events or to predict the future.

Similarly, the usefulness of a particular game for a given teaching purpose can be judged by two criteria:

1. The game enables students to more readily grap more or less abstract concepts.
2. The game helps students gain insights into complex relationships.

Drexel's research team found the Cities Game seriously deficient on all counts, and recommends accordingly, the consideration of the following reforms by would-be designers of urban affairs games.

Expansion of Roles. As the Cities Game limits itself to four roles (Business, Government, Slum Dwellers, and Agitators) it was soon apparent that this particular abstraction from reality was too self-limiting and restrictive. The Game suffered from the danger of what political scientist John Raser calls the "excluded variable." He warns that such errors arise, not because the scientific process is weak, but simply because the human and social pressures to take the easier path are great. With characteristic levity Dr. Raser observes that "if you have neglected important variables, the outcomes of your simulation are apt to be absurd."[7]

We undertook to expand the number of roles operating in the Cities Game. After considerable review of the literature on political decision-making processes the research team proposed that our revised formulation of the Game include the following new roles:

Mass Media
"Do-Gooders"
Whites of the "Silent Majority" Variety
Organized Labor
Organized Religion
Young Adults

It was further proposed that the existing role of "Business" be split into two roles - "Finance" and "Industry," and, that the existing role of "Agitator" be split into four roles - "White Sepratist," "Black Sepratist," "Left Extremist," and "Right Extremist."

As was anticipated the unfolding of four roles into 14 altered the character of play considerably. While we made only a brief, tentative effort to play with enlarged numbers the research team was almost immediately set back by the near-geometric increase entailed in significant inter-relationships among players. The "din and roar" of the "buzzin' confusion" that is

reality rushed like a tidal wave into the Game Room, and figuratively drown all present.

We recommend the further development of many-role games. Techniques are available to prevent game-operators and players alike from being overwhelmed by the intricacy of negotiations involving large numbers. We also recommend, however, that both would-be operators and novice players alike undertake an apprenticeship in gaming before venturing into the "deeper waters" of many-role games. Such an apprenticeship might profitably begin with the original four-role design of the Cities Game, and only later proceed, a step at a time, into more complex, if more accurate, re-creations of the many-role urban world we inhabit.

Contingency Provision. In short order it was clear to the research team that the Cities Game was too pat and predictable. It was seriously weakened by what political scientist Matthew Holden, Jr., calls the fallacy of static pluralism. He points out that a pluralistic politics does not have to be static, but may be extremely volatile: He warns model builders against an approach to urban politics, and therefore to the simulation of urban political decisions, that disengages urban political analysis from the ultimate and fundamental problem of politics: chaos, disruption, violence, and turmoil.[8]

We undertook to include the phenomena of chaos, disruption, violence, and turmoil within our revised formulation of the Game. To this end we prepared dramatic contingency cards the application of which to a round of negotiations was arbitrarily determined by a roll of a die. The die also determined whether or not the contingency card contents would be known to the negotiators before or after the period of negotiations. A typical card read - "Dr. King has been assasinated; the black urban ghetto is wracked by grief and chaos; the negotiating strength of the "Slum Dwellers" is now twice that of other game rounds."

To our surprise and dismay the new contingency cards did not have the desired results. The die often ruled out the use of a contingency card at the very start of a round; the cards often did not upset pat bargaining postures with anywhere enough impact.

We recommend the further development of life-like, contingency-introducing, game-jarring innovations. Other games employ alarmist "newspaper" editions, sudden "radio" announcements, and pre-cast actors: Details to one side it is vital that the contingency factor figure into the game often and with brow-arching (if not "blood-drawing") impact.

Diversification of Rewards. Unfortunately as originally designed, the Cities Game poses a single monetary reward structure in which success is measured by the accumulation of wealth throughout the Game play. This is to ignore what political scientist Norton Long calls the "ecology of games," wherein strategies and payoffs shift in and out of contact, and where the rewards and penalties of one player are often in a different coin than those of another.[9]

We undertook to expand the range of rewards - and penalties - possible in the Game, so as better to approximate reality. To this end we proposed that each of the 14 roles we were including in our revised formulation of the Game have separate, role-specific goals, eg., "Finance" might seek a profit on loans, while "Do-Gooders" could be rewarded by pledges of friendship from once-distant or even hostile fellow-teams. Finally, experience with the Game suggested the usefulness of a new post for a Game Referree, or someone who might set penalties for common derelictions of game rules and norms (such as bargaining after the permissible time period has past).

While the Summer passed before we were able to undertake the enormously complex task represented alone by the notion of separate reward-and penalty matrices for 14 different teams, we nevertheless believe this a promising

avenue to pursue. Details to one side the game of urban affairs must catch up with the multiplicity of gains and losses ever possible in the game-like reality of urban life.

Miscellaneous Reforms. Space limitations discourage all but brief mention of the following:

> Role versatility, if a goal of the game managers, can be promoted by having actors switch roles after X number of rounds.
>
> Longevity, if the experience thereof is a goal of the game managers, can be "promoted" by introducing the idea that each round represents the passage of a decade.
>
> Planning, if the experience thereof is a goal, can be "promoted" beyond its present one-round-at-a-time orientation. This can be accomplished by distributing not three cards as at present, but ten cards to each team, thereby making possible the long-term, calculated re-distribution of power. Teams can buy or earn desirable cards, looking ahead to their strategic use in far-off rounds of negotiations.

Another reform that occurred to the research team involves the use of technicolor slides and sound effects to dramatically underline the implications of a round-outcome (such as the ensuing urban "riot," or, "police action").

This, of course, remains illustrative, and is by no means exhaustive of the improvements one can undertake in the Cities Game. The point has never been exhaustiveness; rather, the goal here is to demonstrate the distance we have still to go - and can readily go - in our effort to improve gaming as a tool of urbanologists.

Summary. Gaming, in Raser's inspired terms, is a "research technique that accidentally turns out to capitalize on man's desires for situational involvement for its own sake, for the construction of esthetically satisfying systems, for the joy of unearthing compelling symbolisms; and on man's delight in the creation of elaborate analogies."[10] It is a particularly promising way of linking such diverse areas as:

social psychological theories of decision processes and attitude formation,

theories of optimal decision-making, and

models of large-scale social structures

all linked so as to enable the research on each to feed into the others.

Gaming is among the most powerful of that critical class of vehicles that balance off mechanistic macro with micro models of attitude and behavior change. Accordingly, we cannot afford anything but an all-out, large-scale joint effort by academics and urban activists to develop the rich potential of scientific gaming - unless, that is, we are willing to risk having the slum that Riis refers to become not only the measure, but the very undoing of our civilization.

Footnotes

1. Appreciation is owed to the following members of the Drexel Research Team of student volunteers assembled by me this past summer: undergraduate Lyle Wolf, and graduate students Bob Plater-Zyberk and Lou Malfara. Two N.A.S.A. project colleagues, Joe Orlando and Dr. James Pennington, were especially helpful, as were also three staff members of the Philadelphia Council on City Planning - Director Ed Folk, and staffers Roslyn Watson and Elaine Blair. None of these individuals participated in the writing of this report, and I am solely responsible for its various shortcomings.

2. As quoted by George Seldes, in The Great Quotations, New York: Pocket Books, 1968 ed., p. 172. See also E. K. Faltermayer, Redoing America: A Nationwide Report on How to Make Our Cities and Suburbs Livable, New York: Harper & Row, 1968.

3. John R. Raser, Simulation and Society: An Exploration of Scientific Gaming, Boston: Allyn and Bacon, 1969, p. IX. This is undoubtful the wisest, most thoroughgoing short (157 pp.) books on the subject; I lean heavily on it in this paper. See also Ira R. Buchler and Hugo G. Nutini, Game Theory in the Behavioral Sciences; Pittsburgh: University of Pittsburgh Press, 1969.

4. See in this case, the writings of the concept's authors, Paul H. Ray and Richard D. Duke, in "The Environment of Decision-Makers in Urban Gaming Simulations," in Simulation in the Study of Politics, edited by W. D. Coplin, Chicago: Markham, 1969, pp. 149-176. See also Harold Sackman, ed., Computers, System Science, and Evolving Society: The Challenge of Man-Machine Digital Systems, New York: John Wiley & Sons, 1969.

5. Paraphrased, with editorial revisions, from Ray and Duke, ibid., pp. 175-176. See also Harry H. Fite, Computer Challenge to Urban Planners and State Administrators, New York: Spartan, 1965.

6. Raser, op. cit., pp. 133-157. See also S. S. Boocock and E. O. Schild, eds., Simulation Games in Learning, Beverly Hills: Sage, 1968.

7. Raser, op. cit., p. 28. See also T. H. Naylor, et. al., Computer Simulation Techniques, New York: Wiley and Sons, 1966.

8. M. Holden, Jr., "Comments on Ray and Duke's Paper," in Coplin, op. cit., p. 177.

9. Norton Long, "The Local Community as an Ecology of Games," American Journal of Sociology, November 1958.

10. Raser, op. cit., p. VIII. See also Johan Huizinga, Homo Ludens, Boston: Beacon Press, 1950.

Appendix D

Public Attitudes Toward Programs of Large-Scale Technological Change: Some Reflections and Policy Prescriptions

by
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How ready is the public for the implementation of large-scale programs of technological change? Assuming that national priorities soon make possible the undertaking of such major projects as the "rebuilding of the cities" or the rapid conversion from systems of small neighborhood schools to systems of large educational parks, is the public likely to welcome or reject such bold new ventures?

During the Summer of 1969, while focusing largely on a project involving the development of computer-based "games" for urban studies, I researched some selected dimensions of the public/planned change issue. What follows below are some first-reflections on four vital aspects of the entire issue, or, the ways in which the public mis-perceives the change process, the ways in which recent history impacts on public attitudes, the ways in which the public divides among itself, and finally, the fundamentals of public attitudes toward change.

While my research project is both young and still very much underway it is nevertheless possible in this interim report to share some tentative early findings, and explore some of the more provacative implications thereof. By design this essay is brief, pointed, and occasionally, opinionated; should this design underline the considerable significance and potency of the study of change-readiness it will justify its lack of fuller discussion, its disinclination to cover everything, and its sometime controversial abandonment of a (sterile?) value-free objectivity.

Popular Mis-Conceptions. A major influence on public readiness for change efforts is available in various widespread mis-conceptions about planned change.

Many people, for example, believe a product or process will succeed on its own merits. All that is necessary is to produce a solid research report that contains clear action implications, and this will convince the client system of the wisdom of adopting the stated or implied action. But this is not true, and has never been true. Information alone is not sufficient for change; at best, it meets the cognitive-rational needs of the client system, but such needs are only one component of a vast matrix of needs that include emotional, psychic, and other complex matters. It is not fair, accordingly, to judge a change-project an early failure if the public cheers are not deafening when the project is announced; acceptance involves much more than knowledge of the merits of the proposed innovation.

A second mis-conception goes to the other end of the change process. It holds that the introduction of an innovation is a final act, and no further attention is required. Nothing could be farther from the truth. Veterans of T-Group training, for example, regularly slip away from the insights earned unless aided through systematic re-learning efforts. Expensive and sophisticated training aids and devices are today, gathering dust in storerooms everywhere. Over and again the change process makes plain the need for ceaseless scrutiny and unhampered reinforcement. Public notions of self-enactment are mis-guided in the extreme.[1]

Until these, and numerous other public mis-conceptions of the change process are identified and addressed by a corrective, effective campaign of public re-education it in clear that public attitudes toward large-scale change processes will contain an extraordinary amount of dysfunctional and ever-hazardous fantasy.

Historical Impact. Perhaps nothing so much shapes the attitudes of those over 40 toward planned change as does the Depression of the 1930's. Change-agents cannot over-estimate the significance of this traumatizing event; they ignore it in their efforts to win public endorsement of new change programs at enormous hazard.

Writer David Cort maintains that "probably nobody can understand America, or hence himself, if he does not understand the Great Depression."[2] Another close student of the subject, writer Caroline Bird, suggests that the Depression "packed a bigger wallop than anything else that happened to America between the Civil War and the Atomic bomb:

> "...it had more far-reaching consequences... than either of the World Wars. Nobody escaped...The twelve years in between (1929 and 1941) were filled with lower-case tragedies: mean stratagems, inspeakable petty economies, lost time, lost hope, lost opportunities, monotony, envy, and bitterness..." [3]

With dreams shattered, skills gone rusty, and children undereducated and therefore unlikely to achieve much more than their fathers, Americans suffered much.

Many have taken away from the Depression decade a deep-set cynicism concerning the built-in, structural deficiencies of society. Many still distrust policy-makers, and live arrested back at a time when "there were no neutrals...(it was) a landscape blighted more than anything else by the absence of pity and mercy."[4] Many remain nostalgic for a mythical past rich in what the English economist C. F. Schumacher has called "an economics of permanence," or livelihood rooted in long-term symbiotic relations. Such men suspect and resent efforts at large-scale planned change; while the passage of time lessens their number, their rise to positions of power presently swells their impact and influence. For some years to come, we will continue to live in the shadow of the

Great Depression, which, while hardly "great," has long since depressed the American spirit.

Typological Approach. The point cannot be made too strongly that refinement of the concept of "American public" adds much to any discussion of public readiness for change projects. To generalize for 200 million Americans is to attempt a quality of social analysis and insight hardly supportable by today's primitive social science tools. Much more plausible is the slow and test-based development of 4, 6, 9, or 15 - fold typologies of relevant kinds of Americans.

Consider, for example, a cross-classification scheme which links the variables - "Previous Personal Experience with Large-Scale Change Projects." Dealing just with the polar extremes a useful 4-fold scheme is available:

PPE	EPI	PPE	EPI
+	+	+	-
1		2	
-	+	-	-
3		4	

The diagram above helps us deliniate Americans who have positive past associations with planned-change efforts from those who do not, and, Americans who have positive expectations of future change efforts from those who do not; what is even more, as basic as the 4-fold scheme is, it nevertheless combines types in a potent new way.

Cell 1, Americans are the real constituency for massive change undertakings. Who are they? How is their number, and influence, changing over time? How can they be helped to convert more Americans to their persuasion? Cell 4, Americans are the real opposition. Who are they? How is their number, and their influence, changing over time? How might they be helped to move into cell 3, at the very least, or perhaps even Cell 1?

Each of the Cell-types has a different elasticity for "reaction" each for example, makes something else of the same presidential speculation about a possible role for NASA in urban social issues. Each has different anxieties that must be quieted, needs that must be variously met, and questions that must be answered. Understanding the internal divisions that sort-out 200 million Americans appears then an indispensable first-step in a truely valid and useful analysis of public change notions.

Psycho-Analytic Formulations. An undervalued influence, undervalued for being too seldom articulated, is conspicuous in fundamental models of man endorsed by change-agents. This is to say that public attitudes toward change appear significantly shaped by the attitude change-agents have in turn toward the public.

Significant here, accordingly, is the model of the public that reflects the dominant school of thought today in American social sciences: As society is thought to move only toward equilibrium, it is assumed that man, too, moves only or especially toward equilibrium. Change-agents who consciously or otherwise subscribe to this conception of man have transformed man into an anemic, "milk toastish" creature. The normal man in such a theory is not a stress-seeker, but is rather anemic, except when he is anomic. Change-agents who believe this minimize the public's readiness for managed change endeavors, and read every sign in a grim, bleak, change-discouraging way.

Overlooked in the matter is the growing body of evidence and interpretation that sharply challenges the "go slow" model of man. This material argues that man is made of sterner stuff, and actually desires stress-seeking options. Man is envisioned as hungry for premiums in his otherwise humdrum life, and as needful of opportunities for personal self-expression. Change-agents who subscribe to this view of man read the signs of public readiness for change quite differently from those who

endorse the over-socialized conception of man.[5]

Erich Neumann, for example, reminds us in his Origins and History of Consciousness that in almost all the mythologies of the ancient hero, such as Oedipus, there comes a time when the youthful hero's fate hangs on his violating the two central taboos of every culture: the murder of the father and incest with the mother. If he fails, he is doomed to madness or sterility.

The point of these strange myths is to be found by interpreting the hero as the ego, or consciousness. To gain maturity the hero must embrace change, must "grow up," must "kill the father." Since the father represents the cultural cannon, morals, justice, reason, and consciousness, the hero must develop the courage to stand against these if they violate life as he has come to understand it. Union with the mother represents his entering into his unconscious and getting in touch with his anima, his feminine shadow. Such union links the hero with the new out of which a vital wholeness and more complete individuation and civilization may emerge. Only by this killing of the father (breaking with the old canons) and merging into the mother (re-exploring his creative unconscious) can a man reach true fulfillment.

Does man, in fact, need change? It would appear indispensable - if man is to become a hero, the hope of mankind.

Can man thwart his own destiny? Of course. A popular distortion is what Neumann calls the "Issac Complex" - the temptation to play it safe, avoid confrontation of the father and just repeat the past. A second, and increasingly popular distortion, is to remain the "Eternal Son" - the permanent revolutionary, carried away with the killing of the father.

Analysis here gets ever-more complex and provacative, the "death-of-God" movement being seen, for example, as the mythical killing of the trans-personal father, the cosmic symbol of all morality and justice -

the declaration of the mass hero that something totally new is coming in mankind. Similarly, the next cultural steps in terms of the mythical union with the mother seem plain: They include the concerns of many youth with the drug scene, the taking of trips into the unconscious, the exploration of outer reaches of the mind and the depths of the self, and efforts to merge into the totality of nature through Eastern religious and mysticism.[7]

Is the public ready for large-scale programs of planned change? This line of analysis suggests the public is always in flux, seeks change in order to grow, and can be perceived as initially receptive to the efforts of planners. Zoologist Desmond Morris interprets the imperative to change in this way:

> "While organizers struggle to encase human behavior in a more and more rigid framework, other trends work in the opposite direction. ...the steadily improving education of the young and the growing affluence of their elders both lead to a demand for more and more stimulation, adventure, excitement and experimentation ...If they feel themselves trapped in a planner's prison they will stage a prison riot. If the environment does not permit creative innovations, they will smash it in order to be able to start again..." [8]

Men must change to grow, must grow to live, must live to change. The playful inventiveness of men, their tenacity and ingenuity, and, above all, their forced-choice between self-renewal or self-sterility, encourages optimism where the public and its likely reaction to planned change is concerned.

Summary. As I reflect on the material above it seems to me that the prospects for public acceptance of large-scale programs of planned change have seldom been brighter - provided, that is, that change-agents do not blunder their way into chaos.

Securing change is not the problem. Niehoff, among others, has long since provided clear guides in this matter, eg., the transfer of an innovation is most likely to be successful if -

- Innovations are selected which tend to be compatible with the cultural patterns of the recepient group.

- Innovations are selected which will meet existing or felt needs of the recipients, preferably those which they have tried to solve through their own efforts.

- Innovations are selected which will provide practical benefits in this world as perceived by the recipients, usually by improving their economic position.

- The strategy of introduction will involve adapting to and working through the local cultural patterns, particularly the pattern of local leadership.

- Channels of communication are established by the change agent which provide an efficient two-way flow of information. Especially vital will be feedback channels from the recipients to the change agent.

- The recipients are involved in the introduction process through full participation. Of most significance will be their contribution of planning, material goods, time, or labor.

- The change agent is flexible in his strategies, altering them to meet unforeseen circumstances.

- The change agent establishes patterns of maintenance among the recipients so that the innovations can be continued when his influence is withdrawn.[9]

Similarly, technology is not the problem. Rather, the problem is one of helping change-agents accomplish two enormous tasks: First, the sorting out of their own values. Second, the securing and maintaining of a deep respect, or better yet, love for the men and women involved as clients in the change process.

Critical in the years ahead will be the clarity and yet, flexibility, that characterizes the change-agents' maintainence of the values which animate his actions. Does he really know why he champions the changes he does? Has he really thought through and "felt-through" the many implications of the changes he champions? Is he himself able to change as new data and the flow-of-events makes such change advisable?

Critical also is the fundamental issue of agent-client relationships. If the change-agent has a "them/us" or "we/they" attitude he is likely to slip into an arrogant, even faschistic, elitist frame-of-mind. Only as he has a deep identification with, even a passion for the participants

in the change-process can he be trusted - by them, and by other change-agents. The times demand, for example, that the truly-worthy "teacher" abandon a perspective which sees teachers here and students there in favor of a perspective which draws all together under the rubric ' "learning partners." Similarly, the times demand, or, at the very least, urge on us a new perspective which has change-agents respect the psycho-dynamic need men have to change, respect the blighting effect that some facets of recent American history have had, respect the many mis-conceptions about change that confuse the scene, and respect the significant differences among Americans that divide them where change is concerned.

Indispensable, all this respect, but still inadequate: The times go further to demand a co-identification with the "learning-partners" in a change-process. What the poverty war designers called "maximum feasible participation," what the ghetto spokesmen call "a piece of the action," and what the young define as "a say" is what really matters: Nothing is so critical in the 1970's to securing public approval for large-scale planned change projects as is securing the approval by change-agents of the public. It is in dialogue and joint planning, in genuine consultation from the very inception on through the much-later follow-up exercises that the hopes for planned change lay. Only as change-agents change to welcome the public into the change process will be possibly secure the the quantity and quality of planned change we so urgently need.

Footnotes

1) Excellant in this connection, and of value to my entire essay, is William A. McClelland, "The Process of Effecting Change," unpublished paper presented as the Presidential Address to the Division of Military Psychology, Division 19, of the American Psychological Association, at the Meeting in San Francisco, September 1968.

2) David Cort, "The Money that Money Can't Buy," The New York Times Book Review, March 24, 1968, p. 38.

3) Caroline Bird, The Invisible Scar (New York: McKay, 1966), pp. XII, XIV, XVII.

4) Murray Kempton, Part of Our Time: Some Monuments and Ruins of the Thirties (New York: Delta, 1967), pp. 1, 11.

5) Especially useful here is Samuel Z. Klausner, ed., Why Man Takes Chances: Studies in Stress-seeking (New York: Doubleday, 1968).

6) Erich Neumann, The Origins and History of Consciousness (New York: Harper & Brothers, 1962).

7) See in this connection, Edward V. Stein, "Guilt and the Now Man," Humanities, Fall, 1969, pp. 205-218.

8) Desmond Morris, The Human Zoo (New York: McGraw-Hill, 1968).