INTERVENTION INTO A TURBULENT
URBAN SITUATION: A CASE STUDY

A Thesis

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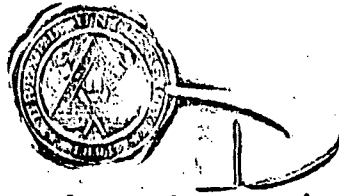G. Mason Cadwell, Jr.

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This thesis entitled   Intervention Into A Turbulent Urban

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ABSTRACT

INTERVENTION INTO A TURBULENT
URBAN SITUATION: A CASE STUDY

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The National Aeronautics and Space Administration sponsored a research effort directed toward an improved understanding of large-scale systems technology and management. Major objectives were: (1) the demonstration of the applicability of the NASA organization and management experience to the solution of large-scale public problems; (2) the expansion of the University's research competence; and (3) the generalization of the knowledge gained in this demonstration project to other similar large-scale problems.

This paper reports the application of NASA Management Philosophy and techniques within New Castle County, Delaware, to meet actual problems of community violence, and resulted in restructuring the county approach to problems of this nature, and developing a comprehensive system of planning based on the NASA Planning Process, which involved federal state, and local resources with community representatives in solving the problems before them.

The concept of a "turbulent environment" is presented with parallels drawn between NASA Management experience and problems of management within an urban arena.

The action-research methodology used in the study is considered to be most appropriate for turbulent environments.

INTRODUCTION

NASA/DREXEL PROGRAM

The National Aeronautics and Space Administration, in conjunction with Drexel University, has engaged in a research effort directed toward an improved understanding of large-scale systems technology and management. This research program has had as its major objectives: (1) the demonstration of the applicability of the NASA organization and management experience to the solution of large-scale public administration problems; (2) the expansion of the University's research competence in this area, as well as strengthening the faculty and curriculum of the University; and (3) the generalization of the knowledge gained in this demonstration project to other similar large-scale problems of concern to the nation.[1]

Supported as NASA Grant NGL 39-004-020, this effort has resulted in a multidisciplinary approach within the University, and the development of a NASA/Drexel Consulting Team which consulted for eighteen months in New Castle County, Delaware, to test research results in an actual large-scale social system.

This document is a report of one clinical research project within the NASA/Drexel Program.

RESEARCH PROJECT OUTLINE

The premise of this NASA/Drexel Program is that management of NASA and of an urban complex are analogous large-scale efforts, and

that management technology developed for the former can be utilized
or adapted for the latter.

This paper reports the application of NASA Management philosophy
and technology to solve urgent urban problems. The paper first
presents a background discussion of the Research Design and Method-
ology (Section I); then a literature search and an overview of
NASA Management technology and philosophy (Section II); and, finally
documents the application of selected concepts and techniques within
an urban setting to meet actual problems (Sections III and IV).

The specific projects assigned this research associate included
delivery of social services in an area local officials considered
their "Watts" (with an equivalent possibility of disruption and
rioting), the stemming of a black-white shooting incident, and the
transformation of adverse relationships between county government
and citizens into positive problem-solving relationships.

RESEARCH PROJECT RESULTS

Conclusions drawn from this study are considered from several
points of view:

° Action Research Process

° Philosophy of Management in a Turbulent Environment

° NASA Management Technology

° Achievements in New Castle County

ACTION RESEARCH PROCESS

A clinical methodology, "Action Research," was adopted to guide
the operational implementation of selected technology to solve

specific problems in the DeLaWarr and Belvedere areas of New Castle
County. Within the conduct of the program it was found that the
management philosophy which guided NASA in development of specific
management tools to meet NASA's problems had relevance to this
researcher's efforts. Thus, the scope of the program was expanded
to evaluate the utility of NASA's philosophy and approach to manage-
ment as well as the application of specific management tools to
meet specific assigned problems.

The Action Research Methodology provided that action-
interventions be planned and taken in response to needs of the
client system; and that these needs would be identified during the
clinical phase of the NASA/Drexel Program. Thus, issues of problem
selection, identification of aspects of the environment which were
of concern, pin-pointing the relevant phenomena, etc., were not
determined in advance. They were determined in conjunction with the
client in response to his particular problems. These issues are the
specific issues of decision making within a Turbulent Environment.

PHILOSOPHY OF MANAGEMENT IN A TURBULENT ENVIRONMENT

A "turbulent environment" is one in which the dynamics arise
from (1) interaction among organizations within the environment,
and (2) discontinuities with past experience; that is, additional
factors and the multiple character of causal interconnections
require that effort be invested in the determination of relevant
factors and their impact on problems at hand prior to the application
of some tool or technique which may have been effective in the past.

NASA Management Philosophy, as articulated in writings and
interviews with senior management personnel, was more relevant to the
specific action research performed by this researcher than were the
tools used by NASA in its own functioning. This was due to the
turbulent environment in which the NASA Administrator and senior
managers functioned, and the buffering function performed at these
levels to reduce environmental complexity for NASA component sub-
systems (and thus the management systems used <u>within</u> NASA). The
action research reported herein was also in a turbulent environment;
thus, the philosophy level was more useful than the tool level for
the planning of action interventions.

NASA MANAGEMENT TECHNOLOGY

The NASA Planning Process provided a model for participative
planning of the DeLaWarr Social Services Center. Due to the
turbulent environment, the relevant aspects of the problem had to
be defined before beginning to approach solutions. The planning
panel established in DeLaWarr brought together those closest to the
problem--representatives of the needs (the community) and resources
(government and private social service agencies)--in a long-term
cooperative problem-solving effort. The planning panel also
provided a base for attack on other problems, such as black identity
and competence, group to group relationships (both black-white and
citizen-bureaucrat), and provided a non-violent means for having
the governmental system respond to community needs.

Additionally, in response to a shooting crisis, a one-day work-
shop in Belvedere successfully telescoped the long-term DeLaWarr

process.

ACHIEVEMENTS IN NEW CASTLE COUNTY

Specific accomplishments from the point of view of the New Castle County client included:

1. Channeling of community violence into less destructive forms of behavior

2. Developing the plan, obtaining necessary approvals and funding, and commencing construction of a Health & Social Service Facility in DeLaWarr

3. Institutionalizing problem-solving activities between government and citizens through mechanisms of citizens advisory boards

4. Establishment of an interdepartmental planning group in the county government to deal with problems which require internal coordination of departments and liaison with outside organizations.

FOOTNOTES

1. Memorandum of Understanding, Drexel University and the National
    Aeronautics and Space Administration, dated August 11, 1969,
    hereto appended as Appendix A.

SECTION I

DESIGN OF THE RESEARCH

CHAPTER I

NASA/DREXEL PROGRAM
RESEARCH DESIGN AND METHODOLOGY

BACKGROUND

The basic parameters for the NASA/Drexel Program in Technology

and Management of Large Scale Programs included "action-oriented"

studies[1] with provision for the University to ". . . assist in the

transfer of technology and management methods from one large-scale

program to another . . ."[2] This emphasis on applied research was

especially appropriate for three reasons: first, NASA had

previously identified the need for experimental and demonstration

programs for the application of the results of space research and

development to urban problems.[3] Secondly, Drexel University had a

rich tradition through cooperative education and consulting programs

emphasizing the applications of research. Thirdly, NASA had

previously identified student Cooperative Programs as being effective

links between theory and practice.[4]

Thus an action-oriented research design was selected with the

goal of having the research associate function as a participant

observer in some (to be selected) urban system. Known as "Action

Research," the methodology was proposed to NASA,[5] and received

enthusiastically.[6]

ACTION RESEARCH

"Action Research" was coined by the applied psychologist, Kurt
Lewin, and defined as:

> . . . a field which developed to satisfy the needs of the
> socio-political individual who recognizes that, in science,
> he can find the most reliable guide to effective action,
> and the needs of the scientist who wants his labors to be
> of maximum social utility as well as of theoretical
> significance.[7]

Figure 1 summarizes the Action Research Methodology as applied
within the current NASA/Drexel Program. Note that the Action
Research Methodology stressed that research would be performed to
meet the needs of a specific urban client system. Additionally,
per Lewin's definition above, the researcher would aim his labors
as well to be of theoretical significance.

Action Research differs from other applied social research in
the extensive involvement of the researcher within the action
process. Some social scientists, reviewing the historical applica-
tion of action research, have called this ". . . applied research
with a client with a problem to be solved" and have called for
increased attention to the ethics of the situation, the social
scientist's (vis a vis the client's) interest in the research, and
the possibility of location of initiative too exclusively with the
client.[9]

Thus, the Action Research Methodology is unlike traditional
research methodologies in several ways. That Action Research is
performed in direct response to a perceived client problem is the
first. A second is the concept of Participant-Observer. The

FIGURE 1

ACTION RESEARCH METHODOLOGY*

The Action Research methodology will proceed in the following manner:

1. Initial Entry

Efforts will be made to gain initial entry to a particular urban system by June or September 1970. Sanction, and negotiation of terms of the relationships, should be agreed upon before final entry.

2. Orientation and Exploration

Once initial entry is agreed upon, a period of 2 to 3 months should be utilized to study that particular client system in order to more fully understand how it functions and disfunctions. Furthermore, this initial explanation and orientation period should serve as a period of gaining wider acceptance and identification with that system. Finally, problem identification and definition would be accomplished in this exploration period.

3. Action Planning and Intervention

Once problems are identified and agreement is negotiated with the client system, then each problem area will be studied as to strategies, designs or methods to effect change or influence to a preferred state. Alternative methods will be considered for each problem. Every effort will be made to consider the behavioral and organizational consequence of every intervention so as not to upset the homeostasis of that system.

4. Action Evaluation

Concurrent with the action research, evaluation of the particular projects will be made by the Associate Investigators, and the organizational preceptors. When appropriate, some of the preceptors may serve as adjunct professors. All of these will serve as process observers of the action research and provide consultative assistance.

5. Termination and Description

Finally, upon successful accomplishment of the action research, a descriptive dissertation will be presented with hypothesis, action steps, and consequences or results, with generalizations drawn from the research. Successful action research should produce three basic outcomes: (1) the achievement of the planned change, (2) new knowledge, and (3) a manager of increasing professional competence.

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*Summarized from an early NASA/Drexel Program Working Paper.[8] See Appendix B for a detailed discussion.

specification of the researcher's participation is in contrast to
the usual thrust to identify and minimize the so-called "experi-
mentor effect."[10,11]

A third major difference is in use of the Case Study. Classic
studies attempt to demonstrate statistically that study results
are, within specified probabilistic limits, not due to chance. A
single case study represents zero statistical degrees of freedom,
and allows valid statistical criticism. There are two responses:
The first response is to follow the lead of the Tavistock Clinic
and generalize not upon a single case, but on a series of cases.
Called an "Ad Hoc Programme," Tavistock has been able to extract
generalized data using action research techniques.[12]

The second response is to utilize the case study "as a
vehicle to enrich the development of new theory."[13]

The application of NASA Technology to urban problems falls
within the development of new theory. The subtleties involved in
researching new theory in the public arena were highlighted dur-
ing a discussion of the current NASA/Drexel program at the 1969
Conference on Public Administration:

> . . . it is interesting to consider why these large-
> scale problems are both interesting and difficult. I
> suspect that one of the reasons why academicians prefer
> a certain amount of detachment is that they can con-
> ceptualize and thereby handle an idealized problem much
> better than a real one. It can be kept simple, the num-
> ber of variables reduced, and frequently some of the
> human factors eliminated altogether. In real large-
> scale problems, however, the sheer qualitative features
> are different from those of small ones.
>
> . . . The human factors enter in a different way. The
> behavior of very large groups and the constituent sub-
> groups are interlocked in ways which are numerous, com-
> plex, and subtle. The magnification factor of any

subtlety may make it very important in determining the success of a given project.[14]

This paper is designed as a vehicle to enrich the complex subtleties of new theory, and, hopefully, will provide a necessary link in an effort continued beyond the present limitations of time and budget.

IMPLICATIONS OF ACTION RESEARCH

The decision to use an action research methodology meant that an action program could not be specified in advance. In contrast to the situation most often found--that of searching out a situation (either laboratory or real world) in which one could test a scientific hypothesis--it meant that the research associate had to be prepared to respond to a problem of the client, and, furthermore, to approach the client's problem in a way which produced results of scientific significance.

Inventory of NASA Management Technology and Philosophy

The goal of the program was to test selected applications of NASA Management Technology within an urban context. Action research precluded the a priori decision to apply certain techniques. NASA Management Technology and the philosophy underlying the technology were investigated by this research associate to provide a sound basis for possible transfer. Chapter II summarizes the relevant literature and identifies the management technology which prior research efforts have articulated as appropriate for transfer from NASA to other endeavors. The NASA Planning Process, an additional technology identified in the

content of the present study, is described in Chapter III. Chapter

IV discusses NASA management philosophy. The philosophy of manage-

ment NASA developed to support operations in a complex and turbulent

world proved to have specific application in the urban setting, as

documented in Section III, Action Research, which describes actual

events in the applied testing of NASA concepts.

FOOTNOTES

1.   NASA Grant First Semiannual Progress Report. Drexel University, Philadelphia, PA., June 30, 1969.

2.   William W. Hagerty, Manuscript prepared for Panel Session G-2, "Large Scale Technology Management," at the National Conference on Public Administration, Miami, Fla., May 20, 1969, Page 2.

3.   Proceedings from the Conference on Space, Science, and Urban Life, Donsmuir House, Oakland, Cal., March 28-30, 1963; NASA Document #SP-37, p. 241.

4.   Ibid., p. 166.

5.   Second Semi-Annual Progress Report, Drexel University, December 31, 1969, p. 3.

6.   Personal communication between NASA Program Officer, Mr. Richard Stephens and NASA Research Professor, Dr. Edward Golden, Drexel University.

7.   Chein, A., I. Cooke, J. Harding, "The Field of Action Research." American Psychological Bulletin, 3:43-50, 1948.

8.   "Working Paper on Action Research." Third Semi-Annual Progress Report, June 30, 1970.

9.   Rappaport, R. N. "Three Dilemmas in Action Research." Human Relations, V. 23 #6, p. 499.

10. Rosenthall, R. Experimenter Effect in Behaviorial Research. New York: Meredith Publishing Co., 1966.

11. Second Semi-Annual Progress Report, op. cit., p. 4.

12. Rappaport, Op. cit.

13. Walton, Richard, "Advantages and Attributes of the Case Study." Journal of Applied Behaviorial Science, August 1972, p. 73.

14. Hagerty, Op. cit., p. 5.

15. Second Semi-Annual Report, op. cit., p. 6.

16. Second Semi-Annual Report, op. cit., p. 8.

17. NASA Semi-Annual Reports #2 & 3, op. cit.

18. Second Semi-Annual Report, op. cit., p. 9.

SECTION II

NASA MANAGEMENT RESEARCH

CHAPTER II

NASA MANAGEMENT TECHNOLOGY

PURPOSE

This chapter summarizes the relevant literature and identifies management technology which prior research efforts have specified as applicable to other endeavors.

SUMMARY OF THE RELEVANT LITERATURE

The political impact of the orbital flight of Sputnik in 1957 was to "shake the U.S. nation to its very core and develop the urgency . . . to marshall and organize quickly the vast intellectual, technological, physical and managerial resources required of man to venture into unexplored space.[1]

The response is now well-known. Disparate resources were mobilized and organized; material and social technologies were invented and expanded; and managed effectually to achieve the well-documented achievements of the Mercury, Gemini, and Apollo programs.

Acting on the conviction that the practice and innovations of NASA ". . . could be transferred by immitation, extrapolation or analogy to urgent problems facing other sections of the society"[2] NASA defined and sponsored research into specific candidates for management technology transfer.

This effort was directed toward identification and
dissemination of advances in knowledge and practice from the space
program to other private and public endeavors. Commencing in 1961,
NASA sponsored a series of major studies of". . . aerospace-
contributed innovations in management technology which may be use-
ful to other sections of economic (and governmental) activity."[3]

This section is drawn from the published literature, and is
included here (a) as a review of management technology which has
been previously identified for transfer; (b) to define and reference
for the interested reader a comprehensive set of technologies, all
of which did not find application in the action-research phase of
the current study; and (c) to provide examples of applications of
the management philosophy discussed below.

PUBLISHED RESEARCH

Published research categorizes NASA contributions in the
theory and practice of management by their experience in evolving
and innovating advanced methods of (1) conceiving, (2) planning,
(3) administering, and (4) evaluating large-scale enterprises.[4]
Each of these categories is described, defined, and summarized
below. Special attention is given to current and past applica-
tions which will aid in the identification of techniques applicable
to client problems to be defined in the action research phase of
the study.

CONCEPTUAL CONTRIBUTIONS

The conceptual contributions reported in NASA management technology transfer literature include methods of anticipating the future and methods of conceiving the large-scale endeavor.

1. The Future

There are two basic underlying conditions governing anticipation of the future: either the future will be continuous with the past (that is, the causal variable system can be projected or extended in some way); or the future will be discontinuous with the past (that is, the relevant causal variables will themselves shift). NASA extended knowledge in both areas.

A. A Continuous Future

In the first area--the extension of the past--NASA developed a highly sophisticated technique for including probabilistic estimates of equipment reliability and maintainability. By considering these factors in the early stages of program development, it is possible to estimate and manage time, cost and resource constraints before the critical date development and production stages.

Reliability Analysis is based on extension of known data and included in Table 1 together with references to specific current transfer applications. While current applications are in areas of hardware development, and appear on the surface to have limited utility for the practitioner of planned urban change, the concept of use of probabilistic estimates should not be lost. Often, when a complex system is composed of many individual probabilistic

Table 1

CONCEPTUAL CONTRIBUTIONS

Contribution	Definition	Initial Source	Current Application	References
TECHNOLOGICAL FORECASTING	Anticipation of Technological invention and change; i.e., prediction of new inventions, new techniques and directions in which current technologies are developing	Military Weapons Systems Contractors	Private Industry	5, 6, 7, 8
			International Consortia	9
			Government Policy	10, 11
			Military Weapons	12
ENVIRONMENTAL FORECASTING	Extension of Technological Forecasting into projections of market and economic trends	RAND	Aerospace Contractors	13
			Private Industry	14
	NOTE: Current literature does not include obvious applications in area of political environments, societal values, etc.			

Table 1 (Cont'd.)

Contribution	Definition	Initial Source	Current Application	References
DELPHI TECHNIQUE	Technique for prediction under unknown conditions and constraints. Uses "informal intuitive judgment" of panel of relevant experts with recycle and feedback to resolve differences of opinions	RAND for U.S. Air Force	Aerospace Contractors	15
			Social Areas Testing Concepts Limited Practice	16
			State and Local Governments	17, 18
			Urban Applications	19
			Medical Systems	20
SYSTEMS ANALYSIS	Concept of interrelationships and interfaces of systems and sub-systems	Initial source unknown—NASA-related activities developed sophistication of approach	Extensive applications of Systems techniques are reported generally in Management and Operation Research Literature	21, 22
MISSION ANALYSIS	See discussion elsewhere in this report.		For a brief overview of NASA-related specific applications	
RELIABILITY ANALYSIS	Consideration of type and incident of break-down together with cost estimates of repair, downtime, lost services, etc.	Industry	Weapons Systems	23
			Industrial Systems	

factors, the pyramid or assembly effect of the individual factors taken together provides an overall result which in counter-intuitive.

B. Discontinuous Future

NASA's critical need, however, was the capability to predict the future when the relevant variables shifted and accurate probabilistic estimates were not available. Only through future projections could informed management decisions be made concerning the allocation of limited resources (time, talent, budget, etc.) toward the most effective approaches to NASA's goals.* There were three contributions to forecast of a discontinuous future: Technological Forecasting, Environmental Forecasting, and the Delphi Technique. Each is summarized with references in Table 1.

2. The Large-Scale Endeavor

The "systems approach" enabled a comprehensive analysis of a large-scale endeavor which included concepts of interrelationships and interfaces of systems, subsystems, and metasystems (that is, the realization that there are levels of systems, and that every system can be treated as a subsystem in some other higher level system). Table 1 includes references to current transfer litera-ture. Most discussions of "systems analysis" center upon tech-niques developed in practice. The discussion in Chapter IV below

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*One characteristic of NASA is that NASA functioned with clearly specified goals. This may not be true of management within an urban complex. See Chapter IV (NASA Management Philosophy) and subsequent discussion below.

of the "systems philosophy" is in response to the technique bias of

current literature in anticipation that the concept is relevant for

management within an urban large-scale system.

PLANNING CONTRIBUTIONS

> To design is to plan; that is, design is the process of
> making decisions before the situation arises in which
> the decision has to be carried out. It is a process of
> deliberate anticipation directed toward bringing an
> expected situation under control.[24]

NASA planning contributions centered upon extension of the

conceptual contributions into Ackoff's concept of "deliberate anti-

cipation." There are two main thrusts in current literature:

1. The use of a planning tool to anticipate the <u>overall impact</u>

of the totality of the relevant factors on the organization.

"Systems Design" and "Planned Program and Budgeting System" are

specific examples of tools designed to coordinate the system as a

whole.

2. The use of a planning tool to manipulate a large number of

variables in an effort to establish the impact of varying a single

variable or specified variable set. "Computer Aided Design,"

"Simulation," and "Heuristics" are examples.

Table 2 contains a summary of current literature with reference

to specific applications.

ADDITIONAL CONTRIBUTION--THE NASA PLANNING MODEL

An addition to the planning contributions, identified during

the course of the current study, was NASA's Process for Planning.

NASA developed a "participative planning model" to involve line

Table 2

PLANNING CONTRIBUTIONS

Contribution	Definition	Initial Source	Current Applications	References
SYSTEMS DESIGN	Application of Systems Analysis to Design. See "Systems Analysis."			25
COMPUTER-AIDED DESIGN AND SIMULATION	Man-Computer design interaction with real-time computer processing and feedback of results of design decision according to preformatted instructions		Engineering Applications	26
			Simulation and Gaming	27
			Social and Urban Simulation	28
PLANNING, PROGRAMMING, AND BUDGETING SYSTEM (PPBS)	Allocation of Resources Technique for evaluating multiple program outputs against multiple goals	Dept. of Defense	Federal Services	29
			State and Local Governments	
HEURISTICS	Use of instinctive judgments or "rules of thumb"		Decision Theory in Complex Enterprises	30
			Production Control	31
			Portfolio Selection	32

management in planning when the initial "expert staff" prepared
plans proved inadequate. The NASA Planning Model is covered in
detail in the next chapter.

ADMINISTRATIVE METHODS

The Administrative Methods NASA designed or developed to deal
with the complex requirements of the space program includes the
greatest number and variety of aerospace contributions to manage-
ment. These techniques are defined and described in Table 3, and
include technological administrative devices (such as CPM, PERT,
etc.); new organizational concepts (Matrix Organization, Functional
Management, Modular Planning and Production, etc.); and legal
innovations (Quasi-Public Government Corporations). Certain NASA
techniques, such as Configuration Management, overlap single cate-
gories.

EVALUATION METHODS

Established in 1963 by presidential directive, the Inter-
departmental Committee on Economic Impact of Defense and Disarma-
ment established with the federal government a concern with the
interrelationships and impact of federal programs upon the country.
NASA designed an approach, Environmental Impact Analysis, to
assess the impact of the space program on society.

Subsequently the approach was extended by the Department of
Health, Education and Welfare to other areas of interest.[33]

Table 4 summarizes the extant transfer literature with reference
to current applications.

Table 3

ADMINISTRATIVE METHODS

Contribution	Definition	Initial Source	Current Applications	References
MODULAR PLANNING AND PRODUCTION	Shift from traditional fixed position production layout to "assembly stations" to maximize integration of production and design		Weapons	34
			Shipbuilding	35
			Private Industry	36
CRITICAL PATH METHOD	Use of Network Decision Techniques for Analysis and Control	Polaris Missile System	PERT PERT/TIME PERT/COST SECP, etc.	37, 38, 39 40
CONFIGURATION MANAGEMENT	"Configuration Management" was NASA's "strong integration function": a management technique for controlling the inter-dependencies of design and design changes among the various hardware and software systems.	NASA	"Adaptive Automation" for Industry	41
Remote Systems			Computer Management	42
Retrofit Management				
Modification Management	Configuration Management Requirements			
	1. Performance and design requirements.			

24

Table 3 (Cont'd.)

Contribution	Definition	Initial Source	Current Applications	References
CONFIGURATION MANAGEMENT (Continued)	2. Definition of major elements (equipment facilities, personnel, technical documents).			
	3. Definition of major project and system.			
	4. Performance requirements (both for) operating and logistically supporting.			
	5. Design constraints, standards, compatibility.			
	6. Primary and secondary functional areas . . . principal (sic) interfaces.			
	7. Performance budgets			
	8. Contracts			
	9. Government furnished property			

Table 3 (Cont'd.)

Contribution	Definition	Initial Source	Current Applications	References
MATRIX ORGANIZATION STRUCTURE	The assignment of personnel to multiple "temporary project systems" with multiple reporting levels and responsibilities		MATRIX	43, 44, 45, 46
FUNCTIONAL MANAGEMENT				
PROGRAM MANAGEMENT				
ADMINISTRATIVE/ DIRECTION				
MANAGEMENT REPORTING				
GOVERNMENT/ PRIVATE CORPORATION	Use of quasi-private corporation in monopoly market position to service consumer	COMSAT	Post Office	47
CONTRACTING INCENTIVE RISK SERVICES	Various techniques for inducing fair-profit time and cost-conscious relationships	DoD	Various	48

Table 3 (Cont'd.)

Contribution	Definition	Initial Source	Current Applications	References
SUBCONTRACT MANAGEMENT				
MATERIAL				
NEGOTIATION AND ADMINISTRATION				

Table 4

EVALUATION METHODS

Contribution	Definition	Initial Source	Current Applications	References
ENVIRONMENT IMPACT ANALYSIS	Analytical Technique to measure the social and economic and ecological impact of technological changes	Air Force	Design of Socia-Indicators	51
			Dyna-Soar Project	52
			Supersonic Transport (SST)	53
TECHNICAL EDUCATION			Fishery Catch	54
QUALITY ASSURANCE			Land Values	55
			Economic Impact Analysis	56
			Farm Price Subsidy	57
			Veterans' Compensation	58
			Military Installations	59

FOOTNOTES

1.   Brown, Courtney C., Dean, Columbia University Graduate School of Business. Writing in the introduction, Space Age Management. New York: McGraw Hill, 1969.

2.   Milliken, J. G., and Gillmore, J. S. "The Transferability of Aerospace Management Technology." Published by American Astronautical Society, July 1968, Denver, Colorado. Available from Denver Research Institute, Denver, Colorado, p. 2.

3.   Ibid., p. 4.

4.   Ibid.

5.   Conference on Space, Science and Urban Life. Proceedings. Washington, D. C.: NASA, 1963.

6.   Jantsch, Eric. Technological Forecasting in Perspective. Paris: Organization for Economic Cooperation and Development, 1967.

7.   Bright, James R. (Ed.). Technological Forecasting for Industry and Government: Methods and Applications. New York: Prentice Hall, 1968.

8.   Gilmore, John S., and Coddington, Dean C. Defense Industry Diversification. U. S. Arms Control and Disarmament Agency, Government Printing Office, 1966.

9.   Jantsch, op. cit.

10. Gilmore & Coddington, op. cit.

11. Bright, op. cit.

12. Gilmore & Coddington, op. cit.

13. Ibid.

14. Milliken & Gilmore, op. cit.

15. Ibid.

16. Jantsch, op. cit.

17. Sweeney, Stephen S., Director Emeritus, Fels Foundation. Private communication, 1970, Philadelphia, Pa.

18. Gilmore, John S., et al. <u>Defense Systems Resources in the</u> <u>Private Sector, An Evolving Approach, An Uncertain Market.</u> Washington, D. C.: Government Printing Office, 1967.

19. Conference on Space, op. cit.

20. Milliken & Gillmore, op. cit.

21. Morrison, Edward J. "Defense Systems Management," <u>California</u> <u>Management Review</u>, Summer, 1967.

22. Borschers, K. H., et al. "The Translation and Application of Aerospace Management Technology to Socio-Economic Problems," Paper presented to American Institute of Aeronautics, 4th Annual Meeting, Anaheim, California, October 23-27, 1967.

23. Carrick, Paul M., Jr. <u>Planning a Least Cost Reliability</u> <u>Constructed Development Program.</u> Paper presented to American Institute of Aeronautics, 1st Annual Meeting, Washington, D. C., June 29-July 2, 1964.

24. Ackoff, Russel. <u>The Design of Social Research.</u> Chicago: of Chicago Press, 1953, p. 5.

25. Rudwick, Bernard H. <u>Systems Analysis for Effective Planning.</u> New York: John Wiley & Sons, 1969.

26. Mitroff, Ian. <u>A Study of Computer-Aided Engineering Design.</u> Berkeley: University of California, 1967. NASA CR 85857.

27. Milliken & Gillmore, op. cit.

28. Crecine, John P. <u>Computer Simulation in Urban Research.</u> Santa Monica: Rand Corp., 1967.

29. Gilmore, et al., op. cit.

30. Emory, W., and Niland, P. Making Management Decisions. Boston: Houghton-Mifflin, 1968.

31. Wiest, Jerome D. "Heuristic Progress for Decision Making," <u>Harvard Business Review</u>, Vol. 44, Sept.-Oct., 1966.

32. Ibid.

33. Milliken & Gilmore, op. cit., p. 9.

34. <u>Improving the Prospects for Shipbuilding. 1967 Interim</u> <u>Report.</u> Center for Maritime Studies, Webb Institute of Naval Architecture.

35. Ibid.

36. Starr, Martin K. "A Modular Production--A New Concept," Harvard Business Review, Nov.-Dec., 1965.

37. Milliken & Gilmore, op. cit.

38. Center for Maritime Studies, op. cit.

39. Welles, John G., et al. The Commercial Application of Missile/Space Technology, Parts I and II. Denver Research Institute, 1963.

40. Fourre, James P. CPM: A Practical Appraisal of PERT. New York: American Management Association Bulletin 114, AMA, 1963.

41. Starr, M. K., op. cit.

42. Liebowitz, B. H. "Configuration Management of Computer Systems." Paper presented before the 4th Space Congress, Cocoa Beach, Fla., April, 1967.
    For a discussion of NASA's Configuration Management, from which this definition was extracted, see:
    Apollo Configuration Manual. Washington, D. C., NASA, May, 1964, pp. 1-3.

43. Milliken & Gilmore, op. cit.

44. Haberstock, C. J. "Origical Design and Systems Analysis," In J. B. March (ed.), Handbook of Organizations, New York: Rand-McNally, 1965.

45. Wikesburg, A. K., and Cronin, T. C. "Management by Task Force," Harvard Business Review, Vol. 40, Nov.-Dec., 1962.

46. An Administrative History of NASA. Washingotn, D. C.; NASA, 1966.

47. Milliken & Gilmore, op. cit.

48. Ibid.

49. Ibid., p. 13.

50. Ibid.

51. Bauer, R. A. (Ed.) Social Indicators. Boston: MIT Press, 1966.

52. The Dyna-Soar Cancellation. Washington, D. C.: Government Printing Office, 1965.

53. Leontief, Wassily. Input-Output Economics. Oxford University Press, 1966.

54. Milliken & Gilmore, op. cit.

55. Ibid.

56. Igo, Donald G., et al. Economic Impact Analysis - A Military Procurement - Final Demand - Vector, Vol. 1. McLean, Va.: Research Analysis Corp. 1967.

57. Wiedenbaum, M. L. "Shifting the Compensation of Government Spending: Implications for Regional Distribution of Income." Speech to Regional Science Association, Philadelphia, Pa., Nov., 1965.

58. Ibid.

59. Breese, Gerald, et al. The Impact of Large Installations on Nearby Areas. U. S. Navy Civil Engineering Lab., 1965.

CHAPTER III

THE NASA PLANNING PROCESS: AN ADDITIONAL TRANSFER TECHNOLOGY

This chapter discusses the NASA Planning Model. NASA's process for planning was identified in the preliminary efforts of the current program, and constitutes an addition to the NASA transfer technology literature.

NASA PLANNING PROCESS

The complexities of NASA, together with its far-ranging mission and lack of off-the-shelf technology, generated the need for an effective system of planning. NASA's initial planning system was "carried over from a previous government experience in NACA and DOD,"[1] and continued the previous concept of division of responsibility between planners and managers. A "Planning Group" of experts prepared plans for managers to critique and then follow. This proved ineffective in practice. NASA was to comment on these earlier planning efforts:

> . . . there (was) little institutional planning . . .
> interrelationships, programs, plans and institutional
> consequences must be more effectively defined and
> understood.[2]

As well as the need to plan from the institutional point of view, NASA also identified the need for involving bright young engineers and managers in the planning process. A case in point

was the controversy surrounding selection of lunar orbit (instead of earth orbit) for launch of the Apollo Lunar Excursion Module (LEM).*

The initial planning, recommending earth-orbit, was performed by a group of senior staff members. Dissention arose from several junior engineers (characterized as "Young Turks") who had developed an alternative plan using lunar orbit.

Convinced that the lunar-orbit technique was superior, they attempted to submit their alternative for review—and ran into a bureaucratic stone wall. The plan was stopped at local levels from being forwarded for consideration. One "Young Turk," putting his job in jeopardy, bypassed the hierarchy and submitted the plans directly by personal letter to the NASA Administrator, who then initiated further review of the alternatives. The lunar orbit was selected, and NASA management identified the need for providing a structure within the organization to ensure adequate consideration of all alternatives for future problems. Additionally, the shortness of the "technical half-life" of the space scientists was highlighted—when a scientist becomes a manager his technical knowledge can become obsolescent rapidly—even before he realizes it—and a process had to be designed to ensure input from those "on the firing line."

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*The author is indebted to Mr. William Flemming, NASA Office of Program Planning, for making these points during an interview with the author and other NASA/Drexel Team Members on October 3, 1969.

STRUCTURE OF NASA PLANNING PROCESS

NASA's planning effort was redesigned to involve line
personnel rather than to leave planning totally in the hands of
a staff group. It was anticipated that this participative approach
would be more effective, since the persons who would have to carry
out the plan would be committed to it at the outset. It was also
expected that better trade-offs among conflicting alternatives
would be made if the managers and engineers directly involved took
part in the planning process.[3]

The redesign of the planning process took the following
structure:

1. Creation of Planning Steering Group

    The Planning Office--which had been charged with program
    planning--had this function removed and replaced with the
    "steering group" responsibility of aiding operational
    managers (formed into "Planning Panels") to do the actual
    program planning. The Planning Steering Group was to aid,
    support, provide administrative services, and guide the
    various planning panels in program planning.

2. Formation of Planning Panels

    For each program area (there were ultimately twelve) a
    Planning Panel was established. Chaired by a senior NASA
    official from NASA Washington, it consisted of members
    assigned from both "field installations" and headquarters.
    Each Planning Panel was charged specifically and
    individually with short, medium and long-range planning

in its program area. Personnel assignments were made on the

basis of technical expertise, anticipated implementation or

mission involvement, and/or facility requirements. Addi-

tional members were assigned for coordination among pro-

grams and across organizational divisions.

3. Appointment of Advisors and Evaluators

Ideas and involvement of persons from outside the NASA

establishment were utilized to: (a) provide inputs that

the in-house people may have overlooked, and (b) critique

the process of planning itself. Scientists from outside

were asked to join certain of the planning groups.

BELLCOM (Division of A T & T) was employed to prepare a

formal evaluation.

4. Integration and Review Board

Integration of program plans coming from the various

planning panels and review from an overall point of view

was performed by a Review Board of Headquarters Program

Office Directors and Facility Directors. The total pack-

age was then forwarded to the NASA Administrator.

5. President's Space Task Force

Chaired by the Vice President, this group was the formal

tie to Executive and Congressional areas of government.

All mission plans and budgets were approved and con-

trolled by this body.

It is interesting to note that while the Space Task Force was
the formal link, informal contacts were numerous. The Administrator
considered the informal "Politics" to be as important as the direct
administration of NASA--and arranged his schedule to allow com-
parable time for each.[4]

SUMMARY

This chapter has discussed the inadequacy of NASA's initial
planning approach, that of an "Expert Planning Group," and
described the participative planning process developed in response
to those inadequacies.

A summary of the reasons for involving NASA line management
and "Young Turks" in participative planning includes:

1. The technical expertise and detailed data exist only (or
are most accessible) at operating levels of management (i.e., top
management do not possess the skills or information contained at
lower levels within their organization which is often implied in
the usual hierarchical bureaucratic organization).

2. The time required was too short for independent divisional
assessments, correlation and integration, at management levels,
and re-cycling for modification and trade-offs.

3. The plan was written on a policy (as contrasted with a
detailed procedural) level. Plans of this nature are either made
or broken by those who implement them. Involvement with plan
development creates commitment toward making it work, and builds
lines of communication which are necessary for successful
implementation.

FOOTNOTES

1. Roskall, C. <u>Administrative History of NASA</u>. Washington, D. C.: NASA, 1958-1963, p. 69.

2. Bingham, C.F. Office of Organization and Management, "Policy Profile Office of Organization and Management," Draft. 06-24-69, pp. 30-31.

3. Bauer, R. A.; Meyer, R. F., et al. "NASA Planning and Decision Making, Final Report." Harvard Graduate School of Business Administration, p. 1-15. The following "Structure" is extracted from the Bauer study.

4. Webb, James. Private communication.

CHAPTER IV

NASA MANAGEMENT PHILOSOPHY

Research was conducted into NASA's philosophy of management
and the concepts which governed the design of specific management
tools and guided operational decisions. This was done for several
reasons: (1) the anticipation that any specific tool developed
for NASA may require adaptation when applied in an urban setting,
(2) the recognition of ". . . the necessity for managers to base
their actions not on a rigid set of principles . . . but instead
to recognize that these actions must be adapted to the particular
situation, organizational levels, and human personalities involved,"[1]
(3) to better understand the milieu in which the tools were
utilized, (4) to better understand the tools themselves, their
rationale and purpose, (5) to provide a philosophical and pragmatic
base for transfer; that is, while a particular tool may not be
appropriate for direct transfer to the urban environment, it may
be useful in modified format or may exemplify certain ideas or
concepts which may be useful in another format.

James Webb wrote that action preceded theory in the management
of large-scale endeavors:

> Many of today's large endeavors, and many of those
> proposed, have management requirements that go beyond
> the proved capabilities of present forms and methods.

Scholarship and research in the disciplines on which
future management groups must draw have not been able
to keep pace with the need in such large endeavors.[2]

Webb himself provided the thoughtful basis for this analysis
in his McKinsey Lecture Series,[3] and this writer amplified,
elaborated and discussed the implications for urban systems in
subsequent conversations with him.

MAJOR AREAS

Four major areas have been tentatively identified. Each area
interacts with the others. The current breakdown is somewhat
arbitrary and serves to focus attention on salient points:

I.   Systems Approach

II. Environmental Considerations

III. Organizational Disequilibrium

IV. Second- and Third-Order Effects

I. THE SYSTEMS APPROACH

The basic concept underlying the "systems approach" is that
the activity of any part of an organization has some effect on the
activity of every other part.* It is therefore necessary to identify
and evaluate their combined impact on performance of the organization
as a whole. This concept is "generally accepted in principle . . .
but seldom followed in practice."[5]

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*Systems Analysis is now an accepted element of management
study and industrial practice. Operational definitions, however,
differ. One recent author relates twelve and cites several
hundred more.[4]

Webb followed the system concept in NASA management practices.

He considered:

> Piecemeal attacks simply will not work. Neither will
> limited concepts of systems engineering or systems
> management . . . . Our integrated systems approach has
> proved vastly more effective than the independent
> components approach of the past for the solution of
> problems in dynamic situations such as are encountered
> in space and in weapons development.[6]

There are three elements of the "systems approach" as practiced

by NASA, which extend the generally accepted "state of the art":

A. Differentiation and Integration of Task Activities

B. Use of a Behavioral Systems Approach

C. Extension of the system's concepts into the realm of

problem-solving

A. <u>Systems Differentiation and Integration</u>

The attention NASA paid to the integration of the diverse

activities within the organization is an important element of the

systems approach. Harvard University characterized this in a

model of NASA functioning, which Harvard constructed under contract

to NASA.[7] The model was based on the findings that an organization

consisting of separate, task-oriented subunits must be wary of sub-

optimization. That is, as well as the need for <u>differentiation</u> of

tasks within the organization, there is a complementary need to pay

attention to the <u>integration</u> of subunits, processes, etc., to

achieve optimal organization goals.

These complementing functions of differentiation and integra-

tion take place simultaneously. The need for integration of highly

differentiated subunits leads to conflicts, and these conflicts must
be resolved if integration is to be achieved. Successful integra-
tion in NASA was achieved through the emergence of a strong and
respected integrator function which did not decide or resolve con-
flict themselves, but caused the subunits to confront their
differences.[8] In practice the integration function ranged from the
complex computer-based configuration management system utilized for
control of the interaction among the many spacecraft components
(such as the electronic characteristics incompatability among
experiments) to committees of key personnel (such as the integra-
tion and review board portion of the planning process) and assign-
ments to key individuals (the key example, of course, being the
Vice President's assignment to oversee the whole program from the
head to incorporate space activities within the overall national
priorities.)

B. Behavioral Systems Approach

Although the systems analysis literature does not so specify,
the systems analysis schemes reported in practice tend to be input-
output analyses. That is, they tend to accept and describe the
situation as it is and manipulate parameters to maximize output,
minimize costs, or obtain some desired function of the two.
Changing the elements of the situation to manipulate the "as it is"
factor is not often reported. Ken Boulding, the noted economist,
provides a tongue-in-cheek definition:

A system is a big black box
Of which we can't unlock the locks
And all we can find out about
Is what goes in and what comes out.

Perceiving input-output pairs,
Related by parameters,
Permits us, sometimes, to relate
An input, output, and a state.

If this relation's good and stable
Then to predict we may be able,
But if this fails us--heaven forbid!
We'll be compelled to force the lid![9]

It was found by NASA that one must "force the lid" and deal

with behavioral, individual, and social parameters of organized

activity.[10]

From a theoretical viewpoint, the need for this extension from

the so-called "mechanical output-oriented approach" to a behavioral

input-oriented approach recently has been the subject of extensive

research by Dr. Russel Ackoff and an interdisciplinary team at

the University of Pennsylvania. Ackoff concluded that the "output-

oriented" approach of systems sciences in building models to meet

mechanistic problems has not been successful in solving behavioral

problems. Behavioral problems have fundamentally different charac-

teristics from mechanistic problems and, because of this, systems

models for behavioral problems must be developed using an input-

oriented research focus rather than the traditional output-oriented

one.

Their findings were summarized in four key points:

1. Behavioral problems are fundamentally different from
    mechanistic ones, even though the mechanistic problems
    may have important behavioral elements.

2. Solving behavioral problems requires an understanding
    of the behavior; solving mechanistic problems requires
    only a knowledge of the behavioral factors.

3. An out-put oriented research focus has been unsuc-
    cessful when applied to behavioral problems because
    it results in a model which describes the bhoices
    people make, and description provides only knowledge
    of the behavior.

4. To understand the behavioral elements in the system,
    researchers must seek an explanation for peoples'
    actions . . .[11]

Thus, there is a fundamental difference between the assumptions

required to analyze behavioral problems and those required to

analyze the behavioral aspects of mechanistic problems. The dif-

ference is caused by the way the problems are formulated, in par-

ticular the degree of control which the decision maker believes he

possesses (or potentially possesses) over the behavioral aspects

of the problem. In behavioral problems, the research objective is

to identify how to change the behavioral patterns of the people in

the system in order to achieve specified objectives. In mechanistic

problems, the behavior patterns of the individuals in the system are

considered to be uncontrollable, and thus the research objective is

to adapt to the behavior in order to achieve objectives.[12]

This concept has also been described by Robert Chin in his

characterization of "Systems" versus "Developmental" Models and

their utility for practitioners of planned change.[13]

C. Extension of Systems Concepts into Problem Solving

According to current literature, a full description of any

system ". . . requires the spelling out of (1) the specific expected

accomplishments, and (2) the specific mechanisms and procedures which are to be used in the process."[14]

However, one characteristic of the large-scale endeavor is that the "specific mechanisms and procedures" are uncertain or unknown. They must be invented. The Apollo moon program, for example, required diverse technologies to be discovered, invented, extended or applied in new ways to make the program a success.

One way of looking at this situation is Thompson's.[15] In his simplified schemata, decision issues always involve two major dimensions: (1) beliefs about cause-effect relations and (2) preferences regarding possible outcomes. Each dimension contains a range of values. To illustrate the issue, Thompson examines the end points: certainty or uncertainty regarding causation and certainty or uncertainty regarding outcome preferences:

Preferences Regarding Possible Outcomes

		Certainty	Uncertainty
Beliefs about cause/effect relations	Certain	Computational	Compromise
	Uncertain	Judgmental	Inspirational

Computational

Where there is agreement on outcomes and mechanisms are known, Thompson characterizes the decision process as "computational." The"computational" box includes the techniques we have been discussing as "systems analysis."

Compromise

It is interesting to note here that the urban complex is characterized, unlike NASA, by a multiplicity of goals. This process of compromise--bargaining and negotiation--becomes primary. In fact, systems analysis is often used to support specific goals on points of view, and not to achieve resolution of the conflict.

For a discussion of the bargaining approach in the political arena, the reader is referred to Lindblow's notion of "disjointed incrementalism"[16] and Karl Popper's "piecemeal social engineering."[17] Archibald compares and contrasts these and other approaches in an insightful paper presented to the Canadian Treasury Board in 1969, in which he calls for an Hegalian Synthesis.[18]

Judgmental

The extension of systems analysis into the judgmental areas is of interest here. It is this researcher's conviction that NASA has pioneered the extension of "systems analysis" into regions of uncertainty regarding causation. NASA called the judgmental approach one of "Problem Solving."[19]

Problem Solving

Established organizational forms and procedures are inadequate to meet today's requirements. They must be supplemented on a regular and continuing basis by . . . adaptive, problem-solving, temporary systems of diverse specialists, linked together by coordinating executives in organic flux.[20]

Problem solving in NASA was enhanced by attention to several factors:

°   Development of cooperative relationships among groups
     and individuals.

°   Designing communications which flowed laterally as well
     as vertically.

°   Development of competence in interfacing organizations
     (especially non-NASA and non-government)

Cooperative Relationships

NASA noted that the competition among techniques applicable to
the solution of a particular problem could not be permitted to
escalate into competition between the persons or groups advocating
the various techniques.[21] There was always attention to the need
to ". . . maintain the essential basis for cooperation between
responsible groups within the framework of representative govern-
ment."[22] This was extended to contractors and other organizations
interfacing with NASA, to the extent of aiding other organizations
to increase their competence as described below. Additionally,
temporary task forces were established as required to bring
experts together for a particular problem or to establish needed
coordination. (One primary example is the NASA planning process
discussed earlier).

Lateral Communications Flow

The free flow of information, laterally as well as hier-
archically, was routinely practiced by NASA in problem-solving
efforts. The classic "chain of command" was modified or ignored
in their perceived need to open-up all communications channels in

their quest for task accomplishment. Engineers, Scientists,

and Managers were instructed to communicate directly with their

counterparts and other persons in other organizations as necessary

to "get the job done."[23]

NASA's empirical attention to the role of communications and

information flow in problem-solving efforts has theoretical support

in an analysis by R. E. Walton concerning lateral organization rela-

tionships and information flow as they impact problem-solving and

bargaining in organizations.[24]

Of primary importance is the way in which lateral organiza-

tions make co-ordinative decisions. Walton distinguishes between

a bargaining, and a problem-solving type of decision process. In

bargaining, the orientation of the parties is "how much will I gain

or lose?" In problem-solving, the orientation is joint exploration

for solutions which involve maximum gain to both parties considered

together.[6]

The information shared in bargaining differs dramatically

from the problem-solving situation.

In the problem-solving process maximum use is made of

voluntary, open, accurate discussion of an area which affects both

groups.

The opposite is true in a bargaining process: each partici-

pant attempts to gain maximum information from the other but to

make minimum disclosure himself; he often tries to manipulate

and persuade the other; and he examines the implications of

actions for possible unfavorable consequences for himself, but

does not concern himself with the consequences for the other.

According to Walton, the problem-solving process is exploratory, problem-centered, and a form of collaboration; bargaining is defensive, issues-centered, and a form of conflict which inhibits problem-solving.[25]

Walton experimentally studied the processes of bargaining and problem solving from the point of view of decision structure, data flow, and attitudes of participants. His experimental data indicated:

1. A decision structure for bargaining will provide fewer interactions than a structure for problem-solving. (This conclusion is justified if one focuses on the amount of accurate information exchanged--not necessarily if one focuses on the total amount.) Information is carefully rationed and deliberately distorted.

2. Where the decision process is of the bargaining type, there will tend to be less experimentation in decision practices, procedures and organization. Inter-group interaction is rigid, formal and circumscribed.

3. Conflictful decision process, bargaining, leads to negative attitudes between organizations; cooperative problem solving leads to positive attitudes.[26]

There data are summarized in Figure 2.

Figure 2

Characteristics of Bargaining vs.
Problem-Solving Decision Processes

Decision Making Between Lateral Organizations

| | Decision Process | |
Characteristics	Bargaining	Problem-Solving
Goal Orientation	Individual outcome and gain	Joint outcome and gain
Information Data Content	Minimum disclosure, maximum sought	Maximum disclosure of data, maximum sought
Accuracy	Overstatement, distortion info used to support individual goals	Accuracy sought
Attitudes	Negative between	Positive between
Observed inter-group processes	Rigid, formal	Adaptive and experimental

Development of Competence in Interface Organizations

In the keynote speech at the Drexel University seminar on
application of NASA Management Technology to urban problems,
Webb touched on one factor which had not been previously reported.
Under his administration, NASA directly and specifically sought
to increase the skills, capabilities and resources of organiza-
tions which interfaced with NASA.[27]

To critics who pointed out that this would aid the establish-
ment of a power-base which NASA might not be able to control, Webb
replied that (1) NASA's functioning would ultimately be enhanced,
(2) a problem-solving attitude was necessary for creative solutions
under the severe time constraints of the Space Program, (3) blame-
placing attitudes which result from concealing data, problems,
etc., would slow the ultimate goals of a man on the moon, and (4)
involving outside organization would serve both to check and
balance--and as additional resources.

II. ENVIRONMENTAL CONSIDERATIONS

    We know that the environment within which every such
    system must operate is itself an essential part of the
    system, especially as it is seen by its management
    leaders. But how to measure or assess this environmental
    element is little known.[28]

The "integrated systems approach" NASA proposed was extended
to include the environment in which NASA functioned. The need for
this was clear--as a student of public administration, Webb had
observed long-run factors decision being ". . . the outside rather
than operational or technological considerations."[29]

As under Secretary of State under Dean Acheson, Mr. Webb was responsible for reorganizing the State Department, along the lines recommended by the Hoover Commission, and he had experienced the ". . . incongruity between the organization structure and the methods and procedures of the Department, on the one hand, and the requirements raised by the rapidly changing environment in which our foreign policy was being conducted, on the other."[30]

THEORETICAL BASIS

There is a theoretical basis available for understanding these environmental aspects which NASA dealt with but did not adequately know how to measure or assess. Based on the "socio-technical systems approach" associated with the Tavistock Clinic Institute of Human Relations (London, England), the theory base initially established the relevance of the relationships between organizations and their environments in the trail-breaking work of Emery and Trist,[31] and has been extended through the work of Lawrence and Lorsch[32] in the United States and McWhinney[33] in the United Kingdom, to include consideration of organizational forms and applicability of various decision-making processes.

CAUSAL TEXTURE OF THE ORGANIZATIONAL ENVIRONMENT

The causal texture of the environment is relevant in two ways; as related to the total environment in which the organization is embedded, and as related to those portions of the environment which the sub-units and individual members experience as occupants of organizational space. The latter is important as the

organization can "degrade" the "textural complexity for its members by certain techniques of buffering."

The total organization, however, must recognize the complexity of the environment in which it operates and develop its strategy accordingly.

Emery and Trist employ a continuum in the causal texture which differs in the degree of uncertainty and in the degree of inter-dependence exhibited between the parts or regions of the environ-ment. Four ideal types are defined.

> The first three of these types have already, and indeed repeatedly been described in a large variety of terms and with the emphasis on an equally bewildering variety of special aspects . . . . The fourth type, however, is new, at least to us, and is the one that for some time we have been endeavouring to identify ... . . Together, the four types may be said to form a series in which the degree of causal texturing is increased in a new and significant way, as each step is taken.[34]

1. Placid, Randomized Environments

In the simplest type, goals and noxiants are relatively unchanging in themselves and randomly distributed. A critical property of the organization is that there is no difference between tactics and strategy, and organizations can exist adaptively as single small units.

2. Placid, Clustered Environments

The next type is also static, but goals and noxiants are not randomly distributed; they "hand together" in certain ways. The need arises for strategy as distinct from tactics. Organizations grow in size, become multiple and tend towards centralized control

and coordination. It is possible to identify sources (causes) of events; make (Probablistically) useful statements about future occurrences and select "best" actions. Most of our physical science knowledge assumes and/or bears on such environments. The process of study is typified by the near independence of the observer from the observed.

3. Disturbed Reactive Environments

The third type is dynamic rather than static. It consists of a clustered environment in which there is more than one system of the same kind. Organizations seek to improve their own chances by hindering each other. Between strategy and tactics there emerges an intermediate type of organizational response—what military theorists refer to as operations. Control becomes more decentralized to allow these to be conducted. Stability may require a certain coming-to-terms between competitors, as in cartel formation.

In these Type 3 environments, an interactional relationship exists between the observer and the environment such that one cannot make statements about the world independent of the knowledge of the position and intents of other individuals and organizations. Social science knowledge becomes increasingly important in understanding Type 3 environments.

4. Turbulent Fields

The fourth type is dynamic in a second respect, the dynamic properties arising not simply from the interaction of identifiable component systems but emerging also from the environment. The

turbulence results from the complexity and multiple character of the causal interconnections. Individual organizations, however large, cannot adapt successfully simply through their direct interactions. Action must be taken to respond to the environmental factors. Normative value structures emerge as a basic response to uncertainty and provide a control mechanism when commonly held by all members in a field.

MODALITIES OF DECISION MAKING

In each environment there is a mode of decision making which fully uses available information, but does not require further assumptions. McWhinney calls this mode "appropriate"[35] and establishes an hierarchy based on Knight's earlier taxonomy of certainty, risk and uncertainty within decision-making.[36]

McWhinny adds a fourth class which he calls "domain problems."

Domain problems are associated with the question of what aspects of the environment are to be of concern, of what phenomena should be noticed and of what variables should be introduced into the criterion function for assessing the organization's performance. The deepest problem of leadership is that of selecting the domains of concern, just as the significant question of scientific research is the choice of the domain of phenomena to be investigated and the domain of criterion of evaluation.[37]

The revised taxonomy of decision making modalities couples with causal texture in significant ways.

Certainty is the only modality appropriate to Type 1 random placid environments.[38] Randomness precludes any probabilistic elements; outcomes (both goals and noxiants) are known. Often isolation from higher order decision modes is created by buffering techniques--accepted assumptions, filtered information, physical or temporal seclusion--all can perform an "uncertainty or risk absorption" function.[39]

Computational techniques are available for aiding decision making under certainty.[40]

Risk is defined as the knowledge of probabilistic occurrence within the environment, and the assessment of decision strategies in light of that knowledge. As such it provides a meaningful approach to Type 2 environments.[41]

Statistical techniques are available to aid decision making under Risk.[42]

Uncertainty includes the situations in which probabilistic statements cannot be made because of either lack of knowledge or because of the mutual interaction among competing organizations.

Decision techniques available (taxonomy by the author) include Uni-actional paradigms (such as the Minimax Technique)[44] which establish decision criteria no matter what the competition may decide, and trans-actional paradigms (such as Game Theory)[45] which brings the strategies of possible joint action into consideration. (See Appendix G for a relevant experiment.)

Domain Problems

Within the domain problem, each of the problem elements is incompletely formulated at the start. The perception of reality and the criterion function emerge out of the process of selection. The process locates new dimensions or elements or reality and assigns values to them. Often the knowledge of this incomplete formulation of the problem is itself obscured, and only becomes known as action based on available knowledge fails to achieve results. The crisis often generated then forces a return to the evaluation of the basic issues and a search for elements which may have been overlooked or which fit together differently from that assumed.

The elements of a domain problem are not so easily isolated and studied as those of well-defined problems. In the terminology of Vickers, solving a domain problem is an "act of appreciation:" "An appreciative system (is) a net of which the weft and warp are reality concepts and value concepts . . . . Reality concepts classify experiences in ways which may be variously valued. Value concepts classify types of relations which may appear in various configurations of experience."[46]

The act of appreciation beings in noticing which aspects of the environment are of concern.

Once awareness has been accorded to some phenomenon of the environment, the involved object or event has been valued; it has competed for attention and has been accepted. The development of the mental awareness into a domain of concern is one of joint

development of the evaluation of facts provided by a search and of the reality testing of the values concepts in the context of other prior valuations.

An "act of appreciation" essentially restructures the world from the decision-maker's point of view.

It is this writer's observation that solution to the "Domain Problem" is analogous to Thomas Kuhn's analysis of scientific revolution, and that any manager attempting to apply techniques developed for one situation in a new one must be prepared to adapt them within the context of "Domain Issues." Kuhn also points out the anxiety and disillusionment often experienced by scientists faced with the need to restructure their work, perceptions and thinking. It is this anxiety which the current researcher felt in his work in the black community, and, which resulted in the turning to philosophical constructs for guidance in the Action Research phase of the program. See Appendix C for a short discussion.

SUMMARY

The relationships among environmental characteristics, organization properties and decision-making modalities is summarized in Figure 3.

SUPPORTING DATA

Although NASA had not drawn the parallel between the theoretical material presented above and their own functioning, it is clear that the NASA Administrator considered himself in a turbulent

Figure 3

ENVIRONMENTAL TEXTURE, ORGANIZATION CHARACTERISTICS & DECISION MODALITIES

Environmental Texture	Organization Characteristics	Decision Modalities
1. PLACID, RANDOMIZED Goals and noxiants are random and unchanging.	Single, small units, tactics and strategy are equivalent.	1. Decision making under Certainty; computational and trial & error techniques.
2. PLACID, CLUSTERED Static, with non-random goals and noxiants	Larger centralized organizations; strategy distinct from tactics.	2. Decision making under Risk. ° Statistical Techniques.
3. DISTURBED, REACTIVE Dynamic with clusters, competing systems.	Decentralized organizations to allow flexible and rapid "operations." Tendency for merger and cartel formation to reduce uncertainty. Adaptive organizations.	3. Decision making under Uncertainty. ° Uni-action of paradigms. Minimax, Regnet, etc. ° Trans-actional paradigms. Game Theoretical Approaches.
4. TURBULENT Dynamic with clusters, competing systems, and complex interaction with environment.	Forms different from bureaucracy. Leadership involvement with domain problems, relationships with other organizations.	4. Domain Problems °Acts of Appreciation.

environment.*

This view is supported by the mechanisms NASA implemented to deal with the environment:

A. Top Level Management Effort

As a continuing policy, the Administrator spent fifty percent of his time on affairs outside of the NASA organization--dealing with Congress, presidential liaison, public speeches, and so forth.

B. Effort to Gain and Maintain Continued Support

The time span before pay-off required that NASA gain continued support ". . . if we did not organize effectively and use methods and procedures that could insure support, there was simply no way for us to transform ourselves into a space-faring nation."[47]

But the large complex endeavor does not lend itself to the same visible proof as do routine endeavors. "The method, then, when results are not available, is to judge by the process being employed."[48] In order to do this, NASA had a policy of:

. . . welcoming congressional participation in areas where committees as mentioned have proper concern.[49]

maintaining relationships of mutual respect and trust . . . "frank person to person exchanges."[50]

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*The author is indebted to NASA Colleague, Thomas Michael, for pointing out this parallel, and suggesting that the NASA Administrator functioned in a turbulent environment. Webb therefore functioned to allow the environment within NASA to be of lower textural complexity for its various departments, divisions and individuals.

C. Communications Network

Designed along the basis of prior experience with reorganization of the Department of State, ". . . (the organization was) structured to ensure open lines of communications hierarchically and laterally, to keep the flow and accumulation of data under control, and to provide the top echelon with a continuing feedback of information on performance against policies, decisions and instructions."[57]

III. ORGANIZATIONAL DISEQUILIBRIUM

The problem facing NASA was to "have a man on the moon and bring him home in this decade (the '60's)." As has been noted earlier, while the goal was clear the means were not. Furthermore, the environment in which NASA operated was ". . . unpredictable and sometimes turbulent."[53] In contrast to the typical organization designed to meet present conditions, NASA's organization had to be designed to meet future unknown conditions. This Webb called ". . . maintaining desired disequilibrium." NASA was squarely on the twin horns of a dilemma: designing for disequilibrium allowed rapid adaptation but also jeopardized the management need for control. In order to achieve disequilibrium, one had to accept instability.

NASA designed their organization to permit rapid response and reaction to:

The turbulent unpredictable environment.[55]

Signals of incipient failure.[56]

Indications of emerging opportunity.[57]

The necessary level of instability was accepted. The features of uncertainty in the environment within which NASA had to operate were recognized and taken into account. I believe NASA's record, covering a brief ten years, shows that for success in its large-scale endeavor, an essential supplement to competence in overall management has been the ability to achieve and effectively use maneuverability and flexibility--that is, the capacity to adjust to and to move forward in an unpredictable and sometimes turbulent environment. Without this capacity, overall management competence is critically deficient.[58]

NASA called this "dynamic equilibrium"[59] and designed a coordinated system of management controls,[60] systems of executive selction and evaluation[61] andcontractor selection and procurement procedures[62] to enable the organization to function in the face of uncertainty.

IV. SECOND AND THIRD ORDER EFFECTS

The National Academy of Arts and Sciences conducted a comprehensive study sponsored by NASA, into the relationship between large-scale endeavors and society. One of the more thought-provoking findings was:

> In the conduct of human affairs, our actions inevitably have second-order consequences. These consequences are, in many instances, more important than our original action . . . . Technical changes have proved to be particularly explosive sources or second-order social, economic, and political changes that were never envisioned. This arises largely because at the beginning technical developments tended to be viewed in a rather restricted context. They are seen as an answer to an agreed problem and tend to be judged in terms of their adequacy in solving the problem.[63]

NASA considered the high-order effects as a matter of deliberate policy.[64] (See, for example, the techniques for Environmental Impact Analysis cited in Chapter I.)

FOOTNOTES

1.   Webb, James. Space Age Management. New York: McGraw Hill, 1969, p. 62.

2.   Ibid., p. 5.

3.   Ibid.

4.   Hopeman, C. J. Systems Analysis and Operations Management. New York; John Wiley & Sons, 1964.

5. Ackoff & Rivet. A Managers Guide to Operations Research. Chicago: University of Chicago Press, 1962.

6.   Webb, op. cit., p. 15.

7.   Bauer & Meyer, op. cit., p. 1-5.

8.   Lawrence, Paul, and Loraugh, Jay. "Organization and Environment," Managing Differentiation and Integration. Boston: Harvard University, Division of Research, 1967.

9.   Hopeman, C. J., op. cit., p. 13. Quoting Milkajlo D. Mesarovic, Views on General Systems Theory, p. 39.

10.   Webb, Space Age Management, op. cit., pp. 65-66.

11.   Emsoff, James R. Analysis of Behavioral Systems. New York: Macmillan, 1961, p. 5.

12.   Ibid.

13.   Chin, Robert. "The Utility of Systems Models and Developmental Models for Practitioners," in the Planning Change, 2nd Edition. Holt, Rinehart and Winston, 1969, p. 297.

14.   McDonough, Adrian, and Garrett, Leonard J. Management Systems, Working Concepts and Practices, p. 2.

15.   Thompson, James. Organizations in Action. New York: McGraw Hill, 1967.

16.   Archibald, K. A. "Three Views of the Experts Role in Policy Making. Rand Courtesy Paper, 1970.

17.   Ibid.

18.   Ibid.

19. Webb, Private communication.

20. Webb, Space Age Management, op. cit., p. 29.

21. Webb. Private communication.

22. Webb. Space Age Management, op. cit., p. 27.

23. Webb. Private communication.

24. Walton, R. E. "Theory of Conflict in Lateral Organizational Relationships," in J. R. Lawrence, op. cit., p. 409.

25. Ibid., pp. 413-414.

26. Summarized from the efforts of Lawrence and Walton cited above.

27. Webb, James at Drexel University Synopsis, April 12-13, 1972. (Proceedings to be issued.) Remarks amplified privately later to this writer.

28. Webb, Space Age Management, op. cit., p. 34.

29. Ibid., p. 4.

30. Ibid., p. 35.

31. Emery, F.E., and Trist, E. C. "The Causal Texture of Organization Environments." Human Relations, Aug., 1963, p. 20.

32. Lawrence, Paul R., and Lorsch, Jay W. Organization and Environment. Graduate School of Business Administration, Harvard University, 1967.

33. McWhinney, W. H. "Organization Form, Decision Modalities and the Environment." Human Relations.

34. Emery & Trist, op. cit., with relevent associations based on the work of McWhinney, op. cit.

35. McWhinney, op. cit., p. 271.

36. Knight, F. H. Risk, Uncertainty, and Profit. Boston: Houghton Mifflin Co., 1921.

37. McWhinney, op. cit., p. 272.

38. McWhinney, op. cit., p. 272.

39. McWhinney, op. cit., p. 273.

40. See for example, D. Miller & M. Starn, *Executive Decisions and Operations Research*. Prentice Hall, 1960, p. 20.

41. McWhinney, op. cit. p. 274.

42. Miller & Starr, ibid.

43. McWhinney, ibid.

44. Miller & Starr, op. cit., p. 86.

45. Ibid., p. 94.

46. Vickers, G. *Conflict*. Glencoe: The Free Press, 1965.

47. Webb., *Space Age Management*, p. 55.

48. Ibid., p. 98.

49. Ibid., p. 100.

50. Ibid., p. 47.

51. Ibid., p. 9.

52. Ibid., p. 134.

53. Ibid., p. 6.

54. Ibid., p. 9.

55. Ibid., p. 6.

56. Ibid., p. 6.

57. Ibid., pp. 8-9.

58. Ibid., p. 11.

59. Ibid., p. 11.

60. Ibid., p. 79.

61. Ibid., p. 157.

62. Ibid.

63. Ibid., p. 112.

64. Ibid., p. 13.

SECTION III

ACTION RESEARCH

OVERVIEW OF SECTION III

This section reports the testing of the assumption that certain NASA Management technology can be applied or adapted for use within an urban complex.

After intensive preparation and analysis of NASA Management, the decision was made to go ahead with the plans to test the applicability of the NASA techniques through "Action Research" within a particular urban system. The sociological technique of participant-observer would be utilized, with the added dimension that members of the research team would take management responsibility within the system.

Subsequently, the research site was selected. Specific problem areas were then identified, evaluated and attacked with applicable NASA management techniques.

CHAPTER V

ACTION RESEARCH SITE

Selection of an action-research site was critical. The "host" government would be expected to profit from the professional resources and NASA technology to be made available. But it ran the risk of having outsiders "meddle" with their situation, and perhaps, create additional problems by their presence.

The Drexel Research Team articulated a set of criteria (hereto appended in Appendix C) which established the minimum conditions for a successful relationship and negotiated for entry to an urban system.

SITE SELECTION

Four possible sites were evaluated:

1. Trenton, N. J.

The newly elected Mayor, Arthur Holland, utilized the services of the Drexel Research Team and members of the Rutgers Faculty as a "Transition Task Force." All city department heads were being replaced, and other major shifts in personnel were being implemented as the new government took over. Mayor Holland needed trusted professional assistance to maintain continuity of government. The effort was successful. The Drexel Team asked to maintain the relationship and use Trenton as the action-research

site. Negotiations dragged on for several months, and were finally

terminted when the Drexel Team chose New Castle County.

2. Washington, D. C.

Preliminary negotiations were held with representatives from

the mayor's office, Washington, D. C. The Drexel Team elected not

to continue them due to the extensive travel which would have been

involved.

3. Wilmington, Delaware

Through the services of the Greater Wilmington Development

Corporation (GWDC), the Mayor of Wilmington was approached. After

initial talks, the Mayor decided not to use the Research Team.

4. New Castle County, Delaware

Again through GWDC, the County Executive was approached.

After two months of negotiation, an agreement was made for the NASA

Research Team to work as special assistants to the County Executive

on projects to be selected by him. NASA techniques were to be

applied as appropriate.

NEW CASTLE COUNTY

New Castle County consists of the northern-most section of

Delaware, one of three counties comprising the state. It has,

however, nearly seventy percent of the state population; and an

estimated ninety percent of the income.[1]

Within New Castle County are eleven incorporated areas--the

City of Wilmington, the City of Newark, and nine smaller towns.

Each incorporated area has its own first-level of government. For the unincorporated areas, the County Government is the closest government to the people. Table 5 summarizes population data, (and includes data for the DeLaWarr and Belvedere sections to be discussed more fully in the author's Action Research described below).

Table 5

POPULATION CHARACTERISTICS

	Population
State population	500,000 (Est.)
New Castle County	386,000
Incorporated areas	123,000
Unincorporated areas	263,000
DeLaWarr	18,000
Belvedere	5,000

The present organization of the county government was established by state law in 1967. A change was made from the so-called "Levy-Court" system dating from colonial days to the establishment of an executive system with division of responsibility between the executive and county council.

The County Executive was elected-at-large, as was the County Council president. Six councilmen were elected from various districts.

The 1967 reorganization established functional responsibility:

County Council

County Council was responsible for approval of financial

operations, operating budgets, capital budgets, debt creation,

bond issues, and the setting of the tax rate. In addition, council

established basic service functions (police, ambulance, trash, etc.),

approved union contracts, employee pay plans; and maintained

responsibility for approving and amending the zoning ordinances.

County Executive

The County Executive was given the broad responsibilities for

administering the County Government on a day-to-day basis. He

was empowered to make appointments and remove appointed officials

at his pleasure, prepare and administer budgets and services, and

enforce laws.

The County Executive appointed a Chief Administrative Officer

to assist him in the management of the government. At the time

there were departments of:

- °   Public Works
- °   Parks and Recreation
- °   Development and Licensing
- °   Planning
- °   Finance
- °   Transportation
- °   Personnel

Each was headed by an official appointed by the County Executive.

Department staff were appointed under civil-service merit system,

although it was estimated that half the employees had received

appointments through an earlier patronage system.

As the government was only two years old, the County Executive considered his tenure as a "shakedown effort" to establish a viable modern government in the fastest growing portion of the state. The five NASA-Drexel Research Associates were considered supplemental staff (See Appendix D) to the County Executive, and would work on mutually acceptable tasks, which would be identified in the "Entry Phase" of Action Research.

FOOTNOTES

1. These and following data are from a personal interview with Mrs. Francis Andrews, Public Information Officer, New Castle County, October, 1970.

CHAPTER VI

PROBLEM SELECTION

ENTRY

The Drexel team began its work in New Castle County on the first of October, 1970. Problem "identification and entry" had been scheduled for a two- to three-month period. However, within days of the initial handshake, a crisis arose. Citizens were shouting and picketing. National news media were televising what the county executive, Mr. William Conner, termed "his hottest and most sensitive problems."[1] County and state officials were afraid of a repeat of a "Watts" type incident several years earlier which resulted in martial law being declared and National Guard Troops patrolling the streets for several months.

PROBLEM ASSIGNMENT

The particular problem facing county officials was the use and disposition of an abandoned shopping center located in the DeLaWarr area, a low income neighborhood located south of Wilmington, toward New Castle, Delaware. Residents had become inflamed when the vacant, vandalized shopping center, at the only entrance to their community, was scheduled to be made into an automobile body shop. The citizens demanded that the county purchase and develop the

property as a site for a satellite center of the new Delaware State program for delivery of social services.

This research associate was asked to represent the County Executive in evaluating the problem and in participating in its solution.

The task was accepted for three basic reasons:

Satisfying the immediate need from the County's point of view would establish credentials and competence of the NASA/Drexel Team, and aid in the (humorously termed) "dog-sniffing" phase of a consulting relationship.

This research associate was specifically asked to assume responsibility for the problem, and the NASA/Drexel Team agreed.

It was a new arena for this research associate to experience. Prior effort had been within or in behalf of the business community. It was an opportunity to experience a community viewpoint.

As will be discussed below, the direct early involvement of this research associate created several problems: (1) the client's interest was paramount, the scientific design became secondary,* (2) the NASA/Drexel Team became split. This research associate's tasks were performed most often in the evening hours, and with governments and agencies <u>outside</u> the county government.

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*This was highlighted during a community meeting when it was decided not to administer a previously designed scientific instrument which measured prejudice and conflict behavior. At the time, it appeared that the procurement of data concerning these behaviors would produce the behavior itself, and sidetrack a problem-solving effort.

The remainder of the team worked primarily within the county

government during normal working hours. While information was

shared periodically, an intensive working relationship was not

maintained due to task differentiation and scheduling problems;

(3) The first two stages of action research (Initial Entry,

Orientation and Exploration) were cut short and overlapped the

Action phases.

THE DE LA WARR PROBLEMS

The immediate problem was to prevent civil disorder. The

secondary, but pressing, problem was to identify and correct both

the immediate and underlying issues. The tertiary problem was to

enable the county organization to better respond to these kinds of

problems in the future--problems for which there was no existing

structure or precedent.

Immediate Problem--Civil Disorder

As representative of the County Executive, this research

associate met with leaders from the Ad Hoc Citizens Group, and

conveyed the message:

1. The County Executive was personally concerned.

2. The research associate was to be his link with the

    community.

3. The legislative process must be followed for a social

    program of the magnitude of that demanded.

4. The County Council would schedule an informal hearing at

    which time a proposal should be submitted (about six

weeks hence).

For the next month, the Ad Hoc Group was encouraged and supported in their activities of:

1. Reviewing the "presenting problems" (the Body Shop) and developing a set of alternative possible solutions for property use.

2. Defining the need for social services in the DeLaWarr region—justifying the request for a social service center.

3. "Touching bases" with contemplated resources (State Department of Social Services, Planned Parenthood, Bureau of Child Welfare, etc.).

4. Preparation of the presentation to County Council.

At the same time, an independent evaluation was conducted to itemize comprehensively, for decision-making in the executive branch of government, the parameters, interest groups, goals, objectives and criteria surrounding the project.

PRELIMINARY INVESTIGATION

Preliminary investigation and data collection resulted in several dimensions of the problem:

1. Statistics (income employment, venerial disease, etc.) for the contiguous black and white neighborhoods in the area were equivalent, as were other demographic, health and social indicators.

2. The DeLaWarr area, from the point of view of the individual citizen, was disorganized. There was no local government. The area had little political "clout."

3. Several agencies--school administration, juvenile authorities, police, welfare and other social services--had indi- vidual programs designed to aid the community but there was no communication and coordination of the various activities.

4. Current programs were planned from past history and statistics. There were no antennae listening for new or different problems.

5. Resources were available from several levels of govern- ment, and various public and private sources. These were also uncoordinated.

6. There were several processes or mechanisms at work simultaneously (which sometimes tended to get in each other's way):

a. Legislative--County Council directly; State Legislature indirectly.

b. Administrative--County Executive, State agencies, private agencies.

c. Social--The beginning of agitation among the residents.

d. Legal--Land use and other civil statutes.

e. Expert--The various expert opinions and studies of the area.

7. There was lack of agreement about which problems were causal, where were symptoms, and who should take action about what.

8. There was, especially among the black community, a feeling of personal incompetence and conviction that government would not respond to their needs.

9. There were critical socio-economic problems--lowest income

in the County, highest rates of poverty and unemployment, high
fertility rates, incompleted family units,* low education profiles
(See Appendix E for a full description).

COUNTY COUNCIL ACTION

The Ad Hoc Committee presented their proposal to the County
Council of November 17, 1970. Without consulting this writer or
the executive branch of county government, County Council shortly
afterward voted to expend capital funds for a Social Service Center
in DeLaWarr.[2] The County Executive declined to intervene, as
preliminary research had supported the need for social services,
and the state had informally restructured budget allocations to
support a facility.

Thus, the problem shifted from "decision among alternatives"
to one of "making it happen." Problem selection became problem
assignment.

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*Either father or mother not living in the home.

FOOTNOTES

1. Private communication.

2. See Minutes, County Council Meetings, New Castle County, Delaware, for December 1970 and January 1971.

CHAPTER VII

THE PROBLEM

The goal was clear: create a Social Service Center in DeLaWarr.
Mechanisms for achieving this goal were unclear. As a part of the
NASA/Drexel Action-Research Program, this research associate was
given the responsibility by the County Executive for achieving the
goal of a Social Service Center. Additionally, and of equal
importance, civil violence was to be stemmed; and capability was to
be built within the county government for handling these kinds of
problems which tended to "fall through the cracks" of the highly
departmentalized bureaucratic organization.

Although there was later found application for certain ele-
ments of specific tools, it was NASA's management of uncertainty
(i.e., Problem-Solving to meet clear goals with cloudy means in a
turbulent environment) which pointed the way towards solution of
the problems at hand.

APPLICATION OF NASA MANAGEMENT PHILOSOPHY

The remainder of this Chapter contains an analysis of the
DeLaWarr problem from the point of view of NASA Management Phil-
osophy. Organization of the Chapter follows the conceptual
presentation of NASA's philosophy from Chapter IV. New theoretical
material is included as it is relevant for understanding the

particular DeLaWarr situation and the selection of appropriate
action strategies. The Chapter ends with detailed "Implications
for Action."

I. <u>Systems Approach</u>

It was apparent that individual functions were proceeding
individually. State and County police had minimal effective
cooperation. Juvenile authorities, welfare services, the school
system, social service agencies, all had programs, all were
uncoordinated, and none were in communication with county officials
except on an <u>ad hoc</u> or casual basis.

As was indicated in the previous chapter, preliminary investi-
gation uncovered the need for a systemized approach.

A. <u>Differentiation and Integration</u>

The various resources from public and private sources, at sev-
eral levels of government, were not coordinated. A strong
"integrator function" was needed.

B. <u>Behavioral Approach</u>

Working with the Ad Hoc Committee brought to light two key
elements of behavior which were heretofore not considered fully,
if at all, in decision-making by the county: 1. The extensive
feelings of rage and feelings of personal impotence of people
throughout the community, and 2. the community in general looked
upon county government (and all government) as opponents to be
ridiculed and mastered. Both theory (discussed below) and the
author's experience pointed towards decreased communications and

increased conflict between community and government, which could
be expected. Explicit consideration of these elements led to the
clinical interventions which are described in the following
chapters.*

1. The Person

Harvard University has recently completed a psychosocial
analysis of "Black Power" and its implications for Community
Development. Charles Hampton-Turner made an eloquent statement:

> Control of the way a problem is set confers great
> persuasive power. The person with this control comes
> into any discussion or negotiation playing on his home
> ground. He has mastered the rules and structures.
> Often, his adversary can be placed in an untenable
> position or the agenda can be set so as to permit
> only one outcome . . .[3]

Stokely Carmichael makes the identical point in his book,
Black Power, quoting a children's classic:

> "When I use a word," Humpty Dumpty said in a rather
> scornful tone, "it means just what I choose it to mean--
> neither more nor less."

> "The question is," said Alice, "whether you can make
> words mean so many different things."

> "The question is," said Humpty Dumpty, "which is to
> be the master--that's all."[4]

It was the feelings of individuals from the black community
that the county government maneuvered situations so that the
only outcome could be that "the blacks lose again," and that they
were unable to change this situation.

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*This is an example of an "Act of Appreciation" within a
turbulent environment decision-making process.

Both Hampton-Turner and Carmichael--the former from theory
and the latter from experience--reached similar conclusions: The
solution lies not in preconceived ends but rather in processes
which result in persons creating their own reconciliation of their
problems. Thus, as problems are solved, competence in creating
solutions is enhanced, and feelings of impotence and powerlessness
are reduced.

2. <u>Group to Group Relationships</u>

We define a "group" as a social unit which consists of a
number of individuals: A. who, at a given time, have role and
status relationships with one another, stabilized in some degree,
and B. who possess a set of values or norms regulating the attitude
and behavior of individual members, at least in the matters of
consequence to them.[5]

Sherif experimented extensively with groups, especially with
conflict behavior and showed conclusively "contact as equals" to
be effective in reducing existing conflicts between groups and
changing attitudes of their members.[6]

> Information is subordinate to the existing state of
> relationships between groups, and actually succeeds
> in changing this state only when it contains definite
> evidence of a shift in relative power . . . otherwise
> . . . favorable information about the advisory is ignored,
> is reinterpreted to fit one's own designs, or is other-
> wise ineffective as the sole means of reducing intergroup
> conflict.[7]

Sherif summarized additional conclusions concerning group to
group behavior:

1. Intergroup conflict and its by-products of hostility and negative stereotypes are not primarily a result of neurotic tendencies on the part of individuals, but occur under conditions specified here even when the individuals involved are normal, healthy, and socially well adjusted.

2. Cooperative and democratic procedures within groups are not directly transferable to intergroup situations.

3. Important intergroup relations affect the patterning of roles and the norms within each group.

4. Contact between hostile groups as equals in contiguous and pleasant situations does not in itself necessarily reduce conflict between them.

5. Contact between groups involving interdependent action toward superordinate goals is conducive to cooperation between groups, but a single episode of cooperation is not sufficient to reduce established intergroup hostility and negative stereotypes.

6. A series of cooperative activities toward superordinate goals has a cumulative effect in reducing intergroup hostility. This cumulative effect involves the successful development of procedures for cooperating in specific activities and their transfer to new situations, so that established modes of intergroup cooperation are recognized.

7. Tools and techniques found useful in problem-solving within groups and in intergroup conflict may also serve in intergroup cooperation. But their use in intergroup cooperation requires recognition that the procedures involve not merely so many individuals within a group, but different groups of individuals contributing to the attainment of a common goal.

8. Cooperative endeavor between groups toward super-orginate goals alters the significance of other measures designed to reduce existing hostility between them:

   Intergroup contacts in the course of striving toward superordinate goals were used for developing plans, for making decisions, and for pleasant exchanges.

   Information about the other group became interesting and sought after, rather than something to be ignored or interpreted to fit existing conceptions of the out-group.

Exchange of persons for the performance of tasks
was not seen as "betrayal" of one's own group.

Leaders found that the trend toward intergroup
cooperation widened the spheres in which they could
take positive steps toward working out procedures
for joint endeavor and future contact.[8]

C. *Problem Solving*

Problem solving is that judgmental process NASA used when
goals were agreed upon but the means for achieving them were not.
As noted extensively in the previous chapter, there are several
critical factors:

1. Cooperative group relationships.

2. Lateral communications flow.

3. Competence in interfacing organizations.

The implications for action were stated earlier and will be
summarized below.

II. ENVIRONMENTAL CONSIDERATIONS

There were inconsistencies in perception of the environment
between the county government and the community. The county
government had been in process of becoming organized with a central
executive function, most appropriate for a Placid, Clustered
Environment. The process was difficult: several department heads
complained to NASA/Drexel Research Associates about the inability
to get policy directives and leadership from "the top." The
department heads noted the lack of a strong executive, blamed it

on either the personalities involved or the "system"* but assumed

that there ought to be strong central authority.

The environment in fact seemed to this observer to be at

least Disturbed, Reactive--with some strong turbulent elements.

Certainly, issues such as the psycho-social dynamics of Black

Power and the Group to Group relationships discussed above include

critical issues of domain: what aspects of the environment are of

concern, which pehnomena should be noticed, and what are the

criteria for the organization's performance?

It was not in this researcher's charter to investigate the

interesting possibility that the inability of the organization to

coalesce around a strong central authority was not due to person-

alities (the system, etc.) but to the organization's need to

function in a higher-order environment. Suffice to point out that

the perceived need for centralization was inconsistent with the

environment relative to the DeLaWarr issue.**

The environmental textural considerations (Types 3 and 4)

pointed toward the need to provide action interventions which

enhanced decentralized flexibility and fostered cooperative

relationships.

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*Never defined when the question was asked, "What do you mean
by 'system'?" during extensive interviews conducted with New Castle
County officials during the initial phases of action research.

**However, there were five research associates, and at least
several Action Research projects were undertaken within the
organization at lower orders of complexity, due to buffering
characteristics of the organization.

The continued examination of the environment to identify and resolve the domain problems was of critical importance.

III. ORGANIZATION DISEQUILIBRIUM

There were two organizational groupings for the researcher to work with: the Ad Hoc Committee and the County Government.

A. Ad Hoc Committee

The Ad Hoc Committee was essentially an already unstable citizens group which moved rapidly into areas of "emerging opportunity." However, much of the efforts seemed like "random motion."* There was too much instability. Some method of guidance was needed to keep the group on course.

B. County Government.

The county government, on the other hand, exhibited great inertia in organizing to meet problems which crossed departmental lines or required modification of current procedures.**

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*Observation by the author.

**Two NASA/Drexel Research Program colleagues conducted an Organizational Development (O.D.) project in which they worked directly with the County Government to improve its effectiveness.[9] In the last month of the action research period, this Research Associate was asked to establish an interdepartmental task force and work with it in organizing the resources of the county to meet the DeLaWarr problems. Perhaps the effectiveness of an O.D. program is dependent upon a critical need from the client's point of view (not the consultant's). That is, the O.D. approach is best approached in support of a task or goal of the client, and not as an end in itself. This is an area for further scholarly research.

IV. SECOND- AND THIRD-ORDER EFFECTS

Paying attention to the interaction of task accomplishment, psychology of the individual and sociology of the group are examples of higher-order interactions. An additional example with negative impact was the removal from the tax rolls of the site selected for the center.

IMPLICATIONS FOR ACTION

The implications for action are summarized in the following table and are translated into an action program in the next chapter.

Table 6

SUMMARY

NASA PHILOSOPHY	IMPLICATIONS FOR ACTION
I. SYSTEMS APPROACH	
A. Differentiation/Integration	Integrator Function Needed
B. Behavioral Approach	
Individual Rage, Incompetence	Enhance Competence
	Government Responsive to Stated Need in Dialectic Process
Group to Group Relationships..........	Need for Superordinate Goal
	Cumulative Activities Building Toward Cooperation
	Full Flow of Information
C. Problem Solving	Clearly Stated Goals
	Need for Cooperative Relationships
	Lateral Flow of Information
	Maximum Disclosure of Information
	Exploration of Consequences of Purposed Action for All Individuals, Groups

Table 6 (Cont'd.)

NASA PHILOSOPHY	IMPLICATIONS FOR ACTION
I. SYSTEMS APPROACH (Continued)	
C. Problem Solving (Continued)	Maximize Interpersonal Interactions
	Develop Competence of Interfacing Ad Hoc Committee
II. ENVIRONMENTAL CONSIDERATIONS	
County Government assumed validity of central ...... authority implying Placid, Clustered Environment	Design to allow flexible decentralized response. Pay attention to integration need.
	Enhance cooperative decision-making within the government.
	Enhance cooperation between government and community.
DeLaWarr is at least DISTURBED, AND has TURBULENCE	Examine leadership function and organization to allow examination of Domain Problems to permit Acts of Appreciation.
	Relevance of Individual Social Problems
	Relevance of Group Social Problems

Table 6 (Cont'd.)

NASA PHILOSOPHY	IMPLICATIONS FOR ACTION
III. ORGANIZATIONAL DISEQUILIBRIUM	
A. Ad Hoc Committee	Need for Stability, Direction
B. County Government	Need to Generate Mobility, Flexibility
IV. SECOND AND THIRD ORDER EFFECTS	Relevance of Individual and Group Phenomena
	Economic Interaction
	Political Considerations

FOOTNOTES

1. Sites, Lt. E., County Police, personal communication.

2. Hampton-Turner, Charles. "Black Power, A Blueprint for Psycho-Social Development," in Rosenbloom and Marris, (Eds.) Community Development: Working Papers.

3. Ibid., p. 66. Emphasis in original.

4. Carmichael, Stokely, and Hamilton, Charles V. Black Power, The Politics of Liberation in America. New York: Vintage, 1967, p. 36.

5. Sherif, Muzeifer. In Common Predicament. Boston: Houghton Mifflin, 1966, p. 12.

6. Ibid., p. 88.

7. Ibid., p. 86.

8. Ibid., pp. 90-93.

9. Siegel, S., and Michaels, T. Ph.D. Theses, unpublished. Available from Drexel University Library, Philadelphia, PA.

CHAPTER VIII

ACTION PROGRAM

DE LA WARR PLANNING PROCESS

The NASA Planning Model is an articulation of a process which involves line and staff management together with resources and operational representatives in a participative problem solving effort to develop feasible programs. As was stated earlier, the NASA Participative Planning Process was developed in reaction to the failure of NASA's previous planning technology: an "Expert Staff Planning Group."

NASA's situation was analogous to urban planning failures.

Urban planning by "experts" alone doesn't work. In a review of a new New York City Comprehensive Plan, Ada Louise Hustable, New York Times critic of urban planning, wrote:

> . . . the textbook scientistic-Utopian planning of long-
> range policies based on statistical extrapolations and
> translated into massive rebuilding schemes has proved
> such a conspicuous failure in the last 25 years that
> doctrinaire planning, and its adherents, are in con-
> siderable disrepute and disarray. The impressive
> theories and presentations that seem so intellectually
> compelling go up in smoke when faced with the human and
> political equation . . .
>
> Therefore, the (new) plan deals with the processes;
> with the forces of growth and decay and the inconstant
> human factors that underlie the city's serious disorders--
> things that cannot be pinned down on charts or graphs.
> It is designed for the greatest flexibility.[1]

New York City was not alone. New Castle County had also had its problems with urban planning by experts. The "Operation Breakthrough" effort previously had failed, and there were numerous instances of other failures in various programs of housing and social improvement.

The first step toward the achievement of a DeLaWarr Social Service Center was the establishment of a system to plan it. The failure of urban planning, as told so eloquently by Huxtable, added to the researcher's conviction that the planning effort had to be designed for a complex, dynamic environment. Measures which would stimulate coordination and cooperation and enhance the identification of forces, issues, needs and solutions as acts of adaptation and appreciation were needed.

NASA's participative planning process provided a basic structure for planning the DeLaWarr Center. The NASA structure deliberately involved those with the most direct and complete knowledge of the issues, and the problems, together with those responsible for carrying out the plan, thus generating the best technological approach with commitment to making it work.

ESTABLISHMENT OF A NASA-TYPE PLANNING PANEL

It was, therefore, decided to appoint a Planning Panel to prepare the short and longer range plans for implementation of the DeLaWarr Social Services Center. The extant Ad Hoc Committee was the basis for the Planning Panel, augumented by community and governmental resources.

This accomplished the following:

1. Gave stability and direction to the Ad Hoc Citizens Committee, which <u>reduced</u> disfunctional excessive disequilibrium.

2. Transferred the divisive conflict and civil disobedience into constructive problem-solving effort.

3. Provided a mechanism for government to be responsive to community needs, thus providing an experience which was dissonant with previously held attitudes of community members toward government, and produced a force <u>towards</u> disequilibrium.

4. Provided an opportunity for government to learn of community needs and priorities first-hand, thus providing the opportunity for a restructuring of value systems and an "Act of Appreciation."

5. Established a responsive outlet for individual "rage" which could turn it towards the seeking of constructive solutions.

6. Provided an opportunity for community members to develop feelings of competence by actually developing competence.

7. Developed community commitment to the plan once made.

8. Developed a super-ordinate goal which promoted satisfactory group to group relationships.

9. Enhanced Problem Solving by providing lateral exploration of issues and information and maximizing interpersonal interactions in the participative process.

10. Provided a forum with maximum disclosure and discussion of all relevant issues--economic, political and social.

In order to achieve a viable Planning Panel, there had to be consideration of the other elements of the NASA Planning Process Structure.

Planning Steering Groups (PSG)

The function of NASA's PSG was to aid, support, provide administrative services and guide the Planning Panels. This researched assumed the PSG duties. In this case, there had to be specific attention to:

1. Top level support and genuine commitment from legal authority. The County Executive affirmed that the Planning Panel was not a device to "buy time."

The Planning Panel functioned with the participation of governmental resources and was charged with the goal of ultimately creating a viable center.

2. Clear Statement of Mission. This was necessary to provide a superordinate goal.

3. Frequent Task Meetings--to provide full flow of information and harmonize interpersonal contacts.

4. Involvement of other individuals and groups as additional skills and resources are needed.

Integration and Review Board

This function was performed by this researcher and the County Executive on an ad hoc basis.

NASA CONFIGURATION MANAGEMENT

The need for a strong "integration function" was apparent.
Not only were county departments pursueing essentially independent
courses of action, but coordination among various levels of
government, and public and private resources, was almost non-
existant.

The formal Configuration Management System was applicable,
but cumbersome in this situation. This research associate per-
formed the "integrator function" personally.

FOOTNOTES

1. New York Times, November 19, 1969.

CHAPTER IX

IMPLEMENTATION IN DE LA WARR

IMPLEMENTATION

The Planning Panel was established and the citizens' Ad Hoc
Committee was legitimized by having each member formally appointed
by the County Executive. Additional nominations were solicited
from community leaders to enable the Committee to be representative
of all geographic, racial, economic, etc., subgroups. Exhibit 1
is the letter appointment. There were twenty-seven original
members.

The citizens' Ad Hoc Committee was empowered to work in four
main areas:

1. Need Identification and Procurement

    Determine required services

    Arrange for them

    Coordinate among them

2. Facility

    Prepare facility requirements

    Recommend architect

3. Operation

    Prepare operational requirements

    Coordinate among the identified services

    Prepare to meet changes as required

EXHIBIT I

May 21, 1971

Your interest in the Community Services Center which is being planned for the former Oakmont Shopping Center site is greatly appreciated by your County officials and by your fellow citizens. I am hereby appointing you to the Community Center Advisory Committee, and I am asking that you give us the benefit of your advice and help in advising and carrying out a worthwhile program of community service from that Center serving the entire DeLaWarr School District area.

It will be the Committee's function to help us to design the precise physical facilities to be erected on the site; to help decide which social service programs shall be furnished at the site; to decide whether the site should include a social and community center for the immediate neighborhood; to recommend what outlying facilities might be provided in other neighborhoods; and to recommend what services might use the community center as their base of operations.

We are anxious to have every interested community in the district represented on this Committee and expect to enlarge it somewhat. I am reserving the right to ask for the resignation of anyone who is not able to attend the meetings and contribute to the problem.

I would appreciate your letting me know promptly if you cannot serve. I have asked Mrs. Deborah Wailes to act as Temporary Chairman, and she has called a meeting for Wednesday, June 2, 1971, at 7:30 p.m. in the County Council caucus room at the Public Building, 11th and King Streets, Wilmington, at which time the group will select its own Chairman and other appropriate officers. My representative on the Committee will be Mr. Mason Cadwell, consultant to New Castle County government.

Thank you for your willingness to serve and best wishes for a successful program.

Cordially yours,

William J. Conner
County Executive

WJC/smc

4. Proposal

    Prepare proposal for federal grant monies

The committee functioned initially to define the problems relevant to their goal of a social services center, and identify additional resources which would be relevant.

A. Problem Identification

    As well as the initially presented problem of the "Body Shop," there were--and are--underlying problems of juvenile delinquency, health and social welfare, drug abuse, medical and dental problems. These first identified problems served as the basis for initial organization around which additional problems were identified for solution.

B. Resource Identification

    In addition to the known and requested resources of the Delaware State Social Service Department, these additional resources were contacted and involved:

    1. Other governmental functions (Juvenile Correction, Department of the Ageing).

    2. Citizens' Groups (Civic Associations and Federations, Ad Hoc Committees, Volunteer Fire Departments).

    3. Professional Service Groups (Planned Parenthood, Community Action).

    4. New Castle County (Police Human Relations, Library, Parks and Recreation).

    5. Local School System.

An effort to develop the linkages necessary to the total effort was started.

Bringing together the various resources to attack the problem required cooperation among groups which heretofore had been pursuing more or less independent courses of action. Several activities were taken to build these links. This was a continuing effort, and required a delicate balance between achieving the desired participation without creating unreasonable expectations or otherwise jeopardizing the effort.

A. County Executive--State Department of Social Services

A "Confrontation Meeting"[1] was held by the county with the director and key staff from the State. The agenda consisted of:

1. How each sees his own problems and priorities.

2. How each views the other's problems and priorities.

3. How we can work together.

4. Who else should be included.

This meeting was successful. It ended with an off-the-record summary in which each organization candidly stated where it stood and agreement was reached on a plan for further action.

B. Federation of Civic Associations

In order for the Social Service Center to be viable, it must draw its clients from the surrounding community as well as in the immediate neighborhood. The immediate neighborhood was black. Surrounding this were white communities, roughly equivalent on a socio-economic basis. The county supported an effort springing from the people to weld the various different neighborhoods

together. The effort was in the critical stages of initial organization, and is known as DEAL--DeLaWarr Environmental Awareness League.

C. Other Resources

As relevant resources were identified they were contacted, informed of the DeLaWarr effort, and invited to participate

REDUCTION OF RACIAL TENSION

An additional problem in the DeLaWarr area was the racial tension between Blacks and whites.

Through their functioning, the committee would work on the "Tasks" necessary to make the social center a reality.* But their functioning would be also the first step in the "Process" of blacks and white working together. In solving the tasks before them, links would be forged between black and white. The positive experience would help reduce the racial tension which existed between them, and assist in the development of personal competence for the participants.

That this was successful was evident when a white community leader took me aside after a meeting--one at which a lot was accomplished--and said, "God damn it, Mace, these niggers, I mean blacks, are really people. I could even be friends."

That meeting, in fact, was the point where I observed the thrust of the weekly meetings shift from a bargaining attitude to

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*Note that these "Tasks" were in support of a superordinate goal, and not "merely a pleasant situation." See p. 84.

one of problem solving. Prior to then, each group in the meeting strove for accomplishment vis-a-vie the other. Information, goals, desires, values, strategies were concealed from each other until they were useful in accomplishing something specific. When problem solving became the primary _modus operandi_, these data, goals, and so forth, were shared more openly in an apparent effort to accomplish a superordinate goal, which would benefit all.

RESEARCH ASSOCIATE FUNCTIONING

For the next year, this Research Associate assisted the Ad Hoc Committee in their functioning in several ways:

1. As "Process Consultant"--"stopping the action" to examine what was going on in the committee meetings, to provide attention toward disfunctional or limiting behavior and encourage stability and acts of appreciation. For example, there were (especially in the beginning) many instances of incongruent communications (usually the words did not agree with the way they were said). When confronted, the communicants realized data was being filtered to meet preconceived notions--and when quality of communication changed, attitudes changed also. (As a side note, one had to be very careful to pick the right timing for this kind of an intervention. If intervention were premature, it tended to reinforce the conflict. There is no explicit advice for the reader to follow in deciding the timing of the intervention. For me, the decision seems intuitive and based on experience. Perhaps there were subtle cues from the exchange that the quality of communications was

starting to shift, and then the consultant clarified what was

happening and reinforced it.)

A case in point was consideration of inclusion of the Police

Family Crisis Intervention Unit in the Social Services Center.*

Initial discussion got nowhere. For several weeks, the contro-

versy raged. Then the patterns emerged. Each reason "pro"

generated a strong rationale against. Ground shifted from week to

week--and very seldom repeated itself. Finally, this researcher

intervened to have the Ad Hoc Committee examine the process which

had been taking place. That is, an examination not of the content

of what happened but how it took place. In the ensuing discussion

the patterns emerged of subgroups and individuals, who consistently

took one position or another. In exploring the patterns, addi-

tional data emerged: those against were afraid that "the govern-

ment and white community wanted police controls in the Black

area." Those for had been bullying and not listening.

The result was that communications became possible, and the

issue was settled. (An interesting point is that original plans

called for only plainclothes FCI personnel in anticipation of the

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*Family Crisis Intervention (FCI) is counseling technique used
by the New Castle County Police Department to try to get to root
causes of family problems--marital strife, runaways, etc.-- so that
they will cease to require periodic police action. The FCI Unit
developed as a part of the police defining their role in the
community as a service organization in contrast to the punative
thrust found in many police departments.[2]

police-station issue--but subsequently those who were previously

against the concept made a minimal uniformed enforcement capability

part of their approval requirements.)

2. As a link from the Committee to resources--As resources

which should be consulted or involved were determined, the research

associate functioned to get them together with the Committee.

Early in the year, this took some "arm twisting." Resources wanted

to be sure that the Committee was legitimate and viable, before

commiting themselves to participation. This was especially pre-

valent among professional people who had had limited contact with

underprivileged people and had stereotypes based on local riots

several years earlier. Additionally, some were personally

frightened to come into an area whose potential for disorder had

been widely publicized. Later, as the Committee's activities

became known, potential resources asked to become involved.

3. As county representative--

Contact with the county was maintained to keep council and

executive informed, to ensure unrealistic or unreachable goals

were not set, and to allow this program to be consistent with

other administrative and political activities. This was achieved

through periodic meetings with the County Executive, and by having

him participate infrequently in Committee deliberations.

These activities continued for over a year of Committee

meetings and integrative effort. Activities and interventions

were rejected which would have made the research associate role

one of "staff" to the Committee. The Committee had to do the

work if competence were to be developed. It could not be done for them. This was evident from the first. In the first meeting with the Committee the research associate made a statement that he could not solve their problems. He could help them solve them. He had access to resources, personal skills in organization and change which can help, but "he can't solve the problems that face you." A reply came from one of the blacks who had been agitating for further civil disorder. "We've been studied to death by eggheads who came, talked to us, got up our hopes, and then left and wrote some (stupid)* paper for other (stupid)* eggheads and nothing happened . . . ." This was the first step in my becoming accepted--after the reply, we started looking!

By assisting the Committee, but not doing the staff work, the research associate accomplished the following:

1. Followed the NASA Planning Panel Concept for planning in a participative process.

2. Observed the behavioral and sociological implications of the committee in action--a first cut at Ada Louise Huxtable's ". . . processes . . . forces of growth and decay, human factors . . . that cannot be pinned down on charts or graphs." and prepared for subsequent action based on the behavioral open systems model described above.

3. Paved the way for the "system to respond to them, rather than forging a mold in which they would be constrained (or

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*"Stupid" is not the word that was used.

co-opted). This met in an operational and evolutionary (contrast

with disruptive and revolutionary) fashion the issue of ". . .

white technology . . . instrument of oppression."

4. Faced the personal issues of identity, competence, self-

confirmation.

5. Forced lateral relationships and a concurrent problem-

solving approach.

6. Met the problems of planning in a turbulent environment

in that maximum attention was paid to the requirement for allowing

significant forces, issues, etc. to emerge and not become blinded

by preconceived notions.

OUTCOMES

The Ad-Hoc Committee functioned successfully:

A. An operational statement of needs was determined and used

as the basis for initial facility planning and resource procure-

ment.

B. Resources with application to specific needs were con-

tacted and involved in the planning process.

C. Initial facility planning was conducted in conjunction

with resource personnel. An architect was selected.

D. A proposal for additional Federal monies was prepared, in

conjunction with involved federal agencies, and submitted.

E. An initial operating and organizational scheme was prepared.

While the Ad Hoc Committee was functioning successfully, other

related problems became apparent:

A. Black-white relationships in the community were not particularly improving. Members of the Ad Hoc Committee functioned in a cooperative manner; but this had little impact on the area in general.

B. County services were not coordinated. Each department would participate fully in planning for the service center but there was no effort toward integrated planning in other problem areas.

C. State, county, school and private services were also still basically uncoordinated.

D. While county representatives who worked with the Committee have developed excellent working relationships, county and state officials were still looked upon in general by the community to be essentially uncaring and unresponsive to their needs.

While wrestling with an approach to solve these problems, another crisis developed: shooting in Belvedere.

FOOTNOTES

1. Invented by Richard Beckhart. See, for example, Beckhart's volume in the Addison-Wesley Series in Organization Development: Organization Development: Tactics and Strategy, Addison Wesley, 1969.

2. Sides, Eugene, Lt., Police, New Castle County, private communication.

CHAPTER X.

BELVEDERE

Belvedere is another primarily black, disadvantaged, unincorporated community in the county, with the county government the closest government to the people.

PROBLEM

A thirteen year-old boy was shot and in the hospital in critical condition. The community claimed racial conflict—teenagers from the affluent Brandywine Hundred area were harassing their children. An emergency meeting was called by concerned citizens—an attempt to mobilize government resources to be concerned with and to respond to their needs to stem anticipated further violence. This research associate was asked to the meeting by community leaders, as personal credibility had been established by the DeLaWarr efforts. Present at the meeting were representatives from:

Belvedere Community

County Recreation Department

County Police (who did not have jurisdiction)

County Executive's Office

State Police

State Department of Social Services

State Department of Corrections

United Fund

There was much arguing and shouting. The tone of the meeting

was defensive. Nothing was accomplished or resolved. Outcomes

were:

1. Citizens were convinced that the State Police would not

step up patrols or otherwise take action because". . . we have to

patrol Brandywine Hundred, too." (Brandywine Hundred is where

many advantaged whites live.)[1]

2. Issues of substance were not clarified nor were facts

clear. There were apparently some real problems underlying the

violence.

3. There were increasingly negative relationships between

government and citizens during the course of the meeting. Govern-

mental representatives who sympathetically reached out to comfort

the injured boy's father were "slapped down" by other governmental

representatives.

4. There was noticeable lack of knowledge, coordination,

and cooperation among governmental agencies.

The meeting broke up with hostility on all sides.

Subsequently, the State Police did increase their activities.

Community leaders redoubled their efforts to control troublemakers.

The hostility between government and community continued.

FURTHER EXPLORATION

Further exploration during the next week revealed that:

1. There were issues of substance, notably police services, housing, traffic, streetlighting and recreation.

2. Coordination among government departments, levels, and agencies was limited.

3. There was genuine commitment from most government representatives, from all levels, toward solving the problems and working with the community.

4. There was genuine commitment from most community residents toward working with government to solve their problems, and under-standing that action took time and budgets.

There was agreement among the various individuals and groups that the issues had to be clarified and solutions had to be sought. Yet the meeting called for that very purpose resulted in conflict and hostility.

Subsequent personal interviews with meeting participants about this issue identified two common trends:

1. From representatives of government:

"The Belvedere people are trying to push us around and don't understand the overall job we are trying to do. They want more than their share."

2. From representatives of the community:

"The government isn't doing anything to respond to our needs. Brandywine Hundred is more important than we are."

Quite obviously, there were vast communication gaps. There was much negative stereotyping and the factual information was

being suppressed, misinterpreted, and otherwise filtered to meet pre-existing convictions.

ACTION

The implementation of the Planning Panel in DeLaWarr was successful in generating cooperative relationships toward the goal of a community social service center. These relationships were necessary in Belvedere. However, the time element did not allow for a long sequence of meetings in which the relationships could be developed.

Thus, the action planned was to assemble the individuals who would constitute a Planning Panel and meet together for a long enough period of time to allow communications to take place. This researcher had previously identified the gap between intentions and outcome of the previous meeting. By focusing attention on this gap, and the feelings and attitudes which created it, it was hypothesized that the gap could be overcome.*

Thus, with the cooperation of the State Director of Social Service Centers, and the Governor's Assistant for Human Relations, an all-day workshop was planned to be held in the community, to try to attack both the substantive issues and the negative relationships between community and government.

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*The basis for this was established during the 1970 Boston University Seminar for Consultants in Organization Development, in which the author, together with seminar participants, used workshop techniques to overcome adverse police-community relationships in South Boston.

SUMMARY OF WORKSHOP

Participants

New Castle County Government

   County Executive

   Department of Development and Licensing

   Department of Parks and Recreation

   Department of Police

State of Delaware

   Department of Health and Social Services

University of Delaware

   Department of Health

Belvedere Community

New Castle County Housing Authority

Local School System

Published Purpose

The purposes for the workshop, as promulgated to those invited, were simply for:

Government and Community to:

   Explore needs and problems.

   Involve resources.

   Establish lines of communications.

   Plan for change.

What Happened

The morning was spent examining the attitudes, biases, habits, assumptions and feelings of the participants toward society, toward

existing organizations, toward each other, and toward themselves.

Surfacing these underlying factors enabled participants to examine factors which were influential but often unstated and to build preliminary bridges of understanding and trust to each other. The need to explore underlying factors was evident from the DeLaWarr experience (The police FCI controversy, for example).

The mechanism for this was a simulation game which included elements of negotation and bargaining in a three-tiered low mobility society.* The initial game state was carefully structured to include a "mix" of bureaucratic and citizen representatives at each level of the society.

The "game" went on only a short while when the lower society levels banded together and confronted the "top level" with the problems of being underprivileged. Using the game as a structure, participants worked through the feelings-issues confronting citizens and government today. This was fantastic and fascinating as at each level of the game were representatives of all levels of real life.

The end result was a genuine feeling for the agonies and responsibilities for each participant in his real work role--both

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*The game called "Starpower" was designed by R. Garry Shirts as an experiential tool for raising questions about the function of power in a competitive society. Details of the game are contained in Appendix F. This game was selected based on the writer's positive experiences from other community groups who had played the game. Apparently the experiential methods of working through the power and the emotional issues related to underprivledged areas produces significant results in communication and understanding among participants. This is an area for scholarly research.

those who look at themselves as being on the "short end of the stick" and those responsible for provision of services--for themselves, and for each other.

As well as generating personal growth and understanding, the game enabled group cohesiveness to be built across the previously divided bureaucratic and community representatives. This was necessary for the efficient use of the afternoon.

The afternoon was spent in self selected small groups exploring the parameters of the Belvedere problem:

1. Stating critical needs.

2. Defining resources.

3. Planning for action.

4. Assigning responsibilities.

WORKSHOP RESULTS

Results can be described on at least three levels--the level of specific issue-oriented actions, the level of communications, and the level of the attitudes of community and government toward each other.

A. Issue-Oriented Results

1. Key needs emerged: The areas of housing and recreation were primary. Abandoned houses were not only eyesores degrading the neighborhood, but were also used for drug traffic and prostitution. The local recreation program was inadequate in both content and availability during evening hours.

2. <u>Needed resources were defined</u>: As well as the resources
which were anticipated (and invited to the workshop), there were
several state agencies and private "Red Feather" (United Fund)
organizations identified peripheral to housing and recreation
functions. These were the various welfare and support agencies,
the juvenile authorities, and State Department of Labor. Plans
were made to approach and involve these additional resources.
An additional resource proved to be the community itself,
especially in the identification of relevant needs and under-
standing the complexities of the Belvedere environment.

3, 4. <u>Planning for Action and Assignment of Responsibility</u>
Action plans emerged on several levels:

A. County Government: The individual Departments represented
indicated the need for their departments to become more responsive
to the community, and for additional effort toward integration
of various county functions. Each department would attend to the
problem of responsiveness; an interdepartmental planning group
would be established.

B. Intergovernmental: The need for involvement of additional
government functions and the integration among governments was
identified. The state social service representative assumed the
"integrator" role.

C. Citizen: The use of citizens from the community as a
resource was noted above. In order to function more effectively,
the community started the development of a federation of area

associations. Included were the "Young Gents," the Belvedere
Civic Association, and the Fire Company. This amalgamation
resulted in inclusion of all known organizational and individual
strengths in a group which was expressly designed to perform within
the community on a continuing basis the communication and working
out of problems which was accomplished between government and
community during the workshop.

D. Integrator Function: The need for integration among
private and public sectors was identified as the result of work-
shop exploration of the housing issue.

The problem of abandoned housing was noted above. The county
had already taken title to the houses--but did not have the budget
for demolition. Additionally, those responsible for assigning
demolition priorities did not know of the prostitution and drug
issue. During the workshop these factors surfaced, and a new
solution was found. Eventually the quasi-private New Castle County
Housing Authority was planning new in-fill low income housing units
to replace the demolished housing. By transferring legal title
to the land from the county to the Housing Authority (and the
Housing Authority would get title later anyway), it was possible
to use federal program funds for demolition. Additional possi-
bilities, such as moving housing to these sites from houses con-
demned for highway construction was also considered, and those at
the workshop gave assignments to themselves to follow up all
possibilities.

The need for an "integrator function" to coordinate the
actions of various interested persons and groups was apparent; work-
shop participants established an informal network among them-
selves with specific plans to meet periodically over important
issues, involving additional resources and organizations as
appropriate.

B. Communication Results

Jockeying for position and the use of the communications
process in a competitive way was changed to joint exploration and
solution. An example is found in the recreation issue. Initially,
community representatives were complaining that the recreation
program had been cut in half. A governmental representative
responded by showing his budget which had been summarized by
computer in a comparison of current versus last year's actual
and planned expenditures. The computer printout showed the budget
almost doubled from one year to the next. This generated a shout-
ing match until some time later it was found that the current
year's budget included an allocation expense for department managers,
which had been absorbed in overhead the prior year. When these
facts became known, communications shifted from shouting to
exploration of what could be done within current limitations.

Another example was the statement by community leaders that
they had tried to communicate, but were continually shunted from
person to person, very politely, but with nothing ever accomplished.
Upon looking further, it was found that only three attempts were

made in the last year, and that the unresponsiveness was left over from the previous "Levy Court" form of government.

C. Attitudes

The indication of shifts in attitudes from conflict and hostility to cooperation was fourfold:

° Reports from the participants after the workshop.

° Behavior of the participants relative to each other in the workshop and for the weeks following the workshop.

° Outcome of a conflict measurement device administered pre- and post-workshop to participants.

° Inquiries from participants and non-participants about conduct of a workshop in other areas.

1. Reports from Participants

The author contacted each participant individually in the week following the workshop and six weeks later, asking the following questions:

° Was the workshop worthwhile?

° Would you participate again?

° Have you talked to (government) (community leaders) since the workshops?

° Have you talked (with your associates) (in your community) about the workshop?

All thought the workshop worthwhile and would participate again. Close to 100% of the participants had talked about the workshop with others in their environment; 30% of the community

and 66% of the government representatives had had contact with each other in the following week (rising to 50% and 87%, respectively, six weeks later).

2. Behavior of Participants

Behavior during the workshop was already noted. Post-workshop action included several instances of support of the community and responsiveness to problems. For example, a county vehicle was dispatched to aid the Civic Association in moving an aged resident thrown out of her home; a county recreation official met with community teen-agers to determine a program which would meet their interest, and citizens provided information to aid police in drug enforcement.

3. Conflict Measurement Device

Using a game theoretical approach, the author developed a measurement tool for assessing the dimension of conflict versus cooperation, over the course of the workshop. The experimental use of the tool is contained in Appendix G. Results were that cooperation was developed; however, scientific validity was not obtained due to lack of control and placebo data for contrast.*

4. Inquiries

The author received inquiries requesting the conduct of a

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*This is a good example of Action Research providing data which can point toward an area for rigorous scientific study. The author is developing a "programme" of follow-up investigation around the issues of a game theoretical approach to conflict and cooperation.

similar workshop in other areas of the state, concerning the
establishment of a participative planning process, started by a
one or two day workshop. Specific issues were: suburban low
income housing, rural social service delivery, and race relations.
The author either assisted as requested, indicated the need for
further preparation prior to an action program, or showed the
inadvisability of the requested technique for the specific prob-
lem.

OUTCOMES

The relevant outcomes were two-fold:

A. An attitude of conflict and hostility was replaced by
cooperative problem solving.

B. The relationships established between community and
government served to:

1. Enable government to become more responsive to
   community statements of need, and

2. Served to allow integration of effect without a
   separate integrator function.

FOOTNOTES

1. Author's notes from meeting. Quotation from state policeman.

SECTION IV

CONCLUSIONS

SECTION IV

CONCLUSIONS

The premise of the NASA/Drexel Program was that management technology developed for the space program could be utilized or adapted for application to urban problems.

A clinical methodology, "Action Research," was adopted to guide the operational implementation of selected technology to solve specific problems in the DeLaWarr and Belvedere areas of New Castle County. Within the conduct of the program it was found that the management philosophy which guided NASA in development of specific management tools to meet NASA's problems had relevance to this researcher's efforts. Thus, the scope of the program was expanded to evaluate the utility of NASA's philosophy and approach to management as well as the application of specific management tools to meet specific assigned problems.

Conclusions drawn from this study are summarized below from several points of view:

° Action Research Process

° Philosophy of Management in a Turbulent Environment

° NASA Management Technology

° Achievements in New Castle County

ACTION RESEARCH PROCESS

The Action Research Methodology provided that action-interventions be planned and taken in response to needs of the client system; and that these needs would be identified during the clinical phase of the NASA/Drexel Program.

It was therefore inappropriate for specific NASA technologies to be identified for transfer in advance. The broad treatment herein of NASA Management Philosophy and a display of available technologies which provided a "menu" for technology transfer selection, was an important preparation for working with the client system.

But the Action Research Methodology had a second important impact: issues of problem selection, identification of aspects of the environment which were of concern, pin-pointing the relevant phenomena, etc., were not determined in advance. They were determined in conjunction with the client in response to his particular problems. And these issues are the specific issues of decision making within a Turbulent Environment.

Thus, the Action Research Methodology prevented premature definition of the problem in order to meet available solutions, and established an approach which ultimately resulted in the identification of several sociological and psychological determinants of behavior (discussed more fully below) which previously were not included in decision making and problem solving activities within the client system.

There was, however, a hazard of Action Research which was confirmed by the current study:

Location of Initiative Too Exclusively with the Client

Action Research calls for clinical activity in response to client problems. At several points during the study, scientific inquiry was sacrificed when there were apparent conflicts with rapid achievement of client objectives. In retrospect, it is the author's opinion that more longer-range benefits would have been accrued, especially in generalization of this program to other situations, had scientific research not been aborted relative to measurement of racial prejudice (p. 74) and a game theoretical approach to analysis of conflict/cooperative behavior (p. 122 and Appendix F).

PHILOSOPHY OF MANAGEMENT

A "turbulent environment" is one in which the dynamics arise from (1) interaction among organizations within the environment, and (2) discontinuities with past experience; that is, additional factors and the multiple character of causal interconnections require that effort be invested in the determination of relevant factors and their impact on problems at hand prior to the application of some tool or technique which may have been effective in the past.

NASA Management Philosophy, as articulated in writings and interviews with senior management personnel, was more relevant to the specific action research performed by this researcher than were the tools used by NASA in its own functioning. This was due to the turbulent environment in which the NASA Administrator and senior managers functioned, and the buffering function performed

at these levels to reduce environmental complexity for NASA

component subsystems (and thus the management systems used <u>within</u>

NASA). The action research reported herein was also in a turbulent

environment; thus, the philosophy level was more useful than the

tool level for the planning of action interventions.

The specific elements of NASA Management philosophy were

articulated earlier (Chapter IV). Their application in the action

research phase led to several concepts which appear to have general

application within an urban environment.

1. <u>The concept of turbulence</u> led to a specific program of

identification of forces, issues, problems, etc., relative to the

situation at hand. It is this researcher's conviction that the

reliance on past history, and an inattention to discontinuities in

the present, lead to Huxtable's ". . . theories and presentations

that seem so intellectually compelling (but which) go up in smoke

when faced with the human and political equation . . ."

2. <u>Psychological and sociological concepts</u> were used opera-

tionally to guide action. The identification of black rage,

psychological feelings of impotence, inability to impact the

"system" except in violence, appear to be general problems facing

those responsible for management in the public arena. These were

approached in this Action Research effort through the mechanism of

a participative planning panel.

3. <u>The relationship of information availability and flow to a</u>

problem-solving effort are important. Additionally, the participa-

tive planning process led to a shift in attitude, which appears to

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be a controlling factor in the perception and use of communicated data. Thus, the concept of meta-communication, or attention to the forces which govern communication, is considered to be of the utmost importance.

NASA MANAGEMENT TECHNOLOGY

NASA Planning Panel

The NASA Planning Panel provided a process for participative planning of the DeLaWarr Social Services Center. Due to the turbulent environment, the relevant aspects of the problem had to be defined before beginning to approach solutions. The planning panel established in DeLaWarr brought together those closest to the problem--representatives of the needs (the community) and resources (government and private social service agencies)--in a long-term cooperative problem-solving effort. The planning panel also provided a base for attack on other problems, such as black identity and competence, group to group relationships (both black-white and citizen-bureaucrat), and provided a non-violent means for having the governmental system respond to community needs.

Additionally, in response to a shooting crisis, a one-day workshop in Belvedere successfully telescoped the long-term DeLaWarr process.

ACHIEVEMENTS IN NEW CASTLE COUNTY

1. DeLaWarr Social Services Facility

Groundbreaking ceremonies for the DeLaWarr Community Center

were held on Saturday, October 14, 1972. They were attended by the Governor of Delaware, and senior federal officials from the Department of Health, Education and Welfare, as well as representatives from State and County Government. This social service facility, with its broad definition of social and health (as contrasted with medical) services, together with the planning process which brought together needs and resources in a cooperative effort, were heralded on the groundbreaking occasion as a "prototype" for a newly conceived federal program for establishing federal centers for the advancement of human potential.

2. Establishment of Planning Panel

The Ad Hoc Committee had provided an excellent mechanism for channeling devisive picketing into constructive problem-solving efforts, and developing commitment towards the superordinate goal of social services for the area. Additionally, it provided a means by which specific needs, problems, and priorities within a turbulent community could be sensed so that an appropriate action program could be designed. The thrust of the Ad Hoc Committee was continued beyond its original charter by using its members as the basis for a citizen's Advisory Board to oversee the completed Social Services Center and its programs. Additionally, plans were made to involve citizens from contiguous communities in an effort to ensure the Center would be responsive to the needs of the total area, and to involve these additional communities in superordinate goal statement and development.

3. Communications and Coordination

Participation in the planning process enabled increased communications and coordination of various levels of government and private effort towards both the DeLaWarr and Belvedere areas. Once established, the integration of efforts was continued, both formally and informally (and subsequently was expanded to other problems of joint interest as diverse as dance theatre for teens, increasing the tax base, and "turn in a pusher" programs).

Additionally, the need to enhance communications and coordination within the County Government resulted in the establishment of an interdepartmental planning group which is responsible for internal coordination of departments and linkage with outside organizations as needed for specific projects and problems.

4. Federation of Associations in Belvedere

The need for a federation of the various organizations, as established during the workshop, was institutionalized. Each organization in the Belvedere area has representation within the Federation. The Federation serves as the mechanism within the community for identifying problems and establishing priorities, which are then pursued with government or other resources as appropriate.

A NOTE OF CAUTION

It is necessary to interject a note of caution for the reader who may desire to apply NASA techniques in other problem areas:

1. Specific Action Programs are extremely situational in
nature. The process of analysis (as asserted in this paper) is
of key importance in designing an action program. The current
program could not have been designed adequately without an under-
standing of the philosophy behind the technology selected.

2. The current program was in response to urban problems with
clearly stated goals. Although it is hypothesized that elements of
the present program may be applicable to problem areas of bargaining
and negotiation, no claim can be extended without additional
research.

3. The current program was performed in a unique social system.
There is no statistical comparison available. The concept of
equi-finality suggests that precise cause and effect relationships
may be difficult to determine. Quite obviously, there is the need
for further research in understanding management within turbulent
environments, the role of buffering, and investigation into appro-
priate research methodologies.

4. This research associate was given responsibility for
social change within the system under analysis. Thus, the
emphasis centered primarily on that responsibility. Interplay
between clinical responsibility and scientific analysis require
close attention.

LIST OF REFERENCES

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Ackoff, Russel The Design of Social Research. Chicago: of
Chicago Press, 1953.

Ackoff, Russel and Rivet. A Managers Guide to Operations Research.
Chicago: University of Chicago Press, 1962.

Archibald, K. A. "Three Views of the Experts Role in Policy
Making. Rand Courtesy Paper, 1970.

Bauer, R. A. (Ed.) Social Indicators. Boston: MIT Press, 1966.

Bauer, R. A.; Meyer, R. F., et al. "NASA Planning and Decision
Making, Final Report." Harvard Graduate School of
Business Administration.

Beckhart, Richard. Organization Development: Tactics and
Strategy, Addison Wesley, 1969

Bingham, C. F. Office of Organization and Management, "Policy
Profile Office of Organization and Management," Draft.
06-24-69,

Borschers, K. H., et al. "The Translation and Application of
Aerospace Management Technology to Socio-Economic
Problems," Paper presented to American Institute of
Aeronautics, 4th Annual Meeting, Anaheim, California,
October 23-27, 1967.

Breese, Gerald, et al. The Impact of Large Installations on
Nearby Areas. U. S. Navy Civil Engineering Lab., 1965.

Bright, James R. (Ed.). Technological Forecasting for Industry
and Government: Methods and Applications. New York:
Prentice Hall, 1968.

Brown, Courtney C., Dean, Columbia University Graduate School of
Business. Writing in the introduction, Space Age
Management. New York: McGraw Hill, 1969.

Carmichael, Stokely, and Hamilton, Charles V. Black Power, The
Politics of Liberation in America. New York: Vintage,
1967.

Carrick, Paul M., Jr. Planning a Least Cost Reliability Constructed Development Program. Paper presented to American Institute of Aeronautics, 1st Annual Meeting, Washington, D. C., June 29-July 2, 1964.

Chein, A., I. Cooke, J. Harding, "The Field of Action Research." American Psychological Bulletin, 3:43-50, 1948.

Chin, Robert. "The Utility of Systems Models and Developmental Models for Practitioners," in the Planning Change, 2nd Edition. Holt, Rinehart and Winston, 1969.

Crecine, John P. Computer Simulation in Urban Research. Santa Monica: Rand Corp., 1967.

Emery, F. E., and Trist, E. C. "The Causal Texture of Organization Environments." Human Relations, Aug., 1963.

Emory, W., and Niland P. Making Management Decisions. Boston: Houghton-Mifflin, 1968.

Emsoff, James R. Analysis of Behavioral Systems. New York: Macmillan, 1961.

Fourre, James P. CPM: A Practical Appraisal of PERT. New York: American Management Association Bulletin 114, AMA, 1963.

Gilmore, John S. and Coddington, Dean C. Defense Industry Diversification. U. S. Arms Control and Disarmament Agency, Government Printing Office, 1966.

Gilmore, John S., et al. Defense Systems Resources in the Private Sector, An Evolving Approach, An Uncertain Market. Washington, D. C.: Government Printing Office, 1967.

Haberstock, C. J. "Original Design and Systems Analysis," In J. B. March (ed.), Handbook of Organizations, New York: Rand-McNally, 1965.

Hagerty, William W. Manuscript prepared for Panel Session G-2, "Large Scale Technology Management," at the National Conference on Public Administration, Miami, Fla., May 20, 1969.

Hampton-Turner, Charles. "Black Power, A Blueprint for Psycho-Social Development," in Rosenbloom and Marris, (Eds.) Community Development: Working Papers.

Hopeman, C. J. Systems Analysis and Operations Management. New York: John Wiley & Sons, 1964.

Igo, Donald G., et al. Economic Impact Analysis - A Military
        Procurement - Final Demand - Vector, Vol. 1. McLean, Va.:
        Research Analysis Corp., 1967.

Knight, F. H. Risk, Uncertainty, and Profit. Boston: Houghton
        Mifflin Co., 1921.

Lawrence, Paul and Loraugh, Jay. "Organization and Environment,"
        Managing Differentiation and Integration. Boston:
        Harvard University, Division of Research, 1967.

Leontief, Wassily. Input-Output Economics. Oxford University
        Press, 1966.

Liebowitz, B. H. "Configuration Management of Computer Systems."
        Paper presented before the 4th Space Congress, Cocoa
        Beach, Fla., April, 1967.

McDonough, Adrian and Garrett, Leonard J. Management Systems,
        Working Concepts and Practices.

McWhinney, W. H. "Organization Form, Decision Modalities and the
        Environment." Human Relations.

Miller D. and Starr, M. Executive Decisions and Operations
        Research. Prentice Hall, 1960.

Milliken, J. G. and Gilmore, J. S. "The Transferability of
        Aerospace Management Technology." Published by American
        Astronautical Society, July, 1968, Denver, Colorado.

Mitroff, Ian. A Study of Computer-Aided Engineering Design.
        Berkeley: University of California, 1967.

Morrison, Edward J. "Defense Systems Management," California
        Management Review, Summer, 1967

Roskall, C. Administrative History of NASA. Washington, D. C.:
        NASA, 1958-1963.

Rudwick, Bernard H. Systems Analysis for Effective Planning.
        New York: John Wiley & Sons, 1969.

Sherif, Muzeifer. In Common Predicament. Boston: Houghton
        Mifflin, 1966.

Starr, Martin K. "A Modular Production--A New Concept," Harvard
        Business Review, Nov.-Dec., 1965.

Thompson, James. _Organizations in Action._ New York: McGraw
        Hill, 1967.

Vickers, G. _Conflict._ Glencoe: The Free Press, 1965.

Walton, Richard, "Advantages and Attributes of the Case Study."
        Journal of Applied Behaviorial Science, August, 1972.

Welles, John G., _et al._ _The Commercial Application of Missile/_
        Space Technology, Parts I and II. Denver Research
        Institute, 1963.

Wiedenbaum, M. L. "Shifting the Compensation of Government
        Spending: Implications for Regional Distribution of
        Income." Speech to Regional Science Association,
        Philadelphia, PA., Nov., 1965.

Wikesburg, A. K. and Cronin, T. C. "Management by Task Force,"
        Harvard Business Review, Vol. 40, Nov.-Dec., 1962.

Wiest, Jerome D. "Heuristic Progress for Decision Making,"
        Harvard Business Review, Vol. 44, Sept.-Oct., 1966.

APPENDICES

APPENDIX A

MEMORANDUM OF UNDERSTANDING
BETWEEN
DREXEL INSTITUTE OF TECHNOLOGY
AND THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

The Drexel Institute of Technology and the National Aeronautics and
Space Administration are of the opinion that future development in
the fields of aeronautics and space technology will require improved
understanding of large scale systems technology and management. We
agree that it is in the national interest to develop greater competency
in this field through expanded graduate education and
research. This Memorandum of Understanding sets forth our mutual
understanding and the guidelines that will govern our joint efforts
to achieve this objective.

In expanding and developing this nation's scientific and technological
capability to meet new requirements and new opportunities in
aeronautics and space, the National Aeronautics and Space Administration
has recognized a continuing need for persons who can work with
the new and expanding dimensions of science and technology and who
understand the broad administrative and management implications of
the large-scale programs carried out by NASA. The success of future
programs in aeronautics and space as well as in other areas of public
concern which can use the management methods and systems developed is
dependent upon the education and training of such individuals.

Further, it is believed that NASA's organization and management
experience over the past decade suggests that similar techniques
might be used to realize other national goals of a large-scale and
technology-based nature. We believe it is in the national interest
to investigate these management practices and the relevant technology,
to study possible transfers of this experience to other
national problems, to increase research in the relevant systems
management-related disciplines, and then to evaluate current graduate
school knowledge in the light of the knowledge gained.

We believe that the facilities and managerial staff of the National
Aeronautics and Space Administration offer many elements that may
be thought of as a research laboratory to give investigators the
opportunity to gain the data and experience necessary to form more
knowledgeable judgments on the items cited above. Consequently,
it is a basis of this Memorandum of Understanding that the National
Aeronautics and Space Administration will open appropriate elements
of its installations and activities and make appropriate members
of its staff available to faculty and graduate investigators
selected by the Drexel Institute of Technology.

We believe such NASA support and cooperation in research-oriented technology and administrative activity, in parallel with an energetic effort by the Drexel Institute of Technology to expand its research activity along with the strengthening of faculty and curriculum, can provide a combination of circumstances that will help meet the need for broader guaged and more effective administrators of research and development efforts.

Therefore, the Drexel Institute of Technology and the National Aeronautics and Space Administration agree to establish a pilot program in graduate education and research reflecting a multi-disciplinary approach to administration, management and the transfer of relevant technology. In recognition of their mutual obligations concerning the development and growth of this program, our two institutions agree to provide reciprocal support, advice and assistance.

The Drexel Institute of Technology will, within budgetary constraints:

1. Offer a curriculum leading to a doctoral degree in public administration or related management disciplines that includes consideration of the elements and best practice in the management of science and technology programs and prepares students for careers either as scholars or administrators of public programs involving the interaction of science, technology, and management.

2. Endeavor to develop increased interest, competence, and knowledge in the graduate faculty and to encourage research in the rapidly advancing areas related to large-scale systems technology and public administration.

3. Through intensive study and evaluation, identify those elements in NASA's technology, organization, and management which may be transferred to other large-scale national problems.

4. Continually update curriculum and methods of instruction to assure that emphasis is placed on an early utilization of research results and an effort is made to relate these to the real world problems administrators face in programs such as those carried on by NASA and other public agencies.

5. Endeavor to develop ways and means to stimulate use of the installations, activities and staff made available by the National Aeronautics and Space Administration, its associate contractors, or other governmental agencies by appropriate senior faculty and doctoral students working under their direction for systematic field research, analysis, and observation.

6. Encourage the inclusion of pertinent research material in the appropriate curricula of other Drexel schools and departments such as business, engineering, and the health professions.

7. Interrelate this program with other space research and educational endeavors at the Drexel Institute of Technology.

8. Observe pre-publication courtesies with respect to research findings permitting comment by appropriate NASA officials, which comment shall not be binding on the Institute.

9. Report semi-annually on the progress and development of the program to the National Aeronautics and Space Administration.

The National Aeronautics and Space Administration will, within the constraints of its operating budget:

1. Make available appropriate elements of its activities, facilities, and staff in the Washington Headquarters, field centers, and contractors' plants for use by investigators conducting research in this program.

2. Provide support to the Drexel Institute of Technology for carrying out its obligations noted in the above paragraph.

3. Recognize the right of the Institute and its faculty to publish research findings in any appropriate journal or other publication of its choice.

4. Monitor progress of the program in order to assure progress toward stated goals for both parties, and in order to determine the extent to which the program should be continued beyond the initial finding.

It is the purpose of both parties of the Memorandum of Understanding to so operate under it, that activities under it, will provide an enrichment of curriculum and strengthening of the faculty in a manner fully consistent with the goals, traditions, objectives, plans for development, prerogative, or freedoms of Drexel Institute of Technology.

Drexel Institute of Technology

Date   11 Aug 69

/s/ Wm. Hagerty
William W. Hagerty, President

National Aeronautics and Space Administration

Date   4 Aug 69

/s/ T. R. Paine
Thomas O. Paine, Administrator

APPENDIX B

WORKING PAPER ON ACTION-RESEARCH FOR NASA/DREXEL GRANT*

The NASA-Drexel Ph.D. Grant is based upon a number of assumptions. First, NASA has developed valid management technology in the process of achieving its organizational objectives. Secondly, that NASA's Management Technology, though honed and refined in clearly defineable terms for outer space objectives, is applicable for the management of large-scale and socio-technical urban problems. Thirdly, that the NASA-Drexel research associates and investigators will attempt to test out the transfer of NASA's Management Technology to urban problems. Finally, such a transfer to any urban client system must, of necessity, involve an Action Research Methodology.

Doctor Paine, Chief Administrator of NASA, has described NASA as a "digital" social system where the objectives were clearly defineable and the major problems were scientific. But Doctor Paine also described urban systems as "Darwinian" or evolutionary where many human factors impacted and could not be as controlled as in a "digital" system. Therefore, the problem of achieving a resolution of critical urban problems is fraught with social and political uncertainty and demands a different management and research capability.

The NASA Research Associates have identified NASA's planning process, configuration management, information systems, and simulation as generically invaluable and applicable to some urban problems. Therefore, an urban social system should be found where these specific management technologies could be tested out for their transferability and resolution to critical urban problems. In order to insure the successful accomplishment of this transfer the client or urban environment in which the NASA Team would work must of necessity have problems which match the possibility of transferring these management technologies. Sanction must be obtained from the highest governing unit in order to have authority to work within a particular system on a particular urban problem.

The key aspects of the model are the development of diagnostic skills, data gathering, feedback to the client group, data discussion and work by the client group, action planning, and action. Naturally this is a cyclical process involving the manager and those with whom he collaborates in studying the

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*NASA Grant, Third Semi-Annual Progress Report, June 30, 1970, Section 2.4.1.

existing situation, state, or problem. But managers are not only interested in understanding what is but also in what should be the preferred state. The question then becomes how to reach that objective through what kind of alternative interventions or strategies.

Action Research should be considered the science of design where courses of design or action are aimed at changing existing situations into preferred ones. In the example of the NASA Research Associates, they will be dealing with live, critical problems in a complex urban setting, attempting to design actions or interventions to correct or change situations or people to a more preferred state of function in accord with the goals of the responsible authorities.

The Action Research Design and methodologies would serve as strategies for the Research Associates in Public Administration. The change problems in real urban situations to which they will address themselves will serve as the laboratory where they will learn and test out their expertise. The dissertations will be scholarly descriptions of their analysis, designs, interventions, and evaluations of their efforts to change an existing situation into a preferred one. There will be developed a methodological framework and a theoretical base in order to provide a systematic way to understand and keep track of the impacts of the significant variables.

However, action research is just not an attempt to enter a particular client system as an expert, apply a known body of knowledge or skill, and exit. It is rather the effort to assist those within a particular system to develop the skill and knowledge to manage their system or problems on their own with greater expertise. Being multi-disciplinary in their training, the NASA Research Associates will make every effort to assist those within the particular client system to be responsible for changing and managing their own system in a more professional manner.

The Action Research methodology will proceed in the following manner:

1. Efforts will be made to gain initial entry to a particular urban system by June or September 1970. Sanction, and negotiation of terms of the relationships should be agreed upon before final entry.

2. Once initial entry is agreed upon, a period of two to three months should be utilized to study that particular client system in order to more fully understand how it functions and disfunctions. Furthermore, this initial explanation and orientation period should serve as a period of gaining wider acceptance and identification with that system. Finally, problem identification and definition would be accomplished in this exploration period.

3. Once problems are identified and agreement is negotiated with the client system, then each problem area will be studied as to strategies, designs or methods to effect change or influence to a preferred state. Alternative methods will be considered for each problem. Every effort will be made to consider the behavioral and organizational consequence of every intervention so as not to upset the homeostasis of that system.

4. Concurrent with the action research, evaluation of the particular projects will be made by the Associate Investigators, and the organizational preceptors. When appropriate, some of the preceptors may serve as adjunct professors. All of these will serve as process observers of the action research and provide consultative assistance.

5. Finally, upon successful accomplishment of the action research, a descriptive dissertation will be presented with hypothesis, action steps, and consequences or results, with generalizations drawn from the research. Successful action research should produce three basic outcomes: (1) the achievement of the planned change, (2) new knowledge, and (3) a manager of increasing professional competence.

The problem to which the NASA Research Associates will address themselves must be doable within a time span of eighteen months, in order to terminate the action-research and accomplish the objectives of the Ph.D. degree. Finally, the client system in which the NASA Research Associates will function must provide a responsible official from within the system who will serve as a preceptor for the NASA Research Associates as they study and assist in resolution of particular problems.

This NASA-Drexel Action Research can be considered then as management problem-solving in complex urban social systems, where the action focuses not only on observing, but on the effective change, or transfer, of management technologies to the resolution of urban problems. Each Research Associate will call upon his increasing knowledge in technology, management science, behavioral science and public administration in the resolution of the particular problem, and he must also perform professionally as a change agent in order to achieve his Ph.D. . . .

Action Research Definition and Theory

A major strategy and focus in urban government management will be to the action research model. Behavioral scientists involved in organizational development and change are convinced that this model is most valid for learning in such a rapidly changing society as we have created. This model has been described by William Fotte

Whyte as "a continuous fathering and analysis of human relations research data and the feeding of the findings into the organization in such a manner as to change behavior." The following figure summarizes some of the essential phases of the action research model.

Figure B-1. An Action Research Model for Organization Development[1]

Joint action planning (Objectives of OD program and means of attaining goals, e.g., "team building")

Feedback to key client or client group

Further data gathering

Data gathering and diagnosis by consultant

Consultation with behavioral scientist consultant

Key executive perception of problems

Action (new behavior)

Action planning (determination of objectives and how to get there)

Discussion and work on data feedback and data by client group (new attitudes, new perspectives emerge)

Feedback to client group (e.g., in team building sessions, summary feedback by consultant; elaboration by group)

Data gathering

etc.

Action

Action planning

Discussion and work on feedback and emerging data

Feedback

Data gathering (reassessment of state of the system)

APPENDIX C

MODEL BUILDING

BACKGROUND

After intensive preparation and analysis of NASA Management, the decision was made to go ahead with the plans to test the applicability of the NASA techniques through involvement within a particular urban system. The sociological technique of participant-observed would be utilized, with the added dimension that the research associate would take management responsibility within the system.

Prior to selection of an urban system for implementation, an Action Research Model was articulated.

The question still remained: are these techniques of NASA applicable within an urban setting? In whole? In part?

In response to that anxiety, this researcher investigated two additional models of scientific progress:

The first—the model of paradigm application and advancement—the model of scientific method (or the model of "strong inference").*

The second—the model of paradigm failure—the model of scientific revolution (the Kuhn model).*

---

*Referenced below.

MODEL OF SCIENTIFIC METHOD

The scientific method consists of:

> . . . systematic application . . . of the following steps to every problem in science formally and explicitly and regularly:
>
> 1. Devising alternative hypotheses;
>
> 2. Devising a crucial experiment (or several of them), with alternative possible outcomes, each of which will, as nearly as possible, exclude one or more of the hypotheses;
>
> 3. Carrying out the experiment so as to get a clean result;
>
> 1'. Recycling the procedure, making subhypotheses or sequential hypotheses to refine the possibilities that remain, and so on.[1]

Platt continues with the problems involved in the systematic approach to new areas:

> On any new problem, of course, inductive inference is not as simple and certain as deduction, because it involves reaching out into the unknown. Steps 1 and 2 require intellectual inventions, which must be cleverly chosen so that hypothesis, experiment, outcome, and exclusion will be related in a rigorous syllogism; and the question of how to generate such inventions is one which has been extensively discussed elsewhere. What the formal scheme reminds us to do is to try to make these inventions, to take the next step, to proceed to the next fork, without dawdling or getting tied up in irrelevancies.[2]

It is this system which provides the system for the classic scientific approach.

However, as Thomas Kuhn has documented, something quite different from the "systematic application . . . (of the) steps formally and explicitly and regularly" happens in scientific revolution.
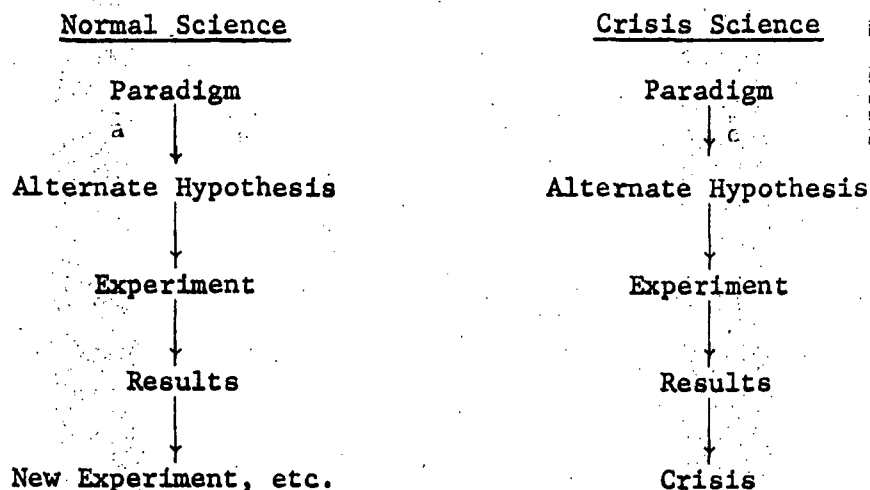
THE MODEL OF SCIENTIFIC REVOLUTION

The Kuhn Model

Thomas Kuhn, in his analysis of the structure of scientific revolutions, makes the distinction between "Normal Science . . . the further articulation and specification under new or more stringent conditions (of a paradigm)"[3] and "Crisis Science . . . paradigm change and the emergence of a novel theory (after a) . . . pronounced failure in the normal problem solving activity."[4]

Both Normal and Crisis Science use the techniques of "strong inference" described above. But, while normal science concerns itself with the articulation of a paradigm, Crisis Science begins with the blurring of a paradigm. Paradigm change starts with unresolved anamoly generating paradigm failure.

The difference can be diagrammed:

Normal Science	Crisis Science
Paradigm	Paradigm
a ↓	↓ c
Alternate Hypothesis	Alternate Hypothesis
↓	↓
Experiment	Experiment
↓	↓
Results	Results
↓	↓
New Experiment, etc.	Crisis

Kuhn points toward the change in behavior exhibited by scientists in crisis situations: they turn to "philosophical analyses as a device for unlocking the riddles in their field."[5]

Confronted with anomaly or with crisis, scientists take
a different attitude toward existing paradigms, and the
nature of their research changes accordingly. The
proliferation of competing articulations, the willing-
ness to try anything, the expression of explicit dis-
content, the recourse to philosophy and to debate over
fundamentals, all these are symptoms of a transition
from normal to extraordinary research.[6]

The process of scientific revolution appears to be analogous
to research into the philosophy of creativity. That is, in contrast
to the continued progression of accomplishment, there is activity
leading nowhere or to failure.

The steps in the creative process:

1. Sustained effort.

2. Disillusionment.

3. Illumination or Insight (usually the same data-set, but

   put in a new way--which may have been blocked by the

   old paradigm).

4. Verification.

C. E. M. Joad explores the historical perspective of this
creative phenomenon.

Modern psychological theory supports the Platonic
account of the aesthetic process, more particularly in
respect of its recognition of two distinct stages, the
first a stage of sustained intellectual effort, the
second an ensuing flash of intuitive apprehension,
which are very similar to those affirmed in the
Symposium and the Republic. A brief account of modern
psychological work on the subject may serve a useful
purpose in developing the Platonic view.

In a well-known work, The Art of Thought, Professor
Graham Wallas summarized the information which modern
psychology has obtained with regard to the processes
involved in the birth of new ideas in the world of
thought and original inspiration in that of art. His

summary goes beyond that of Plato's account in that
it distinguishes four stages in the process which
leads to the making of a new generalization, the
discovery of a new formula, the devising of a new
invention or the conception of a new work of art.
The first is that of Preparation, during which a
particular problem is investigated in all directions;
the second, that of Incubation, during which no
conscious thinking is done in connection with the
problem or work of art with which the creative
thinker or artist is concerned; the third, consisting
of the "happy idea," together with psychological
events accompanying that appearance, is called
illumination; and fourth, embodying the working
our and application of the idea in thought or the
execution of the work of art, Vertification.

Particular stress is laid upon the importance of
Preparation as a preliminary to Illumination.
Professor Wallas speaks of the many men of genius who
have done their best work after a period of idleness.
But the period of idleness must itself be preceded
by a spell of hard thinking, during which the intellect
is working at full pressure. To adopt the language
of modern psychology, we may say that consciousness
during the Preparation stage propounds a problem,
collects the relevant data and explores different
avenues for a possible solution. A period of rest
ensues during which the problem and relevant data
are transferred to the unconscious. That the
unconscious may work effectively consciousness must,
so far as possible, be unoccupied. The solution is
worked out by the unconscious, and appears in due course
in consciousness as the "happy idea" of the scientist
and the inspiration of the artist.

The conclusion bears out Platt's hint in the Symposium.
Wallas like Plato stresses the fact that the "happy
idea" which succeeds the period of hard thinking is
of an entirely different order from the thinking itself.
It outruns the thinking, and, although it is led up to,
is far from being necessitated by it. The mind, in
other words, makes a definite jump, and it is for this
reason that in the sphere of science a subsequent process
of "vertification" is necessary.[7]

CONCLUSIONS

Action Research provides the model for intervention into an

urban system to meet problems of that system. And, in doing so,

utilizes paradigms of management learned from NASA.

Prior to entry into the urban system, it is unknown whether solutions will lie in paradigm application or paradigm change. Models for each were stated. It also appears that Scientific Revolution is found in a Turbulent Environment, and Scientific Inference in less complex environments, an area for further research.

FOOTNOTES

MODEL BUILDING APPENDIX

1. Platt, John R. "Strong Inference." Science, Vol. 146 #3642, 10 October, 1964, p. 347.

2. Ibid.

3. Kuhn, Thomas. The Structure of Scientific Revolution. University of Chicago Press, 1962, p. 23.

4. Ibid., p. 75.

5. Ibid., p. 87.

6. Ibid., p. 90.

7. Joad, C. E. M. Guide to Philosophy. New York: Random House, 1936, pp. 329-330

APPENDIX D

CRITERIA FOR SELECTION OF ACTION RESEARCH PROJECT

for

Drexel University – NASA Team

March 2, 1970

Action-research is the vital link in the testing of the transferability of NASA's technology to solving urban problems. The selection of the appropriate location and the related project or projects is therefore crucial.

The basic criteria for the selection are as follows:

1. The invitation should be approved by the highest governing unit to which the project is related.

2. The inviting unit should have adequate resources (legitimate authority, financial resources or political influence) to carry out the project.

3. The inviting group should be able to provide or arrange for adequate financial resources to meet the local expenses involved in the action-research.

4. The action-research should focus upon the transfer of the planning-configuration management process, information management and simulation.

5. There should be a reasonable chance of success in achieving the goals of the project.

6. The length of time for the action-research should not exceed 15-18 months depending on the starting date and should be completed by January, 1972, at the latest.

7. Preferably, the Research Associates should be able to function as a team of professionals in relation to the participants in a particular project.

8. Within the action-research the Research Associate shall be responsible for carrying out and reporting upon an identifiable aspect of that research. The resulting thesis based upon this research shall fulfill the academic requirements of Drexel University.

9. The project should have local participants with the competence and authority to see the project through to its completion.

10. The project should be of such scope as to involve the coordination of the efforts, resources, and approval of several governmental agencies and/or private agencies.

11. The project should be relevant to a major social issue.

12. The appropriate governmental authorities should approve in principal the planning of the particular project.

13. The planning for the particular project should include representatives of the persons or group directly affected by the project.

14. The appropriate NASA authorities should be in agreement about the action-research.

15. The location of the action-research should be within a reasonable commuting distance of an hour or less from Drexel.

16. The host agency or agencies should appoint a preceptor from within their organization to whom the NASA Research Associates can report, test out hypotheses, and receive feedback.

APPENDIX E

THE DE LA WARR AREA*

Of all the suburban school districts within the immediate vicinity of Wilmington, I would assign the highest priority to the De La Warr School District in terms of participation in the local anti-poverty program. To validate this observation, it is important to discuss the De La Warr districts in the larger context of metropolitan Delaware.

In preparing its report on the demographic and socio-economic characteristics of the metropolitan area, the research staff on the Community Services Council subdivided the populous northern section of New Castle County into six metropolitan districts. Wilmington city is treated as a separate district; the Brandywine Metropolitan District is coincident with the Brandywine Hundred, the Alex I. Dupont District is roughly synonomous with the area served by the school district of the same name; the Newark Metropolitan Special School District; the Southwest Metropolitan District combines the service areas of the Conrad High School and Dickinson High School; and the New Castle Metropolitan District, which contains in its northern portion the De La Warr School District, is coincident with the boundaries of New Castle Hundred.

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*Summary of remarks presented to representatives of the De La Warr School District by Lawrence Schein, Research Director of the Community Service Council of Delaware, on February 2, 1965.

In a comparative analysis, our attention is obviously on the
New Castle Metropolitan District which had in 1960 a youthful,
highly fertile population and the largest family size of the six
metropolitan districts of northern Delaware. Compared to the
other suburban districts, the New Castle area has the lowest
average family income and the highest rates of poverty and
unemployment; it was the only suburban area to contain a
substantial negro population. Compared to all metropolitan
districts in northern Delaware, including the city of Wilmington,
the New Castle District had proportionately the smallest white
workers, the fewest adults with college training and the fewest
families in the highest income brackets.

In the terminology of economists and sociologists, the
Brandywine and Alex I. DuPont districts display traits which have
become identified with the "affluent society." The Newark and
Southwest districts with their nearly equal division between white
collar and blue collar workers may be termed middle income or
middle class areas. Taken together, the Wilmington and New Castle
districts--the latter inclusive of the De La Warr area--present a
very different socio-economic profile. Essentially these two
districts show a high frequency of low income and lower middle
income neighborhoods; the area could be described as working class
in nature with respect to both its white and nonwhite inhabitants.
In one sense, the New Castle district represents an extension of
many of the working class and lower income characteristics found
in the city of Wilmington and this is particularly true of the

northern segment of the New Castle Metropolitan District which
embraces the area served by the De La Warr District.

The De La Warr District, as of the last dennial census, con-
tained a population of 17,687 persons inclusive of approximately
1500 patients at the Delaware State Hospital. Slightly over one-
fifth of the De La Warr population was Negro; This ratio closely
resembles that obtained in the city of Wilmington. Of the De La
Warr districts Negro population of 3800 persons, 88% were concen-
trated in Tracts 154 and 155---the Dunleith, Millside, Oakmont,
Eden Park, Simonds Gardens, and Holloway Terrace sections.

Median age of population in the school district was slightly
less than 27 years. Whites, on the average, were 27 years of
age and Negroes averaged about 25-1/2 years. The minimum age
differential between Negro and White in the De La Warr district
stands in sharp contrast to Wilmington where a very much older
white population co-exists with an extremely youthful Negro
population. In the De La Warr district median age would be even
younger where the population at the Delaware State Hospital
excluded from the statistical base. For example, upon elimination
of the female institutionalized population in Tract 153, the
median age for women in the district is but 23 years; white women
show a median age of 24 years and nonwhite women averaged 20-1/2
years of age.

Fertility in the De La Warr district is considerably above
average for the county with the anomaly that the white fertility
is higher than the Negro fertility. This can be seen by examination

of fertility ratios for 1960, that is, the number of children
under 5 years of age per 1000 women in the child bearing years 15
through 44. Exclusion of the female institutionalized population
from the base for calculation yields a white fertility ratio of
704 children under 5 years per 1000 women in the child bearing
years compared to a Negro fertility ratio of 632. In the city of
Wilmington, the Negro fertility was 707. Since the Negro De La
Warr population is slightly younger than Wilmington's Negro popula-
tion but demonstrates a lower fertility ratio, it is suggested that
this differential fertility may indicate a trend to smaller
families among middle income families living in the Oakmont area
of Tract 154. It should also be noted that the white fertility
ratio in the De La Warr district is of the same high order of
magnitude as that demonstrated by Negro inhabitants in Wilmington.
Family size in the De La Warr district is subsequently relatively
high--an average of slightly over 4 persons per primary family
unit.

In speaking of family characteristics, it is well to point
to the extent of family disorganization within the district as
measured by the proportion of youngsters not living in complete
families. In the De La Warr district 950 children under 18 years
of age or 135 of the area's youthful population did not live with
both parents in 1960. This rate for children living in broken
or incomplete families is somewhat higher than for other suburban
metropolitan districts although considerably lower than the rate

which was obtained in the city of Wilmington. In suburban New Castle County as a whole, 8-1/2% of children and youth were living with one parent, with relatives other than their parents, with non-relatives or in institutional arrangements. In Tract 165, close to one in every four youngsters were not living in a completed family unit.

With respect to migration into the area, it is noteworthy that the proportion of Southerners in the De La Warr district is greatly higher than for most other sections of the northern county. Of 1950 persons coming into the De La Warr section from southern states. There is also a tendency for De La Warr district to draw proportionately more city people than is the case for other suburban areas: 15% of the district's 1960 population reported living in Wilmington 5 years earlier.

The median family income in the De La Warr district was $5954 in 1959 as reported in the 1960 census. This figure stands in contrast to median family incomes of $8900 in the Brandywine district, $10,000 in the Alex I. Dupont district, $7100 in Newark and Southwest Districts and closely parallels Wilmington's average family income of $5600. Since the average family income in the New Castle district as a whole was $6300, this means that these families living in the area served by New Castle Special School District to the south of the De La Warr district were living in somewhat more advantaged economic circumstances. Of De La Warr's 3825 families, 405 or 10-1/2% lived in poverty according to current common definitions, that is, with income of less than $3000

annually. If the less than $4000 poverty criterion is used as
recommended by the Conference on Economic Process, then 819 De La
Warr families or nearly one of every five would live in economic
deprivation. In the district, wealth and poverty are very evenly
balanced: 11% of families had incomes in excess of $10,000.

Of the 405 families earning annual incomes of less than
$3000 or 303 or fully three-fourths, were concentrated in the
three Northern tracts of the districts: 153, 154, and 155. At
least one-third of these low income families were Negro. The 405
low income families in the district represented one of every ten
low income families in suburban New Castle County in 1960.

Only one-third of the De La Warr district's employed workers
were in white collar capacities compared to slightly over half
of all workers in the county as a whole who were engaged in
professional, technical, managerial, sales and clerical employment.
In the county, the single largest occupational group consisted of
professionals and technicians: 17-1/2% of all employed workers.
In the De La Warr district, on the other hand, the single largest
group was composed of operatives of semi-skilled workers. One-
fourth of all employed workers were assemblers, filers, grinders,
polishers, guards, furnacemen, welders, apprentices and the like.
Nearly half of all workers were unskilled or semi-skilled, working
laborers, operatives, domestics and service workers. The male
employee rate in the De La Warr district in 1960 was about 7%--
considerably higher than in all other areas with the exception
of Wilmington.

Educationally, the De La Warr district does not present impressive credentials. 70% of all adults, i.e., persons 25 years of age or over had not finished high school; 405 had not completed ninth grade; only 8% had had at least one year of college training. It is significant to note that in the De La Warr district, the public is the primary form of educational experience; in 1960 85% of all children of school age in the district were enrolled in public schools compared for example, to about two-thirds of school children in Wilmington similarly enrolled.

With respect to housing characteristics the De La Warr district shows an exceptionally high home ownership rate: 85% of all housing were owner occupied. Of the districts 4324 housing units, units in the amount of 11% were in deteriorating or dilapidated condition. Of all the substandard units in the De La Warr area, 347 or 71% were located in the northern tier on Tracts.

Both the foregoing remarks as well as the data presented in the attached tables show a reasonably well defined socio-economic differential obtained between the northern and southern sections of the De La Warr district. The southern tier of tracts show a higher proportion of white collar workers, greater adult educational attainment, higher family income, and generally less severe problems of substandard housing when compared with the three Census tracts whose boundaries adjoin the Wilmington city line.

APPENDIX F

STAR POWER

R. GARRY SHIRTS

This is a game in which a low mobility three-tiered society is built through the distribution of wealth in the form of chips. Participants have a chance to progress from one level of society to another by acquiring wealth through trading with other participants. Once the society is established, the group with the most wealth is given the right to make the rules for the game. They generally make rules which the other groups consider to be unfair, fascistic and racist. A revolt against the rules and the rule-makers generally ensues. When this occurs the game is ended. The game is useful for raising questions about the uses of power in a competitive society.

Preparing for the Game

Dividing the Participants and Assigning Chips

The participants are divided into three approximately equal groups named: squares, circles and triangles. Each person wears a symbol representing his group, i.e., the squares wear a square symbol, the circles a circular symbol and the triangles a triangular symbol.

Each participant is given five chips. Each square receives one gold chip, one green chip and the remaining three randomly selected from the colors red, white and blue. Each circle is given one green chip and the remaining four selected from the colors red, white and blue. The triangles are given a random assortment of red, white and blue chips. The only exception to this distribution is that one circle and one triangle receive the same distribution as the squares, i.e., one gold, one green and a random assortment of red, white and blue.

Determining the Chips Required for a Game

The TOTAL number of chips required equals:
5X number of participants

red chip, his score would equal 4 x 5 (for the blue chips) plus 15 (for the red chip) plus 10 points for distribution of the same color for a total of 45 points. Three reds and two blues would equal 45 + 5 + 10 or 60 points. Five reds: 75 + 20 or 95 points.

3. Distribute the chips as outlined previously to the squares, circles and triangles.

4. Explain the following rules of bargaining.
   a. They have ten minutes to improve their scores.
   b. They improve their scores by trading advantageously with other squares, circles and triangles.
   c. Persons must be holding hands to effect a trade.
   d. Only one for one trades are legal. Two for one or any other combinations are illegal.
   e. Once participants touch the hand of another participant a chip of unequal value or color must be traded. If a couple cannot consummate a trade they may have to hold hands for the entire ten minute trading session.
   f. There is no talking unless hands are touching. This Rule Should Be Strictly Enforced.
   g. Persons with folded arms do not have to trade with other persons.
   h. All chips should be hidden. This Rule Should Be Strictly Enforced.
   i. Do not reveal that the squares are given chips of a higher value than the circles or triangles.
   j. Any other rules that you deem appropriate.

Start the Trading Session

1. After the rules have been explained, start the trading session. Tell them it will last 10 minutes.

2. During the trading session, your assistant should be putting each participant's initials on the blackboard.

3. After 10 minutes of trading session, have each group return to their circle of chairs.

4. Have the participants compute their scores for the trading session, record them on their score sheet and hand the score sheet to your assistant.

5. Have your assistant record the scores on the blackboard opposite the person's initials. (The initials and their scores can be put on by the participants themselves if an assistant is not available.)

The number of GOLD chips required equals:
The number of squares plus 2

The number of GREEN chips required equals:
The number of squares plus the number of clients plus 1.

The number of RED, WHITE and BLUE chips required equals:
5X number of participants minus the total number of green
and gold chips required. There should be about an equal
number of red, white and blue chips.

Example: Suppose you have 34 people and divide them into
12 squares, 12 circles and 10 triangles. The total number
of chips required equals: 5 x 34 or 170. The total number
of GOLD chips required equals: 12 (the number of squares)
plus 2 or 14. The total number of GREEN chips required
equals: 12(the number of squares) plus 12 (the number of
circles) plus 1 or 25. The total number of RED, WHITE
and BLUE chips required equals: 170 - (14 plus 25) or
131 which means about 44 of each color.

Explaining the Rules

1. Tell the participants that this is a game that involves
trading and bargaining and that the three persons with the highest
scores will be declared the winner.) They will probably ask later
in the game if there is going to be a group winner. The answer is:
("The three individuals with the highest scores will be declared
the winners.") Do not tell them that a group is going to be given
the right to make the rules for the game.

2. Explain the following scoring system to the participants:

Every gold chip is worth 80 points
Every green chip is worth 25 points
Every red chip is worth 15 points
Every white chip is worth 10 points
Every blue chip is worth 5 points

Additional points are given if a person is able to get
several points of the same color.

Five chips of the same color are worth 20 points
Four chips of the same color are worth 10 points
Three chips of the same color are worth 5 points
No extra points given for two chips of the same color

Example: A person's total score if he had 5 gold chips
would be 250 plus 20 for 5 chips of the same color for a
total of 270 points. If he had four blue chips and one

6. Explain the rules for the <u>bonus points session</u>. The rules are:

   a. Hold up a bonus chip (a double chip) and tell them that this is a bonus point chip.
   b. Give each group three chips.
   c. Tell them that each chip is worth 20 points.
   d. Their task during the bonus session is to distribute the bonus chips to members of their group.
   e. The chips must be distributed in units of 20 or more, that is, one person might receive all 3 bonus chips and 60 points or 3 people could not receive 10 points each.
   f. They have <u>five minutes</u> to distribute the bonus chips. If the groups have not distributed the chips at the end of the five minutes, the points will be taken back by the director and no one will receive them.
   g. The decision regarding the distribution of chips must be unanimous vote.
   h. Participants can eliminate people from their group by a majority vote. (Eliminated people can form another group.) They should be a triangle group.

7. Answer any questions.

8. Start the bonus chip bargaining session.

9. After about five or ten minutes, end the bonus chip bargaining session.

10. Have those people who receive bonus points record them on the blackboard opposite their initials.

11. Put those people with the highest total scores in the square groups. If there is a circle or a triangle who has a higher score than a square, have them trade groups. Any changes should be announced to the group, and it generally made known that so and so who was a square has become a circle, because they did not receive enough points, and so and so who was a circle, is now a square because they received a higher number of points than a square. In any event, it is important that the group know that the squares are made up of those people with the highest scores.

12. Start the second round.

   NOTE: Repeat this cycle--bargaining session, bonus session, reclassification for one or two times or until the participants understand the process and the fact that the squares are high scorers.

13. After about the second bonus session, announce that the squares now have the authority to make the rules for the game and that while any group can suggest rules for the game the squares will decide which rules will be implemented. You might tell the squares that they might want to make rules like: re-distribute the chips on a more equal basis, require triangles and circles to bargain with the squares even though they have their arms folded, require triangles and circles to give squares the chips they ask for regardless of whether they want to trade or not, etc. Announce any rules that the squares establish to all of the participants unless they want them kept a secret.

14. From then on, play it by ear.

What is likely to happen is that the squares will make very tough rules that protect their own power. This has happened in every organized group that we have played it with so far. The circles and triangles will either give up, organize, become hostile, or commit an act of frustration and defiance. Stop the game when it is evident that the squares have made rules which the others consider unfair and fascistic. This is generally after two to four rounds. After the game gather the group together and discuss the implications of the game for the real world.

Some questions you might want to discuss at the end of the game.

a. Are there any parallels between the system set up by the game and the system or subsystem in which we live?

b. Does the game say anything about the nature of man?

c. Is it the nature of man to seek inequality? To attempt to be better than his fellow man, to seek for more privileges and wealth? If yes, is there anything wrong with such strivings. Can they be legitimized? Is there a moral alternative to man's search for inequality?

d. Would it have made much difference if the people who were the circles had been the squares?

e. Were the squares acting with legitimate authority?

f. Are there any parallels between the game and the race problem, the campus problems, the problems faced by our founding fathers?

g. If an entire group acts in unison such as the circles and triangles frequently do in going against the squares, does their actions have more legitimacy than when a person acts alone?

h. Is the square a masculine or feminine symbol?

i. Would it be possible to develop a game which emphasized cooperative behavior and is fun to play?

Summary of Rules for Running Star Power

1. Prepare distribution of chips.
2. Divide participants into three groups.
3. Distribute symbols to appropriate groups.
4. Distribute chips.
5. Explain rules for trading session.
6. Have the group trade for 10 minutes or so.
7. After ten or so minutes stop trading session and have the participants return to their original group.
8. Have them record scores on slips.
9. Give three bonus chips to each group.
10. Explain rules for bonus chips to each group.
11. Give the participants five to ten minutes for bonus chip session.
12. While they are in bonus group session collect all the chips originally distributed and prepare them for the second round of distribution.
13. End bonus chip session.
14. Revise the scores on the board to reflect points received from the bonus chips.
15. Promote high scoring persons to squares and demote low scoring squares to circles or triangles.
    END OF THE FIRST ROUND
16. Repeat process.
17. After second or third round give rights to make rules for the game to the squares.
18. Play it by the nose from then on.

One note of caution. Generally groups need to talk about the game in personal terms or, "who did what to whom" before going on to the issues involved. This can be an important experience in interpersonal relationships, helping members of the group understand their reaction to authority, competitive situations, etc. However, it is important that this discussion does not damage the ego, status or self-concept of any of the participants. If you see the discussion going beyond the point of friendly rivalry, then you might direct it more forcibly toward the issues involved rather than the personalities. If in the unlikely event that the squares are being badly scapegoated, then you might point out that every group that has participated in the game thus far has reacted in essentially the same manner and in general try to direct the discussion toward the question of whether any group put in such a situation would act any differently.

APPENDIX G

EXPERIMENT

The tension between conflict and cooperation has long been the subject of scholarly research. This problem transcends the usual limits of scientific application. No matter what the state of verifiable and reliable knowledge, decisions are made daily--in personal and local affairs, between states and nations--which are known to be based on limited knowledge of human affairs.

Game Theory is a powerful tool in the examination of conflict and cooperation. To date, it has been used in the laboratory with hired subjects (or with students, often part of a course). A recent study which included behaviorial concepts is R. Ackoff's work for the U. S. Disarmament Commission.[1] This study used student subjects from the University of Pennsylvania and Drexel University, and ends with a hueristic finding: to optimize your payoffs, play the so-called platinum rule--do unto others as you expect them to do unto you.[2]

It is my thought that this role reversal theory is a function of similar attitudes the subjects bring with them to the game.

An experiment was conducted, with subjects who were genuinely hostile with one another, in a real life setting, to examine their characteristics of play in a simple 'game'. Inconstancies found in experimental results from studies in Game Theory are hypothesized to be related to the normative values brought to the analysis by the

subject, and not representative of inadequacy in the theory per se. The experiment was conducted as part of a behaviorial workshop, with change in play behavior characteristics measured a priori and posterior to the experience.

GAME THEORY

Game Theory is a rigorous deductive approach to the study of conflict and cooperation in human behavior. Springing from the monumental work of Von Neuman and Morgenstern published at the close of World War II,[3] it is judged by many to stand on a par with Newton's celestial mechanics as a scientific achievement.[4]

However great the conceptual achievement, though, Game Theory has proved less than useful as a predictive model of human behavior. Experimental evidence yields significant paradoxical results,[5] which have been subject to attempts to resolve them logically.[6,7,8,9]

For instance, take the often-used "Prisoner's Dilemma."[10]

Prisoner's Dilemma

	β_1	β_2	
α_1	R,R	S,T	
α_2	T,S	P,P	T>R>P>S

The rows of this matrix contain outcomes (in utilities) for α_j strategies; columns contain outcomes for β_j strategies.

The dilemma becomes clear with a numerical example:

	β_1	β_2
α_1	3,3	0,5
α_2	5,0	1,1

Rationality (as always in Game Theory) means doing the best for oneself. Following the now-classic Game Theoretical Approach of Von Neuman and Morgenstern,[11] equilibrium and therefore solution lies at α_2, β_2. If communication and agreement between players are possible, α_1, β_1 provides a superioe (i.e., more "rational") outcome for **both** players.

However, with actual experimentation with this particular matrix (and similar matrices) uncooperative behavior (α_2, β_2) characterized subject behavior under conditions of communication and agreement ranging from zero to total.[12]

Various modifications of theory have been devised to satisfy this dilemma. However, I hypothesize that the dilemma is created not by inadequacies of game theory, but by normative values beought to the game by the players.

VALUE SYSTEMS

Social Scientists have long been aware of the interaction between values and society. Weber's analysis of the connectives between social values and capitalistic institutions[13] perhaps

initiated modern interest in the phenomenon.[14] Additional studies

have investigated various interrelationships: achievement,[15,16,17]

economic development,[18] and family patterns.[19,20]

However, the literature on social and cultural change, although

extensive, contains little emperical attention to the research

issues: what are the profiles of value component associated with

individual and group behavior?[21] Furthermore, most studies are

laterally comparitive due to the pragmatic considerations of the

long time constant of societal change, effect of external influences,

and the time frame available for study and publication.[22]

The O. D. Workshop, based on its T-Group antecedents, has as

one of its prime resultants the shift in participant attitude

from individual goal setting to group goal setting, from initial

hostility to trust, from original heirarchical authority expecta-

tions to collaborative leadership. The group "culture" at the

termination of the experience as compared with the start contains

operational normative values of trust, openness, and joint

responsibility for resolving conflicts. An experiment is designed

longitudinally with a "Prisoner's Dilemma" the measure player

prior and posterior to a workshop with T-Group naive subjects.

MEASUREMENT SELECTED

A Prisoner's Dilemma-type matrix game, known as "Chicken"

was selected. Cell values as shown:

+5,+5	−1,+10
10,−1	0,0

Note the minimax solutions:

For α

5	−1		−1
10	0		0 ← ——— MAXIMIN

For β

5	10
−1	0
−1	0 MIN

MAXIMIN

Thus, we find equilibrium at $(\alpha_2\beta_2) + 0,0$.

If either player deviates, and his opponent does not, the opponent receives +10, while the player who deviated receives −1.

If both players deviate, each receives +5.

Playing the $(\alpha_1\beta_1)$ strategy requires communication and trust between the players.

If trust, communications and goal setting which involve the totality of game playoff is followed:

i.e. $\Sigma (\alpha_1 + \beta_1)$ =   Payoff   =   10

We can expect $\alpha_1\beta_1$ in experimental play.

Note that: $\Sigma(\alpha_1 + \beta_2) = \Sigma(\alpha_2 + \beta_1) = 9$

and $\Sigma(\alpha_1\beta_1) > \Sigma(\alpha_2\beta_1)$

If goal setting is versus opponent, then we find communication and pattern of play which results in mixed behavior, designed to obtain +10 for oneself.

PLAY OF THE GAME

Play was pre- and post-workshop. A control group was solicited from friends of the players not attending the workshop.

When the game was played, no instructions were given to direct attention toward either conflict or cooperation.

Communications between players (but not among) was allowed to permit reaching $\alpha_1\beta_1$ agreement.

DATA

The game was played pre- and post-workshop. Data are summarized by player's patterns of behavior:

	COOPERATIVE PLAY	CONFLICT PLAY
PRIOR TO WORKSHOP	27%	73%
POST WORKSHOP	92%	8%

DATA ANALYSIS

The present study has not provided statistical valid data, as experimental data did not include provisions for learning processes, subject matching, and longitudinal and lateral control groups.

The data indicates, however, a phenomenon which needs rigorous investigation.

FOOTNOTES

1. Emshoff, James. <u>Analysis of Behavioral Systems</u>. New York: Macmillan, 1971.

2. Ibid.

3. Von Neuman and Morgenstern. <u>Economic Behavior and the Theory of Games</u>. 1944.

4. Rappaport, A. "Critiques of Game Theory," <u>Modern Systems Research for the Behavioral Scientist</u>. Buckey (Ed.) Aldine, 1968.

5. Davis, M. D. <u>Game Theory</u>, Basic Books, 1970.

6. Shubik, M. "Game Theory, Behavior, and the Paradox of the Prisoner's Dilemma: Three Solutions." <u>Journal of Conflict Resolution</u>, Vol. XIV, #2.

7. Luce, R., and Raiffa, H. <u>Games and Decisions</u>. Wiley, 1957.

8. Orwant, C., and Orwant, J. "A Comparison of Interpreted and Abstract Versions of Mixed-Motive Games." <u>Journal of Conflict Resolution</u>, Vol. XIV, #1.

9. Schelling, T. <u>The Strategy of Conflict</u>. Harvard University Press, 1960.

10. Rappaport, A. <u>Two-Person Game Theory</u>. University of Michigan, 1966.

11. Von Neuman, J., and Morgenstern, O., op. cit.

12. Davis, M. D., op. cit.

13. Weber, M. <u>The Protestant Ethic and the Spirit of Capitalism</u>. New York: Scribner, 1958.

14. Turner, J. H. "Patterns of Value Change during Economic Development: An Emperical Study." <u>Journal of Human Organization</u>. Vol. 30, #2.

15. Klukhohn, F. "Dominent and Substitute Profiles of Cultural Orientation." <u>Social Forces</u>, Vol. 28, 1950.

16. Rosan, L. "The Achievement Syndrome: A Psychological Dimension of Social Stratification." <u>American Sociological Review</u>, Vol. 21, 1956.

17. Kahl. "Some Measures of Achievement Orientation." _American Journal of Sociology_, Vol. 65, 1965.

18. Turner, op. cit.

19. Goode, W. _World Revolution and Family Patterns._ London: Free Press, 1963.

20. Inkeles, I. "Social Change and Social Character: The Role of Parental Mediation." _Journal of Social Issues_, Vol. 11, 1955.

21. Turner, op. cit.

22. Ibid.

23. See for extensive discussion of these and other T-Group related factors: Argyris, C. "T-Groups for Organizational Effectiveness." _Harvard Business Review_, March-April, 1964; and Bradford, et al. _T-Group Theory and Laboratory Method._ John Wiley, 1964.