COMMUNICATION IN'THE ORGANIZATION

AS A SOCIO-TECHNICAL SYSTEM


by


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SECTION I:   BACKGROUND

This first section places the present work in the context of scientific theory in general, and specifically of the history of organizational theory. It provides definitions necessary for understanding the rest of the paper.

CHAPTER ONE

SCIENTIFIC THEORY AND ORGANIZATIONAL COMMUNICATION

> The conferees encourage research relating speech-communication theories to the theories and research of related areas of study . . . Opportunities . . . exist to advance speech-communication theory and research through amplification and refinement of formulations originating in other branches of the behavioral sciences and the humanities (Kibler & Barker, 1969).

The growing field of organizational communication, which overlaps so many other disciplines, should be a logical location for the type of cross-fertilization the participants in the conference (above) recommend. However, the difficulties of mastering multiple fields cause inter-disciplinary approaches to receive more paraise than application. Yet the lack of such synthesis is a major limitation to the growth of the study of organizational communication.

Studies of communication in organizations usually relate one communication variable to another or to an attitude variable. They involve such questions as "Are formal and informal channels active at the same time?" "Are 'good leaders' also 'good communicators'?" "Does horizontal

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communication supplement or supplant vertical communication?" After a series of studies, the answer is usually "sometimes."

The purpose of the material presented here is to provide a way out of this dead end by providing a theoretical base which relates communication in the organization to the nature of the organization itself.

This first chapter will begin by presenting the need for a theoretical basis for science. That is followed by a discussion of the requisite parts of a theory-- definitions and scientific laws. Following are criteria for evaluating theory, humanistic and scientific. Then the deficiencies of current theory of organizational communication are discussed in light of the criteria presented.

The paper then procedes to forecast the theory that will be presented to remedy the deficiencies discussed. The ideas of writers in three main areas--organizational technology, environment, and goals--are summarized. The chapter concludes with a brief statement of purpose for the dissertation as a whole.

## Need for a Theoretical Base

> The basic aim if science is theory.  Perhaps
> less cryptic, the basic aim of science is to find
> general explanations of natural events
> (Kerlinger, 1964, 10).

A scientific field is nothing if it is not empirical--the scientist must get his feet wet, test out his ideas in the world of reality.  At the same time, science is also nothing if it is not theoretical.  A random collection of facts, however thoroughly verified, does not constitute a science.

In some fields such as  Speech Communication and educational research, there seems to be a tendency for anyone with a new idea to procede immediately to run a study to try and verify it.  Sociologists, in contrast, seem to spend more time considering, developing, and arguing about theory.  Rather than than doing a new study, they often try to bring new insights to existing data, an approach which leads to considerable re-hashing.

A balance between new work and the thoughtful consideration necessary for theory-building is what is necessary, and that sense is a difficult one to develop. Possibly the study of organizational communication has failed to develop the theoretical side of science because

of a desire for immediately applicable results. Many
studies are the result of a response to a pressing need
in some organizational setting, rather than a theoret-
ical interest.

But the field will continue to be inadequate unless
these scattered problems can be brought together under
more general concepts and explanations. Such work is
beginning to be more widely recognized in other behavioral
science fields as well. Altman writes:

> Interest in synthesizing knowledge in the be-
> havioral sciences has only recently grown and,
> even now, only a small minority see such work as
> equal in importance to the empirical generation
> of new "facts." But the picture should rapidly
> change . . . Thus, the time may be ripe for
> making the classification of knowledge a res-
> pectable area of scholarly contribution and
> one worthy of support and reward (1968, 48).

### The Parts of a Theory

#### Inter-related Concepts

> Definition. A theory is a set of interrelated
> constructs (concepts), and definitions, and
> propositions that presents a systematic view
> of phenomena by specifying relations among
> variables, with the purpose of explaining and
> predicting the phenomena (Kerlinger, 1964, 11).

A theory, therefore, consists of terms, definitions,

and the propositions that specify their inter-relationships.

Einstein (1923, 1936) pictures the ideal science as a

series of organized layers.  The lowest levels are "sense

impressions" such as readings on dials, color changes,

sounds, and movements.  The upper layers combine and

explain the direct findings.  They are "freely invented"

by the scientist, but then must be related to and modified

by sense experiences.

> The aim of science is, on the one hand, a com-
> prehension as complete as possible, of the
> connection between the sense experiences in
> their totality, and, on the other hand, the
> accomplishment of this aim by the use of a
> minimum of primary concepts and relations (83).

The Paradox of the Hierarchy of Concepts.  But  though

a science is built in layers, we immediately come to

a paradox in the relationships among the layers.  For

example, "observations" are supposed to be direct and

immediate, and theory is supposed to be built on them.

Yet we must have theory even to make the most straight-

forward observation.  What an "instance" is, or whether

something is an instance of "A" or "B" can only be deter-

mined on the basis of theoretical understanding.

Without a system, we can no more make meaningful

observations than we could take dictation in a language

foreign to us.  Kaplan comments

> The proper concepts are needed to formulate
> a good theory, but we need a good theory to
> arrive at the proper concepts. . . . Like all
> existential dilemmas in science, of which this
> is an instance, the paradox is resolved by a
> process of approximation:  the better our
> concepts, the better the theory we can formulate
> with them, and in turn, the better the concepts
> available for the next, improved theory (1964,
> 54).

The paradox may not always be solved so easily.

A much-patched theory may require radical re-thinking and

revision rather than improvement.  But the scientist

must remember that all parts of theory are inter-related,

and decisions regarding methods and measurements will

have a bearing on the final generalizations produced.

<u>Definitions</u>

Definitions are the first part of a theory.  The

way language is to be used is a very significant part

of entering any new field of experience.  Roger Brown,

a leading linguist, writes:

> If you go to visit the family that has a pet
> zebra they will teach you his name.  If you go
> to live with the Hanunóo or among rice growers
> in this country  they will begin by teaching
> you their ninety-two names.  If you undertake
> to study zoology your teachers will start out
> by showing you pictures of <u>protozoa</u>, <u>coelenterates</u>,
> <u>hydra</u>, and the like.  It is as if every linguistic

community, parents at home or nationals of
another country or teachers of a science, adopts
the same policy toward neophytes:  "Let us
begin by defining our terms."
     The whole point of defining terms is to
make it possible to go on and say something
useful employing those terms (1965, 339).

Bormann divides definitions into two types:

operational and non-operational (1965, 77).  These two

types will be considered and related to the needs of

scientific theory.

     Operational Definitions.  Bormann writes that

Operational definitions are the basis for
concepts in the natural sciences.  The con-
cept is a kind of a shorthand way of stating
the operations that would be performed to
determine specific gravity or temperature
(1965, 77).

At one point, the behaviorists seemed to believe that

the use of the operational definition was the true

route to making the social sciences truly scientific

as well.

     The term defined was to be considered nothing more

than the operations carried out to test it.  For example,

a "hungry" rat is one at 80% of his normal weight.

However, in more complex cases, the operational approach

limits the attempt to discover better tests of the

variable.  Many studies described "intelligence" as

"what intelligence tests measure" before scientists

began to realize that the tests themselves could be

inadequate (Tyler, 1965, 10-15).

Similarly, the strict operational approach does
not encourage the use of multiple methods of measure-
ment. Since "A" is a certain set of operations, no
other seems to be needed. But Denzin (1970) strongly
argues that such a multiple approach is needed for
social science:

> The combination of multiple methods, data
> types, observers, and theories in the same
> investigation is termed multiple triangualtion.
> While it may be difficult for any single inves-
> tigation to achieve this full combination, it
> is certainly possible to utilize multiple data
> levels and methods.
> These remarks suggest a standard for eval-
> uation of studies: The greater the triangula-
> tion, the greater the confidence in the observed
> findings. The obverse is equally true. The
> conclusion is evident; Sociologists must move
> beyond single-method, atheoretical studies (472).

But there are still advantages to the operational
approach. It forces the investigator to look at what
actually actually occurs before proceeding to interpre-
tation. Such a step is particularly important in the
planning of a study based on a theory. In the writing of
the theory itself, other types of definitions become equally
important.

Non-operational definitions. "[N]onoperational
definitions are of three kinds: (1) conventional defi-
nitions, descriptive definitions, (3) prescriptive defi-
nitions (Bormann, 1965, 77)."

A conventional definition simply gives the meaning of the word as commonly used in a linguistic community. Descriptive definitions go beyond that to include some reference to reality. A linguist could conventionally define magical beliefs or spirit beings as their names are used among the aboriginals. In contrast, Aristotle defining God as the unmoved mover was attempting a descriptive definition.

The third type of definition is prescriptive. This means that it does not prescribe only how a word ought to be used--all definitions do that--but how men ought to act. An example would be the definition of science as a "value-free" activity. Such a definition does not mean that people do not call activities involving values "science," but that scientists ought to avoid that type of contamination in what they do.

Use of Types of Definition. All types of definition may find their place in a theory. Simply conventional definitions are least useful, since the goal of science is to describe reality, but sometimes they make it possible for the discussion to proceed. Descriptive definitions are central to theory. They should have implications for the operational definitions that are used to apply them to

empirical work. Prescriptive definitions whould be largely confined to meta-theory--that is, our discussions about how theory should be made.

Improvement of Definitions. Several suggestions can be provided for the improvement of definitions in theory.

1. The author should offer well-thought-out definitions and not assume his meaning is understood.

2. The author should be aware of previous usage, and either maintain the conventional meaning or explicitly depart from it.

3. Definitions of terms should be related to the author's understanding of reality, and, if possible, to direct experience. That is, there should be implications for putting them into operational terms.

4. Every attempt should be made to clarify the definition, both by providing actual examples and "ideal types."

## Scientific Laws

The definitions of a theory are connected into a series of scientific laws

The Nature of Scientific Laws. A law is a universal statement of the form "All A's are B." Statistical laws are similar, but indicate that a predictable

percentage of A's are B.  But not all statements of this form are laws.  The first problem is tautology:  the second, the problem of causation.

First, to be a law, a statement must not be simply a tautology.  The terms related must have independent meaning.  Madden explains:

> [A] law is a universal conjunction of terms
> or variables.  The qualification we need to
> add is "independently defined terms or variables."
> Consider the following sentence:  'Only the fit
> survive.'  Yet if there is no other criterion
> of the occurrence of fitness than survival,
> then the two concepts are not independently
> meaningful and consequently they stand in a
> definitional rather than a lawful relationship
> (1960, 207).

The point seems obvious, yet it affects many of our current studies.  For example, Baker (1973) criticizes a study by Jain (1973) for exactly this type of problem.

> I am not sure what most of the correlation
> coefficients in the Jain study mean because of
> a contamination problem. . . . For instance,
> "supervisors expressing appreciation for the
> subordinate's work" is represented as an inde-
> pendent variable and "expressing appreciation
> for good work done" is represented as a dependent
> variable! (132-133).

A second problem is the non-causal statement. Philosophers of science sometimes try to avoid this way of referring to the problem.

> Some philosophers of science, it is true,
> insist that scientists do not bother with the
> notion of cause at all. Cause-and-effect gen-
> eralizations, they say, hold only within ranges
> whose limits are unclear and therefore that
> certain unmentioned factors remain  constant;
> therefore, scientists disregard the concept of
> causality in favor of the more sophisticated
> notion of lawfulness or functional connection.
> . . . Actually, however, it matters little for
> our purposes whether scientists talk about
> "causes" or "laws" or whatever, since . . .
> the very same difficulties beset one no matter
> which of these terms he tries to define or
> clarify (Madden, 1960, 201).

The classic example of the true, but non-law state-

ment is "All apples in this basket are red." But while

some authors attack this from the concept of confirmation

(Scheffler, 1963), and others stress counter-factuals

(Chisholm, 1955), basically they are all trying to show

that what is wrong with the statement is that the terms

are accidentally, rather than causally related.

Scientific laws, then, must provide causal explan-

ations. Hempel and Oppenheim (1948) discuss the parts of

a causal explanation. It consists of the item to be

explained, which is either a fact or a lower-order theory,

the antecedent conditions, and general laws. The item to

be explained could be logically deduced from the general

laws and the antecedent conditions.

For example, in explaining the striking of a match, the antecedent conditions would include the sulfur and phosphorus composition of the match, the oxygen in the surrounding air, the physical striking, and so forth. General laws would include the concept that friction produces heat, that the ignition point of the chemicals is so many degrees fahrenheit, and others. Obviously, a complete causal explanation can never be given. However, it is the function of theory to indicate which antecedent conditions are significant, as well as to provide the general laws.

Other Forms of Explanation. Two other forms of explanation are sometimes offered as part of scientific theory. They are called teleogical and historical explanations. The first type, the teleogical explanation, is goal or future-oriented. Such explanations as "The rat pressed the lever to get a reward," or "the firm expanded to make a greater profit," are teleogical.

The second type, historical explanations, relate a present event to the past. Historical explanations may refer to events in the history of an organism  or an institution that led to the current situation.

But behavior often does not reach the goal it seeks, and it may not be related to the goal in any rational way. And particular historical conditions do not produce particular results, either for men or institutions. Rovere comments in his biography of Senator Joe McCarthy:

> But even if we accept as revealed truth all
> that had been said and all that may be assumed
> about his early life, we are still lacking any
> necessary background for a demagogue of genius.
> Adversity and rejection may scar the soul or
> enlarge it or have no identifiable consequences.
> He could have grown up shy, awkward, compul-
> sively industrious, too much mothered in what
> we can picture as the meager conditions of
> life in Grand Chute in the twenties and been
> something very different from what he turned
> out to be: an Outagamie County farmer like his
> father, a respectable dentist in Appleton, a
> priest, a Communist functionary, a burglar,
> a respected public servant in the great Wiscon-
> sin tradition, or Joe McCarthy (1959, 82-83).

The present author agrees with those who believe that teleogical and historical explanations are better re-cast in terms of current processes. That is, the scientist should refer to present motivations rather than to future goals, and the on-going processes begun by historical events rather than the events themselves.

## Criteria for Evaluating Theory

Theories are evaluated in two ways--strictly on their scientific value, and humanistically, on the effects it is expected they will have on the well-being of man. Social science theories are often particularly subject to attack on humanistic grounds.

### Humanistic Evaluation

Value Arguments in Science. One curious phenomenon in the literature on organizations is that each school of thought accuses the others of being the enemy of progress, the defender of the status quo. Many writers also claim severe social, human, and economic costs if the views of the others are adopted. In one sense, such criticisms are extra-scientific. Scientists have long fought for the independence of their minds, the right to follow where their facts and theories lead them. They point to Galileo and the Inquisition, the adoption of the genetics of Lysenko in Russia, and the prostitution of science under the Nazis and rightly insist that they can owe allegiance to no ideology.

A typical view is stated by Kerlinger:

If we said that the aim of science is the betterment of mankind most readers would quickly read

the words and accept them. But the basic aim
of science is not the betterment of mankind.
It is theory (1967, 11).

Both social and other scientists often find the

claim that their work is "value-free" a convenient screen

to hide behind. Gouldner (1969) comments in rather ex-

treme terms.

Before Hiroshima, physicists also talked of a
value-free science; they, too vowed to make
no value judgements. Today many of them are not so
sure. If we today concern ourselves exclusively
with the technical proficiencies of our students
and reject all responsibility for their moral
sense, or lack of it, then we may someday be
compelled to accept responsibility for having
trained a generation willing to serve in a
future Auschwitz (617).

Action Implications. We have called the value

judgments we are concerned with extra-scientific. Rudner

describes some of them:

If it is necessary to make a value de-
cision to have a science before we can have
one, then this decision is literally prescien-
tific and has not been shown to be any part of
the procedures of science. Similarly, the
decision that one problem is more worthwhile
than another is an extraproblematic decision
and forms no part of the procedures involved in
dealing with the problems decided upon (1954, 363).

However, Rudner believes that problems concerned with

the application of results are part of the scientific

process since they deal with the acceptance and rejection of hypotheses. The present author believes that questions of the _use_ of knowledge gained from science are also non-scientific but nevertheless significant.

It is these implications for action, rather than the weight of evidence, which arouse so much furor. For example, the assertion by a prominent psychologist that American Negroes are actually hereditarily inferior to their white compatriots in intelligence might well be taken as a rather uninteresting statistical result. The finding, even if true, is based on an average taken from such a broad range of scores as to make it impossible for us to make any statements about individuals or small groups. Further, it is not part of a theoretical statement about the nature of intelligence or its heredity.

But people are, of course, infuriated because they believe--probably correctly--that those who accept this "finding" will use it to support certain practices which

others believe undemocratic and inhumane. And they be-
lieve such practices will not be abolished by the "self-
correcting" nature of science. Criticisms of organizational
theories are based on similar considerations.

Organizations control large portions of our lives.
We are born in them, educated, married, divorced, and
die in them. Anything that would de-humanize organizations
or make them harmful to those who work in them or deal with
them would be very significant to society. On the other
hand, many projects of the future will require the coop-
eration of many people, and a theory facilitating such
cooperation could be of immense value. Therefore, we are
obligated to consider the nature of values and the potential
effects of a theory proposed for organizations.

Underlying Values. Certain American values underlie
the philosophical arguments that occur. They include
(1) the importance of the individual, (2) equalitarian-
ism, (3) a positive value on risk and free choice, (4) the
value of work and accomplishment, and (5) economic and
technical progress.

The value of the individual is reflected in the legal
maxim that it is better for a hundred guilty men to go
free than for one innocent man to be punished. Indeed,

our whole system of justice in theory is built around the importance of both the accused and the humblest victim of crime. This value is also expressed in the tremendous efforts often exerted to rescue a single victim of accident, even at great risk to the rescuers.

Equalitarianism rests on the importance of the individual, but emphasizes the rights of all to equal opportunity (see Boorstin, 1973, chap. 53). It is somewhat in conflict with the value of hard work and accomplishment. Americans do accord differential respect, but we feel it should be earned rather than given. Status in our society is supposed to be achieved rather than ascribed (Brown, 1965, 103).

Another value in American society is freedom of choice and risk. One is not supposed to cling too much to security, to the tried and true. Of course this value is held within limits—daredevils are not necessarily admired—but it is still very real (Brown, 1965, 698-707).

In recent years, Americans have begun to have some doubt and distrust regarding the nature of economic and technological progress. Environmental destruction, the dissatisfaction of young people, and the apparent inability

of technical resources to create desired social change
have led to devaluation of science and technology for
their own sakes. Yet the broad, underlying faith in the
system that has brought so many so much of the world's
goods remains (see Boorstin, 1973, pt. 9).

Conclusion. This author believes that the effects
of a theory, while not directly part of a scientific eval-
uation, should be considered by the scientist. Such an
evaluation of the present theory will be included in the
final chapter of this work.

## Scientific Evaluation

There are also strictly scientific, as contrasted with
humanistic, considerations for evaluating a theory. They
involve developing or choosing the best theory from the
materials offered.

Given alternative theories, then, how is the scien-
tist to choose among them? The criteria developed below
are based on Madden (1960, 3-13).

First, a theory must account for the facts. A theory
that does not accord with the known facts is obviously
not adequate.

Second, a theory must account for as large a group
of facts as possible. A small, special-purpose theory

must yield to a more inclusive one. A theory is partic-
ularly valuable if it leads to the prediction of new,
unknown relationships.

Third, if two theories seem to account for the same
set of facts, the one more logically simple is to be pre-
ferred. One must choose the theory with fewer undefined
terms and unproved assumptions.

Fourth, a theory should lead to results in publicly
confirmable studies. This implies that it has psycholog-
ical richness and productivity for the working scientist,
as well as producing findings that are repeatable. Criti-
cisms of para-psychological theory would seem to be based
on this criterion.

Also, the theory should relate to other concepts
available and not be inconsistent with other facts and
theories which it does not purport to explain.

## Deficiencies in Current Theory of Organizational Communication

In his massive review of studies of organizational
communication, Redding (1972) advocates a greater use of
theory:

> [O]ur understanding of organizational communi-
> cation will be enhanced if we go beyond the
> traditional categories and look at our subjects
> in a frame of reference of basic theoretical
> concepts (vii).

He then then examines organizational communication in

two ways:

> (1) In terms of certain fundamental "postulates"
> derived from underlying theories of human commu-
> nication, but interpreted in the organizational
> setting. . . .
> (2) In terms of the over-all "climate" of the
> organization, climate taken in the broad sense
> of assumptions and attitudes influencing the to-
> tal behaviors of the members of the organization (vii).

While these items have some unifying value, they do

not constitute "theory" as this work has used the term--

a set of defined terms inter-related by causal laws. Nor

do his chapter headings or "basic postulates," a miscellany

of topics and advice such as "meanings not transferred,"

"Feedback," "Anything a potential message," add much to

a real scientific theory.

Redding's work is closely based on the existing lit-

erature, and this is intended primarily as criticism of that

literature rather than of his specific work in gathering

it. The first point is based on the previous discussion of

parts of a theory. Too often in the literature, terms are

not defined and related to experience. For example, Redding's

definition of "climate" (above) could mean everything or

nothing.    It is intended to be a descriptive definition, but it gives no hint as to how it might be operationalized. Also, no definitions are given for the constituent terms, such as attitudes, so there can be no building of the heir- archical structure of science.  Also, the items are not causally inter-related by a series of laws.

A third criticism is based on page 20 of this disser- tation.  There it is stated as one criterion of a good theory that it account for as large a group of facts as possible. A major failing of current theory in organizational commu- nication its limitation to special areas and communication variables.  A theory involving a wider group of variables would provide a stronger base for the field.

## Forecast of Theory

The view presented here as an improved, alternative theory is based on several groups of writers sometimes linked together as the "socio-technical school."  The authors included are from at least three different areas:  sociology, social- psychology, and administration.  Their work does not form a single body of literature, though there is some overlap among the groups.  Several, perhaps, would be surprised to find themselves in the company of the rest.

Within the group, the usage of terms is inconsistent and confusing. For example, there are at least three completely different meanings of "bureaucratization" and two for "organic." In other cases, different terms, such as "bureaucratic" and "mechanistic" refer to the same reality. The authors have different areas of emphasis, and sometimes their views conflict. Yet a common thread runs through their writings-- that <u>the problems with which an organization is faced determine its social structure</u>.

These authors are divided into three major areas of concern: environment, technology, and goals. A brief summary and forecast of the material in each area is presented below.

## Technology

Technology is defined as both equipment and the knowledge needed to use it. The two principal writers in this area, Charles Perrow and Joan Woodward, approached the topic from different ends. Perrow wrote the chapter on "Hospitals" for the HANDBOOK OF ORGANIZATIONS (March, 1965). In order to bring the material into a usable framework, he tried to relate the technology--routineness or non-routineness of the work--to the findings regarding the social structure.

Later (1970, 78) he bisected the simple routine--non-routine continuum with a second one, based on whether those exceptions which occurred could be provided with solutions programmed in advance.

Nevertheless, much of his work centers on the routine--non-routine distinction. Work units at the routine end of the continuum are predicted to be like Weber's (1957) bureaucracy. They have firm, heirarchical systems of organization, rational-legal authority, and vertical, written, systems of communication. Units at the non-routine end tend to be what Toffler (1970) calls"ad-hocracies," with rapidly shifting, oral communication systems.

Woodward (1965) began with the very practical intent of proving the efficacy of the principles of classical management in the South Essex firms near the college where she taught. However, the results indicated no logical predictors of success, until the technology of the firms was taken into account. Then they discovered that these bureaucratic principles led to success in large-batch and mass production firms, but not in others.

Woodward's results applied to the entire firm. However, further investigation of complex firms (Wedderburn & Crompton, 1972; Meissner, 1969) showed that they

often have units with different technologies and very
different social structures. Thus a second set of var-
iables was required to explain the structure of the firm
as a whole.

Environment

The two major writers in this area are Paul Lawrence
and Jay Lorsch. While most of their theorizing centers
on the relative certainty or predictability of the envir-
onment, they also discuss the time span of definitive
feedback, and the relative importance of environmental
sectors (1967, 253), and heterogeneity and differences in
time orientation in different parts of the environment
(1967, 93-96).

Their findings indicate that different organizational
units deal with different parts of the environment.
The prime requirement for a successful organization is that
each unit be differentiated so as to deal most effectively
with its own task (technology), and then integrated with
the rest of the organization. Intermediate or transfer
units may be necessary to provide the communication to
accomplish this integration (Lorsch & Lawrence, 1965).

Goals

No single author or group of authors has developed an extensive theoretical and empirical interest in organizational goals. Yet students of organizations have long pointed out that the deliberate construction and manipulation of these institutions is what differentiates them from naturally occurring units like the family.

Perrow (1968, 1972) places the study of goals squarely in the sociological tradition. He discusses different types of goals, such as survival, product characteristics, and internal characteristics. These goals may conflict or displace each other.

One author (Child 1972b) in this area hardly uses the term "goals" at all. He prefers to refer to strategic choice." He points out that goals operate not only in the slack or lee-way provided by a given technology and environment, but also in the choice of technologies and environments with which to deal.

Image and Plan

One criticism of the socio-technical school is that its writers fail to base their work on an adequate view of human psychology (Argyris, 1972). In the present paper, this psychology is provided by the cognitive view of man

(Miller, Galanter, & Pribram, 1960). This relates the "image" of the technology and environment to individual and shared "plans" for carrying out the task.

## Purpose of Dissertation

The purpose of the present work is to open up an area of theory for the use of communication scholars. This is done in four steps. The purposes are as follows:

1. To present, clarify, and analyze material regarding three causal variables in the analysis of organizational communication:

   a. Environment

   b. Technology

   c. Goals.

2. To inter-relate these variables by showing where their effects occur.

3. To provide additional material where analysis indicates inadequacies in the material developed by others. The major effort in this area involves relating the psychological and sociological levels of analysis through the use of the concepts of "image" and "plan," and how these are shared and maintained by communication.

4. To present the implications of the theory for organi-
   zational communication, at both intra-departmental and
   inter-departmental levels.

Finally, this chapter concludes with a comment from
Kaplan on the value of theory:

> To engage in theorizing means not just to learn
> by experience but to take thought about what is
> there to be learned. . . .
>     Theory is in this respect properly contrasted
> with practice, and "theoria" is contemplation viewed
> as something distinct from action . . . In an enlarged
> context, theorizing may be a very practical acti-
> vity indeed and contemplation may be another kind
> of action, neither  passive nor disengaged (1964,
> 295).

CHAPTER II

DEFINITION AND ANALYSIS OF TERMS

Certain widely and carelessly used terms must be
defined before the major portion of this paper can begin.
They include "communication," "organization," and "systems."
Other key terms will be defined as they arise in the body
of the work.

## Communication

Dance (1970), in reviewing the literature, found 95
definitions of "communication," with 15 "conceptually
different components." This section does not intend to
repeat his work, but only to provide a guide to usage in the
present study.

The New Orleans Conference on Research and Instruction
of the Speech Association of America (later Speech Commu-
nication Association) stated:

Speech communication research and related phrases
were adopted to identify the area principally
concerned with the scientific investigation of
messages, their antecedents, and their consequences
(Kibler & Barker, 1969, 18).

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The editors later state

> Terms frequently used to characterize the major
> concern of speech-communication processes were
> "linkage," "coupling," "transaction," "interaction,"
> "message/channel," and "nexus." In the end, most
> conferrees accepted "message" (Kibler & Barker,
> 1969, 33).

This quotation gives the reader a strong feeling of

a connection, "bridging a gap," the partial unification of

two separate fields. But a feeling is not a definition, and

some situations are not clear. Therefore, the following

definitions will be used in this paper.

Terms Related to Communication

Message. A message is first of all a physical event,

separate from both sender and receiver at some point in

time (see Cherry, 1966, 7, on "sign"). And it must be the

result of "sending" or the cause of "receiving" behavior.

Communicative Behavior. Such behavior is of two types:

a. Sending. The creation or selection of a message,
an event intended to alter the behavior of another
organism in specific ways.

b. Receiving. The acceptance of a message as coming
from a "communicative alter (Hymes, 1967, 24), or
as having been produced by beings more or less
similar to myself and produced with certain kinds
of intentions (Searle, 1967, 121).

Information. The "content" of a message—that which

can be translated from one medium to another. In statis-

tical communication theory, the information in a signal

is the degree to which it reduces uncertainty (Cherry, 1966, 168-218).

Completed Communication. Completed communication, includes both the intentional sending and the receiving of a message.

Intra-personal and machine "communication" are excluded from this usage. They are analagous to, but not the same as, the "communication" defined here.

## Classifying Communication.

Direction. The most common method of classifying organizational communication is by the formal relationship of those giving and receiving it. Categories used are:

1. Vertical communication--between superior and sub-ordinate, which is divided into upward and down-ward communication;

2. Horizontal communication--between peers;

3. Diagonal communication--between a superior and the subordinate of someone else.

The main problem with this form of classification is that it requires an organization chart which may be non-existent or extremely misleading. Secondly, it pays no atten-tion to the type of message, and message is a key variable in the present paper's view of communication.

Formal and Informal. A second classification differen-
tiates between "formal" and "informal" communication. In
some cases this division seems based on direction also;
communication between subordinate and superior is assumed
to be job-related while that between peers is not. In other
cases it is based on content. However, in a creative and
unstable situation it would be very difficult for an outsider
to tell what messages were related to the job and what were
social.

Messages. Eilon (1966) writes that

A fairly comprehensive classification system
might consist of four dimensions: (1) the kinds
of messages, (2) the area of activity, (3) the
importance of messages, and (4) the intent and
impact of messages (268).

He develops a system only for the first dimension, the kinds
of messages. He states

This dimension is restricted to categorizing
messages into certain types according to their
form, and to some extent, according to the way
in which they are triggered (268-269).

In Eilon's system, for each message its type and the
sender and receiver are noted. This allows a picture of the
communication structure to emerge from the actual system,
rather than classifying communication in terms of a pre-
conceived and artificial picture. The classifications are
as follows (Table  I   ).

TABLE I

Coding Scheme for Messages

| General coding | Detailed coding |
|---|---|
| R  Routine report | R-1 Time triggered report<br>R-2 Event triggered report |
| M  Memorandum | S  Statement, following an  inquiry<br>   or event triggered<br>C Comment<br>   Details on data collection and<br>processing can be added as follows:*<br>   1-data from available records<br>   2-ad hoc data collection<br>   3-routine data processing<br>   4-ad hoc processing |
| I  Inquiry | I-1 Inquiry covered by standing<br>   procedures<br>I-2 Inquiry about a novel situation |
| Q  Query | Q-1 Query about problems covered<br>   by regular procedures<br>Q-2 Query for novel situations, or to<br>   clarify ambiguities and inconsistencies |
| P  Proposal | P-1 Proposal about procedures or<br>   recurrent events<br>P-2 Proposal on an ad-hoc issue |
| D-Decision | D-1 Decison on procedures affecting<br>   recurrent events<br>D-2 Decision on ad-hoc issues |

H  Meeting, the outcome of which may be any or several messages
   above; if the meeting fails, the result in denoted by 0.

T  Telephone discussion

*The particular kind of memorandum may be coded in this way,
such as S-1, C-3, etc.

From Eilon, 1966, Table 1

## Organizations

### Formal Definition

> Organizations are . . . <u>systems which utilize
> energy</u> (given up by humans and nonhuman devices)
> <u>in a patterned, directed effort to alter the
> conditions of basic materials in a predetermined
> manner</u> (Perrow, 1965, 913).

The definition above applies to all forms of social
organization: the family, the traditional farm, or General
Motors. We are concerned with those called <u>formal</u> organ-
izations, as defined by Etzioni (1964, 3):

> Organizations are social units (or human
> groupings) deliberately constructed and re-con-
> structed to seek specific goals (Parsons, 1960,
> 17). . . Organizations are characterized by:
>
> 1.  divisions of labor, power, and communication
>     responsibilities which are not random or
>     traditionally patterned, but deliberately
>     planned to enhance the realization of speci-
>     fic goals;
>
> 2.  the presence of one or more power centers
>     which control the concerted efforts of the
>     organization and direct them toward its goals
>     . . .
>
> 3.  substitution of personnel, ie., unsatisfactory
>     persons can be removed and others assigned
>     their tasks (1964, 3).

Organizations are contrasted with other social units
such as the family by the emphasis on planning and goals.

But the planned activity and intended consequences by no

means exhaust the nature of the formal organization.

Other activities supplement those formally planned.

Systems

An organization was defined above as a "system."

That simple term is actually a key to new understandings

of many social phenomena, including organizations.  It

deserves analysis at length.

> We are drilling holes in the wall of
> mystery that we call nature and reality in
> many locations, and we carry out delicate
> analyses on each of these sites.  But
> it is only now that we are beginning to
> realize the need for connecting the probes
> with one another and gaining some coherent
> insight into what is there (Laszlo, 1972, 4).

Doctors may still quote the old saw that a

specialist is one who knows more and more about less and

less until finally he knows everything about nothing.

A general practitioner, on the other hand, knows less

and less about more and more until he knows nothing

about everything.  According to Laszlo (1972), the

approach of the specialist has been preferred in western

scientific thought.  Finding reality so diffuse and

intractable, we have carved out smaller and smaller

pieces which we have attempted to understand.  So, for

example, in communication, we have a host of studies

that place the "best" argument in different places in

a speech.  The studies may be soundly done, but the bits

of knowledge are unrelated.

But there is an alternative approach.

What, then, is contemporary science doing
about this?  It offers a solution which is
another simplification of the real states of
affairs, but one that is more adequate to grasp-
ing their more complex nature:  it takes them
in integrated chunks.  Instead of looking at
one thing at a time, and noting its behavior
when exposed to one other thing, science now
looks at a number of different and interacting
things and notes their behavior as a whole
under diverse influences (Laszlo, 1972, 6).

Systems--definition.  Hall and Hagen (1956) offer the

following definition of system:

A system is a set of objects together with
relationships between the objects and between
their attributes (31).

While this definition is general and vague enough to be

acceptable to other writers, it leaves several questions

unanswered.

The first problem is that of the boundary between

the system and its environment.  The same authors continue:

For a given system, the environment is the
set of all objects a change in whose attributes
affect the system and also those objects whose
attributes are changed by the behavior of the
system.  The statement above invites the natural
question of when an object belongs to a system

and when it belongs to the environment; for if
an object reacts with a system in the way described
above, should it not be considered part of the
system?  The answer is by no means definite
(Hall & Hagen, 1956, 33).

Undoubtedly in many cases there are obvious, logical
places for the boundary to be drawn.  Events may cause
infinitely expanding ripples, but there comes a point at
which the effects of many different ripples can be safely
regarded as chance.  Still, many times boundary choices
will make a difference.  For example, it is important
whether clients, patients, or buyers are considered part
of the organization or its environment.

Haas and Drabek (1973, 15-16) suggest that two criteria
be used to separate the organization and its environment.
First, interaction within the organization is high in
frequency and similar in content (14).  Also, the organ-
ization controls activity within its boundary (15-16).
Therefore, a salesman and a purchasing agent are part of
different systems even though they interact regularly.
The authors indicate that different investigators
could legitimately locate the boundary in different places
for their own purposes.

A second problem is whether certain non-physical, conceptual "systems" are to be included in the definition. Some writers, such as Rapaport (1968, 453) say definitely "yes."

Others point out that two different types of phenomena are involved. Kuhn (1971, 106) uses the terms "pattern" systems and "acting" systems--those which maintain boundaries and steady states etc. He states:

> So for the moment, I am extremely skeptical that
> systems analysis, as such, has, or ever will have,
> anything to contribute to understanding pattern
> systems. . . . A Gregorian chant is a pattern
> system, and so is the theoretical structure of
> neoclassical economics. Again, I doubt if any
> generalizations about the one would be applicable
> to the other (107).

These distinctions will be maintained in this paper.

General Systems Theory. The general systems theorists are the most general of the generalists. They attempt to find and define--mathematically if possible--structural similarities among diverse types of systems. As Litterer puts it:

> If mathematics can be said to provide a language
> of science, then General Systems may be viewed
> as providing a skeleton of science. It is concerned
> with those generalities of theory that occur in
> more than one specialized discipline and, in fact,
> may not be able fully to be developed within the
> confines of one discipline . . . [e.g. homeostasis].

We have a structure, a framework that permits
us to identify some of the general characteristics
of a theory in a number of specialized fields
(1969, x).

General systems theory develops concepts such as

the following characteristics of systems:

1. Inter-relatedness of objects, attributes,
   and events

2. Wholism

3. Goal seeking or return to equilibrium

4. Regulation

   a. adjustment--the whole can be re-established
      from its parts

   b. control--fixed arrangements for control,
      usually involving feedback

   c. learning--can make new arrangements

5. Inputs and outputs--receives from the envir-
   onment, must produce something "needed by other
   systems"

6. Transformation--does not deliver to the envir-
   onment what it receives

7. Heirarchy--made up of sub-systems

8. Entropy--using up energy, becoming disorganized

9. Differentiation--open systems tend to become
   more complex

10. Equifinality--beginning state does not determine
    the outcome (Litterer, 1969, 4-6).

These items picture a system as an entity actively maintaining its internal state as well as transforming some material received from the environment.

Mathematical Models. An important part of the general systems approach is the use of mathematical models of the system studied. Indeed, Rapaport writes

> The main theme of general systems theory is,
> I believe, the explicit fusion of the mathematical approach with the organismic. The key
> task of general systems theory is to show how
> the organismic aspect of a system emerges from
> the mathematical structure (1968, 457).

The implication might be that a good theory must be cast in mathematical terms. But the author adds

> The mathematical model approach to general
> systems theory has one serious, at times crippling, drawback. To define a system, a much more
> precise specification of entities and relations
> is required than our knowledge usually warrants
> (1968, 456).

And the 1968 president of the Society for General Systems Research is even more generous:

> Perhaps just the idea of systems is powerful
> when it gets across. A large part of the battle
> is getting the concept accepted. It is important
> to educate people to be systems-oriented, even
> if a great deal of theory does not get across,
> just so that they appreciate the interactions
> of members of a system and the environment, and
> to be on the watch for such interactions (Rubin,
> 1971, 11).

Apparently, then, we have the blessings of those who should know about systems in social science for not running too quickly to attain mathematical elegance. We can begin by attempting to conceptualize and define the organizational system, its boundaries and environment, hoping that further experience and research will lead to more sophisticated models.

Implications for Research and Theory. Miller and Rice write:

> An open system [such as a formal organization] exists, and can only exist, by the exchange of materials with its environment. It imports materials, transforms them by means of conversion processes, consumes some of the products for internal maintenance, and exports the rest. Directly or indirectly it exchanges its output for further intakes, including further resources to maintain itself (1967, 3).

Therefore, any complete organizational theory must include the effects of: (1) In-puts; (2) Transformation processes; (3) Organizational maintenance; (3) Out-put, of both materials and information.

However, the use of systems approaches does not mean that the researcher can never depart from a vague level of wholeness. Miller and Rice (1967) stress the importance of relating specific environments and technology to internal structures and outputs.

Likert takes the wrong approach

Every aspect of a managerial system is related
to every other part and interacts with it.
The results obtained by altering a single variable
or procedure while keeping all others the same
usually will yield quite different results from
those obtained when that variable is changed
along with simultaneous and compatible changes
in all other aspects of the management system.
The true influence of altering one aspect of a
system cannot be determined by altering it
alone (1967, 123).

But these remarks beg the question. If we knew already

what "compatible" changes would be, there would be no

need  to do research. And if a variable is significant,

then surely one would expect some change from manipulating

it alone, though of course interaction effects could

affect different combinations of variables.

The systems approach teaches us to look at the

inter-relationships among a variety of inter-acting

entities. In encourages, but does not require, mathe-

matical precision. The wholistic approach does not mean

that specific and inputs and outputs should not be considered.

CHAPTER III


HISTORY OF ORGANIZATIONAL THEORY


The field variously known as organization
theory, formal organizations, complex organ-
izations, or organizational behavior is clearly
a multi-disciplinary endeavor. Organizational
researchers are apt to be sociologists, psycholo-
gists, operations researchers, engineers, polit-
ical scientists, or economists. Small wonder
that the field is deluged with publications
applying or advancing theories differing in
scope and employing a variety of methodologies.
Such diversity can be a distinct advantage if
it contributes to the cumulative growth of know-
ledge. It can, on the other hand, be a decided
disadvantage if organizational researchers talk
past one another because of a tendency to become
primarily committed to a particular theory or
methodology (Evan, 1971, 1).

Need for Review

While the present paper is devoted to presenting the

implications for organizational communication of one general

approach to organizations, this view must be set in the

framework of other schools of thought. Chapter III provides

a broad historical review of various approaches, while the

final chapter includes a more specific critique and comparison

of the technological-environmental approach.

The attempt to define and isolate "approaches" is

mind-bending, and clearly indicates the chaotic state

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of the field pointed out by Evan (above). Perrow (1972),
for example, defines four approaches; Haas and Drabek
(1973), eight; Scott (1967, 410), three; Sofer (1972),
ten; Zwerman (1970, 2), only two which are "dominant."

Problems arise because of the currents, cross-currents,
eddies, and marshy edges of the stream of thought. It is
not clear who is to be included, or even where those who are
clearly contributors belong. The present arrangement
aims to present some of the historical developments while
making no pretense of exhaustiveness or perfect logic.

Writers are divided into two broad groups: The detached
scientists, who look at organizations from the windows of
their ivory towers; and the practical, involved management
theorists who are in the midst—or on the edges—of the
fray below.

## Practical Writers

### Classical Management

The earliest writers on organizations are the founders
of the "classical management" school. Their writings
involve both descriptions and prescriptions based on exper-
ience with firms. Their work is often criticized for its

lack of scientific base and mixture of value and fact.

Yet as Perrow writes

> These principles have worked and are still working,
> for they addressed themselves to very real problems
> of management, problems more pressing than those
> advanced by social science (1972, 62).

Principles. Examples of "classical" principles rele-

vant to communication are given below:

> 1.   Division of work.  (Permits of reduction in
> the number of objects to which attention and effort
> must be directed and has been recognized as the
> best means of making use of individuals and of
> groups of people (20).
>
> 4.   Unity of Command.  For any action whatsoever,
> an employee should receive orders from one super-
> ior only. . . . (24) (Fayol, 1949, from Massie, 1965).

Classical management theory continues to be a major

influence both on organizational practice and theory.   Koontz

(1961) places Classical Management theory first in his list

of six approaches to the study of organizations:

> 1.   Management process or "classical"
> 2.   Empirical or case studies
> 3.   Human behavior or human relations
> 4.   Social system
> 5.   Decision theory
> 6.   Mathematical approaches.

As Urwick (1971) and others have pointed out, classical

principles have grown from the experience of working managers.

Even Stephenson (1968, 83) grants that the knowledge provided

by classical management theory is more practical than that
of the relatively undeveloped social science approach.

Criticisms. However, Stephenson repeats and affirms
the two charges most often made against the principles
promoted by classical management: (1) that they are unclear
and undefined; and (2) that they are pro-management.
Urwick (1971) replies that the sin of unclarity falls on the
heads of the behavioral scientists, with the additions of
impracticality and an almost willful failure to understand
the writings of the classicists.

For example, he explains that the term "organization"
is used by the classical writers in a special sense The
writers were not unaware of the human factor, but chose
to concentrate on structure (6). He explains the special
usage:

> Previous writers on management when they
> used the word "organization" were not writing about
> institutions as a whole or human group behaviour
> at large. They were writing about a special
> aspect of that behavior--the need in any human
> system of cooperation, if unity of action is to
> be maintained, for a timely and unambiguous system
> of official communication. That is what organization
> in the technical meaning of that term is about.
> Individuals cannot collaborate unless they know
> precisely what is expected of them by the insti-
> tution (11).

While this statement implies a view of human nature and
inter-personal cooperation probably unacceptable to many
other writers, it does clarify the terminology. It seems

likely that the confusion over "clarity" is also a semantic one. The principles of classical management are intended to be clear to the manager faced with a decision. They need not be operationalizable for the purpose of scientific measurement. Behavioral science concepts, on the other hand, while measurable, may be unclear in their implications for practice.

As to the charge that the principles are pro-management and anti-worker, Koontz replies that the concepts of "good management" are supposed to prevent the kinds of frustration and inefficiency which the human relations writers attack (1961, 185). Apparently, Koontz would accept changes in the principles if experience or practical research showed them to be inefficient or psychologically harmful to the employees.

A newer and more serious criticism of the classicist's principles comes from some further research--that is, in some cases, they simply don't work. Woodward's (1965) study was begun to show the efficacy of "good management" for organizational success. The researchers not only found that many successful organizations did not follow classical principles, but that in some instances classical principles led to failure. Only when she considered

the type of technology involved was she able to make sense of her data. The classical organization led to success in firms dealing with mass-produced products, and not in others.

Future. Classical management continues to be taught and to be useful to the working manager. However, we can expect that its principles, like those of classical rhetoric, will be refined, supplemented, and limited by the results of empirical investigation.

## Scientific Management

Strong criticism of the classical approach came from a recognized giant in the field, Frederick Taylor. Zaleznik writes, "No single figure in the history of industrialization did more to affect the role of the manager than Taylor (1970, ix)."

"Scientific" management is usually identified with time-and-motion study, the use of planning rather than rule-of-thumb methods, and close supervision of the worker's time and task. Taylor, however, was most insistent that scientific management not be confused with such "details." He said his system, it its essence, was

> First. The development of a true science.
> Second. The scientific selection of the workman.
> Third. His scientific education and development.
> Fourth. Intimate friendly cooperation between
> the management and the men (1911, 130).

Taylor's approach flew in the face of comfortable, established ways of doing things, and gave new prominence to the engineer and technician over the benevolently or autocratically paternal manager. He envisioned what many feel has now happened--arbitrariness would be taken out of the authority system because of the technical requirements of the work. For example, he said that work should be assigned as follows:

> The work of every workman is fully planned out
> by the management at least one day in advance
> and each man receives in most cases complete
> written instructions, describing in detail the
> task which he is to accomplish, as well as the
> means to be used in the work (1911, 39).

Taylor is often criticized for his lack of understanding of informal work groups. However, his understanding of output restriction is as clear as anything to come out of the human relations studies. In fact, he even gives the workers credit for rationality, though he says restriction is not rational--and doesn't occur--under scientific management. He discusses two types of "soldiering." The first, natural soldiering, is simply a tendency to "take it easy." The second somes "from more indirect second thought and reasoning caused by their relations with other men, which may be called systematic soldiering (1911, 19)". It is based on the following ideas:

1. That working harder would put other men
   out of work
2. That they are not rewarded for faster pro-
   duction
3. The use of "rule of thumb" methods (1911, 19).

He needed no further analysis, because his system

involved breaking down each job so that it could be done

by one individual. His major omission was ignoring

jobs that required cooperation. Even at the executive

level, he seems to have felt that coordination whould

be taken care of by individual use of "scientific" methods.

The manager was to be an expert on work methods and a

planner of tasks rather than a leader of men. One of

Taylor's famous dicta was "In the past the man has been

first; in the future the system must be first (1911, 7)."

## Human Relations

Mayo. Elton Mayo would emphatically disagree.

Actually, the human relations school came out of the same

background as scientific management. By the mid-twenties,

there was a body of research regarding fatigue, monotony,

personnel selection, and similar matters of work psychology

(Sofer, 1972, chapter 3). The famous Hawthorne studies

(Roethlisberger and Dickson, 1947) grew directly out of

this kind of concern. A study had been made, varying the

amounts of illumination in a work room. Production had

increased with the improved lighting. It also increased

in a control room where the lighting wasn't changed.

Of course, this result was later made famous as the "Hawthorne effect." But at that time, the researchers were simply puzzled.

The Hawthorne studies are really two things--the studies themselves, and the myth. An excellent critique of MANAGEMENT AND THE WORKER as a research monograph is found in Landsberger (1958). He points out that most of the conclusions reported are tentative and that negative data is provided to allow the reader to draw his own conclusions.

But it was the myth of the studies, both praised and attacked, that most affected the literature. Mayo analyzes the increase in production in the "relay assembly test room" as follows:

> The improvement in production . . . is not very directly related to the rest-pauses and other innovations. It reflects rather a freer and more pleasant working environment, a supervisor who is not regarded as a "boss," a "higher morale" (Mayo, 1933, 78).

From this beginning developed the characteristics which still predominate in the "human relations" school. They include:

1. An emphasis on the interpersonal skills of the supervisor, and training methods to improve them;

2. An interest in morale and sentiments on the job, and attempts to relate them to production;

3. Concentration on the individual or small group, less interest in structural and extra-organizational factors.

Lewin. Another major source for this school was the work of Kurt Lewin. Lewin had a broad influence in many areas of psychology. While his primary interest was the group and the individual's psychological "field," many students of organizations, particularly those who became involved in the National Training Laboratory, followed his ideas.

Lewin did many classic studies dealing with the formation and effects of leadership in experimental groups. He also believed that research could be done in existing groups by working with them in a practical, helpful manner. Sofer comments

It is to Lewin and his colleagues that we owe the notion of action research, that is, the notion of the social scientist as an active colleague with administrators in planned social change, learning about the character of social situations by trying to change them (1972, 87).

Leadership Studies. One major area of study in the human relations school has been that of leadership. Several groups have, in one way or another, broken leadership into

two factors--one having to do with structuring the activities of the subordinate, and one having to do with interpersonal skills (Stogdill & Coons, 1957; Katz, Maccoby, & Morse, 1950). However, a review by Korman concluded:

> [I]t seems apparent that very little is now known as to how these variables may predict work-group performance and the conditions which affect such predictions. At the current time, we cannot even say whether they have any predictive significance at all (1966, 361).

More elaborate theories have attempted to relate the characteristics of the leader to those of the situation in which he is attempting to lead. Foremost among these writers is Fred Fiedler (1967; Mitchell, Biglan, Oncken, & Fiedler, 1970). He indicates that the "climate"--favorable or unfavorable to the leader--determines what leadership style, a structured or an inter-personally oriented one, is most effective.

Another writer who uses a two-factor theory is Blake. In his theory, every organization can be placed on a grid defined by the two axes of concern for people and concern for production. The ideal firm is very high on both factors. He also claims that organizations which he has worked with are not only more pleasant but more profitable. This theory concentrates on attitudes rather than structural or group variables (Blake & Mouton, 1965).

McGregor. Doug McGregor was concerned with leader-
ship and the role of management, but also with the firm
as a whole. He presented two theories under which firms
operated, which he called "Theory X" and "Theory Y."
"Theory X" seemed to include the assumptions of classical
and scientific management.

> (1) The average human being has an inherent
>     dislike of work and will avoid it if he can. . . .

> (2) Because of this human characteristic of
>     dislike of work, most people must be coerced,
>     controlled, directed, threatened with
>     punishment to get them to put forth ade-
>     quate effort toward the achievement of
>     organizational objectives.

> (3) The average human being prefers to be directed,
>     wishes to avoid responsibility, has rel-
>     atively little ambition, wants security
>     above all  (1960, 33-35).

"Theory Y" was the basis of the new human relations or
human resources approach:

> (1) The expenditure of physical and mental effort
>     in work is as natural as play or rest.

> (2) External control and the threat of punish-
>     ment are not the only means of bringing
>     about effort toward organizational objectives.
>     Men will exercise self-direction and self-
>     control in the service of objectives to
>     which he is committed.

> (3) Commitment to objectives is a function of the
>     rewards associated with their achievement.

(4) The average human being learns, under proper
    conditions, not only to accept but to
    seek responsibility.

(5) The capacity to exercise a relatively high
    degree of imagination, ingenuity, and
    creativity in the solution of organizational
    problems is widely, not narrowly, distributed
    in the population.

(6) Under the conditions of modern industrial
    life, the intellectual potentialities of
    of the average human being are only par-
    tially utilized (47-48).

Likert. Rensis Likert modifies the Theory X-Theory
Y pattern four systems:

(1) the exploititive authoritative;

(2) the benevolent authoritative,

(3) the consultative, and

(4) the participative group (1961, 223).

He places great stress on supportive leadership
(1967, 47). Apparently he feels that such supervision
can be best given in the "participative" structure.
Likert's work does not allow for differences in the pref-
erences of the worker or in the work to be done (Perrow,
1972, 122-138).

Argyris. Chris Argyris has written on a wide
variety of topics concerned with organizations and organi-
zational change. Much of his work is directed to making

organizations more "human," allowing the employee to develop and use his full potential. He would aim to create what he calls the "organic" organization, which

> is characterized by decentralization of dec-
> ision-making; an emphasis on mutual dependence
> and cooperation based on trust, confidence, and
> high technical or professional competence; a
> constant pressure to enlarge tasks and interre-
> late them so that the concern for the whole is
> emphasized; the decentralization of responsiblity
> for, and the use of, information, rewards, and
> penalties; the responsibility of participants
> at all levels for developing and maintaining
> loyalty and commitment at as high a level as
> possible; and an emphasis on status through
> intergroup and interindividual cooperation
> (1968, 317).

However, Argyris, unlike Likert, admits that this organization is not the only effective type. Its usefulness from his point of view seems to depend on the maturity of the workers, whether they are dependant or self-directed.

Frederick Herzberg. Herzberg takes a somewhat different approach to problems of morale and job satisfaction, con-centrating on the contents of the individual job. His theory states that kinds of things affect worker atti-tudes.

The first group he calls "dissatisfiers," which include "company policy and administration, supervision, salary, interpersonal relations, and working conditions (1966, 74)."

Job satisfaction comes from the other group of variables, including "achievement recognition, work itself, responsibility, and advancement (72)." He seems to agree with McGregor that people will not only accept but welcome responsibility and risk.

Therefore, the solution to morale problems is not to provide more bowling leagues or a kinder supervisor, but to give opportunities for meaningful work and advancement. This process is sometimes called job enlargement or job enrichment.

Tannenbaum. Tannenbaum is like other human relations writers in his interest in individual fulfillment. But he is centrally concerned with the amount of control in organizations.

His study indicates that the use of participative management can increase the total power or control in an organization. That is, the situation is a non-zero-sum game, where all can win. And, further, when the structure is opened up and the control increased, productivity increases as well (1966, 91-97).

In contrast to the writers discussed above who set out to improve the efficiency of organizations or the lives of their members, there are those, primarily sociologists, who study organizations more with the object of understanding them than improving them.

## The Detached View

There are, of course, many criticisms of the authors discussed above.  But those to be discussed next would center their objections on one made by Charles Perrow:

> One cannot explain organizations by explaining the attitudes and behavior of individuals or even small groups within them.  We learn a great deal about psychology and social psychology but little about organizations per se in this fashion (1972, 143).

### Weber and His Followers

Max Weber. The originator of work in this area was the German sociologist, Max Weber.  Weber was concerned with changes in the entire nature of society over prolonged periods of years.  He saw the development of bureaucracy as one major historical trend.

He explained what he meant by "bureaucracy" by construction of an "ideal type."  And that has led to a tremendous amount of argument as to what relationship this concept has, or is supposed to have, to actual organizational reality.  Yet the very arguments indicate that Weber's

approach not only intuitively "makes sense" but is a

useful tool for analysis.

After careful examination, Rogers (1969) describes

the "Ideal Type" as:

> a utopian construct which is primarily rational
> and abstract.  It is normatively ideal, therefore
> in its conceptual purity it cannot be found empir=
> ically anywhere in reality.  While it does not
> describe a concrete course of action, it does
> describe an "objectively possible" course of action.
> Thus it contains the logical requirements of the
> relevant frame of reference, all the necessary
> properties or features of a concrete act or complex
> of action (91).

Weber himself explains one use of the Ideal Type:

"We can make the characteristic features of the relation-

ship pragmatically clear and understandable by reference

to an ideal type (1969, 17).

His ideal type of bureaucracy has  the following

characteristics:

1. Organization bound by rules
2. Division of labor and authority
3. Heirarchy
4. Roles and norms for each office--holders qualified
   technically rather than by heredity, age etc.
5. Separation of administration and ownership
6. No rights to a given position--interchangeability
   of personnel
7. Use of writing for orders, decisions, rules
   (Weber, 1957, 330-332).

This model implies a very formal kind of communication,

largely written rather than oral, and largely downward.

Rules and orders are promulgated from the centers of author-
ity and obeyed by those below. The necessity for writing
implies slow and deliberate action, and the requirement that
selection of personnel be made impersonally implies that
communication must be similarly unemotional.

Weber was largely neglected until the 1940's, when
his work was translated by Talcott Parsons, himself a
major figure. Mouzelis (1967) sums up the criticisms
and positive factors of Weber's approach--putting him
together with Marx in a group he calls the "classical"
writers.

1. The writing shows all-inclusiveness.
   The organization is placed in the general
   social structure.
2. There is an awareness of differences between
   saying and doing, the formal and informal.
3. There is concern for impact on the indivi-
   dual's freedom and personality.
4. The work lacks rigor and precision "which
   is achieved by a more limited and less
   ambitious investigation."
5. "[T]hey seem to formulate oversweeping
   generalizations which are clearly half-
   truths (in the sense that they are only
   valid under certain conditions which remain
   unspecified by classical theory" (35-37).

The Neo-Weberians. Several divergent groups start
from Weber. The most consciously identified with him are
the neo-Weberians. These writers emphasize the bureaucratic
model as the most important, but not the only, system of

production in modern society. They view organizations

as socio-technical systems, and stress the importance of the

type of work being done. The pure bureaucracy is best for

dealing with routine, predictable events. This view will

be thoroughly discussed in the body of this dissertation,

under the topic of "Technology."

## The Decision-Making School

The writers of this school such as Herbert Simon

and James March are social psychologists. They

are placed here because they share the detached view, and

because Perrow, a self-proclaimed neo-Weberian, has adopted

them (1972, 145-158).

These writers concentrate on the making of decisions

in organizations. There are two aspects to this problem:

1. The individual, and organizational constraints
   on his decisions, and

2. The division of decision-making in the organi-
   zation as a whole.

The Individual Decision-maker. Weber places great

emphasis on the role of authority in the organization.

The bureaucracy is governed by "rational-legal" authority,

that is recognized as legitimate because it is part of a

system both superior and subordinate recognize as right

and proper. The decision-making school discusses restraints caused not by the giving of orders, but by the nature of the organization itself.

In some models of man, the decision-maker is presumed to know all the possible outcomes of his choices, and to rationally select the one best suited to his purposes, or most satisfying to him personally (Taylor, 1965). As opposed to this model, Simon (1951, 1960) introduced the concept of "satisficing," or limited rationality.

Satisficing involves not selecting the very best alternative, but one that is adequate, or satisfactory. The satisficing solution fills the minimum criteria for the decision, and involves only a limited search along largely predetermined lines.

What most concerns us here is that it is the organization that largely determines the criteria and indicates the paths of search. This may be done formally, but more commonly it is a matter of

1. History, or trying what worked before;
2. Vocabulary, or defining the nature of the problem;
3. Socialization, or the decision-maker has adopted the organizational way of seeing things.

These factors provide considerable control without calling for a great deal in the way of orders and authority.

Organizational Decision-Making.  Like other aspects
of organizational work, decision-making must be divided
among organizational sectors.  Compatability of decisions
reached is partially assured by the kinds of individual
constraints discussed above.  However, further problems
are bound to arise as the different sub-units see the situation
from a different view-point, and have their own interests
at stake.  As Feldman and Kanter write

> The most complex models of organization decision
> making view the organization as a coalition of
> groups, each with its own goals.  Because these
> goals are not always compatible, a major organ-
> izational concern is conflict (1965, 641).

## Natural Systems

Parsons.  Branching off Weber's thought in another
direction are the "natural system" theorists.  Foremost
among these is Talcott parsons, who was mentioned as
Weber's translator.  Parsons shares with Weber a concern
for the structure of the society as a whole, and classi-
fies organizations by the function they serve for society.
He lists the following groupings:

1. Economic--business

2. Political--allocation of power.  E.G. some banks

3. Integrative--arts and laws, political parties

4. Pattern maintenance--schools and churches
   (1960, 45-46).

It is difficult to tell where to place different organizations in this scheme, and hard to tell what is known about them when they are placed. It is hard to see how banks are primarily political while political parties are not. It is, however, clear what he is attempting to set up--a typology of how certain functions are performed for the society. He writes

> An organization is a system which, as the attainment of its goal, 'produces' an ident- ifiable something which can be utilized in some way by another system; That is, the output of the organization is, for some other system, an input (1960, 17).

Mouzelis (1967, 155) criticizes Parsons on the grounds that his emphasis on the inter-relationships and complementary functions of organizations and the integrative effects of values ignores the problems of conflict and individual freedom. These criticisms could probably also be applied at other natural system writers.

Blau. One writer who has shown some interest in communication from a natural system perspective is Peter Blau. This author began his career with a study of the Internal Revenue Service (1955). By the formal

bureaucratic rules, the men working in the office he
observed were not supposed to consult each other about
problems in their work. In fact, such consultation
took place regularly, and the communication formed
a system that could be identified and described.

His description was in terms of what he called
"exchange theory." In this view, one must give "social
value such as prestige or deference in return for values
such as time and advice received. His later works have
also dealt with unintended consequences of social system
characteristics. However, he also has begun to consider
the effects of technology and the nature of work done
on organizational structure (Blau and Schoenherr, 1971).

Blau, along with Scott (1962) also proposes a
typology or classification system for organizations.
This is based on who benefits from the activities of the
organization. The types are as follows:

1. The members or rank and file membership--
   mutual benefit associations;

2. The owners or managers of the organization--
   business concerns;

3. The clients or, more generally, the "public-
   in contact," which means the people who are
   technically "outside" the organization
   yet have regular, direct contact with it,
   under whatever label--patient, customer,
   . . . prisoner, enemy soldier, student--
   service organization;

4. The public-at-large--commonweal organizations
   (42-43).

This classification is not specifically integrated into the exchange framework. Also, it does not seem, on the surface, promising for explaining many differences among organizations. The authors claim:

> Government regulations, notably the extreme
> case of nationalization of industry, might
> succeed in making the public-at-large the prime
> beneficiary of a business concern. . . Whether
> such shifts in prime beneficiary are evaluated as
> advantageous or disadvantageous depends on one's
> ideological position, but there is no doubt that
> they would constitute fundamental transformations
> of business concerns into distinctly different
> types of organizations (1962, 44).

But would a nationalized railroad be so completely different from one run by "private enterprise?" Experience seems to show that they face the same problems. And many other government agencies serve specific groups—Veterans, the elderly, Indians, the poor—rather than the "public-at-large."

Stress and Strain. Haas and Drabek (1973) offer a variation on the natural system perspective which they call the "stress and strain" view. This is supposed to combine cooperative and competitive approaches to the organization into a single viewpoint, which would be a useful addition to this perspective. However, though they present interesting analogies and give examples, they do not explain how the

researcher is to diagnose the stresses before they cause strain. They claim to be trying to keep their factors in an organizational, rather than a psychological frame of reference; yet a "stress" seems to be essentially a matter of negative attitudes between members of different departments.

Institutional School. Certain writers concerned with the organization as a natural system and the unintended consequences of decisions are known as the institutional school. The writers of this group emphasize the history of the organization, view it as a growing—or declining—whole, and study people's sentiments within the structure and toward the institution.

A leader in the school, Philip Selznick, showed how the Tennessee Valley Authority deviated from its officially established goals, "bargaining off" some to accomplish others (1949).

> Perrow states
>
> Of all the schools of thought . . . the institutional school is the closest to a truly sociological view of organizations. It combines much of the best, and some of the worst, of sociology as it existed in the 1950's and the 1960's (1972, 177).

Perrow praises the emphasis on the organization as a whole, the "exposé" tradition, and the indications that there are a variety of organizational types. He criticizes the

insignificance of the organizations often studied and the "moral ambiguity" of functionalism (also Wollin, 1960). The institutional approach lacks implications for the study of communication.

Etzioni. Another important figure in the field of organizational sociology is Amitai Etzioni. His books, both those he has written and those he has edited (1964, 1968, 1969) have done much to shape and focus the field. While he, too, is indebted to Parsons and the natural systems approach, he has his own approach and classification for organizations. This is based on the type of power used for control, and its results. The more coercive the type of power, the more alienated are the lower-level participants.

This approach allows him to pay more attention to conflict than many natural system theorists. Also, he can operationalize and apply his definition more consistently than either Parsons or Blau and Scott. However, his classification still may not say much about other aspects of the organization.

Classifications. In considering the usefulness of classification systems, mention should be made of a study by Hall, Haas, and Johnson (1967). These authors classified organizations by both the Etzioni and the Blau and Scott

typologies. They found that not only were the classifi-
cations difficult to apply unambiguously in practice, but
that organizations classified together did not seem to
have other important characteristics in common.

## Ecological Psychology

A promising approach that is difficult to classify
is that of ecological psychology. This field is based on
the study of the "behavior setting." The behavior setting
is a physical-social-psychological concept, consisting of
a space-time location, physical objects, and a standing
pattern of behavior. A baseball game, with a field, bats
and balls, and rules, is an excellent example of a behavior
setting. To predict what will occur, the researcher must
understand the game, not just the previous actions of the
players (Barker, 1968).

The study most relevant to the study of organizations
is BIG SCHOOL, SMALL SCHOOL (Barker & Gump, 1964). This
study showed that the "big school" had proportionately
fewer extra-curricular behavior settings than the small
ones. Among other consequences, this led to the students
in the small school receiving more communications urging
them to take part in activities, a difference that was
particularly noticeable for the poor or marginal student
(Willems, 1964).

The analysis of behavior settings could help provide
clues to some of the puzzling problems of organizational
structure, such as the inconsistent effects of over-all
increase in organizational size.  Further, understanding
the standing patterns of behavior, the social "rules",
so to speak, could give insights into communication behavior.

Other Approaches

There is other material related to the study of organi-
zations.  One is the general systems approach discussed in
Chapter II.  Other areas of study, such as attitudes, con-
formity, obedience, persuasion, and obedience, are relevant
to particular issues (Sofer, 1972).  Those discussed above
trace the main lines of thought in this area and provide
the context in which the present theory is offered.

PART II:    SOCIO-TECHNICAL WRITERS

Is there a convergence?

According to Hickson  (1966), most writers are already saying the same thing about organizational technology and structure.  Quarrels among the major writers are either semantic or denominational, such as sociologists vs. management writers vs. social psychologists.  Page ii is a shortened version of his summary.

There is a certain attractiveness to Hickson's formulation, but he has done some straining to create it.  He states that "Theory has converged upon the specificity (or precision) of role prescription and its obverse, the range of legitimate discretion (225)." But some of the writers consider this cause, some deliberate effect, and others, a by-product of attitudes held by members.

Remember that an organization is a system which takes in material from the environment, subjects it to processing and then returns it to environment.  Most writers are concerned with the predictibility or certainty of this process, but they locate the uncertainty at different points.

| Writers | Terms Used for Specificity of Role Prescription | |
|---|---|---|
| | Higher Specificity | Lower Specificity |
| Structure analysts | | |
| Weber | Traditionalistic, bureaucratic | Charismatic |
| Burns & Stalker | Mechanistic | Organic |
| Barnes | Closed system | Open system |
| Whyte | Formalized | Flexible |
| Hage | High formalization (standardization) | Low formalization |
| Crozier | Routinized | Uncertain |
| Thompson | Overspecification | Structural looseness. |
| Litwak | Weberian | Human relations |
| Simon | Programmed | Unprogrammed |
| Bennis | Habit | Problem-solving |
| Structure designers | | |
| Taylor | Scientific task determination | Personal rule-of-thumb |
| Classicists | Clear statement of responsibility | Personalities predominate |
| Structure critics | | |
| Likert | Authoritative | Participative |
| McGregor | Theory X | Theory Y |
| Argyris | Rational organization | Self-actualization |
| Others | | |
| Perrow | Routine | Non-routine |
| Woodward | Mechanistic | Organic |
| Lorsch & Lawrence | Open network | Vertical network |

Modified from Hickson, 1966

Some see it in the environment, some in the organization's understanding of the materials, and some in the clarity of the organizational goal.

The importance of these differences for the study of communication are clear. In each case the question of uncertainty is a matter of information, and is, therefore, at least partly one of communication.

These controversies will be considered in the following section. Perrow (1970) writes:

> Structure, technology, environment, goals--
> these are the concepts that have been stressed
> in this book. Leadership, interpersonal relations,
> morale, productivity--these concepts have not
> been stressed (175).

The following three chapters are organized around the relationship of three of Perrow's concerns--technology, environment, and goals--to the fourth concern of structure.

CHAPTER IV

TECHNOLOGY

Since an organization is a system that transforms

materials, it seems logical to begin with the study of

organizational technology.

## Definition and Classification of Technology

### Definition

In a broad sense, all writers agree that technology

is what turns input into output. But within that frame-

work there is disagreement and confusion.

In general terms, Harvey states

By organizational technology is meant the mech-
anisms or processes by which an organization
turns out its product or service. Organizational
structure refers to properties essentially internal
to an organization, such as levels of authority,
as contrasted with essentially external or "setting"
factors, such as an organization's location or
environment (1968, 247).

Hetzler (1969) writes that "techniques, tools, and

machines are the sum and substance of technology " (161),

76

but "techniques are purely social (163)." In contrast,

Trist _et_. _al_.(1963, 48) consider the "technology" to be

only the equipment.

Litterer seems to share Hetzler's emphasis of social

knowledge, but he adds a second kind.

> We define technology as <u>knowledge of</u>
> <u>how to do something</u>. Managerial decisions to
> divide or specialize work depends on a knowledge
> of this as a possibility and also a knowledge
> of the various ways work can be divided. Therefore,
> with this definition, managerial decisions are
> also technology. In the very broadest terms,
> then, the organization can be conceived of as
> an entity that comes from two fundamental inputs,
> one social and one technical, leading to the
> current practice of analyzing organizations as
> socio-technical systems (27).

However, Litterer later departs from the definition

of managerial knowledge as part of technology. He lists

three inputs for organizations: (1) "technology . . .

engineering and scientific knowledge of how a thing can be

done," (2) the managerial system, "a knowledge of structure

and process to guide workers in collective effort," and

(3) membership (27-28). He specifically excludes machinery

as an input, stating that it is rather

"the culmination of social and technological inputs (27)."

But most writers seem to agree that technology includes

both knowledge and the equipment to carry it out. A car

is of no use to the person who does not know how to drive
it.  On the other hand, the most skilled machinist would
be no better off than a complete novice after a plane crash,
stranded in a jungle without his tools.  And knowledge
of the complex tasks carried out in organizations must be
shared, or social.

Different formulations of this idea give some insights
into what is meant.  For example, Blauner writes

> Technology refers to the complex of physical
> objects and technical operations (both manual
> and machine) regularly employed in turning out
> the goods and services produced by industry.
> Technology signifies primarily the machine system,
> the level and type of mechanization, but also
> includes the technical "know-how" and mechanical
> skills involved in production (1964, 6).

Perrow (1970, 1972, 1965), who is concerned with social
service agencies as well as businesses, emphasizes the role
of knowledge rather than that of tools.

The present paper takes the position that the tools
of all kinds--including medication, typewriters, and pencils
as well as machinery--and the knowledge of their use are
inseparable, and both are equally important parts of tech-
nology.

Classifications of Technology

Classifications of technology vary with the definitions used. That is, some writers emphasize the machinery, others the "know-how," and others the nature of the cooperation. A few writers stress the material processed rather than the process itself.

Knowledge. The primary exponent of the view that emphasizes technical knowledge is Charles Perrow, and he also offers the most refined classification. He uses two dimensions, the number of exceptions to ordinary procedure, and the analyzability of the search for a way to deal with them. He lays these out orthogonally.

|  | Few Exceptions | Many Exceptions |
|---|---|---|
| Unanalyzable Search | Craft 1 | 2 Nonroutine |
| Analyzable Search | Routine 4 | 3 Engineering |

(1972, 78)

He further comments

> Note, that if one were discussing only routine and nonroutine companies or bureaucratic and nonbureaucratic structures, only cells 4 and 2 would be relevant. These are represented by a two-dimensional continuum characterized by a broken line . . . However, organizations can fall into the categories represented by cells 1 and 3 (78).

Mechanical Process. Rackham and Woodward (1970, 33)
criticize Perrow because "he classifies technology in terms
that are themselves social." They prefer a classification
on the basis of "variety" rather than "exception" (35).
However, they found variety quite difficult to define.
They found it impossible to define a "product" satisfactorily
so that a researcher could count different ones. For example,
two writers from the same group (Reeves and Turner, 1970)
studied a factory which made suits to order. Each suit was,
in fact, slightly different--not only in measurements but
in style and usually fabric. But these differences could be
accomodated in a mass-production framework. Other firms
presented other problems in defining a product.

Harvey (1968, 252) used a measure of "technical
diffuseness" which was based on the number of product changes
in a firm in ten years. This measure correlated .94 with
the average number of different products produced during the
ten years. He included only "major" changes, which he defined
as those that involved some re-tooling, and a change in material
or design and purpose. It seems that this definition would
require subjective judgment, and considerable knowledge of the
technical process itself.

Woodward's earlier scale (1965) was based on the relative "sophistication" of the technology in use. This scale (Table II ) had 12 classifications. However, their work, and that of those following them, has concentrated on three broad categories:   nit or small-batch  production, large-batch or mass production, and continuous-flow production.

--- While the broad categories are certainly useful for a rough placement of firms, the variable of "technical soph-istication" is not clear. The question remains as to what part of the  system is sophisticated--the men or the machines.

Woodward's group has also begun to use another type of classification which should be of particular interest to students of communication. After more intensive study of batch production, Reeves and Turner (1970) began to focus their concept of such firms around the unavailability of complete information. In such a firm "techniques must be found for planning and control without collecting all the infor-mation necessary to describe the situation (95)."

Social Classification. Members of the so-called Aston group, from the university at Aston, Great Britain, which tends to minimize the importance of technology, never-theless has developed an interesting system of classification, emphasizing the social aspects of production. Pugh, Hickson,

TABLE II



Fig. 11. Production systems in South Essex industry

Woodward, 1965, p. 38

Hinings & Turner (1968) developed four factors from a study

of a variety of organizations, both production and service.

The factors are:

1. Structuring of activities--standardization, specialization, and formalization;
2. Concentration of authority;
3. Line control of workflow--as opposed to impersonal control;
4. Supportive component--clerks etc. (85-87).

In a more theoretical vein, Thompson (1967) classifies

types of internal interdependence as

1. Pooled--like two independent branches;
2. Sequential--A precedes B;
3. Reciprocal--like maintenance and operations(54-55).

He also has a broad, over-all view of technology,

classifying organizations as

1. Long-linked, e.g. an assembly-line
2. Mediating, e.g. banks, insurance companies, and
3. Intensive,e.g. hospitals, military teams, custom work.

While this concept has some interesting points, many organ-

izations could not be included. Also, it gives no means to

compare, for example, one bank with another. Essentially,

Thompson is taking a broad view, like Parsons (1960) of

the function of the organization for society. He is not

providing a set of categories for internal analysis. His

classification of types of interdependence is more useful

for purposes of this paper.

<u>Materials</u>.  Another approach emphasizes the nature

of the materials used.  Perrow (1972) combines this approach

with his concept of knowledge.

> Where tasks are not well understood, generally
> because the "raw material" that each person
> works on is poorly understood and possibly reactive,
> recalcitrant, or self-activating, the tasks are
> non-routine (166).

Others pay less attention to the understandibility.

Rushing  (1968), for example, was able to account for

a great deal of the variance in organizational structure

simply by looking at the hardness of the material processed.

He based his approach on the assumption that

> [T]he harder the substance, the more elaborate
> the process required to manufacture a finished
> product from it.  As materials in hardness, their
> resistance to altering and shaping operations
> increases; consequently the number and complex-
> ity of operations necessary to break materials
> down and shape them must also increase (230).

Blauner (1964) uses two dimensions to characterize

products:  their uniqueness; and their structural character--

fluid vs. discrete (6-7).  He believes this is related to

the worker's alienation from his work.  Woodward (1965, fig.

11) also considers the fluid vs. discrete character of the

product in her study of organization structure.

Conclusion. Most of the systems developed for the classification of technology are quite limited and usually developed for only a few types of organizations. The most clearly developed and widely applicable is that used by Charles Perrow, who looks at two variables, the number of exceptions encountered and the analyzability of search procedures. While it would be valuable to have, as suggested by Woodward, a measure of technology independent of the perceptions of the workers, neither they nor anyone else has developed such a measure, generally applicable, to date. Therefore, at present it is suggested that Perrow's classification be used.

Perrow, however, is also aware of the inadequacies of current measures of technology:

> To be pure . . . we should focus upon character-
> istics that are measured independently of human
> behavior--perhaps the number of items produced per
> minute, the number of occupational specializations,
> or the scrap rate. For a number of reasons, this
> has not proved feasible. . . Failing here, we should
> try to focus upon actual human behavior--detailed
> observations of what is actually done. This, too,
> has thus far been rather unproductive and pro-
> hibitively expensive. A "quick and dirty" method
> is to ask people about the frequency with which
> they come across problems for which there is no
> solution ready at hand . . . This has the virtue
> of being an easy method . . . [b]ut is rather
> unreliable . . . (1972, 168).

## Implications of Technology for Structure

### Ideal Types

Writers about technology have developed specific and clearly articulated theories of the implications of their variable for organizational structure. In fact, in broad outline, there emerges from the literature a pair of types illustrating the extremes of technological effects. The first is similar to classic Weberian bureaucrachy. The second is not usually named, but Toffler (1970) calls it an "ad-hocracy." While as a modern, western-type organization, it has some characteristics in common with classical bureaucracy it is otherwise very different. Its structural differences are suited to its different task (Table III).

There are two criticisms of this over-all scheme. The first, oddly, comes from Charles Perrow, who calls it over-simplified:

> [The] most serious problem with the current state of the technological view is that it reverts to the old dichotomies. By clinging to a routine-nonroutine distinction, the technological theories too often place a caricature of Weber in the former and the human relations model in the latter type of organization . . . Neither the simple bureaucratic model nor the human relations model is adequate, so a theory which tells us which to use is not all that useful (1972, 169).

## TABLE III

### MODERN WESTERN ORGANIZATIONS

Common characteristics

1. Separation of administration and ownership
2. No rights to a given position
3. Qualifications for position technical, rather than heredity, family etc.

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| BUREAUCRACY | AD-HOCRACY |
|---|---|
| 1. Repetitive task | 1. Constantly changing task |
| 2. Organization bound by formal rules | 2. Organized by negotiation among personnel |
| 3. Formal, specified division of labor | 3. Division of labor informally developed to meet situation |
| 4. Hierarchy, division of authority | 4. Little or no heirarchy |
| 5. Roles and norms for each office, authoritatively established | 5. Role developed by the occupant |
| 6. Use of writing for orders, rules, and decisions | 6. Use of oral communication for arriving at and communicating decisions |
| 7. Structure by "bureaus"--established divisions | 7. New groups formed for new tasks |

A second major criticism is leveled by the Aston group (e.g. Pugh, Hickson, Hinings, Macdonald, Turner, & Lupton, 1963, 289).  They claim that their findings indicate that the variables do not co-vary across the spectrum from type to type as indicated.  Rather, some means of control are alternates or substitutes for one another. This view will be further discussed in light of specific studies bearing on the point.

Emphases

Groups. Within this framework of agreement, there is still room for difference.  Litwak (1961, 1962), for example, concentrates on group characteristics.  He views the ad-hocracy as a set of primary groups.  In the earlier article, he writes as though the groups are departments of a larger organization.  The later article apparently envisions the possibility of an organization's entire task being carried out by primary groups.

The classic example of the primary group is the family--stable, personal, affectionate, with a number of activities in common.  It is quite different from the specialized, impersonal, large bureaucracy.  Litwak relates the advantages of the primary group for production to its communication characteristics.

[E]verything else being equal, the face-to-
face nature of the primary group grants the fast-
est form of feedback. This speed is further
increased by the fact that primary group members
are in continuous touch in many different areas
of life (diffused relations). Again . . . studies
in communication suggest that positive affect
and permanent relations improve the accuracy of
communication [no studies cited]. In a similar
manner it can be argued that the primary group
structure provides greater flexibility once
knowledge and resources are held equal. For the
primary group member, because of his face-to-face
relations and legitimation of a wide range of
life problems, can can change decisions rapidly
and include many contingencies (1968, 472).

Litwak lists a series of three situations where the

primary group can be better than bureaucracy.

1. Where the task is simple.
2. Where the task is complex and idiosyncratic.
3. Where knowledge is incomplete (1968, 474).

Although Lorsch and Lawrence (1965) cast their theory

in terms of the environment, some of the variables they

consider would actually come under the present definition of

technology. They conceptualize three dimensions on which

units or groups can differ from each other, "the time or-

ientation of members, the interpersonal orientation of

members, and the unit's internal formal structure (471)."

Each of these should be appropriate to the task.

They apparently recommend a non-hierarchical, primary-

type group to deal with an "uncertain" task--perhaps the

same as Litwak's "complex and idiosyncratic" task.  This

material is further discussed in the following chapter,

on the environment.

The Individual.  Other writers begin their theory

with the individual.  For example, Willer (in See, 1969)

writes:

> Simplicity and routinization at one extreme
> are necessarily connected, as are variability and
> complexity at the other . . . If actions are
> determined exclusively by rules and orders, then
> these tasks would of necessity be simple and routine,
> for as complexity and variability of tasks increases,
> complexity of role and order structure would
> have to increase until subordinates would  have
> to make significant decisions concerning the
> application of both the rules and the orders.
> Tasks which are extremely complex and variable
> lose their predictibility and thus necessarily
> require decisions by subordinates (16).

Litwak (1961) also considers this view when he

notes:

> [I]t can be argued that the separation of policy
> and administrative decisions is inefficient when
> the organization is confronted with non-uniform
> situations.  Such separation implies that general
> rules can be laid down a priori to guide admin-
> istrative decisions along common lines of policy
> . . . [S]uch general rules become impossibly
> complex when the organization faces non-uniform
> situations.  Internalizing organizational policy
> and localizing discretion (combining administrative
> and policy decisions) would then be more efficient
> (179).

Perrow (above, page 75   ), with his emphasis on individuals and their exceptions and search procedures, also falls in this category.

Summary.   There are, then, two approaches to the construction of an "ad-hocracy" type of organization. The first emphasizes the purchase or importation of ready-socialized individuals with the skill and  attitudes to work without external rules.  A second approach concentrates on building up a semi-independent group, which carries out tasks cooperatively.

## Studies

Theory from the writers on technology has been well based in empirical work.  Several groups of researchers will be reviewed here.  Then the objections to this line of theorizing will also be considered, and some conclusions drawn.

### The Woodward Group

The story of the beginning of the research at the Technical College in South Essex seems destined to become as much of a classic as the story of the Hawthorne studies. The original purpose was to validate classical management theory using local firms.

The researchers found no relationship between any

classical principles and their criteria of success.

This was shocking to a group who had been dedicated to

teaching these very ideas.  They found that

> [T]he twenty firms assessed as 'above average'
> in success had little in common organizationally.
> Seven seemed to be organization-conscious, eleven
> were not.  The successful firms included the two
> with a functional type of organizaton; this sugges-
> ted that in some circumstances people can and do
> work effectively under more than one supervisor.
> .  .  .
>                            .  .  .
>     The twenty firms assessed as "below average"
> in success differed equally widely.  Here again
> nine were organization-conscious and eleven were
> not, and those with organic systems outnumbered
> those with mechanistic systems by approximately
> two to one.  There were wide variations in the
> size of the span of control at the different levels
> of the heirarchy, and whereas in some unsuccessful
> firms command heirarchies were very long, in others
> they were very short (1965, 33).

Only by re-considering their data in the light of

the technology used by the various firms were they able

to make sense out of their results.  As discussed under

the classification of technology, they grouped the firms

into 12 groups, based on technical advancement (Table II).

The three over-all categories were (1) unit, (2) large

batch and mass-production, and (3) continuous-flow

production.

Some of the structural characteristics were directly
related to this scale, namely

the length of the line of command; the span
of control of the chief executive; the percent-
age of total turnover allocated to the payment
of wages and salaries, and the ratios of manag-
ers to total personnel, of clerical and admin-
istrative staff to manual workers, of direct and
indirect labor, and of graduate to non-graduate
supervision in production departments (1965, 51).

Other characteristics, however, were more similar
at the two "ends" of the scale than they were to the "middle."
These included

1.  low span of control of first-line supervisors
    (small primary working groups)
2.  Many skilled employees in direct production.
3.  Tend to be more organic (large batch firms
    were mechanistic)
4.  A more clear division into line and staff
5.  Technically competent supervisors
6.  Less formalized control of materials and
    quality
7.  Reliance on oral communication (Batch firms
    use written)
8.  Firms seemed more placid and easier to
    research (60-67).

Several of these categories seem to fit the pattern of the

bureaucracy-ad-hocracy distinction, with batch firms being

bureaucratic and the others "ad-hocratic." For example,

the unit and continuous-flow firms had small, primary-

type working groups, organic systems, less formal control,

and used oral communication. Further, their supervisors

were technically competent and there were skilled employees

in direct production, indicating the use of independent

judgment rather than rules of procedure.

<u>Communication Implications</u>. Certain communication practices were related to the technology variables, while others were not. For example, "organic" systems outnumbered "mechanistic" systems two to one, both in successful firms (24). They found that "There was a tendency towards written communication in mechanistic systems and towards verbal [sic] communication in organic systems (24)." So this factor was not very directly related to technology, unless possibly the question of success was also considered.

The researchers did find that large-batch firms tended to follow the formal channels of communication. One firm which switched to such a system produced definite changes in the communication behavior of their superintendents:

> All three production superintendents spent less
> time alone after the changes had taken place,
> and the average number of daily contacts
> increased. They spent more time with people
> senior to themselves, and less with colleagues
> from other departments. They also had less to
> do with their own subordinates.
>
> . . .
>
> There was more reading, writing, and filing
> to be done and less time to do it (215-217).

No clear case was made for or against "opening communication channels"between divisions. The researchers's impression was that there were practical advantages to letting research and development personnel have some involvement in production. On the other hand, such involvement created conflict and confusion (138-140). Also, "it seemed that in the firms where research staff spent some time in the workshops, deliberate attempts were made to keep information from them (141)." The best relationship between R & D and the rest of the factory was found in a firm where the two divisions were several miles apart.

> In this firm, physical separation had not prevented the establishment of adequate commu- nication channels. A lot of information was exchanged . . . (140).

There were visits on a guest-host basis between R & D and production. This was also the only firm where R & D cooperated with sales in interpreting technical results.

Zwerman. Zwerman (1970) replicated the Woodward study in the Minneapolis area. He was only able to find one failure of one division of a firm in 1966- 67 when he collected his data, so he had to compare

"very successful" with "less successful" firms, instead
of actual successes and failures.  The success rate
was clearly a result of the over-all abundance of the
environment in this country at that time.

On the whole, Zwerman's results confirmed those
of Woodward.  Consistent with her findings, he deter-
mined that

1. There were no organizational correlates
   of operating success;
2. Ideas of classical management apply to
   large-batch firms;
3. Size of firm is not related to organizational
   variables;
4. The type of production technology was
   related to organizational variables;
5. For each technology, there was an optimum
   form of organization (144-145).

He did two differences from the British studies:

1. In Minneapolis, but not in England, the
   size of the labor force was correlated with
   the span of control of the chief executive;

2. In England, the span of control of the
   first-line supervisor was strongly correlated
   with the technology, while in Minneapolis
   it was uncorrelated (145).

Unfortunately, not enough information is given about
the actual organizational "shapes" resulting in the two
countries to speculate on the reasons for these differences.

Further Woodward Studies. Meanwhile, Woodward's
group decided to extend their study by concentrating on
batch production firms. The reason for this approach was
given by Woodward in the introduction to the reports:

> The South Essex studies had shown that in
> relating technology to organization behaviour
> there are two clear-cut extremes in the technical
> scale--firms making small units or batches to
> customers individual requirements, and process
> or continuous flow industry--and a large and
> difficult center area in which are found medium
> to large batch production firms and firms with
> the component assembly type of production
> system. Structure and behaviour appear to
> be more consistent and predictable at the
> extremes than at the centre (1970, x).

Woodward suggests two possible reasons for
these problems with  the "centre" firms:

1. The measures of technology might be inad-
   equate;
2. In large batch firms, the technology might
   set limits rather than determining the
   form of the organization (xi).

Since the authors believed that in large-batch
firms the control system might be independent of the
technology, they were very interested in discovering exactly
how such control systems worked. One method they used was
called the "tracer," following an order from first in-
quiry to delivery.

One such study was done by Rackham (1970).  He found a communication system made up of reports and paperwork that was largely separate from the needs of the technology.  The author comments

> Generally speaking . . . the circulation of
> Issues A and I [preliminary reports] appeared
> to be of doubtful benefit; the marginal utility
> of getting information early being offset by the
> increase in the complexity of the paper work
> system.  There is a tendency to judge the effect-
> iveness of the firm's communication system by
> the amount of information communicated.  Of
> course, it is possible to have too much as well
> as too little information, and by overloading
> the system to reduce the impact of the essential
> communication (135).

The initial plan provided an "expected" date for completion some ten weeks after delivery was required (135).  Rackham speculates that the presence of some plan, any plan, was useful only to reduce anxiety (145).  However, he made no effort to study anxiety levels in the plant at various stages of the work.

Some very interesting work was done in two large-batch and one mass-production factory by Reeves and Turner (Reeves, 1970; Reeves & Turner, 1972).  Woodward describes their work as follows:

> Kynaston Reeves and Turner . . . identify the
> inability to comprehend the production system in

> its entirety as the defining characteristic of
> batch production. In conditions of high uncer-
> tainty it is impractical or uneconomic to collect
> enough information to know what is happening
> at any given moment in time. The result is
> that people working at different points in the
> system have access to only limited amounts of
> information and therefore different conceptions
> of what the total system is like (1970, 242).

Apparently the mass-production factory was orig-

inally included under the mis-conception that it was

a batch production organization. The work was the

production of suits, made to individual order and routed

through in weekly "batches." Yet the differences in the

suits did not actually "make a difference" as far as

the production system was concerned. They were, in fact,

mass-produced.

In this case, the control system was very simple.

Each week's suits were assigned a color, and those of

a given color were supposed to be done first. The colors

were prominently posted (115-117). The foremen apparently

spent most of their time doing repairs on garments returned

from inspection rather than supervising. There was a

small "order seeking department" for locating overdue

garments.

In contrast to the suit factory, the two true

large-batch factories were quite similar to each other.

Meetings were held daily to discuss shortages and information from sales about pressing customer needs. "Progress chasers" did much of the work to see if shortages were being met. These employees were free-ranging (84). Foremen had to do much scheduling in their own areas, and many problems were worked out at the shop-floor level (85).

The authors also propose a relationship between internal technology and the external environment.

> In many respects the complexity of the production systems in the two batch production firms was a function of their market position and the nature of the products they were manufacturing. The fact that they were making their products in discrete batches . . . was a function of the level of market demand for their products (87).

Further, the nature of "the market" was colored by the perceptions of management. For example, one firm felt that it had to "meet all customer demands from the home market, including the development and modification of products to meet customer requirements (87)."

Apparently Woodward's group concluded that both their initial speculations were true to some extent. They have not yet developed an adequate description for the technology

of large-batch firms, and such firms do have a certain
amount of lee-way in the establishment of a control system.
They conclude that

> The managers responsible for batch production
> firms can make deliberate decisions which may
> result in their firms being either more like
> continuous flow production firms from a struct-
> ural and organizational point of view or more
> like unit production (Reeves & Woodward, 1970,
> 39).

Harvey--Technological Diffuseness. Harvey's study
(1968) is mentioned here because he claims to have
measured product changes, the approach Woodward's group
claimed was impossible. He identified technical diffuse-
ness with the number of product changes in the last
ten years (252). He considered that a change had to
require some re-tooling before he would count it.

His findings were that the less changeful the tech-
nology, the more likely the following were to increase:
number of specialized sub-units, number of levels of
authority, ratio of managers and supervisors to total
personnel, and degree of program specialization. These
findings held even with size controlled in the 43 industrial
organizations studied (247).

These findings indicate that the more routine or
less changeful organizations were more bureaucratic;
that is, they had more rules and a more definite hierarchy.

The reason for the greater number of specialized sub-units is not clear, but possibly a more routine task be broken down more not only at the individual level but also for groups. Later the possibility will be considered that a pre-established program requires less coordination.

One of Harvey's variables, "program specification" deserves consideration in more depth. He defines this factor as including:

1. Rule programming--the formalization of duties and responsibilities;
2. Output programming--formal steps for transforming the raw material;
3. Communication programming--the specification of the structure, content, and timing of communication within the organization (250).

He claims that this entire factor increases with "technical specificity." He calls this finding a "considerable departure" from Woodward and procedes roundly to criticize her findings.

> Concerning the implications of technology for program specification, Woodward presents some rather weak evidence to suggest that organization at both ends of the scale is more flexible and less subject to formal specification than it is in the middle range of the scale. Apart from questions about the quality of evidence Woodward's findings seem questionable on at least another count. It will be remembered that Woodward found that the ratio of managers and supervisors to total personnel and the number of levels of authority both increases with increasing technical complexity (250).

Certainly the conflict of evidence regarding the continuous flow firms cannot be overlooked. But Harvey does not consider the possibility that supervisors in a sophisticated setting may act as consultants and advisers rather than enforcers of rules (see Blau and Schoenherr, 1971). It is, of course, possible that he and Woodward were looking at different variables--a possibility increased by the all-too common use of different definitions.

## Coal-mining Methods

An often-cited study was conducted by Trist, Higgin, Murray, and Pollock (1963), comparing alternative methods of organization for coal-mining. Unfortunately, the study tells us more about coal-mining, and less about coal-mining groups, than we might care to know.

Under the old, manual system, miners worked largely alone, carving out a "room" and doing the associated work (49). An area to be mined was "given" or "bid" by a working group. With the introduction of machinery, management developed the "conventional longwall" system, based on the "principle of one man--one job (13)". Such a bureaucratic division of labor would only have been appropriate for a routine task, and coal-mining is both varied and dangerous, requiring close cooperation and social support.

Essentially, the "composite long-wall system," which was adopted, was in some ways a return to old methods. The men formed an autonomous group of forty to fifty, and were able to share dangerous or difficult tasks or to help out when one part of the job (such as timbering) was behind. This also gave them an appreciation for the nature of the total task and the importance of each part.

In spite of all the details about gates and machines and work vocabulary, we have almost no picture of how these groups actually assigned their tasks or communicated internally. It is possible that, in spite of their size, they may have been very much like primary groups, with close personal bonds and familial relationships.

## Supervision

Some studies concentrate on the area of administration and supervision. One collection of studies in this area (Dubin, Homans, Mann, & Miller, 1965) notes that "All of us emphasize technology as an important influence on productivity and supervisory practices (viii)."

Their claims throughout are modest and circumscribed. Homans points out, for example, that by maximum effort, workers might be able to increase their output 20% to 60% (1965, 55). The effects of supervision can only extend to this portion of improvement. He is speaking in general terms, and does not go into the possible effects of supervision on absenteeism, turnover, and quality.

Fensham and Hooper (1964) studied the change-over
to automatic looms in two mills of one company in England.
While this is another study that tells more about machines
than about people, the authors do have some theoretically
relevant conclusions in the area of supervision. Because
of the increased speed of the machines, supervisors had to
pre-plan to see that not loss of production occurred through
lack of materials. Also, there had to be swift communi-
cation to see that errors or breaks were swiftly repaired
(35).

The supervisor also seemed to serve more of an inte-
grating or inter-departmental communication function under
the new system.

> Because the weaver is so much more tied to a
> geographical location that the overlooker, it
> was almost inevitable that the overlooker would
> develop communication contacts more readily than
> the weaver (194).

Probably the occurrence of occasional "emergency"
situations created different supervisory relations, sim-
ilar to those found in the study by Emery and Marek (1962).
In this case, a power plant was increasingly automated over
a period of years. As the jobs became more complex, with
a decreased tolerance for disturbances, the worker called
in the supervisor when there was trouble. There was little
that could be routinely checked or supervised (24).

Technology and Attitudes

   Blauner.  Blauner is the first to intensely relate

technology to the attitudes of the workers on the job.

His interest is clearly industry, and he studies four

different types:  chemical (continuous flow), printing

(craft), textiles, and assembly-line firms.  Like other

students of industrial technology, he did spend some personal

time finding out what these people actually did, rather than

taking information solely from questionnaires.  He also

took some information from other studies.

   However, his concern for individual feelings, the

impressionistic nature of his work, and his overlooking the

question of economic effectiveness, give his work quite

a different slant from other technologists mentioned so

far.

   Blauner's key concept is "alienation"

   Domination, futility, isolation, and discontent
   are each aspects of the general condition of
   alienation, a leading perspective in modern
   social thought (vii).

   Unlike some writers who describe the technical process

at length for its own sake, Blauner attempts to give the

"feel" of actual work in the establishments studied.  He

believes that lack of control over the immediate conditions

of work leads to the greatest alienation.  And he concludes

that alienation increases

1. When the product is less unique

2. When the worker works on a smaller part of it

3. When the sphere of responsibility is more restricted (23).

These conclusions indicate that the bureaucratic structure has a human cost, a problem that will be discussed in the concluding chapter.

He finds the continuous-flow firm to decrease alienation compared with other types of blue-collar work. He believes the worker has considerable responsibility, can see the process as a whole, and even has the freedom to heat a can of soup on the job. The worker takes the responsibility of calling the supervisor in case of an unusual occurrence--a finding consistent with that of Emery and Marek (1962) in a highly automated electric plant.

The Affluent Worker.Actually, this work and the next are so similar  that they should be reviewed together. Both (Goldthorpe, Lockwood, Bechhofer, & Platt, 1968; Wedderburn & Crompton, 1972) are comparisons of a small group of factories, exhibiting different technologies, located on a single site in Britain. Both concentrated on obtaining information on worker attitudes regarding their work, their supervision, and the company.

The first study (Goldthorpe, _et_. _al_., 1968) was intended to be the first part of a study of the "_embourgeoisment_" of the well-paid worker. That is, the authors wished to find out if workers whose income approached white-collar levels would begin to adopt middle-class attitudes and values as well. To find the most favorable instance for the occurrence of such a value shift, they selected only married, male workers between 21 and 46 for their sample. They did not compare the actual attitudes of middle-class employees.

They determined that the values held by the workers regarding their work could be summed up by the term "_instrumental_ (1)". They place great stress on the fact that the workers regarded their job as a place they earned money to do other things with, rather than as intrinsically satisfying for its social or achievement characteristics.

It seems clear, however, that while workers had struck this bargain of work for money rather than satisfaction, they were not entirely happy with it. Most said they would prefer jobs with more skill and independence (15). And they had other values. For example, most said they would not like a promotion to foremen, not for reasons of money or prestige, but because they felt the work was intrinsically unpleasant (123).

Goldthorpe et. al. further claim to differ from the "technical implications approach" (e.g. Woodward, 1965; Blauner, 1964) in beginning with the meaning of the work to the worker (see Bechhofer, 1973, 138). They claim this meaning explains why their process workers, in contrast to those studied by others, were actually less satisfied than those working in other types of technology (73). That is, the workers were dissatisfied with the instrumental bargain they had struck.

However, they offer in a footnote (76) that the process workers they studied were peculiarly isolated and scattered over the plant, in contrast to those studied by Woodward and by Blauner, whos workers apparently could spend much of their time together. It is possible that Goldthorpe simply had a deviant case--one in which some other characteristic temporarily outweighed the expected effect of technology. Also, it could be that the nature of the work was analyzed in sufficient detail, and that in some way this process plant was different from others placed under that classification.

Wedderburn and Crompton. Wedderburn and Crompton (1972) found such detailed study necessary in their

investigation of plants with different technologies. The
two plants called Works A and B were both classified as
Woodward's class IX, "continuous flow." But the authors
found the attitudes of the workers regarding their work
and the company were quite different.

After closer consideration, they found that the
working situation was very different in the two plants.
The continuous flow in Works A could continue for several
months or more with no significant change. In works B,
changes could come within weeks, requiring stopping, setting
up, and contact with the supervisor. The uncertain nature
of the technology deprived the workers of the opportunity
to do their own self-pacing, and required their constant
attention on the task (80-81).

The authors found that the workers in Works A did
have the attitudes expected for process workers, approving
of their supervisory system and taking a "teamwork" view
of the organization (57). Those in Works B were more like
workers in batch factories.

They also found other differences related to the
actual nature of the work being done. For example, within
Works B, there were differences between those who worked
on the chemical processing, and those who packaged, inspected,
and warehoused the final product (85). The latter, of course,
were batch-type jobs.

Like Goldthorpe et. al. (1968) they found the workers had instrumental attitudes to their work. This similarity occurred even though their workers were more traditional and less mobile than the "affluent workers," and might be expected to show more traditional atitudes (146-149). It is not clear what Wedderburn and Crompton feel are the more "traditional" attitudes toward work held by workers since the industrial revolution.

As noted above, the findings of Wedderburn and Crompton regarding process workers agree with those of Woodward (1965) and others, and conflict with those of Goldthorpe et. al. One apparent solution for this problem, used by them, is a more careful analysis of the technology. A system for such analysis has been developed with extreme thoroughness by the author discussed next (Meissner, 1969).

## Meissner

Sources of Conflict in Theory. Meissner (1969) offers the proposition that much of the difference between the "human relations" school and the technologists comes from the different research settings they used. He writes

> In what kinds of industrial settings did
> research take place that followed these two ori-
> entations? The human-relations researchers
> went to places in which work was done on compar-
> atively small work pieces, easily carried to
> a workbench by hand. The work consisted of the

assembly of small pieces or machining operations,
both carried out independently on separate work
stations. These assembly and machine shops were
comparatively quiet, and workers could, at least
to some extent, walk around from time to time.
In short, human relations men in search of Homans'
"favorable instance" found what they were looking
for. And so did researchers intent on describing
the formal technical demands of work and its
consequences: They went to steel mills and
automobile plants, where the massive array of
integrated machinery is the most obvious and
overwhelming fact of industrial life (6).

Meissner's approach was to expand the range of possi-

bilities by including all cases of types of industrial

production from the literature. He does not consider

other types of work, but within his limited area he ana-

lyzes a wide variety of settings.

In his analysis, the author considers three classes

of variables.

> First, there is the technology of work places.
> Technology has two dimensions: conversion
> operations and transfer operations. Variation
> of each is seen as a progression of technical
> change: at each stage an additional component
> of work is performed by machines rather than
> by men (40).

His second set of variables involves technical con-

straints on behavior, which he puts in five categories:

> space, function, time,and perception.
> Variations of these contraints is described by
> a composite of several combined dimensions
> (40-41).

Finally, he relates these technological variables
to the dependant variable of the workers social behavior:

> Sharing of combinations of technical resources
> is noted as a defining condition of cooperation.
> By reference to the outcomes of which technical
> processes are designed, both cooperation and
> communication are distinguished as being either
> technically required or technically permitted.
> Our first interest is whether required and
> permitted cooperation occur alone or in combination.
> variation of required cooperation is further
> distinguished by the distribution of cooperative
> acts over time. Differences in communication
> are analyzed in terms of varying combinations of
> communication means and linkage networks.
> Technical and nontechnical resources as bases
> of control of technical performance and non-
> technical behavior are characteristics of types
> of influence. The symmetry of technical in-
> fluence is seen as reversible or irreversible
> within the limits of an operation cycle (41).

Communication Implications. Meissner is unusual

for a socio-technical writer in that he gives considerable

attention to communication in his study. Again, he is

concerned with what happens within the work crew, and

not such matters as how orders are received from above in

the heirarchy. He begins by listing five properties of

fully sufficient communication, particularly technically

permitted communication: "gestures, facework, literacy,

completion of unit of discourse, and choice of partner

(210)."

He then relates these to each of the four levels
of technology he has developed.

> Level A--heavy hauling:  Full communication
> in teams.
>
> Level B--handwork.  Constrained nontechnical
> communication.  All the Hawthorne studies
> were in handwork settings.  At this level,
> communication is not technically required,
> but tends to develop in "floating" networks,
> rather than within a single team.
>
> Level C--machine line.  Technical communication
> without words.
>
> Level D--automation, or what others call continuous-
> process.  Close/remote communication re-
> lations.  Workers have close, full non-
> technical communication with their imme-
> diate team, remote communication for tech-
> nical reasons with others by sign and
> machine (209-222).

This detailed analysis of the task requirements
and the need and opportunities for communication and
inter-action gives exciting implications for the analysis
of other settings.  Meissner himself relates some of his
findings to those of others in the field.

He finds an implied difference with the findings
of Woodward (1965), who found a steeper heirarchy and
greater proportion of indirect workers with the increase
in technological sophistication (52-59).  Meissner writes

In contrast, our data indicated that the workers
discretion, so far as it was determined by the
technology of man-machine relations and their
constraints, was greater at both ends of the
scale (244).

He attempts to reconcile this difference by suggesting

the jobs of supervisors, particularly foremen, may be

quite different in different types of production. Thus

the higher percentage of foremen and staff in sophisticated

industry may be concerned more with paper-work and less

with direct control of their workers (244). This analysis

is similar to the discussion of Blauner (1964, above).

It also suggests that the work of the foreman deserves

the same type of careful observation and analysis Meissner

has given the laborer.

Meissner recognizes certain similarities between

his work and that of Blauner (1964), in that both are

concerned with such factors as the worker's attention

level, pace, and freedom to move (Meissner, 1969, 249).

However, he criticizes Blauner's failure to consider the

many types of technology in a single industry or even

a single workplace. For example, by considering capital

investment per production worker for an industry as a

whole, Meissner claims "we have an equivalent to the

'ecological fallacy'" (249). Meissner is asking for
the kind of detailed analysis which he himself provides.

Summary. While Meissner's analysis is limited to
the production of goods in industry, within that setting
he considers a wide variety of situations. He shows that
authors have partly based their conclusions on special
characteristics of the work-places they have studied
and not considered the general problem of the opportu-
nities and requirements for communication and other
forms of social behavior. Meissner analyzes actual
studies of industrial work, and develops a typology
of settings which he relates to the communication patterns
in them.

## Chapple and Sayles

Chapple and Sayles (1961) take to an extreme the
analysis of work, believing that the manager can be timed
like those in the more usual work-study job. They take
the search for stability as the main job of the mana-
ger (79), overlooking the possibility of other types of
tasks. Where exact stability cannot be provided, they
look for statistical regularity:

> Just as the frequency of telephone calls
> or machine breakdowns can be predicted, so the

> reactions of particular personalities in partic-
> ular situations can be predicted with statis-
> tical regularity. . . . Althought the actual
> moment in a given day the superintendent will
> have a problem with a certain subforeman cannot
> be pinpointed, the frequency of occurrence and
> the time spent can be estimated within specific
> limits (62).

This approach ignores the needs for changes in
established processes  because of market change, techno-
logical change, or desire for imporvement.  It also
fails to provide even for the routine situations it
claims to cover.  For example, it may be predictable that
in a large plant some ten employees will become alcoholics
during a given year.  But for their ten foremen that
predictable occurrence will create an unpredicted drain
on their time.

Nevertheless, the authors do make some good points.
For example, their findings and recommendations regard-
ing the foreman's span of control are similar to those
of others concerned with technological implications.
But they state them in an extremely straightforward way
that clarifies what others have said.

> The span of his control . . . depends not on
> the number of people to be supervised but on
> the frequency and duration of disturbances within
> his work-flow unit and the length of time re-
> quired for him to correct them.  Thus, two

considerations need to be made in planning his
job; the ease with which disturbances can be de-
tected and the freedom he has to do something
about them (73).

They also provide a very interesting explanation of

the value of unions. Most authors seem uncomfortable

with unions, even listing union activity as a sign of

low morale. Some list its value for those interests of

workers and management which are in conflict. Chapple

and Sayles consider it an instrument of communication.

> [C]ollective bargaining can help the organ-
> ization by providing a compensatory channel
> and, thereby, a potentially more stable environment.
> Unions become a real part of the organizational
> structure as employee-union members contact their
> leaders, who, in turn, interact with various
> members of management. The effect resembles
> that of the addition of any new organizational
> component such as a new staff department or a
> new level on the line (1970).

## Perrow

A significant piece of intellectual piece of intell-

ectual history is told by Charles Perrow (1973). Perrow

had been aware of the work of Woodward, but he developed

his own point of view from a field study (Street, Vintner,

& Perrow, 1966). He describes the experience as follows:

> We were . . . to study seven juvenile correctional
> institutions, focusing upon the contrast between
> custody and treatment. . . . It was during the

course of this project that I became convinced
that the goals of the organization, say custody
of [sic] therapy, were not the independent
variables.  Nor were the strategies of the top
leadership, let alone their personalities.
Instead, I began to to feel, along with others
on the project, that it was the set of beliefs
about the nature of delinquents held by members
of the organizations that were the major deter-
minants of structure and goals, and even, to an
extent, the leadership styles and strategies.
If you believe that the main problem with delin-
quents was that they had not been taught to respect
and obey adults, then you selected techniques
of rehabilitation consistent with the "nature
of the raw material." . . . Your goal was still
to rehabilitate.  If you believed, on the other
hand, that delinquents were suffering from
intra-psychic problems that were rooted in their
childhood experiences, you adapted, as best
you could, psychoanalytic techniques and tried
to structure your institution accordingly . . .
[I]t was not the intrinsic nature of the raw
material that was at question, but only the way
the institution defined it (1973, 48).

While there are clearly similarities between the

viewpoint expressed above and that of those discussed

previously, there are significant differences as well.

Perrow is more willing to consider the perception of

the participant regarding the task and the organizational

goal.  Some of these differences may be due to his focus

on social service and voluntary organizations rather than

industry.

The study found, as predicted by Perrow's theory,

that the organizations whose work was routine--the custodial

institutions--had a definite heirarchy, formal rules, and
a less-educated staff. Those with non-routine tasks--the
treatment oriented--had highly-professionalized staffs,
few rules, and little formal structure. There were multiple
communication channels, and all views were considered
important as a possible contribution.

Another significant analysis is Perrow's article on
hospitals in the HANDBOOK OF ORGANIZATIONS (March, 1965).
While this involves no field research of his own, it
is original and creative in re-interpreting the existing
literature within the technological framework. He concluded
that "a change in structure in mental hospitals was not
viable without a change in technology (1973, 50)." With
regard to communication, he notes the common complaint
of writers on mental hospitals that communication in
these institutions is lacking.

> A high rate of communication in an organization
> is associated with complexity of tasks and a
> raw material that passes through many units, or
> a number of materials that are combined. This
> is not the case with the mental hospital. In
> fact, there is little information to communicate ·
> about, compared to most organizations (1956, 927).

Another study of Perrow's goes in a different dir-
ection, to explore the kind of question of inter-departmental

relationships that will be considered in the following

chapter on environmental writers. In a study reported

in 1970, Perrow investigated twelve varied firms. Members

of different departments ranked the relative importance

of each department in the firm. Sales was dominant in

eleven of the twelve (63).

The relative dominance of the departments was not

directly affected by the routineness of the technology.

The author concluded that:

> There are two clusters: technology and struc-
> ture, and power and discretion (and influence).
> Technology is indeed well related to task
> structure and also related to co-ordination.
> But it is not related directly to the power-
> and-discretion cluster (73).

Again, this reinforces the point that technology deter-

mines the structure of individual units, not the total

organization.

Perrow's classification of technology is discussed

earlier in this chapter. Chapter VI contains some of his

work on organizational goals, and Chapter VII includes

his classification as part of the final synthesis of the

socio-technical view.

## Critical Studies

### Mildly Critical Studies

Mohr's (1971) approach to technology seems to be basically like Perrow's:

> Technology was conceptualized in terms of the manageability of tasks and materials--essentially the predictibility dimension considered at the individual job level--and further conceptualized in terms of uniformity, complexity, and analyzability (1971, 448).

Mohr examined 144 work groups from 13 health departments, ranging from custodians and laboratory glass washers to dog catchers to nurses and physicians (448). He criticizes Woodward for using personnel ratios and spans of control, saying that their depiction of the social structure is "problematic" (452). The author himself, however, made no real attempt to provide an alternative method for the study of group or organizational structure.

His main concern was "participativeness of structure," which apparently referred to number of staff meetings rather than actual control over job-related decisions.

He found the following correlations with participativeness: manageability of technology,-.18; task interdependence, .31; noise level, -.31. He only notes the first as reaching a significance level of .05. He also found that "[E]ffectiveness was consistently and substantially higher whenever participativeness was high (453)."

While Mohr's measures seem to provide a good start, "participativeness" in this sense is a variable the casual observer might well expect to be relatively independent of technology in this range of that variable. No prediction can be clearly derived from other authors regarding it. Of course, as Meissner could point out (1969), there are jobs where groups meetings are almost impossible, and others where they are indispensable for effective operation. But in the public health field, it may be the more considerate or communication-oriented supervisor who meets with his staff and therefore has an effective group. The measure could be tapping a factor of general morale.

Meyer (1968) expands Mohr's criticisms of organizational charts. He studied data-processing sections in 254 government departments of finance, and found that they

> are quite different from other parts of organizations: they have more levels of heirarchy, a wider span of control of first-line supervisors, fewer employees under the direction of higher supervisors, and fewer supervisors responsible for members who are mainly in supervisory positions. These findings suggest that the consultant's role and horizontal channels are institutionalized in automated organizations (256).

That is, the consultant nominally holds a high supervisory status for the purpose of dealing with organizational members from other departments. But his job

does not correspond to his title. He is consultant, not supervisor.

Actually, however, Meyer did not find a great deal of difference--about 5%--in time spent in supervision between managers in data-processing and other divisions. And that difference was based on shaky evidence. The percentage of time spent was estimated by the <u>division</u> head, who may not have known such detailed descriptions.

Hage and Aiken (1969) also studied 16 health and welfare organizations in a midwestern city. They found that

> The social structure of organizations with more routine work [were] found to be more centralized, more formalized, and to have less professionally trained staffs, but no relationship with strat-ification was found. Organizations with routine work [were] further found to emphasize goals of efficiency and quantity of clients served, not innovativeness, staff morale, or quality of client services (366).

These findings are consistent with predictions regarding formality and staffing, and intuitively appro-priate regarding goals. The lack of difference in strati-fication may be due to the fact that the organizations were relatively non-routine. It is possible that the variation was not great enough to affect the structure. Or the charts may not have shown the true structure.

Summary. The studies support the relationship of routineness of technology and specification of program. The relationship with structure is unclear because of definitional problems. The following section will consider another possible reasons for  for this confusion, and a whole group of critics of those considered here. While the group just reviewed mildly criticize or modify the technological view, the following writers attack its fundamental logic.

## Is it all really size?

There is a bulky literature concerned with the problem of size and its effects on structure. It is ably reviewed by Starbuck (1965). Most of it has little to do with either communication or technology and is not relevant to this paper. However, certain writers in this area have attacked the technological view and so require consideration.

Statement of Purpose--Aston. The Aston group are members of the Industrial Administration Research Unit, College of Advanced Technology, University of Aston, Birmingham, England. Their initial statement of purpose gives no special prominence to size as a variable. The group was determined to analyze the concept of bureaucracy and examine it empirically in a large number of organizations.

> A survey of the literature on bureaucracy leads
> to an analysis of organizational structure in
> terms of a set of variables (specialization, stand-
> ardization, formalization, configuration, and
> flexibility) that are capable of empirical veri-
> fication. Comparative studies will establish
> organization "profiles" along these variables
> and relate them to contextual variables such as
> size, ownership and control, charter, and technology.
> The profiles will also allow comparative studies
> of individual and group behavior to be undertaken
> in clear relation to industrial settings (Pugh,
> Hickson, Hinings, Macdonald, Turner, & Lupton,
> 1963, 289).

Pugh (1966) established a very broad charter for the

group's studies, expressing a need for organizational theory

that would include both an adequate psychology and a sociol-

ogy of organizations. So far, however, none of their studies

has considered the problem of individual or group response

to the structures they found.

Breaking Down Bureaucracy. Hinings, Pugh, Hickson,

& Turner (1967) emphasize the need to "break down" the concept

of bureaucracy into its constituent parts. They claim that

"What was originally thought of as a unitary conceptualization

can be seen to have a number of meanings which can be

conceptualized as dimensions " (63). Their principal

empirical finding was the unsurprising fact that larger

organizations had more full-time specialists.

A later study investigated 52 organizations in the

Birmingham area (Pugh, Hickson, Hinings, & Turner, 1968).

They interviewed "key informants" (67) on 64 scales, based on six dimensions: specialization; standardization, formalization; centralization; and configuration, including span of control, height of heirarchy etc. (70). From factor analysis, they developed the following:

1. Structuring of activities--standardization, specialization, and formalization.

2. Concentration of authority--increasing specialization and increasing dispersion of authority.

3. Line control of workflow rather than impersonal control.

4. Supportive component--percentage clerks etc (85-87).

Attacking Technology. In a study of both service and industrial firms begins the real emphasis on size and attack on the technological school (Hickson, Pugh, & Pheysey, 1969). The article includes a thoughtful discussion of the types of technology found in the literature. They include

Operations technology--the equipping and sequencing  of activities in the workflow;

Materials technology--materials used in the workflow;

Knowledge technology--knowledge used in the workflow (380).

Actually, these seem to be different ways of looking at

the same problem. But analyzing the approaches should

be valuable.

The report considers only "operations technology,"

in which the authors include automation of equipment,

workflow rigidity, specificity of evaluation, and con-

tinuity of throughput.

The authors did find results related to technology.

> The more the technology is integrated,
> the more activities tend to be firmly structured,
> with specialist departments and formal procedures.
> Where the technology is least integrated ( . . .),
> authority tends to be concentrated at the
> apex in borads or with the chief executive,
> and workflow activities tend to be directly
> controlled by line management and not through
> staff departments and their routines (387).

While it is difficult to relate these findings

to the technological writers, it seems possible that

integrated departments could be routine, and non-integrated

ones include small-batch and craft firms. This would

be consistent with the more bureaucratic structures of

the integrated firms.

However, the authors stress that size is a stronger

over-all determinant of organizational activities (387).

They even argue that the findings of such studies as

Fensham and Hooper (1964) of the automated power plant

may be due to the increasing size, rather than increasing technical sophistication of the plants studied. There is still the possibility that other approaches to technology might have led to stronger results.

The group continued to attempt to relate structural variables to "contextual" ones, and conclude that:

> The predictibility of the structural dimensions from contextual elements serves as external validating evidence of the structural concepts themselves. It has now been shown that besides being internally consistent and scalable, as previously demonstrated, they can also be related in a meaningful way to external refer- ents. Indeed the size of the correlations inevitable raises the question of causal impli- cations. It is tempting to argue that these clear relationships are causal--in particular that <u>size, dependence, and the charter-tech- nology-location nexus largely determine struct</u>ure (90).

In their explanation, they posit a relationship of size to structure via technology--size causing more repetition and standardization and hence impersonal control (91). The implication would be that if repi- tition occurred because of some other factor than size, it would have similar implications for structure.

While there is no clear, logical development of studies from the group, Pugh, Hickson, & Hinings (1969) do proceed to develop the promised "profiles" of org- anizations.

This study is an investigation of "structure," in which the authors include structuring of activities, concentration of authority, and line control of work-flow. Most writers use the term "structure" to mean something like the the Aston group's "configuration," that is, span of control, percentage of staff vs. line and so on.

They developed the following types:

|  | Authority | |
|---|---|---|
| Structure | High | Low |
| High | Full Bureaucracy | Workflow Bureaucracy |
| Low | Personnel Bureaucracy | Implicit Structure |

A dotted line from "Implicit structure" to "Full bureaucracy" would look suspiciously like Perrow's "routine--non-routine" continuum (p. 75 ). This might support the view that the different usages of the term "technological" are alternate ways of considering the same problem.

While this group seems determined to minimize technology and break down the unitary concept of bureaucracy, their own results do not clearly support these efforts. In addition, there are critics to be considered.

Critics of Aston. The first critics to be considered are actually members of the group themselves. Their objections develop from further research. In an "abbreviated replication" Inkson, Pugh and Hickson (1970) based their report on a one-hour interview with one executive in each of 14 companies. The concluded that

> The fact that changes in structure were not
> found to be associated with changes in size
> contrasts with the large correlation of 0.69
> obtained in the earlier study of size and struc-
> turing of activities (Pugh et. al.1969b).
> This suggests that in the long run increases in
> structuring would parallel increases in size,
> but that in the shorter term there is a "ratchet
> mechanism" operating, that is, increases in
> size would bring increasing structuring although
> decreasing size would not result in decreasing
> structure. Decreased concentration
> of authority seems to accompany increased struct-
> uring of activities (24).

The authors do not, however, provide information on the structuring of firms that increased or decreased in size over the five-year period to support their concept of the "ratchet mechanism."

Another member of the Aston group, Child studied size and other variables in businesses, labor unions, engineering firms, and the original Aston sample (1973). He found that "while the broad outlines of formal organization structures are predictable with a high degree

of confidence from a knowledge of organization size (168),"
other factors need to be taken into account for a satis-
factory model. He concludes:

> [W]hile size, with technology, location and
> environmental variables, predicts complexity,
> the degree of complexity itself has a more direct
> relationship with formalization than does size.
> Size, however, remains the major predictor of
> decentralizaton. It is concluded that, in the
> organizations studied, complexity cannot be satis-
> factorily predicted or fully understood without
> reference to the economics of scales, but that
> it is neither theoretically convincing nor stat-
> istically demonstrable that size in itself is the
> major determinant of formalization (168).

Child (1972) also defends the unitary, Weberian con-
cept of bureaucracy against his colleagues efforts to
splinter it. Apparently he believes that the provision
of certain latitude for strategic choice by management does
not destroy the unity of the concept.

Mansfield (1973), an "outsider," is stronger in his
attack. He begins with Aston's understanding of Weber,
then their operationalization of his concepts, and their
methodology. Regarding Weber he writes

> Weber's second principle stated that a strict
> system of authority was a vital characteristic
> of a bureaucratic system of administration.
> At no point did he suggest, however, that cen-
> tralization of decision-making in such a heir-
> archy was a characteristic of bureaucracy nor
> did he even make explicit the relationship

between bureaucracy and centralization. The
closest he came to such a description was in
a statement which implied a negative relation-
ship (478).

Mansfield indicates that most of the Aston variables
are not closely related to the things Weber was concerned
with. They ask, for example, whether a rule book  exists,
but not whether rules are followed, and ignore such Weberian
factors as career and specialization of management (480).

He also believes that their factor analysis is
mis-leading , because

[N]ot one of the major items considered by the
Aston group can usefully be considered as
vector quantities (484).

Their scales do not indicate length and direction (vector),
but simply place the variable on a scale (scalar).

Aldrich (1972b) took a different approach, devel-
oping a criticism of the Aston group based on a "path
analysis" model. He first criticizes their measure of
technology, claiming that

There is a real question as to whether the
technology measure is not simply acting as
a dummy variable for manufacturing/non-manu-
facturing (28-29).

Aldrich feels that the basic Aston data deals with two
populations of organization.

He recommends that further work should be done using technology as an independent variable and emphasizing theory-oriented analysis. In such work,

> Technology also has high causal priority because an organization's choice of its technology is deliberate and conscious, with other aspects of organization design following logically from the particular technology chosen (35).

Then two outsiders rush to the defense of Aston (Heise, 1972; Hilton, 1972). The article by Heise is more germane to the problems we are concerned with--that is, evaluation of different approaches to the study of organizations. Heise indicates that Aldrich is wrong because he analyzes the Aston data in terms of a causal model, whereas they are attempting rather to develop a decision model. He explains

> The Aston group state they are applying correlation and regression analyses without making presumptions about causal dependencies. This implies that they are intent on developing dec-ision models. Thus, if one has no information on structure, their results indicate an approximate classification can be made in terms of size and technology, and size should be weighted much more in the transformation of data than technology, since size is a better indicator of structure (59).

In a reply to Aldrich, Pugh and Hickson (1972) accept Heise's view. They write:

> [T]he Aston studies are consciously decision models. They try to estimate atemporally the relationships between stable, meaningful char-acteristics for organizations that have been oper-ationally defined and measured (273).

They add, nevertheless, that Aldrich provides different alternatives for consideration as causal hypotheses, which make his work "so interesting and such a useful contribution (275)." But if Aston is not interested in causal relationships, their work cannot well be used as an attack on those who are.

To the widely-flung battle, the latest entrant is Peter Blau. In a major study of state employment security offices (Blau and Schoenherr, 1971), he determined that size had a major relationship with structure, the administrative component increasing with decreasing size. He later found the same effect in state governmental financial units.

Later, recognizing that the study was limited by the special problems of governmental bureaucracy (Argyris, 1972, Chap. 1), he also studied 124 department stores, 115 universities and colleges, and 1,279 American teaching hospitals (Blau, 1972). In this further work, Blau found similar results, and so argues with those who discount size effects.

> The larger an organization the more differentiated
> it is along various lines. Whether we look at
> heirarchical levels, functional divisions, sections,
> within them, occupational specialities, or geo-
> graphical branches, organizations become differen-
> tiated into a larger number of them with increasing

size, and this is the case for very different
kinds of organizations (4).

But this finding does not account for procedural, rather
than structural, differences.

<u>Summary and Conclusions</u>. Critics, primarily the
"Aston group," argue that size is the strongest predictor
of organizational structure and formalization--students
of communication would be more interested in the second
variable. Certain of their own later work tends to de-
emphasize the importance of size.

Even where they and others such as Blau consider size
important, they are using some form of decision model.
The causal effects of size, they conjecture, are mediated
through some other variables which are part of technology.
Such variables include repetition, standardization, and
group structure. Therefore, if these variables occurred
independently of size, they would cause the same effects.
Students of organizational communication would probably
be more concerned with the direct, causal effects rather
than the indirect predictor of size.

A second effort of the group has been to break down
the unitary of bureaucracy and replace it with separate
variables. Yet there seems considerable evidence that
the aspects do co-vary as the Weberians predict.

# CHAPTER V

## THE ENVIRONMENT

> It's a very odd thing--
> As odd as can be--
> That whatever Miss T. eats
> Turns into Miss T.
>                     --Walter de la Mare

Organizations are created out  of the environment.
People, tools, information, material, clients--all come
from the "outside," and some of them become, for a short
or long time, part of the system.

The environment may be discussed in two general
senses.  The first is the broad social setting which
legitimizes the enterprise.  This includes such factors
as the national political ideology, the general economic
and educational level, and the broad religious and ethical
values.  Such factors are considered in Chapter VI.
The other sense, to be discussed in the present chapter,
is the environment which provides the immediate input
of information and material to a given organization.

A particular concern of the material below is the effect of the environment on the organization's internal structure and communication.

## Definitions and Classifications

### Definitions of Environmental Terms

Relations Among Terms. Tagiuri (1968, 22) lists quite a collection of terms having to do with aspects of the environment [Table IV]. He admits that some of his distinctions are arbitrary, but believes that adoption of the proposed usage will improve communication among students of organizations. Unfortunately, it still is not clear what the referent is for some terms, particularly his favorite, "climate."

He writes

> Climate and atmosphere would be put outside this whole hierarchy to function as summary concepts that refer to the "quality" of other environmental aspects, as experienced by the actor.
>
> . . .
>
> A particular configuration of enduring characteristics of the ecological, milieu, social system, and culture would constitute a climate, much as a particular configuration of personal characteristics constitute a personality (1968, 22-23).

This presents a peculiar mixture of objective and subjective, e.g. "as experienced by the actor", terms.

TABLE IV

ARRANGEMENTS OF ENVIRONMENTAL TERMS

BY PROPOSED CONVENTION

Environment (ecology)

Ecology (physical, material)

Milieu (social:  actual presence of persons
         or groups)

Social System (social:  relationship patterns
              of persons or groups)

Culture (social:  meaning system; beliefs)


Climate
Atmosphere


Field

Behavior Setting

Situation

Setting

Conditions

Circumstances

from Tagiuri, 1968, 22

Tagiuri does not make clear whose perceptions at what level

are involved. However, where his conventions are clear,

the present paper will follow them. The distinctions among

"milieu," "social system," and "culture" seem particularly

useful. And it will also be necessary to make clear, as

Tagiuri points out, whether we are discussing the environ-

ment of the organization, or the environment in the organ-

ization.

## Classification of Environments

Approaches. Litterer lists three approaches to differ-

entiating environments:

1. By finding unique characteristics of environ-
   ments. Like classifying people by hair-color,
   this might be easily definable but not relevant
   to important characteristics.

2. By trial-and-error.

3. By variations in a characteristic, such as
   a. Number of customers, or
   b. Pattern of inputs--speed and precision of
      feedback (1969, 195-196).

He also states that

   Organizations must relate specific actions or functions
   to specific aspects of an environment. Ultimately,
   we may be able to identify these specific aspects.
   As a start, we are beginning to see that an environ-
   ment is really made up of many different environments
   and than the organizations respond differently to each
   (1968, 195).

While his emphasis on specificity is valuable,
it would be more parsimonious to consider the variety and type
of individuals and organizations a given organization had
to deal with as a characteristic of its environment, rather
than as separate environments.  For example, Argyris (1972,
21) criticizes the U.S. State Department for being closed
to its environment because it seems only to stockpile
paper about other countries.  However, it may be that this
organization survives by effective relationships with
other parts of its environment, such as the Congress or the
Executive Office.

Tagiuri (1965) lists four "problems" in the classi-
fication of organizational environments:

    a.  distinguishing between the objective and
        subjective environment;
    b.  distinguishing between the person and the
        setting;
    c.  determining what aspects of the environment
        need to be specified;
    d.  identifying the structures and dynamics
        of the environment (13).

However, he does not provide solutions to the problems

he raises.

Complexity.  Heydebrand (1973) defines environments

as more or less complex, along two dimensions:

1.  The differentiation and heterogeneity of
its _aggregate_ characteristics, e.g., degree
of industrial diversification, or different
types and degrees of social differentiation and
stratification, such as modern educational
attainment, percentage of white collar labor
force, percentage in manufacturing, median family
income, ethnic and religious differentiation.

2.  The second general element is the number
of other (similar or dissimilar) organizations
with whom a given organization can potentially
interact (14).

Still, this is more a potential set of categories than

a set of classifications.

An interesting typology of environments was developed

by Emery and Trist (1965).

1) Placid, randomized--market of classical
economics.

2) Placid, clustered--imperfect competition.
(A given firm needs knowledge of the environ-
ment).

3) Disturbed-reactive--oligopoly.  (A firm needs
knowledge of the environment _and_ of what
other firms know).

4) Turbulent fields--dynamic properties are
not just from the actions of other organi-
zations but from "the field itself."  It is
not possible to get complete information
(21-32).

However, they only provide the types, not the variables.

That is, it is not stated what continua lead to the types.

Certainty--uncertainty. Thompson (1967) and Burns
and Stalker (1961) seem to simply classify environments
along a dimension of the relative uncertainty they provide
the organization.

The two writers who have been most active in this
area, Paul Lawrence and Jay Lorsch, still leave some
confusion in their classification of environments. While
most of their theorizing centers around the idea of certainty
vs. uncertainty in the environment, they discuss other
characteristics. At one point they mention "Time span of
definitive feedback,"and "Relative importance of environmental
sectors (Lawrence & Lorsch, 1967, 253)." They also mention
"heterogeneity" and "differences in time orientation"
in different parts of the environment (93-96).

Melcher (1973) comments specifically on the Lorsch
(1973) paper in the same volume. Some of his criticisms
are answered in the author's other writings, but his
point that not all the variables are clearly differentiated
is good. As he points out:

> Certainty and feedback are not operationally
> distinguishable. Differing degrees of feedback
> are important factors affecting the degree
> of certainty (1973, 197).

Summary. The following factors from the various authors seem to be important for a complete description of the environment of an organization: (1) the number of other organizations, groups, and individuals that must be dealt with; (2) the diversity and heterogeneity of the above; (3) their relative power with regards to each other and the organization under study; (4) the amount of change or stability in the environment; (5) the predictibility of the change that occurs. Further research is needed to refine the above factors.

## Organizational Boundaries

### Membership

To return to the original definition given in Chapter II,

> For a given system, the environment is the set of all objects a change in whose attributes affect the system and also those objects who attributes are changed by the behavior of the system (Hall and Hagen, 1956, 33).

And the same authors immediately question if any "object" with those attributes should not be considered part of the system. A major problem in studying the organization and its environment is differentiating the two.

Haas and Drabek (1973, 14-16) offer two character-
istics to differentiate system and environment.  First,
interactions within the system are more frequent, and of
a similar character,  Second, actors within the system
are under the control of that system.

Aside from the empirical difficulty  of recording
the interactions of possible members to determine their
frequency and content, how is the researcher to decide
which interactions are "similar?"  A single job--say a
football coach--could require a wide variety of activities,
within and without the system.  The coach might budget for
and buy supplies, read about sports, talk to administrators
or alumni groups, direct scrimmage, and personally counsel
players.  The authors do not indicate if interactions are
similar in direction, style, content, or effect.

"Control" seems a fairly neutral sociological term.
Yet in fact if one is to determine if A controls B, one
must deal with difficult problems of motivation.  Did he
do it because he was controlled, or because he wanted to
do it anyway, or because it would please C.  Also, methods
of control are often subtle and difficult to define.

An empirical problem is that control is not the same as legitimate control. Spies, divided loyalties, and "going native" are common enough to create definitional problems.

## Levels of Participation

Ecological psychology has developed a more sophisticated solution than simply labeling people as "in" or "out." Instead, for each behavior setting, they define levels of participation as follows:

> Zone 1. Onlooker. This is the most peripheral zone. Persons in this zone are within the behavior setting but take no active part in the standing pattern of behavior; at most they are onlookers. They are tolerated but not welcomed; they have no power . . .

> Zone 2. Audience or invited guest. The inhabitants of this zone have a definite place; they are welcome, but they have little power in the setting; at most they can applaud or express disapproval.

> Zone 3. Member or customer. Occupants of zone 3 have great potential power, but usually little immediate power. They are the voting members, the paying customers who ultimately make or break the setting. . . .

> Zone 4. Active functionary. Inhabitants of the zone have power over a part of a setting, but they do not lead it. . . .

> Zone 5. Joint Leaders. . . . Persons in zone 5 have immediate authority over the whole setting, but their power is shared with others . . .

> Zone 6. . . . Here are included the positions of all persons who serve as single leaders of behavior settings. . . (Barker, 1968, 49-51).

There are two approaches one could take in using this type of scheme for the study of organizational membership. A researcher could simply take it over, and define as "members" those who reached a certain level of participation in a certain percentage of the organization's settings. Those with lesser degrees of penetration would be considered part of the environment.

A second approach would be to define levels of participation with regard to activities of the organization as a whole. A crude scale in these terms could be gradually modified with experience and research. Such a scale is proposed below:

> Level 1. Resources. These persons provide some resource necessary for the organization, but are not actually participants. Example: stockholders of most medium-to-large firms.

> Level 2. Peripheral participants. These persons show more definite commitment, and have potential power. However, their major commitment lies elsewhere. Examples: rank-and-file members of voluntary organizations, clients in certain types of poverty programs.

> Level 3. Full-time . These persons have a major, usually full-time commitment to the organization. They include workers, employees, and leaders at all levels.

Even such a rough classification could avoid
many of the arguments now held, such as the one over
the "membership" of clients in health and welfare and
organizations. According to this classification, some
organizations might have clients as level 1 or 2 parti-
cipants, but it would be unlikely that they would have
real power.

Organizational Dependency

Even isolating "an organization" as a unit of study
is difficult in this day of combinations and conglom-
erates. A cartoon in Mexico made the point something
like this:
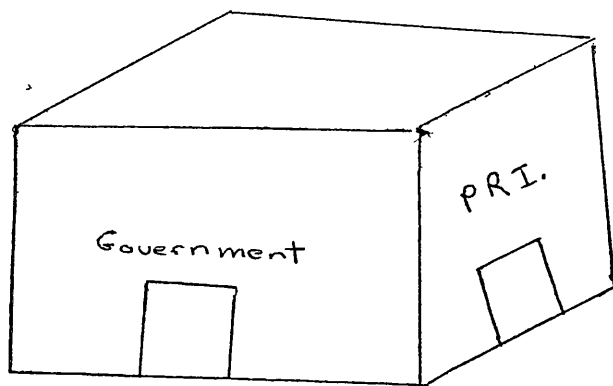


"Go in either door. It's the same building." (The
P.R.I. is the dominant political party).

There are many types of dependent and inter-depen-
dent organizations. Yet the question of whether organization

A is part of Organization B, or whether B is part of A's environment is very important in deciding such questions as the degree of centralization.

Again, we will take a concept, though not an exact pattern, from Barker (1968). He bases the degree of local autonomy of a behavior setting on the level at which the following decision are made:

> appointment of members
> admittance of members,
> determination of fees and prices, and
> establishment of programs and schedules
> (76).

This material would have to be tested and revised for use with organizations, but is suggested that a system that controls at least three of the four items be considered independent; one controlling two would be a dependant organization, and one or none would be a part of the controlling organization.

## Conclusion

Writers on the organizational environment have usually tried to define whether a person "is" or "is not" a part of the organization or part of the environment. An alternative is suggested here, that of using levels of participation in the organization rather than a simple member--non-member distinction.

A second problem is defining whether a system is
an organization or part of another. Again, a suggestion
is made that levels of independence be determined, based
on the authority of the system in question in determining
its own membership and functioning.

## Theoretical Predictions

### Certainty--Uncertainty

There are two main statements predicting the rela-
tionships between environment and structure. The older
one, by Burns and Stalker (1961) is qualitative but has
affected many other writers. They use the terms "organic"
and "mechanistic." The "mechanistic" system is approp-
riate to stable environments.

> In mechanistic systems the problems
> facing the concern as a whole are broken
> down into specialisms. Each individual pur-
> sues his task as something distinct from the
> real tasks of the concern as a whole, as if
> it were the subject of a sub-contract. . . .
> Operations and working behavior are governed
> by instructions and decisions issued by super-
> iors. . . .
>
> Organic systems are adapted to unstable
> conditions, when problems and requirements
> for action arise which cannot be broken down
> and distributed among specialist roles within
> a clearly defined hierarchy. Individuals have
> to perform their special tasks in the light of

> their knowledge of the tasks of the firm as
> a whole.  Jobs lose much of their formal
> definition . . . Interaction runs laterally
> as much as vertically.  Communication between
> people of different ranks tends to resemble
> lateral consultation rather than vertical command.
> Omniscience can no longer be imputed to the
> head of the concern (5-6).

These authors seem to related the need for the different

types of system to the internal informational and

decision-making characteristics of the organization.

That is, the organic form allows for greater sharing

of information which is not needed in the stable system.

They specifically related the organic form to Simon's

"non-programmed decision-making (118)."

Lorsch and Lawrence (1969) are also concerned with

environmental uncertainty.  They related the type of

information available at the organizational boundary

to the internal structure.

> In order to relate  effectively to its envir-
> onment, any organization must have reasonably
> accurate and timely information about environ-
> mental changes.  This is clearly an easier
> job if the environment is relatively stable.
> The job can be specified in a pre-determined
> set of operating rules.  The necessary messages
> can be handled through the traditional superior-
> subordinate channels, which may be few and
> restricted but are probably less subject to
> error and relatively inexpensive.  Fairly
> short time horizons are usually adequate . . .
>
> On the other hand, life in an organizational
> unit must become more complex in order to
> deal with an uncertain and rapidly changing

sector of the environment.  To have more
points of contact with the environment, a
flatter organization is employed.  Formal
rules cannot be formulated that will be
suitable for any appreciable time period, so
it seems better not to rely heavily on them.
More of an all-to-all communications pattern
is indicated, which can keep environmental
clues moving throughout the unit for inter-
pretation at all points. . . . The growth of
this necessarily more complex and  sophis-
ticated (as well as more costly) communication
network is fostered by an interpersonal
style that emphasizes building strong relation-
ships rather than just accomplishing the
task, per se (1969, 25-26).

Speaking from slightly different viewpoints, the

two sets of authors come to the same conclusion.  Units

that deal with unstable environment must be flat with

open channels for internal communication.  Those with

stable environments can rely on the cheaper but slower

formal channels.

## Internal Differentiation

One of the clearest ideas that emerges regarding

environment and internal organizational structure is

that the organization facing a differentiated environment

is, or should be, itself differentiated.  Thompson (1967,

70) writes that different departments are established

to deal with different parts of a heterogeneous environ-

ment.  An example would be a foreign division of a large

firm.  He further writes that "the more constraints and

contingencies the organization faces, the more its boundary-
spanning component will be segmented (73)." And, finally, he
discusses at some length relating contingencies of technol-
ogy and environment.

> First, organizations face the constraints
> inherent in their technologies and task environ-
> ments. . . .
>
> Second, within these constraints, complex
> organizations seek to minimize contingencies
> and to handle necessary contingencies by
> isolating them for local disposition. Since
> contingencies arise in different ways for
> various organizations, there is a variety of
> structural responses to contingencies.
>
> Third, where contingencies are many, organ-
> izations seek to cluster aspects into self-
> sufficient units, each equipped with the
> full array of resources necessary to meet
> contingencies. This means, in effect, that
> variables controlled by the organization are
> subordinated to the constraints and contin-
> gencies it cannot escape (78).

Lorsch and Lawrence (1965, 1969, 471) summarize
their findings as follows:

> The functional units in these organizations
> were each required to cope with quite distinct
> segments of the organization's environment--
> sales with the market, research with the
> scientific environment, etc.

They found that the most successful plants differentiated
different departments in style and structure, and used
integrating units to connect them.

In a historical study of four large U.S. business firms, Chandler (1962) discovered that expansion in size and products did lead to the establishment of separate divisions. He writes

> If diversity rather than increased size of operations lead to organizational inadequacies, then it becomes clearer why these four companies were among the earliest in the United States to consider structural reorganization (302).

This section can also be related to this paper's earlier discussion of systems (Chapter II). General Systems theory indicates that heirarchy, or sub-division, is a characteristic of systems. The advantage of this type of organization is that it is more flexible. It can "degrade gracefully" under stress, returning to its constituent parts, while a unitary organization would be destroyed. Thus environmental stress would account for the unitary, disconnected nature of Resistance groups and Communist cells.

## Summary of Theory

Organizations faced with certain environments may limit their information intake and spread it through the slow, vertical channels. Those with unstable environments must open channels of communication both internally and with the environment.

Organizations faced with a variety of environments
must have differentiated units to deal with them.
These units may need to be connected by internal "bridging
departments."

## Studies

### Boundary Confusion

Some studies dealing with the organizational
environment suffer from confusion in the definition
of boundaries.  For example, Greiner, Leitch and Barnes
(1968) attempted to improve the functioning of Internal
Revenue Service district offices by the use of training
based on Blake's managerial grid.  Courageously they
write:

> [D]istrict climate seemed deeply rooted in
> factors largely outside the control of local
> management.  Our findings revealed little change
> in the climates for the eight districts over
> a three-year period.  Moreover, those climate
> changes which did take place could not be attrib-
> uted to the Grid program (199).

They believe the environment largely controlled
the organization (220).  However, while the managerial
grid describes an organization's internal goals and
leadership, many of the items used to test change had
to do with dealings with the public.  The authors do

note that there was some change in <u>internal</u> relation-
ships, but not in the <u>external</u> area of taxpayer relations
(211). A clearer definition of boundaries could have
made the study more useful.

<u>Differentiation and Integration</u>

Lorsch and Allen (1973) studied differentiation
and integration in large multi-divisional firms. In
these organizations, they found that

> In the low performing corporate-divisional
> pairs the more differentiation the poorer the
> integration, while in the high performing
> pairs there was a tendency to achieve both
> high differentiation and high integration (67).

Apparently this synthesis of antagonistic states was
reached through considerable conscious effort, and a
tendency to leave alone those divisions that were
performing well.

An interesting analysis of the recording industry
by Peterson and Berger (1971) produced results consistent
with Lorsch and Lawrence. The authors found that
record companies were in three parts: manufacturing,
which was very bureaucratic; sales, a flat organization;
and production, which was very loosly organized.
Each producer of popular music is given a great deal
of discretion to find talent and put together records.

However, in the "older" market, including jazz and classical records, where the environment is less turbulent, the producer has less discretion and does not form an independent unit.

Similarly, Morse and Lorsch (1970) studied four organizational units. Two used production lines, two did research in communications technology. The better plants had social systems that fit their task. For the production plant, this involved defined and structured formal relationships, formal controls, and a short view of time. Relationships for the laboratory were opposite.

Criticism. The measure developed by Lorsch and Lawrence for the measurement of environmental uncertainty has, however, had strong attacks(Tosi, Aldag, & Story, 1973a). These writers correlated the Environmental Uncertainty Sub-Scale with "more objective measures" taken from Standard and Poor's Compustat tapes. They describe these as follows:

> Three volatility measures were collected . . .
> for each industry and firm . . . The coefficient
> of variation for sales over the past ten years
> was used as a measure of market volatility . . .
> As a measure of technological change, the average
> ratio of the sum of research and development
> expenditures and capitol expenditures to total
> costs over the past ten years was used . . .

> Finally . . . the coefficient of variation of
> earnings before interest and taxes over the
> past ten years (30-31).

This study is particularly valuable because it attempted

to use "hard" data rather than attitudinal or qualitative

measures of the variables.

The authors found that the Lorsch and Lawrence

sub-scale had poor internal reliability, and sections of

it could not be validly used alone.  And correlating the

scale to the "hard" measures, they found:

> The correlations are low and inconsistent,
> ranging from -.0294 to 0.036.  The research
> subscale is negatively correlated with all the
> volatility measures.  The manufacturing subscale
> shows low positive correlations, while the market-
> ing subscale and the total scale score show
> negative correlations with all the volatility
> measures.  In some cases, correlations are
> significantly negative (31).

As they comment, one cannot even take refuge in the

usual consolation that the results were "in the right

direction."

Reply.  Lawrence and Lorsch reply to the criticisms

by analyzing the contradictory study (1973).  They make

two major criticisms and a lesser one.

First, they claim that Tosi, et. al.'s "volatility"

is not equivalent to their "uncertainty."

First, their measure of volatility would increase as a result of periodic fluctuations in sales, etc. which would be entirely predictable to experienced managers and, therefore, not a source of uncertainty in our terms.

Second, we used a separate but related way of characterizing uncertainties which is not captured in the idea of volatility, namely the length of time needed for environmental feedback.

Finally, two of the three indicators of volatility are really tied to fluctuations in organizational outputs--sales and income--rather than inputs. In other words, they reflect only those uncertainties that the firms involved had not been able to regularize by their own actions (397).

Further, they claim that their measurements are justified by a system of "cross-checking" which Tosi et. al. failed to provide for theirs. They claim their findings were enforced

     (1) by carefully selecting industries for sharp contrasts in environmental uncertainty based on the general a priori repetition;

     (2) by studying and reporting "hard" economic indicators;

     (3) by conducting lengthy structured interviews with informants . . . (397).

Finally, they make a lesser criticism that Tosi et. al.used inadequate informants--as few as one, and that one not oriented to social factors, and extremely broad categories of industries.

Rejoinder. Tosi et. al. (1973b) agreed in a rejoinder that "volatility" is not the same as "uncertainty," but they argue that the two should be highly correlated. Further, they claim that "volatility" is widely used in finance as a "measure of risk," and is as "hard" as other economic measures (399). They seem to deny the need for any further "cross-checking."

Finally, regarding the selection of informants, they point out that Lawrence and Lorsch give no guidelines on who must be selected as informant, or how they are to be oriented. They claim they chose knowledgable executives.

The situation seems to boil down to the old saw "Further research must be done." The attack on measures does not invalidate the theory, but renders it "not proven." Work must begin by clarifying the concept of uncertainty and relating it to volatility. Lorsch and Lawrence must do further testing of their measuring instruments, and use the improved instruments to further test their propositions.

Environment and Information

Some writers imply that the environment only affects the organization through the information members have about it. However, an effect may begin before the cause is known, and there can be direct, physical effects, from earthquake

fire, and flood to petty shop-lifting. But information about the environment is significant in affecting the system, and two studies relate it to organizational differentiation.

The first was a comparative case study by Dill (1958) of two Norwegian factories of roughly the same size. Alpha was a clothing manufacturer, while Beta did engineering and contracting.

Buyers usually came to Alpha twice a year, to order clothing stocks for the new season. At Beta, there was constant concern for new tasks, developing new relationships and products. This affected the internal communication system.

> Because the environment of management at Alpha
> was less differentiated, more inputs were directed
> to the firm as a whole. If they did not demand
> uniform action from different work groups, they
> frequently made it difficult to avoid coordinated
> action. A single customer's order might request
> simultaneous deliver of several products; a
> union complaint about incentive rates might
> cause adjustments in all departments (124).

In contrast, at Beta, a briefing was required before different departments could even begin to discuss problems. Dill implies that lack of internal communication may have a circular effect, making further communication even more difficult (127).

A more recent study by Reeves and Turner compared the organization of batch production factories. They point out that

> In many respects the complexity of the pro-
> duction systems in the two batch production
> firms was a function of their market position
> and the nature of the products they were manu-
> facturing. The fact that they were making their
> products in discrete batches . . . was a function
> of the level of market demand for the their
> products (87).

This complex input requires a complex internal communication system. The firms must employ "chasers" to discover where the products are. They also have regular meetings to locate and expedite batches that are overdue.

Health and Welfare Inter-dependency. Aiken and Hage (1968) did a study in quite a different type of setting from those above--health and welfare organizations. They compared organizations with various numbers of joint, cooperative programs with other organizations. They found that

> Organizations with many joint programs have
> more active internal communication channels
> (284)
> and
> [O]rganizations with many joint programs have
> less routine technology (289).

However, their measures are not well thought out. For example, their measure of activity in the "communication

system" is only concerned with non-heirarchical communi-
cation such as committees. And the measure of "routine"
technology is by questionnaire, and they do not consider
the possibility of contamination by a morale factor.
That is, seeing one's work as "routine" may be a matter
of low morale, and also related to the lack of innovative,
cooperative programs.

Simulation. A different approach, involving computer
simulation, was taken by Bonini (1963). He found that
organizations in a simulated variable environment had
lower costs and prices and higher sales, inventories,
and profits than those in stable environments. He did
not simulate any variables of internal structure.

Environment and the Aston Group. The industrial
sociologists at the University of Aston--discussed at length
in the previous chapter--have a variable in their scale
which they call "environment." Actually,it is only a
measure of the organization's direct dependence on other
organizations (Pugh, Hickson, Hinings, & Turner, 1969).
Their original findings indicated that dependent firms
were more structured, more centralized and less auton-
omous.

A replication (Hinings & Lee, 1971) found similar
results using the same instruments. They did find one
difference.

[T]here is one finding here which differs
from the Birmingham study. Dependence is found
to have a significant and negative relationship'
to those variables which have been identified
as concerning structure. The more dependent
an organization is, the less likely it is to be
clearly structured. But this finding cannot be
taken at face value due to the relationship
between dependence and size (r=-0.6). For this
small sample, it is the small organizations
which are dependent (e.g. branch factories)
whereas the larger ones are less dependent (e.g.
legal subsidiaries). Thus, the exact relationship
between dependency and structuring awaits further
investigation (92).

There is no clear relationship between these findings and

the theories previously offered.

## Summary

The importance of organizational environments is

widely recognized but poorly understood. The first problem

is the failure to draw boundaries between organization,

both regarding membership and other, related organizations.

A solution is suggested in terms of levels of membership

and levels of dependence.

The second major problem is the lack of classification

of environments, and a classification is proposed in terms

of change, predictibility, and heterogeneity.

Theory is presented which predicts that organizations

in unstable environments will be flat and open, while those

in stable environments will be heirarchical. Also,

organizations facing differentiated environments must be differentiated as well. Studies bearing on these points were discussed and evaluated.

CHAPTER VI

GOALS

## Reasons for Studying Goals

There are two reasons for a consideration of organizational goals. The first is that the organizational goal, like the technology or the environment, may affect the organization's communication system. Eisenstadt (1965) writes

> [T]he major goals of any bureaucratic organization;
> the place of those goals in the social structure
> of the society, and the type of dependence of
> the bureaucracy on external forces (whether
> clients, holders of political power, or other
> prominent groups) may be of great importance in
> influencing its internal structure (196).

Such relationships can be direct, as when a goal of "democracy" leads to open communication channels. Or, they may be more subtle. Such goal characteristics as clarity, multiplicity, or ease of accomplishment may have consequences for the nature of the organization.

The second reason for consideration of goals is the need to study organizational effectiveness. That is,

can only evaluate how well something is done in the
light of what is meant to be done.  And any consideration
of the advantages of different organizational systems--
bureaucratic, ad-hoc, contingent--must deal with the
prolem of organizational effectiveness.

Many businessmen as well as social critics are very
much concerned with the goals to be accomplished by
industry.  In a forum article (Bell, Coase, Greenberger,
& Parker, 1971) Daniel Bell discusses issues regarding
possible business goals:  satisfaction on the job, minor-
ity employment, relative pay, responsibilities to the
community, the environment, and moral issues (7).  Similar
questions have been raised about the proper goals of
other types of organizations.

Even in the most straightforward case, the "goal"
may prove elusive.  A company's actions may be very
different depending on whether it regards its goal as the
production of widgets, turning a profit, or providing
jobs for the founder and his family.

### Defining and Classifying Goals

### Definition

Goals are one of the defining characteristics of the
"formal" organization.  There is always some element of
purpose or objective--unlike Topsy, General Motors didn't
"just grow."  Blau (1968) writes:

> The defining criterion of a formal organiza-
> tion--or an organization, for short--is the
> existence of procedures for mobilizing and
> coordinating the efforts of various, usually
> specialized, sub-groups in the pursuit of joint
> objectives (298).

Similarly, Sofer (1972) writes:

> Organizations are associations of persons grouped
> together aroun  the pursuit of specific goals.
> . . . [M]embers of the organization come together
> to pursue converging or overlapping interests
> rather than because of more diffuse sentiments
> or feelings of mutual belonging.  These may well
> develop out of their association, but they are
> not the central reason for the persons being
> assembled together (1).

But while, for some writers, the "goal" is part

of the definition of organization, others consider it

improper to use the term at all (see Perrow, 1968).  In

this view, only persons can have intentions, and to speak

of an organizational "goal" is to reify or anthropomorphize.

Simon solves the problem by re-casting goals into

his decisional framework.

> It appears convenient to us to use the term
> "organizational goal" to refer to constraints,
> or sets of constraints, imposed by the organizational
> role, that have only an indirect relation with the
> personal motives of the individual who fills the
> role (1964,1).

This definition, however, creates difficulties because of

its individual, psychological approach to what is usually

considered a social or organizational phenomenon.

Furthermore, the implications of Simon's approach are static. Clearly, organizational goals persist over some length of time. In this sense they can be considered equivalent to the equilibrium state of a system--the level which the system maintains against environmental pressures.

However, goals also change. Thompson, for example, defines goals simply "intended future dimensions (1967, 127)." If the goal is achieved, it will no longer require organizational effort. In an earlier work, he referred to goal changes:

> It is possible . . . to view the setting of goals (i.e. major organizational purposes) not as a static element but as a necessary and recurring problem facing any organization (1958, 123).

In another forum, this one on systems, (Grinker, 1967, Deutsch suggests

> Would you put "goal-seeking" between "maintenance" and "change"? "Maintenance" means that you main-tain the physical channel system. "Change" means it would have to drift somewhere else. But "goal-seeking" means that a system in organization moves in search of certain things which are not directly related to its maintenance (299).

While this idea is attractive, it is not fully worked out. For example, it would not label an animal's search for food as "goal-seeking," because what was sought was nec-essary for maintenance.

A more fertile approach comes from Haberstroh, who analyzes goal-directed activities in terms of two types of control:

> The task analysis comprises a program of means activities understood by the participants to lead to goal achievement. One way of responding would be to adjust the level of resources used in these means activities. Let us refer to this as "routine control." Another way of responding would be to look for a better way of achieving goals. This type of activity could take the form of inventing new means activities or of altering the system of executive functioning. It might be expected that this type of activity would only occur in a case of extreme or repeated failure (1960, 446).

This division of goal-related behavior allows for continuous goals, future goals, and for the changing of organizational goals. It would even allow for either a more psychological or a more sociological approach to operationalization.

Child (1972b) prefers the term "strategic choice" to "goals." He points out that choice has to do not only with the lee-way provided by environment and technology, but also with the choice of technology and environment.

This very significant paper points out that organizations affect, as well as being affected by, their environment (4), and at least can expand or contract their environmental contacts. Also, choices are possible in

the creation of technology, as shown in the Tavistock

studies (Miller & Rice, 1967).

Child summarizes

We have been concerned with the role of stra-
tegic choice as a necessary element in any
adequate theory of organizational structure, and
have suggested that many available explanations
over-emphasize constraints upon that choice.
In so doing they draw our attention away from the
possibilities first of choosing structural arr-
angements that will better satisfy the prior-
ities of those in charge of organizations, or
indeed of any interested party, and secondly
away from the exploration of organizational
design as a means of reconciling more successfully
economic and social criteria of performance (17-
18).

## Classifying Goals

Goal Types. Only two authors have provided sets

of classifications of organizational goals. One set,

by Eisenstadt (1965), is primarily a classification of

organizations by consideration of their over-riding goals,

and in that sense is parallel to Parsons (1960) economic,

political, and integrative organizations (45-46). However,

Eisenstadt recognizes the possibility of multiple or

changing goals within his classification, which are economic,

socio-political, and cultural goals. Thus the university,

a cultural organization--"scientific, educational, or

literary"--must also function in the economic and political

arenas if it is to obtain the funding to survive.

Perrow presents five classes of goals, based on Cyert and March (1963).

> (1) Societal goals. Referent: society in general. Examples: produce goods and services; maintain order; generate and maintain cultural values . . .

> (2) Output goals. Referent: the public in contact with the organization. This category deal with the types of output defined in terms of consumer functions. Examples: consumer goods; business services; health care; education. . . .

> (3) System goals. Referent: the state or manner of functioning of the organization, independent of the goods or services it produces or its derived goals. Examples: the emphasis upon growth, stability, profits, or upon modes of functioning, such as being tightly or loosely controlled or structured. . . .

> (4) Product goals (or, more exactly, product-characteristic goals). Referent: the characteristics of the goods or services produced. Examples: an emphasis upon quality or quantity, variety, styling, availability, uniqueness, or innovativeness of the products. . . .

> (5) Derived goals. Referent: the uses to which the organization puts the power it generates in the pursuit of other goals. Examples: political aims; community services; employee development; and investment and plant-location policies which affect the state of the economy and the future of specific communities (135-136).

This broad classification, while lacking theoretical elegance, should provide a better vocabulary for

discussing certain problems. For example, certain "human relations" writers (Likert, 1967; Argyris, 1972) argue that organizations must provide for the personal growth of their members. Classical writers, in contrast, seem to see the only legitimate goal as the production of more and better widgets (see Bell, Coase, Greenberger, & Parker, 1971). This can be seen as a conflict of goal types--system goals vs. output goals.

Goal Diffuseness and Change. However, this improvement in vocabulary does not give the key to organizational structure hoped for. Such information as is available on this relationship can be classified under two headings: goal diffuseness and goal change.

The two topics are closely related. As is clear from the classification system above, organizations have multiple goals. They must, at least, aim at their output and their internal maintenance. The more vague and conflicting the goals are, the more likely there is to to be some trade-off, or slighting of one goal for another.

A classic study of goal change was Selznick's (1949) investigation of the Tennessee Valley Authority. In this work, Selznick introduced the term "co-optation":

> [C]o-optation is the process of absorbing
> new elements into the leadership or policy-
> determining structure of an organization as
> a means of averting threats to its stability
> or existence. . . .
>     Co-optation tells us something about the
> process by which an institutional environment
> impinges itself upon an organization and effects
> changes in its leadership, structure, or policy
> (13).

Selznick apparently believes that co-optation of

certain elements was necessary to achieve the goal of organ-

icational survival. However, accomodating these new ele-

ments required the sacrifice of certain of the original

goals, such as services to poor farmers. This trade-

off was easier because some goals were vague, with no

standards set for their accomplishment. For example,

"Improve practices of poor farmers" is more vague than

"Produce fertilizer."

Selznick uses another term--institutionalization

for another type of goal change:

> Because organizations are social systems, goals
> or procedures tend to achieve an established,
> value-impregnated status. We say that they become
> institutionalized (1949, 256).

To Selznick, this seems to be generally a positive, stab-

ilizing force for society. "Organizations" are cold and

rational; "institutions"--the church, Old Miss, even the
old family firm--help make our experience richer and more
meaningful.

Merton (1967) sees the same phenomenon in a more
sinister light. He refers to "goal-displacement--in the
present terminology, a substitution of derived goals for
output goals. He sums up one such situation in the term
"trained incapacity."

> Such inadequacies in orientation which involve
> trained incapacity clearly derive from structural
> sources. The process may be briefly recapitulated.
>
> (1) An effective bureaucracy demands reliability
>     of response and strict devotion to regulations.
> (2) Such devotion to the rules leads to their
>     transformation into absolutes . . .
> (3) This interferes with ready adaptation under
>     special conditions not clearly envisaged by
>     those who drew up the general rules.
> (4)  Thus, the very elements which conduce toward
>     efficiency in general produce inefficiency
>     in specific instances. Full realization of the
>     inadequacy is seldom attained by the members
>     of the group who have not divorced themselves
>     from the meanings which the rules have for
>     them. These rules in time become symbolic
>     in cast, rather than strictly utilitarian
>     (1967, 200).

Thus the derived goal of following the rules overrides
the output,  or quality, goal of providing good service
to each individual.

## Studies

While there is considerable literature in some way relevant to the topic of organizational goals, most of it is not organized in terms of that concept. And rarely is much new ground broken beyond the early work cited above.

### Goal Change

Crozier and "Bureaucracy." One often-cited work is Crozier's (1964) study of two French bureaucracies--one a clerical, accounting office of the government; the other a state-owned manufacturing plant. He follows Merton, concentrating on "bureaucracy" in what he calls

> the vulgar and frequent use . . . It evokes the slowness, the ponderousness, the routine, the complication of procedure, and the maladjusted response of "bureaucratic" organizations to the needs which they should satisfy . . . (3).

However, the government bureau seems actually to have been a fairly effective place. While clearly it was gloomy and miserable in a physical sense--unsafe and unhygienic (33)--only a third of the workers were dissatisfied (21). While the department, which was the Paris branch, may have been less effective than the provincial branches, it seems to have gotten the job done. Apparently the goals--as imposed by the legislature--strongly emphasized economy, an adequate level of public service, and the absolute minimum in employee satisfiers.

The manufacturing plant <u>was</u> afflicted with "ponder-
ousness, routine, and complication of procedures." However,
it was clear that maintaining employment and satisfying
employees were important goals for it, not rapid production
or profit. The plant was required by law to hire from
certain needy groups--such as war widows--and strictly
controlled by union seniority regulations in the placement
and promotion of workers after hiring. Again, one could
argue that the goals neglected were not important to the
organization.

Co-optation in Zambia. A study by Bates (1970)
shows an attempt to co-opt the mineworkers union of Zambia.
The leaders were offered prestige and the possibility of
desireable jobs in return for adopting government goals.
Bates writes

> Instead of an exclusive commitment to advancing
> the interests of their members in higher wages,
> in their grievances against supervisors, and in
> their desire to work less hard while receiving
> greater pay, the union leaders are asked to
> perform their duties as conscientious spokesmen
> for the public interest (905).

But while the government was able to co-opt the
leadership, that group was not able to bring their organ-
ization along. For example, with a government policy

and leadership opposed to strikes and encouraging increased

productivity, there was a 300% increase in strikes, and

no evidence of increased productivity (911).

On the local level, there also seems to be a general

belief among the membership that even the stewards have

been co-opted, that they have "sold out (920)". The

local stewards "believe that by achieving management's

respect they will win more cases and thus gain the loyalty

of members (921)."

Bates indicates that [considering member goals]

Our data indicate that the Union is relatively
effective; that it wins cases the members care
about; and that the local branches, which are
in closest contact with the members, are as
effective as the national level of the Union
(921).

He relates the failure to achieve the leader's

goals to the union's social and communications structure.

The stewards had offices outside the factory gates where

members with grievances could report to them immediately

after the shift. This was very effective for sending

grievance material upward. However, the means for sending

goal information downward were limited. The only real

channel was the general meeting--and the miners did not

attend these meetings when the messages were unpopular

(916-918).

Structure to Support Goals. Quite a different study,
but with a complementary result, was done by Goldenberg
(1971). This book is a report of the setting up of a
residential treatment center for delinquent youths, an
Office of Economic Opportunity funded project. Goldenberg
believes that the typical pyramidal organization does not
allow information to flow upward from those who know the
situation--in this case, the client--best (92). He also
believed that organizational structure reflects organizational
goals, and that the appropriate structure is the key to
prevention of goal displacement (84). The organization
was therefore run by a continuing "t-group," intended
to maintain equality and stress the importance of every
staff member (158). The organizational structure was
effective in terms of output criteria, and apparently
successful in its derived goal of maintaining a certain
structure.

Zald and Ash (1966) discuss another type of organ-
ization, the Movement Organization, and how it may modify
its structure to maintain its goals. They define a Move-
ment Organization as one that wishes to change society (329).

They cite what they call the Weber-Michels view that
the original charismatic leadership of such an organization

must be replaced, and the organization must become more conservative and committed to its own maintenance (327). Zald and Ash believe the results can be affected either the organization's environment, or by deliberate manipulation of structure.

For example, an organization might change through the achievement of its goals in the society, as did the abolitionist and women suffrage movements, rather than by a change of leadership(330). Or the nature of its goals may make an organization relatively immune from pressure to change.

> The more insulated an organization is by exclusive membership requirements and goals aimed at changing individuals, the less susceptible it is to pressures for organizational maintenance or general goal transformation (332).

Even the organization that might be subject to outside pressure can structure itself so as to maintain its original goals. For example, they can keep the leaders low paid, and transfer them often so they cannot build up their own empires. They summarize

> In short, the militant MO is given a quasi-exclusive structure not only to implement goals, but also to maintain them in the face of pressures to become more conservative (340).

Juvenile Institutions. Goldenberg's Residential
Youth Center was designed as a substitute for such standard
institutions as juvenile reformatories and mental hospitals.
The goals of these institutions have also been studied.

Zald (1962) was part of the group study later reported
in Street, Vintner, and Perrow (1966). He analyzed the
data in terms of those juvenile institutions emphasizing
custodial vs. treatment goals. He related these goals
to the conflict within the organization. He concludes
that:

> Analysis reveals that the level of conflict
> is lower in the in the most custodial institutions,
> and is higher in institutions with mixed goals
> or predominately treatment goals. The pattern
> of staff conflict is found to be linked to the
> power balance in the institution, the degree
> of divergent perspectives among groups, and the
> amount of interdependence and intercommunication
> among groups (22).

Zald does not make clear why these effects occur.
One might logically expect the most conflict in those
institutions with mixed goals, with those clearly dedi-
cated to treatment or custody relatively calm. It could
be that even the most treatment-oriented must have some
goal of custody to keep things running and minimally clean
and safe, and this creates conflicts. Or it could be that

treatment institutions were set up somewhat like the Residential Youth Center, with no clear heirarchy to resolve disputes. Or the difficulty could be the lack of a clear technology to translate the goals into behavior.

Mental Hospital Goals. Scheff (1962) stresses the weakness and ambiguity of treatment goals and the ease of their displacement in various wards of a mental hospital. It was not clear to staff if patients were to be treated as "sick people" or "just like anyone else," and therefore it was easier to emphasize custodial or maintenance goals.

Other problems were the "regulation of staff behavior by outside groups, and the availibility of role imagery to structure staff-inmate relations (209)" as well as the conflict with the attendants's need to gain status by separating themselves from the patients. This seems to be another case in which the goals of the leaders--here, treatment and equalitarianism--cannot over-ride the goals of the lower-level participants.

Vague Goals and the Environment. Zald and Ash (1966) considered the effects of the environment on Movement Organizations. Zald and Denton (1963) considered the environment and goal change in the YMCA.

The YMCA was origianlly intended to provide spiritual and practical help for young, single men in the city. However, the goals were always broadly stated, and no particular efforts were made to hold to an ideology. Zald and Denton conclude that the

> broadly stated goals and unrestricted clientele encourage a wide diversification of programs and target populations (214).

Thus the vague goals provided no means to resist environmental pressure.

A vivid example of environmental effects on organizational goals is given in the report of a City Youth Commission in a college town (Maniha & Perrow, 1965). As background, the authors state

> The organization had little reason to be formed, no goals to guide it, and was staffed by people who set out to insure a minimal, no-action role in the community. By virtue of its existence and broad province, however, it was seized upon as a valuable weapon by other organizations for the pursuit of their goals. In the course of being used, the commission became a viable organization in its own right with new goals, even as its members denied that the no-action policy had been compromised (238).

In this case the vagueness of the original goals gave the organization flexibility to seize certain opportunities as they arose.

Simpson and Gulley (1962) studied goals in a broad assortment of voluntary associations. They asked whether

the organizations were focussed or diffuse in their goals, and whether membership involvement was important to their goals. They found that

> [O]rganizations with the widest range of pressure will tend to score low on an index of centralization of authority, and high on emphasis on membership involvement in organizational activities and attention devoted to internal communication (344).

The organizations which needed member support for their goals maintained them by devoting a considerable portion of their resources to spreading and reinforcing them.

Goal Conflict. Broad, ambiguous goals, then, can have some advantages for flexibility and survival. What about goals which actually conflict? Three studies bear on this point.

The Spanish Empire. Phelan (1960) studied the goals of the Spanish Imperial Bureaucracy during the golden age. Orders came from church and crown and government bureaus. This confusion could be used by the vice-roys to gain independence:

> Given the ambiguity of goals and the frequent conflict among the standards all the laws could not be enforced simultaneously. The prevalence of mutually conflicting standards which prevented a subordinate from meeting all standards at once, gave subordinates a voice in decision-making without jeopardizing the centralized control of their superiors (47).

Phelan points out that the use of several different heir-
archies served both to look after the importance of various
goals and served to see that information was transmitted
back to Spain.

Industry in Communist Lands. Frank (1958-1959)
finds similar principles at work in Soviet industry.
A Russian factory has to respond to market conditions,
buyers, and suppliers just like one in a capitalist country.
At the same time, it must meet government plans and demands
of the Communist Party. The management must violate some
standards to carry out others (10). At the same time,
their superiors have alternatives for evaluation and
enforcement. Apparently some global factor of over-all
success is more important than the violation of a given
law or standard.

Factories in Yugoslavia have a double heirarchy,
probably similar to that in Russia. Authority is supposed
to come from the "worker's collective," which is made up
of all workers, who are represented by a council of about
30, some decisions being made by a managing board of about
10. This heirarchy is over a second, normal heirarchy
with workers at the bottom (Kavcic, Rus, & Tannenbaum,
1971).

Participation by workers is an organizational goal. While various factories achieved it in different degrees, it was found to be unrelated to such other measures as productivity, economic success, or wages--which reflect profits.   Since these goals are not mutually contributory, it may well be that the use of special internal structures may insure that each receives some attention.

Levels of Goals.  Most writers in this area pay little attention to the problem of determing what organizational goals are.  Haberstroh gives a tantalizing hint of his methodology, indicating that he determined the goals of the steel company he studied by "content analysis" of internal communication (1960, 44).

He wrote that

> In the case of Integrated Steel, four goals were discovered.  These related to cost reduction, production level, safety, and medical care.  The safety and production goals are formulated in terms of acceptable level by an external office.  Performance is measured in terms of tonnage produced and frequency of injuries. . . . The goal of providing adequate medical care was departmentalized in a plant hospital; and a standard cost system and various cost reduction programs were in operation (446).

He analyzes the safety program in some detail, in terms that are of interest to us.  The safety program

consisted  of two parts: time-triggered routine inspections and recommendations as well as safety training; and event-triggered reports and investigations required after every accident (446).

Again, this plant demonstrates the strategy of using different units for different, and possibly conflicting goals.  In addition, Haberstroh indicates another strategy for dealing with conflict of goals.  Some goals are cast in terms of optimizing--for example, cutting costs as much as possible.  Others are defined as meeting a certain level; for example, producing x tons of steel. When those goals are being reached, no special effort is required for them.

## Conclusions

This has been a disconnected and difficult area of the literature to explore and to summarize.  However, some tentative conclusions can be drawn.

First, goals should be seen in the broad framework of strategic choice.  The organization is manipulated to achieve certain ends, including the choice of technology and environment.

However, goals are not of primary importance in immediately determining organizational social structure and communication.

articulated goals cannot necessarily be communicated to lower-level members or established in the face of technical or human problems that oppose them.

At the same time, within technological limits, goals may be significant for understanding organizational structure. Multiple, conflicting goals may be enforced by separate organizational units and separate communication channels. Internal or derived goals may modigy the structure.

When goals are relatively narrow and specific, or when the organization places great stress on the goal and on communicating it to members, the goal is more likely to be carried out.

On the other hand, broad general goals leave more flexibility that may contribute to organizational expansion or survival.

Now, we turn to the other reason for consideration of organizational goals--their relationship to organizational effectiveness.

## Effectiveness

Consideration of organizational effectiveness is necessary to evaluate the costs and advantages of different organizational structures.

A major collection of studies of effectiveness
was made by Price (1968). He writes:

> Effectiveness, the dependent variable of this
> inventory, may be defined as the degree of
> goal-achievement. For example, a prison,
> which has a custodial goal, and which has a
> low escape rate among its inmates, would be
> an effective organization (2-3).

Again, Price notes, we face the problem of determining
the organization's goals.

## Types of Effectiveness

The inventory includes literature concerned with
"productivity, morale, conformity, adaptiveness, and
institutionalization (3)." Price assumes "that these
variables are generally and positively related to effect-
iveness (3)." He weights productivity most heavily in
evaluating the results of studies.

It seems that it would be better to say that an
organization with high morale was effective in reaching
that derived goal. The relationship to any other goal
would remain problematic, and, of course, open to inves-
tigation. An author like Blake (Blake & Mouton, 1965)
argues that one concern have the best of all possible
worlds--maximum effectiveness in dealing with employees
and maximum effectiveness in taks, but that the two are
independent.

Likert (1967), in contrast, seems to contend that, over the long run, one can only have high productivity in an organization that develops its people. A firm can save money and raise profits one year by harsh personnel policies, but will soon begin to loose effectiveness because of lowered morale and increased turnover.

Goal and System Models. Etzioni (1960) contrasts two models for judging organizational effectiveness--the goal model and the system model. "the starting point of this approach [system] is not the goal itself but a working model of a unit which is capable of achieving a goal (261)."

He summarizes

> A measure of effectiveness establishes the degree to which an organization realizes its goals under a given set of conditions. But the central question in the study of effectiveness is not "How devoted is the organization to its goal?" but rather, "Under the given conditions, how close does the organizational allocation of resources approach an optimum distribution?" (262).

In effect, however, this approach would require first a very careful specification of goals, and a decision of which was to be maximized and which were only required to reach an acceptable level. Although Etzioni does not specify it, the multiple variables of such a study would require computer simulation, a major project.

However, Etzioni does indicate an important truth, further discussed by Kelly (1969): One cannot maximize all organizational goals.

> The Task Approach treats an organization as a sociotechnical system and in concerned with the development of optimal organizations within which object and vailable resources, both human and technical, determine the activities to be performed and the methods of work to be employed. Three positions illustrative of the economic excellence of the task approach are: (i) Technology is a major determinant of industrial behavior; (ii) Optimal organization is not a function of personality (. . .); (iii) Generally any attempt to optimize an end-product variable will cause other end-product variables to become increasingly suboptimal. Production blitzes are frequently achieved at the expense of product mix, maintenance, or morale. In this context, the major management problem is the definition of acceptable margins of suboptimality in significant variables (60).

Conclusion. A study of organizational effectiveness, or the use of effectiveness as a variable, requires determination of the goals and the margins allowed in reaching them. Also, if possible, studies should continue over time so that costs and benefits carried over from one year to another can be traced.

### Environmental Validation of Goals

Perrow (1965) writes

> Organizations are influenced by three factors: the cultural system which states legitimate

> goals, the technology which determines the
> means available for reaching these goals, and
> the social structure of the organizaton in
> which specific techniques are embedded in such
> a way as to permit goal achievement. The
> three factors are interdependent (912).

The environment has previously been considered as providing specific inputs of material and personnel for the organization. The present short section will consider the broader social and cultural setting of the organization in relation to its goals. Woodward's (1965) original study was done in the firms of South Essex. In more diverse environments, cultural factors may override technological ones.

In discussing societal validation or acceptance of goals, we are actually combining several processes, such as law, custom, "national character," and values under one head. For the purpose of analysis, they seem to affect organizations in roughly the same way. Organizations also, of course, can in turn affect the environment, goals and values of their society. Such effects must be kept in mind, even though we are concentrating on the firm as receiver.

Socialization

How does society validate goals? One obvious way is through socialization of its children. Presumably

if a goal is shared by organizational members and
outsiders it will not become a cause of contention.
One classic example would be the goals or ideals of
frugality and financial success embodied in the "Prot-
estant Ethic." Brown (1965, 460-469) discusses how
people must receive certain kinds of training to be
motivated to achieve, and society must also provide
certain roles, e.g. the entrepreneurial role, for
economic growth to take place.

Custom

Values may become enshrined in custom. Clarke
(1969) discusses the change in British employment
practices in relation to the decline of the individual-
istic values of the nineteenth century.

> To what do we owe the changes in the employment
> relationship? Firstly, of course, what has
> made them possible is the continuing technolog-
> ical improvements which have led towards the
> affluent society together with the opening
> up of undeveloped parts of the world. What
> has done most to govern the form [emphasis
> added] of change is the climate of opinion.
> Could the individualism of the mid-Victorian era
> have prevailed to this day it is conceivable
> there would be very high wages indeed, by our
> standards, instead of paid holidays, occupational
> pension schemes, continuous work, and so on.
> This was not to be: the dark side of our nine-
> teenth century economy (. . . ), lack of pro-
> tection for the distressed, led, both industrially
> and politically, to a reaction against individual-
> ism (1968, 171).

Where values conflict because of differences in culture or interests, attempts are made to enforce one over another. Methods include demonstrations, strikes, boycotts, and revolution. But if enforcement is to continue, it often becomes institutionalized in the form of law.

## Law

Such American values as freedom of association, equality of opportunity, and freedom of speech have become part of law that a company ignores at its peril. Labor relations law in the country very severely restricts the kinds of communication an employer can have with his employees on certain subjects. Anti-trust law similarly restricts communication between firms.

Such expressions of value may extend into areas that seem strange to us. An example is taken from India, where a textile firm received consultation assistance from Tavistock Institute (Rice, 1963). During that country's struggle for independence, great stress was laid on self-sufficiency and the use of local, hand-made goods, especially cloth, rather than machine-made luxuries. The image of Gandhi at his spinning-wheel became a tremendously emotion-charged symbol. Therefore strict laws were passed, limiting the mechanized production of cloth. These severely restricted the goals and decisions of the company.

Even within Britain, Cotgrove and Vamplew (1972) found significant differences in regional values. They studied "process" industries and found, consistent with previous studies, that the work was more "meaningful, responsible, and skillful (182)" than ordinary blue-collar work. But they concluded

> Marked regional differences in industrial and political attitudes were found among process workers in highly automated plants. It is argued that a major explanation is to be found not in the technology but in factors outside the factory gates, notably in the process of political socialization (169).

Unfortunately, they did not study different types of technology in the same region, but they apparently believe the differences would be in the same direction found by others. They would simply be modified by the surrounding culture.

## Summary

In the analysis of goals, then, it must be remembered that an organization is part of a culture. The values of that culture may affect the goals unobtrusively, when organizational members and others share and accept them. When there is conflict or confusion, the organization may be forced, by law or other methods, to adopt or to abandon certain goals.

SECTION III:  CONCLUSIONS

Section III provides conclusions for and evaluations
of the entire paper.  Chapter VII examines a widely-recog-
nized gap in organizational theory--an inadequate and over-
simplified psychological base.  The chapter then provides
material, based on the cognitive, information-processing
approach to psychology, that will fill this gap.

Chapter VIII presents the theory as modified and
synthesized.  The theory is then evaluated according to
the criteria presented in Chapter I.

CHAPTER VII

THE INDIVIDUAL IN THE SOCIO-TECHNICAL SYSTEM

Criticisms of Sociological Neglect of Psychology

Many writers have criticized sociological theory
for its over-simplified view of human psychology. Sociol-
ogists devalue individual differences by pointing out
that an organization can persist even when all its members
have been replaced. But even this view fails to consider
that there could be general human psychological character-
istics that affect the nature of organizations. Also, it
is obvious that there are many people who could fill most
social roles, that does not mean that all people could do
so.

Sociologists. Let us first take this criticism from
from the view of two indisputably sociological sociologists
(Bendix and Berger, 1959). These authors quote a colleague
(Linton, 1945) as follows:

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I realize that in the forgoing discussion
of society and culture the emphasis has been
mainly laid upon the passive role of the indivi-
dual and upon the way in which he is shaped by
culture and social factors. It is time now to
present the other side of the picture. No matter
how carefully the individual has been trained or
how successful his conditioning has been, he
remains a distinct organism with his own needs and
with capacities for independent thought, feeling,
and action. Moreover, he retains a considerable
degree of individuality. His integration into
society and culture goes no deeper than his learned
responses, and although in the adult these include
the greater part of what we call the personality,
there is still a good deal left over   (1945, 22, passim.)

Bendix and Berger comment

In this view, culture and society are used as
explanatory principles, and what they fail to
explain is left over as a residue, which is indeed
a "good deal" . . . The trouble with this approach
is that it conceptualizes only part of the evidence,
while the "remainder" is left unaccounted for (97).

While sociologists would undoubtedly express them-

selves in a more sophisticated manner now than in 1945, little

real progress has been made towards providing a psycholog-

ical foundation for their work.

Organizational Theorists. Strong criticisms have

been made by students of organizations. Pugh (1966), for

example, comments:

[A] considerable limitation on all major socio-
logical theories of organizational functioning
is an extremely naive treatment of human moti-
vation combined with a neglect of individual
differences which are characteristically devalued
into "personal idiosyncracies (236)."

Argyris (1972) criticizes the socio-technical writers.

> Man is not conceptualized as proactive but as
> passive with little influence on the organization.
> The individual is treated as a non-human item
> almost to the point of being conceived of as
> a black box. . . .
>
> Blau, Thompson, Perrow and Goldthorpe et. al.
> imply a concept of man which is very close to
> the one autocratic conservative management
> have [sic] always maintained; namely that people
> prefer to be market-oriented and economically
> motivated (72-73).

Possibly Perrow took to heart the criticisms offered

by Argyris at the conference reported in the above book,

because he, too, indicates a need to take account of the

nature of people.

> What do we do about the individual in organizations?
> Do we have to more or less ignore him, as Weber
> did, because the alternative is to become mired
> in all his complexities and contingencies. . . ?
> Organizations are something more than the struc-
> tural categories of the Weberian model--the
> skeleton of hierarchy, rules, offices, roles,
> careers, and so on. If we cannot accept the
> human relations propositions as being adequate
> or plausible, must we ignore individuals?
> (1972, 145-146).

To "flesh out" the theory of organizations, Perrow

offers the decision theory of Herbert Simon. But the

discussion of organizational "constraints" does not really

explain how they "confine" the mind of the individual worker.

Another vocabulary and approach is needed for that.

Another point about Perrow's use of psychology is the
vagueness of his concept of the "view of the material
to be processed (1972)." He gives a clear picture of
what he means in several examples, but the operationali-
zation of the general principle is unclear.

In contrast, Woodward (1970, 16) dislikes Perrow's
use of psychological concepts entirely. And he himself
is obviously uncomfortable with his approach to technology
by "exceptions." He writes "I decided to take a very
grave risk and utilize a cognitive definition and oper-
ationalization of technology (1973, 52)."

Before providing an improved view of man for the
organizational setting, we must make a detour to clear
up a semantic problem  Many discussions of man in relation
to organizations center on whether he is "rational."
This requires clarification, provided in the next section.

Rationality--a Detour

> If we examine closely the "classical"
> concepts of rationality . . . , we see immediately
> what severe demands they make upon the choosing
> organism. The organism must be able to attach
> different pay-offs (or at least a definite
> range of pay-offs) to each possible out-come.
> This, of course, involves the ability to spec-
> ify the exact nature of the out-comes--there
> is no room in the scheme for "unanticipated
> consequences." The pay-offs must be completely
> ordered--it must always be possible to specify
> in a consistent way, that one outcome is better
> than, as good as, or worse than any other (Simon,
> 1957, 245).

In the quotation above, Simon gives a clear picture of the "rational man" of game theory or classical economics. He clearly sees the solutions to a set problem, and single-mindedly (single-motively?) orders and selects from among them.

Loose Uses of the Term. Thompson (1967), throughout his entire list of theorems on the organization, inserts the qualifying clause that they serve for firms "operating under norms of rationality." But he never explores the meaning of this concept. For example, he implies that purely economic motives are the most compatible with "rationality," and that a firm might deviate from his predictions because it was more committed to family control than to "rationality" (1967, 49)." But Perrow (1972, 13-15) points out that nepotism can be extremely valuable to an individual manager attempting to cover his own incompetence. It can even be useful to the firm in an industry riddled with industrial espionage and take-overs. And even if the owner is only aiming at providing jobs for his sons, is that less "rational" than the desire to turn a profit?

Argyris (1972, chap. 5) criticizes those who attempt to change organizations by using excessively rational

approaches, ignoring emotional and psychological variables. But his final statement, (123) implies that "rationality" is still the ultimate goal to be reached through taking account of emotional factors.

A philosophical dictionary (Grooten & Steenbergen, 1972) has no listing for "rationality" but two columns on "reason." Most relevant to the present discussion is the following:

> Reason: the human ability to discover the ground of the beings, their causes and end, meaning and sense. Reason is sometimes identified with intellect, and has then the broader meaning of: ability to know the beings and to understand them in their essence. Reason is sometimes opposed to intellect, and does then not express so much the contemplating and recognizing activity (. . .) but rather the searching and progressing . . .

Reasoning therefore can be a type of knowledge, or the process of problem-solving. Rationality in some cases is opposed to faith; in others, to practical, experiential knowledge. And "rational" analysis does not seem to apply at all when entirely new problem areas are developed and the options and their effects are unknown.

Even in a situation set up and defined as a game, the "rational" solution may not be the most desirable one. The classic case if the Prisoner's Dilemma , in which the "rational" choice leads to a less than optimal outcome for both parties.

About real life, Lindsay and Norman (1972) write:

> If the other side knows that you are rational,
> you may be at a disadvantage. . . . The normal
> rules of bargaining assume that each participant
> evaluates the costs and penalties in a rational
> manner, each trying to maximize his own position.
> But if one side is irrational, then the strategic
> negotiations are totally disrupted. If the
> opponent is believed to be incapable of making
> a proper evaluation of costs and penalties or
> if he does not care about them, then strategic
> manipulations become ineffective (582).

Their examples indicate that the tremendous power possessed

by terrorists is largely based on their lack of rationality.

Therefore, a reputation for hard-headedness can lead to

greater success than one of sweet reasonableness.

Various terminologies have been used to get around

this type of confusion. Simon (1957), for example,

speaks of behavior that is "intendedly rational" (196)

and of a distinction between "subjective rationality"

and "objective rationality (278)."

He summarizes his view as follows:

> The central concern of administrative theory
> is with the boundary between the rational and
> non-rational aspects of human social behavior.
> Administrative theory is peculiarly the theory
> of intended and bounded rationality--of the
> behavior of human beings who satisfice because
> they have not the wit to maximize (1957, xxiv).

Conclusion. If rational behavior is not the most

useful or effective, not necessarily that which is free

of prejudice or emotional bias, not even possible in
ordinary life let alone a creative problem-solving sit-
uation, then the concept seems useless to this  author.
We can assume that all persons have reasons for what
they do, that their actions seem in some way sensible
in their own eyes.  We will seek to understand those
reasons rather than comparing their actions with some
vague and arbitrary standard of "rationality." We agree
with Lindsay and Norman.

> Our basic assumption is that each decision
> does optimize psychological utility, even
> though the bystander (and perhaps the decision
> maker himself) will later wonder why the
> choice was made (1972, 535).

## Cognitive Man

### Criteria for a View of Human Nature

Since the description of man as "rational" or "irra-
tional" is not adequate for the needs of organizational
theory, we must establish the criteria that a psychology
must meet to fill the gaps in the sociological view.

First, the view must account for individual and
shared views of reality; specifically, of the materials
processed, the environment of the organization, and of
the organizational goals and the "constraints" they put
on action.

Second, it must describe decision-making both in routine situations and non-routine ones, and provide a vocabulary for distinguishing the two types.

Finally, it must provide a framework for explanation of the cooperation and docility of organizational members, and their more or less frequent uncooperativeness and deviance from expectations.

## Image and Plan

The approach presented here to meet the above criteria centers around two terms: Image and Plan. These are defined as follows:

> Plan. Any complete description of behavior should be adequate to serve as a set of instructions, that is, it should have the characteristics of a plan that could guide the act described. When we speak of a plan . . . however, the term will refer to a heirarchy of instructions . . . A Plan is any heirarchical process in the organism that can control the order in which a sequence of operations is to be performed.
>
> A Plan is, for an organism, essentially the same as a program for a computer . . .
>
> Image. The Image is all the accumulated, organized knowledge that the organism has about itself and its world (Miller, Galanter, & Pribram, 1960, 16-17).

The Image is defined as "organized." That organization will be described in terms proposed by Koestler (1967). He uses two terms, "code" and "matrix."

> I shall use the word 'matrix' to denote any
> ability, habit, or skill, any pattern of ordered
> behavior governed by a 'code' of fixed rules.(38)

He further explains

> This is perhaps the place to explain why I have
> chosen the ambiguous word "code" for a key
> concept in the present theory.  The reason
> is precisely this nice ambiguity.   In signi-
> fies a set of rules which must be obeyed--
> like the Highway Code or Penal Code; and it
> indicates at the same time that it operates
> in the nervous system through 'coded signals'--
> like the Morse alphabet--which transmits orders
> in a kind of compressed 'secret language'
> (39-40).

Koestler distinguishes two kinds of problem-solving
which seem to parallel Simon's programmed and un-programmed
decisions.  Creative problem-solving involves what he
calls the bi-sociation of two matrices--synthesizing
two separate areas, such the falling of an apple and the
movement of the planets.  Such a solution not only creates
a new matrix, it destroys our old image.  Routine problem-
solving, even though it may require considerable training
and skill, sticks to a pre-established matrix of asso-
ciations.

Koestler elaborates that creativity

> has a revolutionary or <u>destructive</u> side.  Asso-
> ciative skills, on the other hand, even of the
> sophisticated kind which require a high degree

of concentration, do not display the above fea-
tures. . . . The skills of reasoning rely on
habit, governed by well-established rules of the
game; the 'reasonable person'--used as a standard
term in English common low--is level-headed in-
stead of multi-level headed--adaptive and not
destructive; an enlightened conservative, not
a revolutionary; willing to learn under proper
guidance, but unable to be guided by his dreams
(1967, 659).

It is obvious, incidentally, that the subject need

not be able to specify the nature of his search or problem-

solving processes.  Some problems are solved by following a

set of formal technical rules; others by a more informal

awareness or "knack" (Hall, 1959, 72).

Relationship of Theory to Criteria

As a basis for organizational theory, the beginning

of this chapter required a view of human nature that

fulfilled three criteria.  Let us now investigate the

cognitive approach to show how it serves these purposes.

First, the view was to account for individual and

shared views of reality; specifically, of the materials

processed, the organizational environment, and the organ-

izational goals.  Information about the material to be

processed or about the environment form parts of the Image.

The actions or behaviors to be carried out are the matrices

goal-related constraints are the results of limitations of

Plans or of matrices.  A person may lack the Plan for an

action, or fail to have necessary information filed in

a matrix.

Some of these matrices may be built up by the informal observation of a role-model, or by trial-and-error (Hall, 1959). But often they will be given in instruction, by communication. Lindsay and Norman point out how much simpler it would be to get adult humans to work a token machine than it is to get chimpanzees to do so. The researcher could simply tell them to put the chips in the machine if they wanted grapes. The authors comment:

> Language can be conceived of as a method of communicating the memory structure of the speaker to the memory structure of the listener (1972, 44).

The second criterion is that the psychology must describe decision-making and problem-solving both in routine and non-routine situations. "Routine" decisions are those for which matrices are already available. Non-routine decisions require the development of some new pattern.

This distinction provides a different explanation of the advantages of primary-type groups and open communication in non-routine situations. If creativity requires the "bi-sociation" of different matrices, then the more people who are brought together, the more likely a usable combination will be hit upon. Also, if people

relate to each other as total persons, they are likely

to know each others's odd and unusual matrices which might

be useful for a given problem.

Finally, the theory proposed was to account for

the individual basis of social cooperation—and its occa-

sional failures. Miller et. al. (1960, indicate that

> [H]uman institutions exist primarily for the
> purpose of executing plans that their members,
> as individuals, would be unable or unwilling to
> execute . . . [G]roups are like computers,
> 90 percent plan and 10 percent image. Individuals,
> on the other hand, are about 75 percent Image
> and 25 percent Plan (100).

It is probable that groups differ not only in the contents

of their plans and images, but in the relative emphasis

on the two.

Perrow (1972) praises Simon's model of man because

> [T]his model makes simplifying assumptions about
> the individual, so that we can get on with
> studying the organization  rather than the
> individual.  It assumes that the individual
> is not all that rational and that his behavior,
> within limits, can be deliberately controlled
> (147).

That is to say, Perrow will admit the individual to theory

if he won't cause any trouble. We know, of course, that

people generally respond reasonably appropriately to envir-

onmental contingencies. But they do not always do so, and

a view that leaves out the possibility of deviance is inadequate. Also, there are times a manager wants the best possible performance, and not just a reasonably appropriate response, and theory should give give some insight to this situation.

In cognitive theory, it is clear that a person might not carry out his role because he lacks the appropriate matrix, because the plan for some reason makes it inaccessible to him, or because he is following an entirely different plan from the one the organization intends. On the other hand, he will often be cooperative because he has learned his image of the work from other organizational members, and because they share a plan of what is to be done.

## Motivation

The view presented does not provide a complete account of human motivation, and quite likely one is not needed for the study of organizations. Lorsch and Lawrence (1969, 55-65) used a cognitive view of man, solving problems presented by the environment. To this they added the three motives studied by McClelland (1961): Need for affiliation, "establishing, maintaining, or restoring a positive affective relationship with another person (160);" Need for power, "the control of the means of influencing a person (167);" and Need for achievement or meaningful accomplishment.

But McClelland never claimed his schema was an
exhaustive description. The important thing for the
cognitive analysis is to know the plan and its strength.
Whatever motivation contributes to that strength can be
classified by the approach most useful to the investigator.

Miller et. al. provide a picture of problem-solving
which leads to a concept of motivation. They call it
TOTE, for "test-operate-test-exit." This operates on a
feedback principle. When information from the environment
is incongruous with expectations, an operation is performed,
and the environment is re-tested until appropriate levels
are reached.

$$\xrightarrow{\hspace{3cm}} \quad \text{TEST} \quad \xrightarrow{\hspace{3cm}}$$

(incongruity)　　$\downarrow\uparrow$　　　　　(congruity)
　　　　　　　　　OPERATE

(1960, 26)

This simple pattern serves for those problems for
which plans or matrices are already available. When
creativity is required, the person must plan.

> Planning can be thought of as constructing
> a list of tests to perform. When we have
> a clear Image of a desired outcome, we can use
> it to provide the conditions which we must
> test, and those tests, when arranged in sequence,
> provide a core strategy for a possible Plan
> (Miller et. al., 1960, 38).

Lindsay and Norman (1972) examine motivation in terms
of just this type of failure of expectations, the need for
action to adjust the environment to the appropriate limits.

> When we come to consider human motivation, one
> dominant theme emerges rapidly. Uncertainty,
> failure to observe an expected event, a disruption
> in the pattern of otherwise smoothly flowing
> response sequences, an anticipation of the
> inability to cope with a pending event--these
> seem to be basic driving forces (610).

They continue

> In many types of motivational situations, the
> organism acts as if something were maintaining
> the ongoing cognitive processes, watching for
> potential trouble spots in dealing with the
> environment, and signalling when difficulties
> arise. . . . So long as things are within sen-
> sible limits, it remains quiet. But when some-
> thing is encountered that is new or discrepant
> from what is expected or patently threatening,
> it acts like an interrupt mechanism alerting
> the organism to the potential problem and mobil-
> izing resources to deal with it. The result
> is a change in the general level of arousal act-
> ivation (1972, 611).

The authors point out that needs may be described
in terms of specific plans. That is, one "needs" a mailbox
to carry out the plan to mail a letter, regardless of one's
attraction to them, or even of one's feelings about the
addressee or the task.

Relationship to Communication Classification

There is a clear relationship between the cognitive
psychology presented here and the classification of messages

discussed in Chapter II (Table II, p. 34). Eilon (1966)
begins with the category of routine reports, which are
time-or event-triggered. This is related to the TOTE
schema, with an environmental input or incongruity lead-
ing to action, in this case the sending of a message.

Another type of message is the query or inquiry.
These are divided into two groups. Questions about
standing procedures are seeking a plan which is already
in existence. Questions about novel situations require
the development of a new matrix. As additional material
is required, it may be available from existing records
or by routine data processing--that is, from an existing
code. Or it may require the development of a new code,
either for elicitation or processing of the data.

Solutions are suggested in proposals, and problems
are settled in decisions. These may either be ad-hoc,
the development of a plan for a given situation only,
or they may involve the development of a plan to be re-
used.

Summary

The information-processing view of human psychology
is offered to provide a base for the study of organizational
social structure. This views helps to explain shared
images and human cooperation and the failure to do so.
The concepts are related to the sending and processing
of messages.

CHAPTER VIII

THEORY AND EVALUATION

## Introduction

As discussed in Chapter I, a theory must be eval-

uated in two different ways:

1. With regard to its scientific validity, and

2. In the light of its probable, practical, human
   effects with regard to our value system.

The socio-technical approach has been attacked both

as humanly destructive and as scientifically inadequate

or invalid. The present chapter first presents and

summarizes the theory as modified in this work, and its

implications for the study of organizational communication.

The theory is then evaluated with regard to the two sets

of criteria, scientific and humanistic.

## Statement of the Theory

## Introduction

This theory focuses on organizational "plans" and

"images" and the ways in which communication maintains,

changes, or carries them out. The present paper draws

together material from several authors into a unified

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theory for the use of the student of organizational communication. In the interest of clarity and conciseness, assertions are made boldly. If they are wrong, it should at least be possible to prove them so.

In general, the theory claims that technology--both equipment and knowledge--determines the social and communication structure of the organizational unit carrying out a given process. The environment, or the organizational image of the environment, determines the inter-relationship of such technical units. Goals are modifying factors, affecting the plans used for technology, the environment, and the internal structure.

## Definition of Image and Plan

Since these terms are central to the theory presented, the definitions are repeated below.

> Plan. Any complete description of behavior should be adequate to serve as a set of instructions that is, it should have the characteristics of a plan that could guide the act described. When we speak of a plan . . . however, the term will refer to a hierarchy of instructions. A Plan is any hierarchical process in organism that can control the order in which a sequence of operations is to be performed. A Plan is, for an organism, essentially the same as a program for a computer . . . (Miller, Galanter, & Pribram, 1960, 16).

The authors make clear that Plans can be shared, and that such sharing is probably the essence of human organization.

> Image. The Image is all the accumulated, organ-
> ized knowledge that the organism has about itself
> and its world (Miller, et. al., 1960, 17).

Similarly, organizational members may share an Image of

their work, their environment, or their goals.

## Technology

Technology is the first major factor to be considered.

As mentioned above, the technology of a unit determines

its social and communications structure.  Technology falls

into four major classifications (Perrow, 1970, 78, drawing

modified).

|  | Few Exceptions | Many Exceptions |
|---|---|---|
| Unanalyzable Search | Craft | Non-routine |
| Analyzable Search | Routine | Engineering |
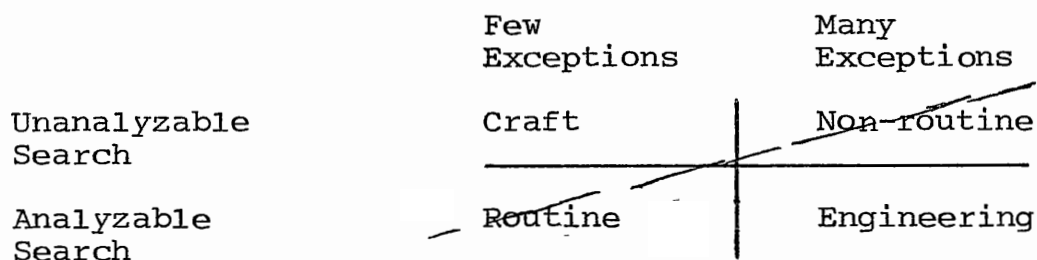
To re-phrase this in the terminology above, "routine"

involves the use of a standard, pre-set plan.  An "analyz-

able search" is programmed, and includes an algorithm or

standard set of steps to reach a solution.  An unanalyzable

search is unprogrammed, involving creativity or at least

an informal "knack."

The two extreme ends of the dotted line represent

two organizational types which are found in the literature.

The first is clearly based on Max Weber's (1957) analysis

of bureaucracy.  The second, at the non-routine end, is

usually unnamed (see Bennis, 1966), but Toffler (1970)
has coined the descriptive name "ad-hocracy." These two
types are compared in Table III.

An important consideration is that a study using this
approach _must_ include a time dimension. While some studies
have considered changes in communication patterns over time,
they usually assume that a stable pattern exists to be
discovered, that "channels" exist even when not used.
In the present approach, the stability of channels is a
major variable that differentiates organizational types.

Analysis of the Organizational Types

The following sections analyze the communication
expected in each of the four organizational types listed
above. Messages are classified according to Eilon's (1968)
system, as to whether they are triggered by time or events.

Routine--Bureaucracy.

Most messages time-triggered; some event-triggered,
often for events specified in advance (exceptions).

Stable patterns of communication, including who
communicates to whom, who initiates communication, etc.,
over time.

Considerable written communication, some in reference
form, such as rule-books.

Plans broken down in a stable, heirarchical manner,
with each person higher in the organizational heirarchy
knowing more of the plan.

Widely-shared images of process and goals, often
instilled in initial training or induction procedures.

### Non-routine--ad-hocracy.

Event-triggered messages, inquiries.  Messages not governed by explicit rules.

Non-written, use of phone or face-to-face communication rather than memo or letter.

Multi-dimensional communication, patterns and channels shift rapidly over time.

Communication necessary to establish plans; meetings to share plans and images.

Scattered sharing of plans and images; no clear pattern of who has what information.  Inquiries are necessary to determine who has information.

In a bureaucracy, the information is available because the situation is stable.  Rules can be written because the same situations recur and old solutions can be re-used. Similarly, "rules" existing in people can be used again, and the heirarchy probably indicates the person most likely to have the answer.

In the ad-hocracy, none of the above applies.  Constantly changing situations may call for the expertise or creativity of any staff member.  New communication groups will have to be formed to deal with changing situations, and the rapid change and unprogrammed solutions will require the speed and flexibility provided by oral communication.

Craft. Perrow (1970, 79) gives as an example of this organizational type the ordinary, typical grade school, in which the same techniques are applied to all children.

The present author suggests that other organizations run
by semi-professionals (Etzioni, 1969)--the social-work
agency, certain hospital wards, the employment agency
(Blau and Schoenherr, 1971)—would have the same type of
structure.

The routine part of the program would call for a
bureaucratic structure.  Such agencies in fact are often
criticized for adherence to rules in books and the worst
kind of heavy-handed impersonality.  Those exceptions
that do occur would not be codifiable.  The manner of
handling them would have to be caught, rather than taught,
and the more experienced personnel would be most likely
to know what to do.  Training for the semi-professions
emphasizes clinical experience, supervision, and discussion.
This organizational type would require a large contingent
of trained supervisors if the lengthy procedure of handling
exceptions is to be carried out.

Alternatively, assistance might be provided by staff
personnel rather than by supervisors.  An example would
be the school which provides resource personnel to either
assistthe teacher in dealing with the "exceptional" pupil
or take him for special processing for a limited time.
This system seems adapted to the case where the exceptions
are of different but definable types.

Another type of organization that may fit this quadrant is the "continuous flow" manufacturing industry (Woodward, 1965). It seems that most of the time the work is routine and communications consist largely of making time-triggered reports at regular intervals. However, when emergencies occur, they are unanalyzable and require a "knack" to fix. This kind of expertise would be acquired in part by experience, and such organizations have steep heirarchies which would indicate who should have the ability that is needed.

Engineering. Perrow's example of an "engineering" organization in the human-services field is a "programmed-learning" school. In such a school, exceptions would be handled automatically by branches in the program. Possibly some hospital wards fit this pattern as well, with the program, elaborate but specified, built into the personnel. For example, a premature nursery might be a place of frequent crisis, with emergencies requiring the attention of a well-trained, specialized nurse. But the indications of emergency, and the steps to solution, could be written out if necessary.

Another example would be the engineering firm, which produces varied products which fall within the area of previously established know-how. Western Electric is

said to claim that no two telephone company central offices are quite alike. They must react to exceptions in fitting service to each city, but the steps they must take are clear.

The staff in an engineering organization should be pre-socialized, and know plans, exceptions, and alternatives before they begin work. Since plans can be specified in advance, there is no need for discussion and negotiation to establish common ones. Workers usually function inde.-pendently, and even where cooperation is necessary it would require little communication.

## Environment

While the technology of production determines the communication patterns of the unit that performs it, the organizational image of the environment determines how these units fit together. Of course, where units are closely related, the technology of the basic process may affect the entire organization, as in the South Essex firms studied by Woodward (1965).

Environmental Types. A homogeneous environment should create an internally uniform structure. A heterogeneous environment, on the other hand, would require an organization that is hierarchical--formed into sub-units. A turbulent, changing environment also requires sub-units, but these tend to be particularly small and self-sufficient. (Lorsch & Lawrence, 1965; Lawrence & Lorsch, 1967).

Images. Images within a production unit tend
to be more similar than those of different units. This
would be modified by the similarity of technology between
units  and by the work of different members within the unit.
For example, accountants assigned to different divisions
would still share similar images. The factors discussed
by Lawrence and Lorsch (1967) such as time-span, speed of
feed-back, nature of rewards, interpersonal orientation,
as well as Perrow's (1970) concept of the view of the
materials to be processed, would be important parts of
the image.

Relations among Units. The internal inter-relation-
ships of the organization depend, as Lawrence and Lorsch
(1967) have shown, on the relationships of the work to
be done--or, in this paper's terminology, the plans.
Two sections carrying out a single plan will have to be
closely connected or integrated. These authors point out
that integration is easy if the images held by the units
are similar, difficult if they are different. In fact,
if the images are very different it may be most efficient
to create an intermediate unit with the responsibility of
translating from unit to the other.

Therefore, different technologies and an environment
that requires integration will require the  organization

to pay attention to communication and possibly employ
specialists to bridge the gaps. Divisions which carry
out different plans, or different parts of a pre-established
plan, however, will need only a minimum of communication.
The form of communication can be established by formal
rules. Meetings need not include developing or negotiating
plans, but simply involve sharing facts regarding the
occasional exception to the previously arranged schedule.

Goals

Goals are a different type of variable from the two
previously discussed--technology and the environment.
They refer to the intentional, deliberate, planned element
in organizational structure and functioning. Organizations
are instruments manipulated to particular ends (Sofer,
1970, 1). But this intentional element, the organizational
goal, can only operate within the limits allowed by the
technology and the environment.

While some have argued that it is not legitimate to
speak of an organization having a goal, the concept fits
within the system model. We recognize that systems have
preferred states without endowing them with human intentions.
We also recognize that several systems may be capable of
producing the required output. More time and money can
be spent on training and recruitment, or more on salaries

and other programs to retain existing employees. The choice may be made by historical accident or idiosyncratic preference, but it may also be the result of a conscious attempt to attain a goal.

Questions. The first question regarding goals is their clarity or diffuseness. When goals are clear and unambiguous, with definite plans for reaching them, then they are more likely to be attained. (Zald & Ash, 1966; Selznick, 1945). Vague goals, on the other hand, by allowing more flexibility and adaptiveness, make the survival of the organization more likely (Scheff, 1962; Maniha & Perrow, 1965; Zald & Denton, 1965).

A second question regarding goals is how they are transmitted and maintained. Vehicles for such transmission include educational institutions, in-house training, organizational development, and conferences. There may be times set aside for the specific purpose of re-examining goals or of re-affirming them. Or major re-evaluations may be forced by environmental changes.

The third question regarding goals is how widely shared they are in the organization. Goals in an adhocracy should be more widely shared than in a bureaucracy, because the bureaucrat needs only to understand his limited section of the plan. But an organization that stresses its goals could run counter to this expectation.

<u>Effectiveness.</u>  One value of the study of goals is
their use in considering organizational effectiveness.
The researcher must know what the organization is intended
to do before he can judge success or failure.  It is the
present author's belief that organizational research should
consider the variable of effectiveness.  It is important
not only to know that organizations differ, to to find
the effects of those differences.

Comparative studies are required to provide this
type of data.  Goals in a single organization are elusive--
if we didn't make as much money as we expected, perhaps
we increased our good will.  But by comparing several
goals in several organizations we can find the real costs
and real achievements.

Summary of Modified Socio-technical Theory

1.  Organizations are not the result of happenstance
but are in part deliberately contrived.  Goals of groups
within the organization determines some aspects of structure.
Over the short run, goals can be achieved only within
the lee-way allowed by technological and environmental
conditions.  But over the long run, there can be strategic
choice of environments and technologies.

2.  Communication serves to define, spread, and
maintain organizational and group goals.  It serves the

same function for images of the environment, technology, and the material to be processed.

3. Organizations differ, and the type of communication that occurs and is appropriate differs with the organizational type.

4. The study of communication in a given organization or organizational unit begins with the classification of that unit. The classification is based on the technology of work, defined in terms of the number and type of exceptions to standard plans that occur.

5. Units where there are few exceptions will tend to be bureaucratic, with stable communication patterns, showing a clear heirarchy, use of written communication and rule books, and messages triggered by time. Sections with many exceptions will tend to be ad-hocracies, with rapidly-shifting patterns of oral communication.

6. A second factor in determining the nature of the organization is whether the exceptions that do occur have programmed (analyzable) solutions. Analyzable solutions require well-trained, often professional staff who tend to work independently. Unanalyzable solutions require a system of consultation with more experience personnel, either staff or line.

7. The organization's environment determines the relationships among the technological units. Homogeneous stable environments will produce internally homogeneous organizations. Heterogeneous environments will produce internally differentiated organizations. Changing environments will require organizational change.

8. Organizational units that are similar in terms of inter-personal orientation, time-span of planning, rewards, etc. will be easy to link. If units are very different, considerable effort in terms of time, expense, and special personnel will be necessary if the environment requires that they coordinate their efforts.

## Evaluation of Theory

### Humanistic Criticism

Critics of the practical effects of the socio-technical approach usually emphasize one of two major points. The first is the claim that it will lead to policies which cause suffering to the individual, which conflicts with the value of promoting human happiness and fulfillment. The second is that it will block society's technological progress, which is also highly valued.

<u>Individual Effects</u>. The first argument made by opponents of the technological approach is that it justifies a bureaucratic system--within certain settings--and that bureaucracies make people unhappy. Such unhappiness is supposed to be a result, or a part of alienation--a combination of powerlessness, normlessness, isolation, and self-estrangement (Blauner, 1964, 32).

Studies have indicated that workers in limited, repetitious, non-responsible jobs experience lowered morale and dissatisfaction. This is particularly true of white-collar and skilled blue collar workers (Susman, 1972; Legerman, 1972). However, the findings vary widely with the background and motivation of the workers, the exact nature of the work, and other factors.

Blauner (1964) claims that alienation increases when

1. The product is less unique

2. The worker works on a smaller part of it

3. When the sphere of responsibility is more restricted (23).

One solution suggested for this situation is "job enrichment," which is

the process of allowing the individual worker
to determine his own working pace; allowing the
individual worker to serve as his own inspector
by assigning responsibility for quality control
to the worker, allowing the individual worker
to repair his own mistakes; allowing latitude
in the choice of methods; and allowing the worker
to be responsible for his own machine set up
(Hulin, 1971, 160).

However, after a review of the literature, Hulin (1971)

concludes that the results of such programs are mixed.

A . . . reasonable conclusion would be that
either positive or negative results may be
expected from a program of job enrichment and
the type of result depends to a great extent
on the motivations of the workforce involved
(. . .) (182).

However, if job enrichment is seen as a useful strat-

egy in a given organization, such a change could be accom-

odated within a bureaucratic framework.  Bureaucracy does

not require Taylorization, and the structure of rules

and authority could be maintained with enriched jobs.

Thorsrud (1968) points out that the Tavistock Institute

humanizes jobs by making work into meaningful units, not

by creating impermanent organizations.

A similar accusation is that the systems approach

leaves no room for freedom for the worker.  This would

seem to apply to the bureaucracy, which would have the

capability for pre-planning and control.  Indeed, Exton

(1972) runs  on at such length about the ill effects of

"systems" in industry and their destruction of human beings
that one expects to find that they also cause cancer,
obesity, and tired blood.

An article by Ericson (1971) counters the views
advanced by Exton. Ericson claims that only "cybernet-
ically controlled" organizations can truly plan for the
fulfillment of human values. This view seems as likely
as Exton's.

Argyris (1972) seems to believe that the socio-
technical view's lack of psychological foundations would
lead to over-looking the human element in any attempt
at application. He says that "if an activist were to use
these theories as a basis for change, he would become an
authoritarian manipulator (viii)."

Again, this implication does not seem inherent
in the theory, especially as described and modified in this
paper. A socio-technical analysis can allow for social
as well as technical values.

Another point overlooked by critics of bureaucracy
is that ad-hocracy also has human costs. Toffler, who
originated the term, writes

It is possible that for many people, in
their organizational relationships as in other

spheres, the future is arriving too soon.
For the individual, the move toward Ad-hoc-
racy means a sharp acceleration in the turn-
over of organizational relationships in his
life . . . The increased turnover of all these
relationships places a heavy adaptive burden
on individuals reared and educated for life in
a slower-placed social system.
      It is here that the danger of future shock
lies (1970, 151).

Therefore, it seems that the satisfaction of human

needs will not automatically be provided by any organ-

izational system. A theory which provides for a variety

of systems that allow for individual differences would

seem the most likely to permit the pursuit of happiness.

Social Effects. A different criticism made by

Argyris (1972) is that the technical school is the enemy

of progress. Basically, he believes the theory supports

management against workers, and existing systems against

improved ones.

Another way in which these writers have
become, unintentionally, in favor of manage-
ment is that they have tended to develop
generalizations about appropriate fit between
organization and environment that correlate
with existing criteria of success (73).

This criticism does apply to many current studies,

though Argyris seems no more comfortable with union

activity than the writers he opposes. But the careful

consideration of goals and effectiveness recommended in

the present paper should allow for a thoughtful evaluation of the ends an organization is meant to serve.

Argyris's criticism of the negative effects of existing organizational forms springs from the same source as the long-standing criticisms of Merton (1964) and Crozier (1964). In their view, bureaucracies serve society ill because their rules do not allow for the importance of the individual. None of the authors, however, have considered the costs of alternative structures.

Perrow (1972) counter-attacks with the claim that the human resources approach is actually the basis of the kind of non-humanistic manipulation of which they accuse others. He begins with a brief discussion of Maslow's heirarchy of needs—the theory that higher needs such as belonging and self-actualization emerge as lower needs such as physical well-being and safety are satisfied. He continues:

> Despite the lack of solid evidence from research (. . .), and the existence of circumstantial evidence that there is no clear heirarchical ordering of the needs, the theory has proved useful for the human relations (human resources) movement. It justifies extensive involvement in, and identification with, the organization. A person who participates in the organization only to the extent of the contract, or to the extent of what he considers a fair degree of

effort for the return he receives, is considered
to be a stunted individual--even though he may
be self-actualizing outside the organization
(121).

Conclusion. Organizations are powerful instruments

for good or ill. It is likely that they do, and will con-

tinue to provide fulfillment for some members as well as

make some unhappy. Those who are attempting to make them more

human need not reject the socio-technical view as incon-

sistent with their purpose.

## Scientific Evaluation of Theory

The next step is to evaluate the theory presented

with regard to its scientific value and usefulness to

the study of organizational communication. Thompson

(1967, vii) writes:

I believe it is a sign of relative maturity
when a field begins to focus on patterned
variations.

The initial attractiveness of the socio-technical or

technical implications approach is just that. It offers

not universalistic prescriptions or or an undigestible

mass of results, but a pattern of meaningful differences.

However, an evaluation requires consideration of other

criteria. In this case, the criteria used are taken from

Madden (1960). and discussed in Chapter I.

Accounts for the facts. First, a theory must account

for the known facts. While there are some studies that

have been set in opposition to the socio-technical writers, they seem to be those that do not take into account factors. For example, Hickson, Pugh, and Pheysey (1969) fail to recognize that different parts of an organization may have different technologies.

In general, the theory is well grounded in fact and empirical study, contrasting with the approach of grand theorists such as Parsons (1960). Woodward's group only began to create new theory after they found that success in companies was not related to the axioms of classical management theory.

The primary attack on the factual validity of the theory comes from those, particularly at the University of Aston, who claim that the concept of bureaucracy is not unitary--that is, that the variables do not co-vary as predicted. An early article (Hinings, Pugh, Hickson, & Turner, 1967) states their intention of breaking down this traditional concept.

Later, Hinings and Lee (1971) found two groups of variables:

> [S]pecialization, formalization, and standardi-
> zation go together on the one hand, and lack of
> autonomy and centralization on the other (87).

Their colleague, however, defends the Weberian or unitary view based on his extension of their study to a nationwide sample of organizations (Child, 1972). And Mansfield (1973) criticizes their understanding of Weber,

their operationalization of his concepts, and their method-
ology.

While further work is needed, it seems likely that
the theory presented does accord with the facts.

Accounts for Group of Facts. The second criterion is
that the theory should account for as large a group of
facts as possible. The theory presented here first of
all accounts for a large number of variables within the
organization--span of control, organizational "shape,"
formality of rules, professionalization, and the direction
and medium of communication as well as the stability of
communication patterns. It also includes psychological
variables usually over-looked in sociological views, including
level of attention, training, decision-making, and image
or accumulation of knowledge.

By including all these factors it fills in the gaps
in other theories, and shows where their predictions are
likely to apply. For example, it indicates that the prescrip-
tions of classical management, intended for bureaucracy,
are likely to predict success in firms only in units with
a routine technology.

Logical Simplicity. The third criterion is that if
two theories account for the same facts, the more logically
simple one--with fewer undefined terms and unproved

assumptions--must be chosen. The main rival here would be the size theorists (see Starbuck, 1965) who claim that that simple, easily defined variable accounts for much of the differences between organizations. But even if size did account for much of the variance, we would still wonder why it did so. And there are several studies (Child, 1970) that indicate that size is only one of several important factors.

Results. Finally, a theory should lead to results in publicly confirmable studies. This criterion is rather subjective in dealing with a relatively new theory. Clearly the present author sees rich possibilities for research. However, at least in the field of communication, not a great deal has been produced.

Argyris (1972) attacks much of the socio-technical work as correlational and atheoretical and as including inadequate or incorrect assumptions concerning psychology. The present paper is adapted to supply the material missing.

He also criticizes the lack of experimental studies. Many of the writers are sociologists, and accustomed to conditions that can be compared but not manipulated. But studies based on the theory need not be limited to observation if the researcher wishes to attempt change.

Communication

     For communication students, the socio-technical approach offers certain distinct advantages. First, it indicates that the importance of communication itself will vary with different organizational situations, and indicates where and when it is likely to be significant.

     Second, it indicates what type of communication is likely to be effective in a given organizational situation. Its inclusion of multiple variables makes it particularly strong for prediction compared to single-variable theories.

     Finally, it provides a truly inter-related set of concepts and terms that should allow for the construction of a strong, logical science of organizations and organizational communication.

## Concluding Summary

This dissertation is based on the assumption that
the advancement of the study of organizational communi-
cation requires attention to the nature of the organi-
zation itself as an entity. To provide the necessary
background, the organizational literature in three areas
has been investigated:

1. Technology
2. Environment
3. Goals.

In each area, the terminology has been clarified and
the variables under consideration defined. The effects
of the variables have been examined in light of the appli-
cable empirical literature. Then inadequacies were filled
by the addition of further material, such as that necess-
ary to provide a psychological foundation. An attempt
is made to synthesize material in the three areas through
the use of the concepts of "Image" and "Plan," and material
from cognitive psychology.

The conclusions drawn are: First, that the tech-
nology of a work unit determines its social structure.
Units with few exceptions tend to be bureaucracies; with
many exceptions, ad-hocracies.

Second, the demands of the environment--whether it is stable, uncertain, or diverse--tend to determine the relationship among such units.  Finally, within the limits provided by the technology and environment, there is some part of the inter-action and communication that is the result of "strategic choice" or organizational goals.

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