SCARCITY AND ORGANIZATIONAL THEORY

by

PRAVIN MOUDGILL

Graduate of the Institution of Mechanical Engineers
(London), 1964

Graduate of the Institution of Production Engineers
(London), 1968

M.Sc. (Industrial Engineering), North Carolina State University
Raleigh, U.S.A., 1971

M.B.A., University of British Columbia, 1972

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

in the Faculty
of

Commerce and Business Administration

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA

June, 1975
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ABSTRACT

There is reason to believe that the world is approaching its limits to growth. The level of natural resources is dwindling rapidly. This diminution is expected to have major consequences for all human activity. The possible effects of environmental scarcity on organizational behaviour were analyzed in this dissertation. The operational problem as defined was: to study at the macro level of analysis the organizational consequences of reduction of matter-energy inputs.

It was pointed out that current organizational theory (OT) is both consciously and unwittingly biased towards abundance and growth, and that there is little understanding of the imperatives of scarcity in OT. Evidence to this effect was presented.

The concept of scarcity was introduced and the centrality of survival as a determinant of behaviour was used to obtain a definition of scarcity. Two types of definitions were generated: (i) relative scarcity, i.e., scarcity as it relates to the focal organization, and (ii) absolute scarcity, i.e., scarcity in the context of the larger geopolitical system. These definitions were explicated with the help of some basic tools of microeconomic analysis. The definitions were relevant to both organizational as well as nonorganizational behaviour.

The inter- and intra-organizational consequences of scarcity were studied separately. Interorganizational strategies which seek to reverse the antecedents of scarcity or to avoid experiencing its consequences were analyzed in detail. The various prescriptions were presented in the form of propositions, and contrasted to those characteristic of behaviour under abundance. A new definition of power was also developed.
It was noted that scarcity may be expected to be (i) temporary, (ii) permanent, but not so severe as to cause failure in the long run, and (iii) gradually worsening scarcity such that the organisation expects to fail in the long run. Intraorganisational consequences of the three different modes of scarcity were discussed separately. The particular response strategies to be used under norms of rationality, i.e., to insure survival, were developed in the propositional form in each case. These strategies were compared and contrasted to those characteristic of abundance.

Scarcity of availability of supplies is generally accompanied by uncertainty regarding their availability. Two "ideal types" of organisations were described; and it was suggested that, depending on the degree of scarcity, the two types are most likely to survive under conditions of permanent low level availability of matter-energy inputs.
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ACKNOWLEDGEMENTS

This venture has been blessed by substantial inputs from many sources. While it is impossible to repay the several debts, some of the contributions are acknowledged below.

While I have always been interested in the future and environmental scarcity, the present project was triggered in September, 1974 by Scott's (1974) article. He sowed the seed. Credit for growth goes largely to my advisor, Vance Mitchell, who encouraged me in many ways during the development of the dissertation. He contributed as an academic advisor, administrative facilitator, a kindly mentor, and most of all as an enthusiastic friend. I value the opportunity of having learned under him. The Ph.D. committee was very supportive and helpful, both in their comments as well as in their judicious refraining from comment. My thanks to Peter Frost, Larry Moore, Rick Pollay, and Gordon Walter. Peter Frost also contributed substantially towards the final stage and is responsible for increasing the comprehensibility of Chapters 6 and 7. Craig Pinder of the O.B. Division was most enthusiastic in his support. Thanks, Peter and Craig. Substantive contributions are acknowledged in the body of the paper. Any shortcomings regarding presentation and content are mine.

I received abundant support from off-campus sources. My wife Indra did not allow any domestic or parental constraints to operate and was truly a facilitator. My thanks to her. A group of friends contributed immeasurably through prayer. I am convinced that the dissertation could
not have been written in this short time (and with so little trauma) without divine blessing.

I always wondered why it was customary to acknowledge the secretarial effort in such an undertaking. Now I know. My thanks to Marilyn Logan for typing the dissertation under severe time constraints. The Killam Predoctoral and Xerox fellowships and other financial assistance from the Faculty of Commerce made this venture possible.

Pravin Moudgill

University of British Columbia,
Vancouver
May, 1975
dedicated to

JESUS

(Let the redeemed of the Lord say so--Ps. 107.2)
CHAPTER 1
INTRODUCTION

Publication of the Club of Rome study (Meadows, et al., 1972) has revived once again the Malthus-Condorcet debate. Starting with two fundamental postulates: "First, that food is necessary to the existence of man. Secondly, that the passion between the sexes is necessary, and will remain nearly in its present state" (Malthus, 1798, reprinted in 1965: p. 11) Malthus concluded that

"The natural inequality of the two powers of population and of production in the earth, and that great law of our nature which must constantly keep their efforts equal, form the great difficulty that to me appears insurmountable in the way to perfectibility of society." (p. 16)

Malthus thus forecast that the inability of nature to continue to support an ever increasing human population would ultimately lead to chaos. His conclusions were bitterly contested by some of his contemporaries. Condorcet, among others, took it upon himself to reply to the Malthusian doomsaying:

"To the question 'can the earth always be relied upon to supply sufficient means of subsistence?' Condorcet says 'either science will be able to increase the means of subsistence or reason will prevent an inordinate growth of population.'" (Gide & Rist, n.d., p. 11)

Condorcet thus felt either science or reason would prevail and calamity would be forestalled.

Meadows et al. (1972) question the ability of science to increase the means of subsistence by emphasizing the finite limits to growth.\footnote{While there has been some debate about the specific limits, it is generally agreed that natural resources are limited. (See, e.g., Ayres and Kneese, 1971; Boulding, 1966; Coale, 1970; Hardin, 1968; and Heilbroner, 1970.) The argument now centres around the ability to recycle and transform hitherto unusable material; and can be reduced to a debate over the limits of energy and the ability of the ecosystem to survive an increase in temperature (Randers and Meadows, 1973: p. 319).}
the highest world population growth rate in human history—over 2% per year in contrast to about 0.7% at the time of the original debate (Coale, 1974)—the argument of reason preventing an inordinate growth of population is also very weak. The evidence is currently heavily in favour of Malthus.

The facts are difficult to ignore. The effects of the increasing gap between need and availability are being felt all over the world. In and around Bangladesh and in the sub-Saharan Sahelian countries in Africa nature is moving in a Malthusian fashion to restore the balance between population and natural resources. While the consequences are not nearly as drastic in the developed countries, the unprecedented double figure inflation rates (well into the 20s in Japan and some European countries) reflect in part the outstripping of supply by demand.

The depletion of limited world reserves of natural resources at ever-increasing rates is resulting in an ubiquitous call for reduced consumption, economy, recycling, conservation, and the like. National values of growth and consumption are being questioned in the rich industrialized countries; and the world is discovering anew the importance of agriculture. The adage "the more the merrier" is being displaced from its time honoured role as the guiding value—both in production and procreation. The increasing credibility of the Malthusian scenario is thus causing, among other things, the peoples of the world to undergo

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2 The sub-Saharan Sahelian countries are Chad, Gambia, Mali, Mauritania, Senegal, Upper Volta, and Niger. In addition famine or near famine conditions prevail in Ethiopia, northeastern Brazil, and India (Time, November 11, 1974: p. 76).
a value crises.  

This value change, drastic as it is in its consequences for the human race, can be reduced to the conceptual difference between abundance or "more than enough" on the one hand and Malthusian scarcity or "less than enough" on the other hand. The two are qualitatively different phenomena.

The Western people have traditionally lived amidst plenty, and consequently have considerable understanding of behaviour in the context of abundance. They are experiencing difficulty however in coping with the present conditions: While awareness of the possibility of scarcity has existed for at least two hundred years, the Western world is not prepared for the contingency of poverty; and possesses little or no reflective understanding of human behaviour in an environment of extreme scarcity.

There exists today an extensive and varied formal body of theory across the six major behavioural disciplines. With little exception however most of this knowledge concerns itself with behaviour under conditions of abundance. There is some understanding in anthropology,  

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The following are some examples of economic conditions affecting national values:

**Abundance**: When Russia was undergoing a recession last year, Brezhnev demanded "serious efforts to improve" planning. Reforms were however not mentioned this year *(Time, January 6, 1975: p. 65).*

**Scarcity**: a White House aid described President Ford's recent energy proposal as follows: "Philosophically, it is cast in terms of a crisis" *(Time, January 20, 1975: p. 14).*

: The 1974 election was fought largely on economic issues in contrast to the social and political issues which characterized previous elections *(Time, November 18, 1974: p. 15).*

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4The six behavioural disciplines are anthropology, economics, organizational behaviour, political science, psychology, and sociology.
sociology, and psychology of behaviour under, for example, conditions of starvation, isolation, sensory deprivation, and excessive crowding; but the knowledge is rather disconnected both within and across the disciplines. There is no attempt at a comprehensive theory of human behaviour under conditions of extreme scarcity. Scarce goods, as distinguished from free goods, are the raison d'être of economics. While variations in the degree of scarcity are recognized in pricing behaviour, no qualitative distinction is made between "abundance" and "not enough". The discipline is symmetrical, as it were, across abundance and scarcity, and thus does not provide any understanding of behaviour particular to Malthusian scarcity. Organizational theory, the discipline of interest to the present writer, does not address itself to the issue either.

The world today is largely an organizational world. Birth and death are usually organizationally located. Organizations are used to make war, and in some cases, peace. The entire continuum of human activity has organizations as a central or important component. In an industrialized, technological society they provide inter alia, employment, education, recreation, and consumables. They are agents as well as resisters of social change.

In the past decade the amount of discussion of organizations have been focused around what they do to and for society and the individual. Research has been directed toward these issues and also toward an understanding of the organization itself. The present knowledge about organizations is however limited to that obtained in an environment of abundance.

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5 This and the following paragraph are based on Hall (1972).
Organizational theory has traditionally been a study of the behaviour of organizations under conditions of abundance: Scott (1974) in a rather provocative article suggests that the theory is founded inter alia on the ultimate prior values of growth and abundance. If scarcity and decay are expected to be the future mode, then it is necessary to supplement existing knowledge in organizational theory.\(^6\)

Organizational responses to scarcity may be either rational or irrational. Sabotage, arson, or looting are examples of the latter. While it is important to understand the antecedents of irrational organizational behaviour, the present analysis will be limited to study of rational responses to environmental scarcity. Before proceeding with the study however it is necessary to examine Scott's contention that organizational theory has a bias toward growth. Evidence for a growth orientation as revealed by a literature survey is presented in Chapter 2. (Successful development of a scarcity related theory which is different from present organizational theory itself constitutes evidence for a growth bias. Such evidence is presented in Chapters 6, 7, and 8.)

\(^6\) There is some argument over the probability of occurrence of scarcity and decay; and differences in prior socio-technical philosophy (DeGreene, 1973) may lead to differential interpretation of the evidence. Heilbroner (1970), Meadows, et al. (1972), and Resources and Man (1969), for example, argue for a very high probability of scarcity. Ayres and Kneese (1971) and Daly (1971) maintain that technology is subject to diminishing returns, and anticipate the possibility of a stationary economy. (The possibility that "nature had begun to yield a decreasing response to human effort" was articulated, among others, by Keynes in his famous Economic Consequences of the Peace, 1919). Maddox (1972), Nordhaus and Tobin (1972), and Passell et al. (1972) question the doomsaying, and anticipate no major changes in the present pattern of growth. The exact probability of scarcity is however irrelevant to the present study. All that is necessary is to show that there is a reasonable possibility of scarcity in the future. (In fact, as argued on pp. 7-8, a scarcity oriented OT may provide valuable insights into organizational behaviour even during periods of abundance.)
Having reviewed the evidence concerning the existence of an abundance bias, the concept of scarcity is introduced in Chapter 3. Definitions are presented, and are then developed in Chapter 4. The operational problem is defined in Chapter 5. Extraorganizational responses to scarcity are discussed in Chapter 6, and the intraorganizational consequences at the macro level of analysis are examined in Chapter 7. Prescriptions for behaviour under norms of rationality are presented in propositional form. Chapter 8 contains a description of two organizational forms which are expected to be viable under scarcity.

\footnote{As shown in Appendix 3, these concepts and definitions are generalizable to the behaviour of individual human beings and their aggregations, and thus constitute the foundations of a possible integrated theory of scarcity relevant to individuals and their aggregations on the one hand and organizations (at both the micro and the macro levels of analysis) and their aggregations on the other hand.}
CHAPTER 2
THE BIAS IN ORGANIZATIONAL THEORY

Two possibilities were identified in the previous chapter: (i) that existing organizational theory (OT) is biased towards abundance and growth, and (ii) that increasingly widespread scarcity may be the coming mode. It was suggested that these two possibilities provide justification for the present study. The first will be examined in detail in this chapter. While the possibility of widespread scarcity has been discussed elsewhere (see, e.g., the references cited in the introductory chapter), it is believed that the abundance bias of OT justifies the present study even though widespread environmental scarcity might not occur. Indeed, it is believed that an understanding of the norms of behaviour during extreme scarcity can provide valuable insights into the behaviour of organizations even during so-called "normal" periods.

Let us examine this belief: It has been mentioned earlier that economics is a study of market rationed goods as distinct from free goods. The economist thus uses a perspective of "nonfree" or market rationed scarcity to study the consumption behaviour of organizations. In the present study a scarce good is defined as one the unavailability of which causes an organization to fail. (See Chapter 3 for a detailed development of this concept.) The present study therefore brings a

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1For the purpose of the present dissertation the term Organizational Theory (OT) will be applied to that body of theory which is concerned with analysis at the inter-group and higher levels; and the terms OT and macro theory will be used interchangeably. In contrast, the terms micro organizational behaviour or micro behaviour will apply to analysis and explanation focused on individual and intra-group behaviour.
different perspective of scarcity—that of "nonfailure" or Malthusian scarcity—to the analysis of organizational consumption. Thus the same phenomenon—consumption of goods by organizations—can be studied from two extremely dissimilar points of view. It stands to reason that different aspects of behaviour will be highlighted by the two perspectives. Using the "nonfree" perspective only will result in a limited realization of the potential for understanding organizational behaviour, while application of both approaches simultaneously is expected to add considerably to knowledge in OT.  

A high prior probability of scarcity is not essential; evidence for a bias against scarcity in OT is the only justification necessary for the present study. Evidence for the latter is presented below.

The Strategy

Scarcity of the type envisaged by Malthus is expected to result in decay and shrinkage. Thus in order to identify a bias in OT against scarcity it is necessary to establish that the discipline does not address itself to behaviour relevant to scarcity, decay, and shrinkage.  

Conversely, a bias against such scarcity may be established by presenting evidence of a predilection for growth in the body of existing theory. The preference for growth may take two forms: conscious and overt, and subconscious and nonreflective.

2"An organization can generally be viewed from several quite different viewpoints or positions and each can yield some useful truths" (Perrow, 1970: p.85).

3The word scarcity will hereafter imply Malthusian or "less than enough" scarcity which is expected to result in shrinkage and extinction over time.
Part of OT is value free, and is symmetrical, as it were, across scarcity and abundance. This portion of OT is expected to be, at least in principle, just as relevant in the context of scarcity as it is in an environment of abundance. Evidence for reduced relevance under scarcity will therefore constitute evidence for a bias toward abundance.

Thus in order to establish a bias in OT for abundance and growth it is necessary to demonstrate that:

1. OT lacks a component which is exclusive to behaviour under scarcity and shrinkage.

2. There is a conscious preference for growth in OT (as well as an awareness of such a preference) both in the theory and in empirically observed behaviour of organizational thought and practice.

3. Certain portions of OT reveal an unconscious bias for growth. This bias may be reflected in the theoretical formulations themselves or in the predictions derived from such theory.

4. Some of the value free components of OT have not been applied historically to actual or anticipated problems particular to conditions of scarcity and shrinkage.

5. A portion of OT is not relevant to, or is less meaningful
in, the context of scarcity.4,5

Let us consider first the evidence for lack of a study of scarcity related behaviour.

Lack of a Scarcity Component

The following eleven OT texts were examined in search of a component exclusive to behaviour under scarcity: Blau and Scott (1962), Cyert and March (1963), Emery and Trist (1973), Etzioni (1961), Gibson, Ivancevich, and Donnelly (1973), Hall (1972), Kast and Rosenzweig (1970), Katz and Kahn (1966), March and Simon (1958), Scott and Mitchell (1972), and Thompson (1967). None of these texts dealt with the problems which are exclusive to scarcity.

The indexes of a majority of the books above contained listings titled growth and/or size. The titles decay, decline, negative growth, reduction, scarcity, shortage, shrinkage, (even conservation and containment) were however absent in all cases.

The author is not aware of any articles (other than Scott, 1974)

4 It may be noted that evidence for any one of the following is sufficient to demonstrate a bias.

5 While no attempt was made to conduct an exhaustive search for material for items 3, 4, and 5 above, a first cut across standard works in OT revealed an indubitable bias for growth and abundance. It was also found that the various authors had borrowed freely from each other, resulting in considerable overlap. Any one particular bias could thus be identified in different forms in different books. Instead of drawing attention to each and every instance of bias however, analysis was limited to comment upon either the original contribution (when identifiable) or a convenient illustration of one of the many variations of a particular concept. Since the search was far from exhaustive it is quite possible that other instances of bias may have been overlooked.
concerning scarcity and its implications in the literature. In the absence of scarcity related content in textbooks and journal articles, it seems reasonable to infer that OT is biased against scarcity. Evidence of a conscious predilection toward growth is presented below.

Conscious Preference for Growth

Preference for growth may take many forms in the actual behaviour of organizations as well as in related theory. This preference may, for example, become an organizational value and be reflected in management thought and practice. Identification of such influence would therefore constitute evidence of a bias toward growth.

If OT is biased towards abundance certain portions of the theory would, for example, be expected to take organizational inputs for granted. In other words, it would be assumed that inputs will not impose operating constraints, and the particular theory would thus be "free" to address itself to other issues. Evidence for the existence of such assumptions in a particular theory would thus also serve to establish a bias against environmental scarcity.

In order therefore to establish a bias for growth and abundance, evidence will be presented for (i) identification of growth as an organizational value, which (ii) colours management policies, and (iii) is also subsumed in some parts of OT. Further, attention will be drawn to those portions of OT which (iv) assume availability of inputs. It may

\[6\text{In contrast there is no dearth of studies related to growth. Even as far back as 10 years ago Starbuck's (1965) article "Organizational Growth and Development" listed over two hundred descriptive studies of growth and development published in the United States. These, it may be noted, had particular relevance for business firms, and were drawn from a still larger set of growth related studies.}\]
be noted however that this section is based entirely on identification of the value/bias by others, and thus also constitutes an argument for an awareness in OT of the bias against scarcity and toward growth.

Organizational Value

The following assortment of quotes reflects the organizational bias for growth: "Size is a fact of life in the United States" (Gibson, et al., 1973: p. 317). "In America there is a positive cultural value placed on bigness and growth" (Katz and Kahn, 1966: p. 104). "Growth has become ... a preoccupation of American business and is held by ... many commentators to be the true goal of professional managers" and "is a validation of success" (Perrow, 1970: p. 152). "Growth may be valued as a symbol of achievement" (Starbuck, 1965: p. 454). "All organizations have inherent tendencies to expand" (Downs, 1967: p. 264). An organization must "expand to justify itself" (Katona, 1951: p. 205). "Seeking to expand the jurisdiction of one's department is a managerial responsibility" (Blau and Scott, 1962: p. 174).

Kast and Rosenzweig (1973: p. 315) and Scott (1961: p. 21), among others, observe that growth is an organizational goal. ⁷

Empirical evidence to this effect is provided by England (1967) in his survey of 1,072 American managers where growth was identified as one of

⁷Providing evidence for an abundance bias Perrow (1970) suggests that "As the economy grows, there is room for all organizations to grow. But should the economy falter in the future, we may find that other criteria are held up by social scientists as the goal of the professionally managed firm. Growth may appear at the present time to be an inevitable goal of professionally managed firms in the view of social scientists, merely because it was achieved with relative ease in the 1960s." (p. 153)
the major organizational objectives.

Management Policies

This predilection for growth can also be identified in managerial policies. According to Aldrich (1972) for example, the value of growth is reflected in the interorganizational policies of management. 8

"Given the prevailing business values of 'size' and 'growth' it is highly unlikely that a utilitarian organization will use the constriction strategy except as a short-run tactic that is taken out of absolute economic necessity. It is more likely that such organizations will choose the expansion strategy when engaged in interorganizational competition and conflict." (p. 290)

Scott (1974) goes so far as to suggest that management thought and practice are founded inter alia upon the ultimate prior values of

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8 A preference for growth over containment is reflected in the intraorganizational micro level policies as well. The prevalent management paradigm, for example, presumes that "organizational growth creates organizational abundance, or surplus" (Scott, 1974: p. 245). Growth is thus expected to result in surplus. Part of this surplus is expected to be diverted to satisfaction enhancement as distinct from production enhancement. Just as macro theory legitimizes growth, micro theory assumes that the fruit of growth will be available. On a nonreflective empirical basis a distribution of excess may be used to purchase compromise or, perhaps, a consensus. Taylor recognized, for example, that "internal consensus is the outcome of growth-created surplus distributed by a scientifically enlightened management as a side payment for a harmony of interests" (Scott, 1974: p. 245). But on a more normative level the human relationists insist that organizations have a moral obligation to increase the level of satisfaction and self-actualization of employees. (See, e.g., Likert, 1961; Schein, 1970.) Subsumed under this maxim of course, is the assumption that organizations will have a surplus. Maslow (1965) makes this explicit in this argument for eupsychian management: He suggests that the Theory Y kind of philosophy "is all very true in the long run under good conditions (sic). (But) it is definitely not true ... under bad conditions, especially under conditions of scarcity (emphasis added)" (pp. 115-116). By implication then, in as much as organizational surplus is a prerequisite to actualization of the employees, and accrual of surplus is a consequence of growth, organizations have a moral responsibility for growth. Management typically strives to fulfill this responsibility.
growth and abundance. (See Scott, 1974: pp. 244-245, for his discussion regarding the primacy of these values.) The following quote conveys the flavour of his argument:

"What politician, public administrator, or business executive in practice supports overtly to his constituents policies of economic contraction, reduction of agency services, or stabilization of sales volume and corporate earnings? How many university courses are offered in 'How to Shrink a Business'? How frequently do articles appear in the professional literature about management strategies of organizational stability or decay? These things seldom happen because they reflect values that are foreign to American expectations and, thereby, are foreign to the mainstream of management thought and practice." (p. 247)

Bias for Growth

Classical OT is in part biased towards growth. Two of the four key pillars of classical OT (namely, division of labour and the scalar and functional processes), for example, subsume organizational growth (Scott, 1961: pp. 9-10). One of Weber's (1947) major interests in the study of organizations appears to have been to identify "bureaucracy" and to "describe its growth and reasons for its growth" (March and Simon, 1958: p. 36). Taylor (1934) arguing for scientific management suggests that application of his principles will result in growth, and both the employer and the employee will benefit. 9

Organizational Inputs

It is suggested that OT in general, and certain portions of OT

9Note the irony underlying Taylor's advocacy of scientific management: In his Principles of Scientific Management (1934), Taylor grounded his arguments for "national efficiency" in the plea for "conservation of our national resources" by President Roosevelt (p. 5). He suggests on the one hand that application of scientific principles will result in conservation of national resources, but on the other hand advocates (unwittingly) an increased expenditure (albeit efficient) of these same resources.
in particular, take organizational inputs for granted. Since organizational continuity (in as much as it is dependent upon matter-energy inflows) is assured, analysis then focuses instead either on other possible disruptive antecedents (e.g., intraorganizational conflict, fluctuations in market demand), or psychosocial variables (e.g., power and influence) or on structures and processes particular to constant-size or growing organizations (e.g., the administrative function). To take an analogy from need theory: OT assumes, as it were, that the "physiological needs" of the organization are satisfied, and then focuses exclusively on the "higher needs". Consider the following instance of this preemptive emphasis on the higher needs:

Twenty-seven faculty members from several American universities representing various disciplines attended a seminar in the Social Science of Organizations in 1963. The purpose of the seminar was to assess the art of organizational design and to move the field toward better science. The five papers which resulted were "in a real sense, the product of all twenty-seven participants" (Thompson, 1971: p. x). The following statement reflects the limit of these scholars' concern for matter-energy inflows: "Theorists often ignore material inputs" (Stogdill, 1971: p. 31). (This sentence was the only one regarding material inputs in the whole book on organizational design.)

As will be argued in more detail later, the historic availability of raw materials and successful growth of organizations are largely responsible for the bias toward growth in OT. Since material inputs have not heretofore imposed operating constraints, social scientists believe
that "the social environment must be regarded as a far more potent force than the physical environment in determining the purpose and form of organization" (Stogdill, 1971: p. 41). (Their bias is understandable.)

The presumption of availability of inputs in the case of classical OT has been highlighted by modern writers. The rational model of organizations used by classical theorists assumes, among other things, that "all resources are appropriate resources, and their allocation fits a master plan" (Thompson, 1967: p. 6). "Scientific management (for example, assumes that ) ... resources in uniform quantities are available" (p. 5). Similarly, "administrative management also assumes that ... resources are automatically available to the organization" (p. 5). This presumption leads to environmental insularity; and in the identification of their closed-system perspective the classical writers have been criticized—unwittingly, and by implication—for their bias against scarcity. "The major misconception (of the closed-system perspective) is the failure to recognize fully that the organization is continually dependent upon inputs from the environment and that the inflows of materials ... is not constant" (Katz and Kahn, 1966: p. 26).

The availability of inputs, as it were, is also subsumed in March and Simon's (1958) general model of adaptive behaviour. Or, to be more precise, their model can be applied to search behaviour for organizational inputs only if it is assumed that such material exists and can be obtained:

The general model of adaptive behaviour is presented in Figure 1.
FIGURE 1
GENERAL MODEL OF ADAPTIVE MOTIVATED BEHAVIOUR

Adapted from March and Simon (1958: p. 49)
While it was formulated to model the behaviour of an organism, the authors subsequently used it to study macro behaviour (see, e.g., their pp. 132-3). According to March and Simon

"1. The lower the satisfaction...of the organism, the more search for alternative programs...it will undertake...
2. The more search, the higher the expected value of the reward..." (p. 48)

The authors qualify their model by pointing out that

"the search behaviour specified (above) depends on an underlying belief...that the environment is benign and on the fact that search is usually reasonable effective. By our verbal hypothesis 2, we are alleging that such requirements are, in fact, met. Hypothesis 1 will be true only of organisms that do perceive the world as benign. If the environment is perceived as malevolent and/or barren, search behaviour will not follow from a decrease in satisfaction. Thus aggression, withdrawal, and regression are certainly observable reactions to dissatisfaction that lead to frustration...These 'neurotic' reactions are excluded from this model. Similarly, hypotheses 2 will not be true if search is ineffectual. Ineffective search--cycling, stereotypy, etc.--is an important part of human problem-solving that is not included in the present model. Ultimately, we will require a set of hypotheses that deals with the switching from 'normal' to 'neurotic' reactions and from effective to ineffective search." (p. 50)

Needless to say, a model dealing with neurotic reactions and ineffective macro search behaviour does not exist in OT. Since it is limited to the study of rational behaviour the present dissertation does not provide such a model either.

Hidden Bias for Growth

In the above section an argument was presented for a bias toward growth together with an awareness thereof (either by the original
authors or by subsequent critics). Arguments for a bias hitherto unidentified are presented below.

The Price Output Decision

Cyert and March (1963) have developed computer models to study price and output decisions (see, e.g., their Chapters 7 and 8). The models assume (implicitly) an elastic demand for the firm's output and examine the possibility of increasing total revenue by decreasing markup on cost. A price reduction is expected to lead to greater sales, resulting in larger absolute (not percentage) profit. Greater sales however imply increased consumption of raw material. Thus the price output model assumes availability of supplies. It is suggested that under certain conditions of environmental scarcity it is not possible to increase inputs at all. The practice of manipulating mark-up and the price output decision-making exercise are thus irrelevant under these circumstances.

Intraorganizational Conflict

In their discussion of intraorganizational conflict (pp. 129-131), March and Simon (1958) suggest that organizations react to conflict by four major processes: (i) problem-solving, (ii) persuasion, (iii) bargaining, and (iv) "politics". According to them, in the case of problem-solving, it is assumed that objectives are shared and that the decision problem is to identify a solution that satisfies the shared criteria. In persuasion, it is assumed that individual goals may differ within the organization but that goals may not be taken as fixed.

10 The partial model of organizational choice (Cyert and March, 1963: pp. 84-86) similarly assumes availability of inputs.
(Implicit in the use of persuasion is the belief that at some level objectives are shared and that disagreement over subgoals can be mediated by reference to common goals.) Where bargaining is used, disagreement over goals is taken as fixed, and agreement without persuasion is sought. "Politics" is defined as a process in which the basic situation is the same as bargaining, but the arena of bargaining is not taken as fixed by the participants. The first two processes are called analytic, and the last two are labelled bargaining processes.

The authors then go on to suggest that organizational conflict of the intraindividual variety will tend to be resolved through analytic processes, while "the more organizational conflict represents intergroup differences, the greater (will be) the use of bargaining" (p. 130). In other words, conflict at the macro level will tend to be resolved by bargaining processes. This assertion is justified by suggesting that "bargaining acknowledges and legitimizes heterogeneity of goals in the organization" (p. 131).

During times of abundance organizations typically enjoy considerable slack. This is expended in servicing those subgoals of individuals and departments which do not correspond to the organizational goals. In other words, organizational slack facilitates the existence and continuity of a heterogeneity of goals. Scarcity is however expected to result in reduction of slack. This will lead to abandonment of nonorganizational subgoals. Only those goals which are directly relevant to the organizational purpose will be retained. There will in effect be a pressure towards sharing of objectives. Intergroup conflict will thus be resolved
through persuasion. In the extreme case, when there is no organizational slack, i.e., the parties subscribe totally to common goals, intergroup conflict will be resolved through problem-solving. Thus, contrary to the processes used during abundance, all intraorganizational conflict will tend to be resolved through analytic processes in the context of scarcity. The prescription for use of bargaining processes reflects the abundance bias.

While they assumed availability of certain organizational inputs, the foregoing formulations were otherwise "neutral". In contrast the two formulations discussed below contain a definite pressure for growth.

Excess Capacity

Organizations acquire certain components in order to handle crucial contingencies posed by the task environment. Acquisition of components of unequal capacity raises balancing problems. Thompson (1967) however "expect(s) organizations subject to rationality norms to seek to grow until the least reducible component is approximately fully occupied. If necessary in order to achieve this state, organizations with excess capacity will seek to enlarge their domains" (p. 50; emphasis added).

While it is reasonable to expect organizations to make use of excess capacity, it follows from the antecedents of the above proposition that enlargement of domain is liable to result in further balancing problems. Resolution of these will, in turn, result in further growth, and consequently new balancing problems. The above prescription thus incorporates, in effect a positive feedback loop for organizational growth.
It is admitted that the above model is a reasonable description of organizational behaviour during abundance. As will be argued later in the context of scarcity however, excess capacity will be either left unused, or used as a basis for mergers (a process of growth different from that suggested by Thompson's model).

Adaptive Behaviour

The March and Simon (1958) general model of adaptive behaviour has been introduced earlier. This model has been used by them to explain innovative macro behaviour (pp. 182-3). In a discussion of the determinants of the criteria of organizational satisfaction they note that "(t)he most important proposition is that, over time, the aspiration level tends to adjust to the level of achievement" (p. 182). In other words when the environment is "good" more will be desired and consumed, and when it is "bad" less will be consumed and (with some delay) desired. The munificence of the environment is thus the exogenous variable, and when the environment itself is in a steady state the system should enjoy a stable equilibrium.

According to the authors however, even in the absence of environmental change "aspiration levels do not remain absolutely constant but tend to rise slowly" (1958: p. 183). They suggest that, among other things, "organizations adjust their criteria to the levels achieved by other organizations" (p. 183). Thus if another (comparable) organization is experiencing "abundance", the focal organization tends to notch up its aspiration level. If its own particular environment does not prove to be benevolent however it will, in time, revise its expectations downward again.
Assuming no change in the environment of the referrent organization, the aspiration level of the focal organization is thus expected to fluctuate indefinitely. But, if the total environment is "truly" homogenous, the aspiration levels of all organizations will, in course of time, attain steady states. This, it may be noted, corresponds to Keynes' concept of the stationary economy, and does not imply a bias for growth.

A verbal description of the general model of adaptive motivated behaviour thus does not reflect a growth bias. The bias is introduced rather through additional assumptions prior to translation into mathematical form. (The authors do not provide an explanation of the prior logic of these assumptions.) According to their system of equations "at equilibrium the aspiration level will exceed the reward" (March and Simon, 1958: p. 49, emphasis added. See also Cyert and March, 1963: p. 34). This formulation contains a built-in pressure for growth, and operates independently of the condition of the environment (and hence of the availability of rewards). The translation prevents a system from ever attaining a "stationary" equilibrium, but rather requires a "growing" equilibrium. Thus according to their set of equations a system will attain a durable correspondence between environmental munificence and organizational expectations only when the environment itself is growing. When the environment is stationary or shrinking however, the model dooms the organization to endless fluctuations in the level of aspiration.

There is considerable evidence for successful upward revision of aspiration levels in America. This has corresponded to a period of economic growth. It is suggested however that the historical affluence of America is
only a particular reality, and is not necessarily a total reflection of
the "nature of things". Thus while the March and Simon model (as well as
Thompson's model above) are valid descriptions of an "abundant" reality,
they are not universally relevant. Arguments for nonrelevance of the
model to a scarcity economy are presented below.

Foster (1967) in his study of the Tzintzuntzan peasants of
Mexico has observed that the village folk have a perspective of a limited
good. In other words, they perceive that every good, including intangibles
like prestige and status, has finite limits. Life to them is a zero-sum
game, and an individual or a family can benefit only at the expense of
others. Their mores thus discourage growth and development, and for
generations the villagers have avoided exploiting opportunities for self-
 improvement. (The only socially acceptable instances of growth are those
which can be explained as arising from luck or good fortune; visible
striving for betterment is frowned upon.)

Similar nonexploitative behaviour can be observed in cultures
and religions which emphasize asceticism as the way of life. Buddhism,
for example, preaches, among other things, a simplicity of life; and in
early Buddhism the monastic life of poverty was the norm. The monk was
expected to strive for less (subject to a minimum—perhaps) instead of
(a limitless) more, and his aspirations were independent of environmental
availability.

It is suggested that if a mathematical mode of the adaptive
behaviour of the Tzinuero or the monk were to be developed, it would
have to be such that, at equilibrium, the aspiration level will be less than or equal to the reward. That is, aspiration levels will not be expected to rise with time, even though there is an increase in environmental potential.

While the above examples may not be admissible as evidence with regard to macro behaviour of formal organizations, it is submitted that they cast reasonable doubt upon the generalizability of statements which require aspiration levels to contain an inherent pressure for growth. It is suggested that assertions of the variety "at equilibrium the aspiration level exceeds the reward" and "aspiration levels do not remain absolutely constant but tend to rise slowly" portray a cultural bias (based understandably on a long history of economic success).

**Biased Development of the Neutral Component**

The section above contained some examples of an unreflective bias for growth in OT. In contrast to the inherent bias identified in the foregoing formulations, the theory discussed below is, in principle, value neutral. It will be argued however that portions of such neutral OT have not historically been applied to behaviour peculiar to scarcity and shrinkage. Only two examples will be discussed.

Game theory and the theory of conflict study various optimizing, conciliation, and bargaining strategies. In game theory there is an understanding of the difference between zero-sum and nonzero-sum contexts. (See e.g., Miller, D.W., 1971; Shubik, 1964.) Study of the latter is however typically limited to growth situations where the contenders play for shares of an expanding pie. No study of competition or collaboration
in a shrinking pie situation has been found in the literature.\footnote{The game "So Long Sucker" (Rapoport, 1970: Ch. 18) is the solitary exception. It provides remarkable insight into behaviour in and of inherently unstable coalitions. There are no theoretical underpinnings to the game however, and there has been no attempt at development of a formal theory of unstable coalitions since the game was invented in 1950.}

The phenomenon of insufficient resources is explicitly recognized in the study of conflict behaviour within organizations (see, e.g., Pondy, 1969; Walton and Dutton, 1969). The conflict is however typically not for survival. Since the conflicting parties are essential elements of the same organizational system, the contest is generally not of the "struggle unto death" type—the higher echelon is expected to intervene before organizational effectiveness is significantly impaired. Organizational conflict thus takes the form of jockeying for relative power and status, within definite and relatively narrow limits, by acquiring control over limited resources (e.g., Pondy, 1967).

**Reduced Relevance of the Neutral Component**

It has been suggested above that certain portions of the neutral component of OT have not been applied to or developed in the context of scarcity. In this section it will be argued that certain other parts of OT, which also are essentially value neutral, have little relevance to organizational behaviour under scarcity; and that, in the limit, they become totally vacuous.

**Management by Exception**

The concept of management by exception has meaning in the context of certainty. A certain environment is conducive to a rational model organi-
zation, and all organizational activity thus tends to be determinate. Under the closed-system type of organization it is possible to develop standard operating procedures for almost all internal activity, and there is little need for exercise of discretion. Under such circumstances therefore, management is truly by exception (Ansoff, 1965: p. 176).

It will be argued later that an abundant environment is also a relatively certain environment; a scarce environment may on the other hand be either certain or uncertain (see Chapter 7). Insofar as the scarce environment is also uncertain, the concept of management by exception cannot be applied to materials management (procurement, inventory control, scheduling, etc.) in the context of scarcity.

Equifinality

According to the principle of equifinality (Bertalanffy, 1968) an open system may, starting from a particular initial state, attain a particular final state through different means or paths. That is, a system may have, at any time, several options, each of which is expected to result in the achievement of a particular goal. Since each of these alternatives is instrumental, i.e., insures goal attainment, the system is expected to choose among them according to some other criterion, e.g., efficiency. Organizations as open systems share the characteristic of equifinality (Katz and Kahn, 1966: p. 28).

The principle of equifinality is reflected in, among others, (i) the separation of system goals from output goals (Perrow, 1970),
(ii) the distinction between satisficing and optimizing (Simon, 1957), and (iii) the sequential evaluation of organizational alternatives (Cyert and March, 1963). The three statements are briefly described below.

Perrow (1970: pp. 135-36) identifies five types of organizational goals: societal, output, system, product, and derived goals. The system goals refer to the state or manner of functioning of the organization, independent of the goods it produces. An organization may choose, for example, between growth and stability, or between being tightly or loosely controlled or structured, as its mode of functioning. According to Perrow "organizations have options in these respects" (P. 135) which may be exercised independent of the output or product goals.

March and Simon (1958) suggest that organizational decision making is typically "concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with the discovery and selection of optimal alternatives" (p. 140-141). To illustrate: "an example is the difference between searching a haystack to find the sharpest (sic) needle in it and searching the haystack to find a needle sharp enough to sew with" (p. 141).

In their study of organizational choice behaviour, Cyert and March (1963) suggest that organizations tend towards "sequential consideration of alternatives" (p. 113). Thus "the method by which alternatives are generated is of considerable importance since it affects the order in which they are evaluated" (p. 86).

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This is not to suggest that the authors were consciously applying the principle of equifinality, but rather that the assumptions underlying their formulations are common to those underlying the principle.
The above observations of organizational behaviour have one assumption in common: the existence of more than one alternative. A benevolent environment may, for example, permit growth, and the organization may then be free to choose between growth and stability. The haystack may contain several needles sharp enough to sew with, allowing the decision-maker to satisfice. There may be a plethora of possible solutions, and the sequence of alternative generation may truly have important organizational consequences. The underlying assumption however has relevance only in the context of abundance. It is suggested that environmental scarcity may severely limit the number of options: there may be, in the limit, only one solution.13

Environmental scarcity is expected to result in the reduction, or even elimination, of organizational equifinality. In order to remain viable in the midst of scarcity, organizations must strive towards a loose structure with tight control; and indeed have little choice in the matter. There may be just one needle in the haystack, so that the distinction between satisficing and optimizing is void of meaning. If there is only one possible solution to a particular organizational problem, then the entire theory of alternative generation and search behaviour becomes vacuous.

The Mechanistic Principle

Burns and Stalker (1961) identify two types of organizational responses to change: mechanistic and organic. According to them 13

13 Theorists who associate the principle of equifinality with organizations recognize that "as open systems move toward regulatory mechanisms to control their operations, the amount of equifinality may be reduced" (Katz and Kahn, 1966: p. 26). The implications of regulation and control are however not pursued to their logical conclusion.
"In firms which operated according to mechanistic principles, the response to change was usually to create a new group, or reconstitute the existing structure, or to expand an existing group which would be largely responsible for meeting the new situation, and so 'not disrupt the existing organization'."\(^{14}\) (p. 8)

While such an approach involves minimum disruption of existing structure, and is hence relatively nonthreatening, it is suggested that this is an "inefficient" method of problem-solving. While it may have been characteristic of abundance, it will be argued later that under scarcity organizations will not have the "mechanistic" option, but will be forced to reorganize.

Sealing Off the Technical Core

Thompson (1967) suggests that under norms of rationality, organizations seek to seal off their core technologies from environmental influences. But since complete closure is impossible, organizations "seek to buffer environmental influences by surrounding their technical core with input and output components. Because buffering does not handle all variations in an unsteady, environment, organizations seek to smooth (or level) input and output transactions ..., and to anticipate and adapt to environmental changes which cannot be buffered or smoothed..., and finally, when buffering, leveling, and forecasting do not protect their technical cores from environmental fluctuations...,

\(^{14}\)"Perhaps the outstanding example of the subordination of structure in our time was provided by Franklin Delano Roosevelt. His creation of new agencies of government produced an alphabet of bureaucracy and became a joke in the hands of his friends and enemies. The central truth, however, was that the government was taking on new functions, especially during the early years of the New Deal, and that it had an overwhelming mandate to do so. To have attempted the accomplishment of these functions entirely within existing structures of government would have been extremely difficult, given the background and ideologies of the old-line government agencies. It was far wiser to permit the old-line agencies to remain in their mausoleums while new agencies of government, lodged in temporary quarters of all sorts, got on "with the new and crucial jobs". (Katz and Kahn, 1966: p. 217)."
organizations resort to rationing." (p. 24; emphasis added)

Buffering is illustrated by the stockpiling of materials and supplies on the input side and by finished goods inventories on the output side. Smoothing and leveling involve manipulation of demand to eliminate undesirable fluctuations. Anticipation and adaptation are operationalized as forecasting of demand and consequent scheduling of the production activity. Rationing requires assigning allotment priorities to consumers of output on the one hand and to alternate use of inputs on the other hand. (See pp. 20-23) (Thompson does not provide examples for smoothing and leveling of, or anticipation and adaptation to, input fluctuations.)

It is suggested that while the foregoing was a reasonable description of organizational behaviour during abundance, it has little or no relevance under scarcity. The concepts of buffering and rationing subsume in the main an expectation of a constant level of availability in the environment. The concepts are relevant largely to operation under a steady state and lose much of their meaning when there are expectations of a steady decline in availability of raw material. Indeed, instead of attempting to seal off the technical core, it will be shown later that under scarcity the organization will build in a degree of flexibility within the technical core.

Organizational Slack and Inconsistent Goals

"Many interesting phenomena within the firm occur because slack is typically not zero" (Cyert and March, 1963: p. 36). Similarly, the fact that ruling coalitions invariably contain a potential for conflict (because of variations among individual goals) both makes organizational
behaviour more interesting and OT richer. (It is argued in fact that it is largely because of the existence of organizational slack and goal conflicts that the behavioural theory of the firm (see, e.g., Cyert and March, 1963) differs from the economic theory of the firm.)

It is suggested that during scarcity there will be little if any organizational slack. Also environmental pressure is expected to force a consensus of goals among members of the coalition (heterogeneity is expected to be minimized). Thus most of the traditional theory related to or derived from organizational slack and goal heterogeneity on the one hand and their consequences on the other hand will become irrelevant during scarcity. (It follows that economic criteria will be increasingly used for organizational decision making, and that in the extreme non-economic behavioural criteria will be totally subordinated to the logic of the economics of the firm.)

In Defence of the Bias

Evidence for a bias toward growth and abundance has been presented above. The origin of the bias is briefly explained in this section.

Thus far it has been argued that OT is concerned with behaviour in a milieu of abundance. This concern with abundance and growth is understandable. Theoretical work can be expected to develop more during times of plenty and leisure than in the midst of deprivation and scarcity. Note, for example, the contrast between "contributions to knowledge" during the Dark Ages in Europe with those during the earlier Aristotelean and Platonic
periods. When money is tight very little of it can be expected to be invested in activities which are not immediately productive, e.g., theory building.

Historically America, where a large part of the theory of organizational behaviour was developed, has been a land of plenty. This resulted in an optimism rooted in faith in economic growth (Heilbroner, 1959; Reich, 1971). Thus both OT and micro organizational behaviour evolved in a milieu of abundance; and it is not surprising that they reflect the ethos of the period. Since organizations in general were experiencing growth and abundance, OT had to address itself to growth-related behaviour in order to be relevant. A theory of survival behaviour under conditions of deprivation would be irrelevant. Again, even if a scarcity-oriented theory had been conceived at that time, it could not have developed far because of lack of empirical grounding. It is difficult to test postulates of scarcity motivated behaviour when abundance is the prevailing mode.

Summary

In this chapter evidence has been presented for a bias in OT toward abundance and growth. Further evidence to this effect will be presented in Chapters 6 and 7.

It is believed that the foregoing provides sufficient justification for a study of macro theory in a milieu of scarcity. The concepts fundamental to such a study are presented in the next chapter.

15 Merle Ace provided this example.

16 Along somewhat similar lines Aldrich (1971) argues that because OT has been traditionally limited to the study of successful organizations, it follows that there is little awareness in OT of the "essential differences between them (i.e., the survivors) and the organizations no longer around to be studied" (p. 282).
CHAPTER 3
THE CONCEPT OF SCARCITY

The concept of long range survival is basic to the behavioural sciences. It is reflected for example in the hierarchical need theories in psychology (e.g., Barnes, 1960; Maslow, 1970) where physiological needs are considered prepotent. In organizational behaviour survival is the long range goal of the organization (e.g., Gibson, Ivancevitch, and Donnelly, 1973; Moudgill, 1974a), and the concept is used among other things to explain changes in instrumental goals (e.g., Etzioni, 1964; Perrow, 1970). Survival is the key to the theory of the firm in economics (e.g., Greenhut, 1970; Vickers, 1968), and determines investment and divestment strategy over time. It is also fundamental to the theory of political science, and in the general systems expositions of such theories (e.g., Deutsch, 1966; Easton, 1965) the concept of self-preservation is recognized explicitly. Sociologists (e.g., Levy, 1952; Parsons, 1951) give central importance to survival and preservation as motivators of social behaviour. Survival in the struggle against nature is the paradigm in anthropological explanations of aggregate behaviour (e.g., Radcliffe-Brown, 1952; Turnbull, 1972), and determines particular societal structures and institutions. Thus, irrespective of the level or direction of analysis, any explanation of human behaviour recognizes, explicitly or otherwise, the cardinal precept of survival.

Survival can be studied in at least three different perspectives: in a milieu of growth, in the context of stability or containment, and in an environment of scarcity and shrinkage. While it may be argued that
these are merely different locations on the same continuum, it is suggested that the three perspectives have different implications for survival; and the process and means of insuring survival in the midst of plenty are different from, for example, those in the midst of extreme scarcity.

These contingencies of survival are reflected very clearly in some anthropological studies: it is recognized, for example, that the degree of availability of means of sustenance effects the structuring of the family (as an aid to survival). Turnbull (1972) reports that among the Ik, a primitive people in the northeastern corner of Uganda who have lived on the verge of starvation for several generations, family ties are seen as a threat to survival. When there is barely enough food for one, sharing it with another, say a child, may lead to extinction of both mother and child. Consequently the child is abandoned to fend for itself at the age of three. There is thus no "family" among the Ik. Among agricultural people in contrast, where cooperation is of the essence for survival, an extended family is the mode (Mamdani, 1973; White, 1974: pp. 374-5). In industrialized countries however, in further contrast, the very assurance of survival has a centrifugal effect on the family and facilitates disintegration (Berelson and Steiner, 1964: pp. 311-2). There is thus a definite recognition in anthropology of, among other things, the differential structural effect of survival in the midst of scarcity on the one hand and abundance on the other.

Anthropological studies represent one extreme of aggregation for the purpose of analysis of human behaviour. At the other extreme, at the level of the individual, there is explicit recognition as well of different
strategies in the face of environmental scarcity or abundance. It is recognized in psychology, for example, that selfish, suspicious, and hostile behaviour is typical of scarcity, while generosity, trust and philanthropy are characteristics of abundance (Maslow, 1970: Chs. 4 and 11). The two sets of attitudes or personality "structure" thus reflect the degree of availability of means of sustenance in the environment.

It has been suggested above that there is some understanding of behaviour under scarcity in anthropology and psychology. In OT however, there is little awareness of the imperatives of scarcity. To draw an analogy from psychology to illustrate the point: OT is not equipped to study, for example, the organizational equivalent of the behaviour of a starving rat; and there is no counterpart in OT of the considerable understanding (in psychology) of deprivation-induced pathology. To take analogies from sociology: there is a lack of understanding in OT of the behaviour of people in the face of a natural disaster. There are no prescriptions even for behaviour under "norms of rationality" in the context of scarcity. What is more important, there is not even a formal distinction between scarcity and abundance. Consequently there is little in OT that can qualify as a theory of survival behaviour in a context of scarcity.

To summarize: (i) there is no scarcity related component in OT, while (ii) there is some understanding of scarcity related behaviour in anthropology, sociology, and psychology. This knowledge however is not directly applicable to the range of behaviour subsumed under contemporary OT: The concepts and information relating to behaviour available in, for example, psychology cannot be directly transferred to organizational behaviour at the macro level. This is partly because of
the conceptual problem of anthropomorphising organizations on the one hand, and partly because of the difficulty of conceptualizing the individual in organizational macro terms on the other hand. Thus the concepts used to study deprivation induced pathology (sensory deprivation), for example, cannot be readily applied to the study of organizational behaviour.

This is not to say that it is not possible, in principle to transfer scarcity related knowledge from psychology to OT. The relevant information available in psychology however tends to be rather diffuse and fragmentary, and at times, mutually contradictory. It would require considerable work (even for a psychologist) to collect and integrate all this information such that it could be used for the purposes of the present dissertation. Such an undertaking is definitely beyond the scope of the present study.

The understanding of behaviour in the context of scarcity likewise is not available in a comprehensive form in the literature of anthropology and sociology. Moreover, the existing diffuse information is not directly transferrable into OT. Accordingly, it was not possible to obtain fruitful leads from anthropology (or sociology. Consequently a more practical alternative was adopted: To attempt from first principles the study of organizational behaviour in the context of scarcity—or rather the formulation of concepts which are prerequisites to such a study.

The First Level Definitions of Scarcity

For logical reasons the analysis begins with a definition of scarcity. At the beginning of the chapter it was suggested that the
concept of survival is basic to explanations of human behaviour. This fundamental concept will be used to develop a definition of scarcity.

According to general systems theory, system maintenance or preservation requires an inflow of negentropic material (Bertalanffy, 1968): Organizations require an intake of particular bits of matter-energy-information in order to survive. The greater the inputs the greater is the possibility of survival, ceteris paribus. Insufficient receipts over time will lead to reduction in survival potential and eventually to extinction.¹

The amounts of input necessary for survival depends upon the individual organization, and varies with both its generic and idiosyncratic characteristics. The organization itself provides the criterion for measuring the adequacy of the inputs: if there is no loss in survival potential over time then the input is by definition adequate (Moudgill, 1974b). If on the other hand the amount of inflow is such that it results in the organization becoming extinct then input is again by definition, insufficient.

Each organization requires different types of inputs for survival. While there may be interaction effects among different inflows, long range survival varies with the quantity of each individual input. If the rate of intake of a particular input drops below a certain threshold, the organization may perish. Above the threshold however the particular material does not pose a threat to survival.

¹The "degree of survival" or survival potential can also be conceptualized as organizational effectiveness (Moudgill, 1974b); and the greater the ability of the organization to compete for scarce resources, the greater its effectiveness (Yuchtman and Seashore, 1967).
This relationship between the amount of input and its consequences for survival can be used to develop a definition of scarcity for a particular material with respect to the focal organization:

A particular material can be said to be scarce with respect to a particular organization if the quantity of the material available to it is such that it causes the organization to become extinct over time (and that the organization would have survived if it had received a greater amount of that input).

The above will be referred to as the definition of relative scarcity.

Different organizations require varying quantities of different inputs. Some inputs are common across a large number of organizations; and several organizations within any geo-political system may use the same material. The requirements of the individual organizations for a particular material can be added to obtain the total demand for that material in the particular system. If the total availability of the material is such that all the organizations continue to survive over the long run, then we can say that it is available in sufficient quantity. If however even one organization becomes extinct, the amount is not enough: The good can then be said to be scarce.

The relationship between the total availability of a particular good in a geo-political system, and the survival of the using organizations within the system can be used to develop a definition of scarcity with respect to the system:
A particular material can be said to be scarce with respect to a geo-political system if the total amount available in the system is such that, for want of the material, at least one organization in the system experiences relative scarcity, i.e., becomes extinct over time (and that it would have survived if more of that material were available in the system).

The above will be referred to as the definition of absolute scarcity to distinguish it from the earlier definition of relative scarcity. The two together will be called first level definitions of scarcity.

It is suggested that an organization may be viewed as an integrated system in the sense that it is comprised of functional sub-units which are important to the survival of the system: The failure of any functional subsystem will result in reduction of the survival potential of the whole. It may be noted that the definition of relative scarcity can be generalized to any integrated system, e.g., the human organism: In the case of a human being the loss of a functional organ may result in the death of the individual.

In contrast to integrated systems aggregations may be viewed as loose collectivities: The failure of any of the constituents of an aggregation will not affect the survival of the rest of the members. The aggregation of organizations in a geo-political system is a case in point. It is suggested that the definition of absolute scarcity is generalizable to all loose collectivities, e.g., aggregations of human beings: In the case of such an aggregation the death of an individual will not endanger the survival of the others.
Generalizability of the Concepts

Organizational behaviour can be studied at two levels of analysis, the macro level and the micro level. The two levels are highly interconnected. Behaviour at the micro level and intra-organizational behaviour at the macro level both influence each other to a considerable extent. Giving due regard to this interdependence, it would be valuable if the scarcity-related concepts developed for the macro level could also be applied to the lower level. Ideally of course the concepts should also be generalizable to the behaviour of individuals outside the organizational context on the one hand and to systems above the organizational level on the other hand. This would facilitate development of an integrated body of scarcity related knowledge which would be valid across all levels of discourse, and would possess all the attendant advantages of generalizability.²

As shown above the first level definitions are also applicable to human behaviour (both within and outside the organizational context).³ It is suggested that these concepts constitute the foundations of an integrated theory of scarcity related behaviour, and can be developed in any one or more of the following directions:

² See, among others, Bertalanffy (1968) and James Miller (1971) for arguments for an integrated body of knowledge and the advantages of generalizability across systems.

³ Seeking maximal generalizability a concept of scarcity was developed which was applicable to individuals, aggregations of individuals, organizations, aggregations of organizations, and the society. It did not however provide any fruitful leads in the study of scarcity related behaviour, and was consequently dropped. The concept has been included in Appendix 1 for academic interest. The first level definitions developed above are not applicable to the societal level of analysis. These limitations are discussed in Appendix 2.
(i) A study of individuals and their aggregations outside the organizational context.

(ii) A study of individuals and their aggregations at the small group level in the organizational context—micro organizational behaviour.

(iii) A study of organizations and their aggregations and the aggregations of small groups in the organizational context—OT or macro theory.

Because of the current interests of the author it was decided to pursue development at the macro level only. This is done in the remaining chapters.  

Preliminary attempts at development of the concepts in the context of individual human beings and their aggregations are however presented in Appendix 3 as evidence of the possibility of a future integrated theory.
CHAPTER 4
DEVELOPMENT OF THE CONCEPT OF SCARCITY

The first level concepts of relative and absolute scarcity were introduced in Chapter 3. These concepts are developed in the present chapter. Certain tools of microeconomic analysis are used for this purpose.\(^1\) The chapter begins with the distinction between essential and inessential goods. The consumption behaviour of organizations and their aggregations are then studied in relation to variations in the availability of essential goods as well as the level of resources.

Essential and Inessential Goods

Organizations typically consume varying quantities of a variety of goods. Not all of these are vital for organizational survival. Depending upon their centrality for survival, goods can be categorized as either essential or inessential. If reduction in the intake of a particular good below a certain level causes the organization to fail, the good can be classified as essential. If the organization continues to survive even when consumption of a particular good has been reduced to zero, the good belongs to the inessential category.

It must noted that the property of being essential and inessential is not intrinsic to the good; but derives instead from the nature of the organization. It is possible that while a particular good is essential for one organization, it is inessential with respect to another.

\(^1\) Those who are not comfortable with microeconomic analysis may prefer to read Appendix 3 before studying this chapter. The use of indifference, demand, and Engel curves is explained in some detail in the Appendix (in the course of development of the concept of scarcity in the context of individual human beings and their aggregations). The present chapter presumes a certain familiarity with these tools.
Indifference Curves

Let us assume that all the goods in the world can be represented by two goods A and B. Let us also assume that there are only two types of organizations, A* and B*, such that good A is essential while good B is inessential for organization A*, and B is essential and A is inessential for organization B*; and that A* and B* are identical in all other respects.

It is suggested that organizations may be indifferent between certain combinations of the essential and inessential goods A and B. The indifference curves for A*(B*) are presented in Figure 2. OQ is the minimum quantity of A(B) necessary for survival of the organization. It is possible that there exists a point Q₁ on the indifference map of the organization such that the indifference curves between Q and Q₁ are vertical lines. This means that as long as the amount of the essential good A(B) available to the organization is less than OQ₁, the consumption of any amount of the inessential good B(A) will not add to the utility of the organization. Consequently B(A) will not be consumed at all. To the right of the point Q₁ however the indifference curves become concave when viewed from the top. When the amount of the essential good A(B) consumed is more than OQ₁, the organization will consume some amount of the inessential good B(A).

A similar argument for B* (i.e., similar to that for A*) can be developed by replacing A* by B*, A by B, and B by A in the text. In the interest of parsimony however, a parallel will be indicated by incorporating the alternative in parentheses along with the main argument. Thus instead of writing "the indifference curves for A* are ..." in the context of organizations A* in one paragraph, and then repeating "the indifference curves for B* are ..." for organizations B* in a second paragraph, the two have been collapsed into one paragraph by use of the artifice "the indifference curves for A*(B*) are ..."
FIGURE 2

INDIFFERENCE CURVES: THE ESSENTIAL AND INESSENTIAL GOODS

Quantity of inessential good

0 Q Q_1 Quantity of essential good

0Q: Minimum quantity of essential good necessary for survival

0Q_1: Amount of essential good consumed when all organizational slack is taken up (the consumption of the inessential good drops to zero)
It may be noted that the location of the point $Q_1$ varies with organizational size. As the organization grows the point $Q_1$ will tend to shift to the right. Conversely, when it divests, the point $Q_1$ will move to the left. After a period of stabilization however the organization may begin to consume inessential goods even though the intake of the essential good is still less than that prior to shrinkage.

**Demand and Engel Curves, and Organizational Slack**

Let us assume that the resources of the organization are independent of its consumption of the essential and inessential goods. Allocation of resources between the two goods will then be determined by the tangent of the budget line with the highest indifference curve. Reduction of the total availability of $A$ and $B$, and organizational resources $R$ can then be depicted by shifts in the budget line—with consequent changes in the amounts of $A$ and $B$ consumed. The changes are discussed below (see Figure 2).

As the quantity of $A(B)$ consumed approaches $OQ_1$ less and less $B(A)$ will be consumed, till when $A(B)$ is equal to $OQ_1$ the amount of $B(A)$ consumed is zero. The organization will however continue to survive even when the quantity of $A(B)$ consumed is below this level: it will divest and reduce its size in order to adapt to the diminished input. It will continue to decrease in size in response to reduction in the quantity of $A(B)$ till, below the critical point $OQ$, it ceases to be viable because

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3 The assumption of independence has been made merely in order to simplify the discussion. The interdependence of organizational resources and product output is explicitly recognized in Chapter 5.
of diseconomies of scale. Consequently the organization has to shut down; or it fails.

It may be noted that as long as the organization consumes more than $OQ_1$ units of A(B) there is slack in the system: Since it can reduce its intake of A(B) without having to divest, it is consuming more than the necessary amount of the essential good; also, resources are being expended on the inessential good. 4

Demand curves can be drawn by plotting the changes in the quantity of goods consumed corresponding to variations in the price of each of the goods. Similarly Engel curves can be obtained by plotting consumption against variations in the level of resources. The demand curves for the inessential and essential goods are presented in Figures 3 and 4 respectively. The demand curve for the essential good is kinked at a point which corresponds to the state at which there is no organizational slack. $OQ_1$ units of A(B) and zero units of B(A) are consumed at this point. The curve terminates when the quantity of the essential good consumed is less than the critical level $OQ$. The Engel curves for the organization are presented in Figure 5. The curve for A(B) is similarly kinked at a point which corresponds to $OQ_1$, and terminates at $OQ$.

Aggregate Demand and Engel Curves

Let us assume that all the organizations $A^*$ are identical to each other, and that the organizations $B^*$ are similarly identical to

4The concept of organizational slack is developed in considerable detail in Chapter 7.
FIGURE 3

DEMAND CURVE FOR THE INESSENTIAL GOOD
FIGURE 4
DEMAND CURVE FOR THE ESSENTIAL GOOD

Price of essential good

0 Q Q_1 Quantity of essential good

0Q Minimum quantity of essential good necessary for survival

OQ_1 Amount of the essential good consumed when all organizational slack has been taken up
FIGURE 5
CONSUMPTION AS A FUNCTION OF THE LEVEL OF RESOURCES:
ESSENTIAL AND INESSENTIAL GOODS

**OQ:** Minimum quantity of essential good necessary for survival

**OR:** Minimum level of resources necessary for survival

**OQ₁:** Amount of the essential good consumed when all organizational slack has been taken up, i.e., when the consumption of the inessential good is zero
each other. The aggregate demand and Engel curves for the A*s and the B*s will be similar to those for individual organizations. The aggregate demand curve for the inessential and essential goods will be similar to that in Figures 3 and 4 respectively. The aggregate Engel curves will be similar to those in Figure 5.

Changes in the Supply of the Essential Good

With demand being held constant, if the supply of the essential good is reduced, its price will be bid up and the quantity consumed will decline. The supply curve will, in effect, shift to the left. This will cause the point of intersection of the supply and demand curves to move upwards along the demand curve—till it reaches the critical point for the aggregation (i.e., till the total quantity of A transacted is equal to the sum of OQs of all the A*s in the aggregation). If the supply is reduced some more, then at least one organization will fail. This critical point is represented by J in Figure 6.

A reduction in the aggregation will result in the demand curve shifting left, intersecting the supply curve at $K_1$. A further reduction in supply will cause the supply curve to move upwards, till at $J_1$ the quantity of A(B) consumed is the minimum required for the survival of the residual aggregation of A*s(B*s). Reduction in the availability of A(B) beyond this point will cause another A*(B*) to fail, and the supply and (residual) demand curves will now intersect at $K_2$. The curves $KJ, K_1J_1, K_2J_2, \ldots, K_nJ_n$ thus represent the locus of intersection of the supply and demand curves of the essential good.

If the aggregation is large enough, i.e., the points J, $J_1$, $J_2$, \ldots, $J_n$,
FIGURE 6

LOCUS OF INTERSECTION OF THE AGGREGATE SUPPLY AND DEMAND CURVES FOR GOOD A(B) FOR ORGANIZATIONS A*(B*)

0Q1: The amount of A(B) necessary for survival of the last organization

0Q: The amount of A(B) necessary for survival of all the organizations in the aggregation

0Q1: The amount of A(B) consumed by the aggregation when all slack is taken up
..., J are close enough to each other, the locus of intersection to the left of J can be approximated by the straight line JJ in Figure 7. The point J corresponds to the minimum amount of A(B) necessary for the survival of the last A*(B*). It may be noted that the price of A(B) does not rise beyond the critical point. Also, when the supply curve moves to the right (because of increased availability) from, say, C in the critical region, the locus of intersection will not move right along the horizontal line; it will instead move southeast along the residual demand curve CD to the left of the original demand curve.

It must be remembered however that the good A(B) is also consumed by organizations B*(A*), and that A(B) is an inessential good for these organizations. The aggregate demand of B*(A*) for good A(B) is presented in Figure 8. The total demand for A(B) at any price can then be obtained by adding horizontally the curves in Figures 7 and 8. The locus of intersection of the aggregate supply and demand curves for A and B is presented in Figure 9 (assuming an equal number of A*s and B*s, the curves are identical).

Changes in the Level of Resources

Let us now analyze variations in aggregate consumption associated with changes in the level of resources. Let us assume that there is no change in either supply or demand. As aggregate resources decrease, consumption of both A and B will reduce; till at R the amount of the

5Comments by Vance Mitchell were helpful in development of the argument in this section.
LOCUS OF INTERSECTION OF THE AGGREGATE SUPPLY AND DEMAND CURVES FOR GOOD A(B) FOR ORGANIZATIONS A*(B*):

APPROXIMATE REPRESENTATION

\[0Q^1\]: The amount of A(B) necessary for the survival of the last organization

\[0Q\] : The amount of A(B) necessary for the survival of all the organizations A*(B*) in the aggregation

\[0Q_1\] : The amount of A(B) consumed by the aggregation when all slack is taken up
FIGURE 8
AGGREGATE DEMAND CURVE FOR THE INESSENTIAL GOOD
A(B) FOR ORGANIZATIONS B*(A*)

Price of inessential good

Quantity of inessential good
FIGURE 9
LOCUS OF INTERSECTION OF THE AGGREGATE SUPPLY AND DEMAND CURVES FOR A(B)

OQ : The minimum amount of the A(B) necessary for survival of all the A*\(\text{s}(B*\text{s})\) in the aggregation

OQ\(_1\) : The amount of A(B) consumed when all organizational slack is taken up in the A*\(\text{s}(B*\text{s})\)

OQ\(_1^1\) : The amount of A(B) consumed when there is only one surviving A*(B*).
inessential good consumed is zero. There is now no organizational slack. Further reduction in the level of resources will result in the organization divesting to reduce its consumption of A, till at the critical level only the minimum amount of the essential good necessary for survival is consumed. The aggregate Engel curves corresponding to the foregoing reduction in resources are presented in Figure 10. If the level of resources is decreased still more the aggregation of \(A*(B*)\) will be unable to acquire the minimum \(A(B)\) necessary for survival. Thus at least one organization will fail. This critical point is represented by \(R\) in Figure 10.

If the resources continue to dwindle beyond \(R\) then the Engel curve for the residual aggregation will be of the shape \(FF_2\); \(OQ_2\) being the minimum \(A(B)\) required for survival. If resources fall below \(R_2\) then another organization will fail, and the Engel curve of the residual will be of the shape \(F_2F_3\). As resources continue to diminish more and more organizations will fail, till at level \(R_1\) there is only one \(A*(B*)\) which consumes \(OQ_1\) units of \(A(B)\). \(GF_n\) is the Engel curve for the last organization. If the level of resources increases from any point, say \(R_3\) below the critical level, the consumption of A will be determined by Engel curves of the residual aggregation: The curve for the essential good, \(F_3F_2\) will be a continuation of the curve \(F_3F_2\). The organization may or may not however begin consumption of the inessential good, and the Engel curve for B may lie anywhere between \(R_3I_3\) and the original curve at \(R_1\).

It may be noted that if the points F and G are joined by a straight line then the various points \(F_2, F_3, \ldots, F_n\) will all lie along
FIGURE 10

CHANGES IN AGGREGATE CONSUMPTION CORRESPONDING TO VARIATIONS IN THE LEVEL OF RESOURCES: $A^*(B^*)$

Inessential good $B(A)$

Essential good $A(B)$

<table>
<thead>
<tr>
<th>Resource level</th>
<th>Quantity of goods consumed by the organizations $A^<em>(B^</em>)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_1$</td>
<td></td>
</tr>
<tr>
<td>$R_2$</td>
<td></td>
</tr>
<tr>
<td>$R_3$</td>
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<tr>
<td>$R_1$</td>
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<tr>
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<td>$Q$</td>
<td></td>
</tr>
<tr>
<td>$Q_1$</td>
<td></td>
</tr>
</tbody>
</table>

$OQ^1$: The amount of $A(B)$ necessary for survival of the last organization $A^*(B^*)$

$OQ$: The amount of $A(B)$ necessary for survival of all the $A^*(B^*)$s in the aggregation

$OR^1$: The level of resources necessary for survival of the last organization $A^*$

$OR$: The level of resources necessary for survival of all the $A^*$s in the aggregation
this line. If the number of organizations in the aggregation is large such that the points $F_2$, $F_3$, etc., are close to each other, then the various Engel curves below $F$ will lie close to the straight line $FG$. The portion of the Engel curve below $F$ can accordingly be approximated by a straight line. Such curves for the aggregations of $B^*$'s and $A^*$'s are presented in Figure 11(a) and (b) respectively. At the level of resources $OR_1^*$ the quantity of the inessential good consumed is zero—all slack is taken up. As resources fall to just below $OR_1^*$, at least one organization will fail. If they continue to fall organizations will continue to perish, till when the total resources available to the residual aggregation is $OR_1^*$, there is only one surviving organization.

The Engel curve for the aggregation of the organization $A^*$ and $B^*$ together are presented in Figure 11(c). Because of our assumptions regarding $A^*$'s, $B^*$'s, i.e., the organizations are identical to each other in all respects (except that $A$ is essential to $A^*$ and $B$ is essential to $B^*$), the Engel curves for $A$ and $B$ are identical.

Dissimilar Organizations

It has been assumed so far that all the organizations $A^*$ are similar, i.e., they are of the same size, have similar demand schedules, and have equal amounts of resources. Let us relax this assumption. The organizations for which a particular good is essential may have dissimilar characteristics. A reduction in the supply of the essential good will thus have a different effect on these organizations.

If for any reason the total supply of the essential good falls below the total demand, the different organizations will take up varying
CONSUMPTION OF A AND B AS A FUNCTION OF THE LEVEL OF RESOURCES:
AGGREGATIONS OF A*, B*, AND A* AND B*

OR: Minimum level of resources necessary for the survival of the last organization
OR: Minimum level of resources necessary for the survival of all the organizations in the aggregation
OR: Level of resources at which all slack has been taken up
1: The resources are plotted to half the scale used in (a) and (b).
degrees of slack. Some organizations may shrink in size. If supply (demand) continues to reduce (increase), more and more organizations will take up slack and divest till, in the limit, one organization fails. The particular good is then scarce in the absolute sense with respect to the original population of organizations. It is possible that the supply now balances the residual demand and there are no subsequent failures. The good is then no longer scarce with respect to the residual population.

At the time of the first failure the total slack in the group of organizations will be less than the slack during the period prior to the failure. Similarly the surviving organizations will, on the average, be closer to their minimum viable size after the failure than before the failure. There is thus less residual potential to adapt to adverse changes. If now the supply (demand) continues to decrease (increase), the second failure will be brought about by a lesser absolute decrease (increase) in supply (demand) compared to that for the first failure. Subsequent failures will require less reduction (increase) in total availability (demand). Thus because of reduced potential for taking up slack and size reduction after each failure, the rate of failure per unit decrease (increase) in supply (demand) increases with further reduction (increase) in supply (demand).

Absolute and Relative Scarcity

It follows from the arguments in this chapter that aggregations

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Demand may increase because of an increase in the number of consuming organizations or an increase in consumption by some organizations. If supply remains constant, then any increase in consumption by some organizations must be accompanied by a corresponding decrease in consumption by other organizations. This compensation may involve taking up slack, reduction in size, or failure.
of organizations may experience scarcity due to one or more of the following reasons: (i) an increase in demand for the essential goods, (ii) a decrease in the availability of these goods, and (iii) a reduction in the level of resources.

Consuming organizations may or may not be able to influence the total supply. That is, there may or may not be a monopsonic situation. For scarcity to prevail however it is necessary that the supply schedule is independent of the demand schedule. \(^7\) (If consumers can increase total availability there will be no scarcity.) Thus it shall be assumed hereafter that the amount of a particular resource available in the environment cannot be increased as a direct consequence of any action by the consuming organizations.

Assuming that resources are constant, an excess of demand over supply may cause the equilibrium quantity to be less than that required for organizational survival. This also means that the level of resources are no longer sufficient to procure adequate quantities of inputs. These phenomena can be expressed in formal terms: A good can be said to be scarce in the absolute sense if:

(i) The locus of intersection of the supply and demand curves is a horizontal straight line (Figure 9); or

(ii) The Engel curve is a sloping straight line to the left of the critical point (Figure 11c).

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\(^7\) This is true at all times under the assumption of perfect competition. In the present instance however the independence of supply follows from the logic of scarcity, and is independent of any assumptions regarding the nature of the market.
It has been assumed that the various organizations are dissimilar. They will thus react differently to the reduction in supply/increase in demand. The organization that is the "weakest" will be the first to succumb. This organization will then, by definition, experience relative scarcity.

The concepts of relative and absolute scarcity were introduced in the previous chapter, and descriptive definitions were presented. The definition of absolute scarcity was based upon that of relative scarcity. The two concepts have been developed in this chapter, and a formal definition of absolute scarcity has been presented. The concept of relative scarcity is "derived" from that of absolute scarcity in the present exposition.

As discussed below the two concepts have rather limited application. Before they can be used for a study of organizations they must be enlarged to incorporate a wider range of behaviour of interest to a study of scarcity.

Second Level Definitions of Scarcity

Relative scarcity was defined earlier as that which causes the focal system to fail: If an organization fails because it is unable to secure adequate input of a certain material, then the material was said to be scarce with respect to the organization. Relative scarcity is thus, in its first level definitional sense, a "one point in time" phenomenon:

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8 Certain prescriptions for behaviour under norms of rationality are presented in Chapters 6 and 7. It is suggested that, other things being equal, organizations which do not (or are unable to) operate according to these prescriptions will be the first to succumb.
as long as the organization survives, the focal good is not scarce; the moment it fails however, the good becomes "scarce". A good is thus classified as scarce only after the fact of failure.

It follows from the above that in order for an organization to come into being and continue to exist, there must be a historical period of nonscarcity: An organization cannot exist if a particular input is scarce. It also follows that at any given point in time, for any set of organizations, none of the relevant goods can be scarce. Thus according to our definition, a good cannot ever be classified as scarce relative to any existing organization.

The concept of relative scarcity as defined above has little application in real life; its application is limited at best to the study of organizations at the time of failure. In order for the concept to be relevant to a broader area of interest in the study of scarcity, it is necessary to modify the definition.

Behaviour of organizations prior to failure, especially when failure is anticipated, is rich in its interest to a study of scarcity. It is only proper that such behaviour is covered in a working definition of scarcity. The concept of relative scarcity is accordingly redefined to include some states of the organization prior to failure. Specifically, the antecedents of taking up slack and divestment are included:

(I) A particular material can be said to be scarce with respect to a particular organization if the quantity of the material available to it is such that it causes the organization to
   (i) take up slack, or
   (ii) divest and reduce its size, or
   (iii) fail.
The above conditions typically prevail as a consequence of reduction in supply. An increase in demand too may result in scarcity. According to the revised definition an organization may experience relative scarcity while it is growing: It is possible that an organization increases the intake of a variety of goods and begins to grow. Growth may be checked however because of the difficulty of acquiring additional quantities of a particular good. In order to procure more of this material the organization may have to transfer resources from other goods. Thus the scarcity of the focal good causes it to take up slack in the process of growth. If the good were not scarce then no internal reallocation of resources would have been necessary; the total expenditure on each good would have increased without any change in the relative proportion of the amount spent on each good (except for changes attributable to economies or diseconomies of scale).

If an organization has no slack it cannot grow by internal reallocation of resources: Consumption of inessential goods cannot be reduced because the organization is not consuming them at all; consumption of other essential goods cannot be reduced because that would cause the organization to fail. This leads us to another possible definition of relative scarcity:

(II) A particular good can be said to be scarce with respect to a particular organization if, when there is no slack in the organization, the quantity of the material available to it is such that the organization cannot grow in size.

Taking up slack or divestment for reasons other than material scarcity, e.g., because of management policy, are excluded from the definition of relative scarcity.
The possibility of a particular organization experiencing relative scarcity due to an increase in its demand has been discussed. It may be noted however that it is possible that an organization may experience scarcity due to an increase in demand by other organizations:

With supply remaining constant, an increase in consumption by one organization in a particular geo-political system must result in a compensating decrease in inputs to another organization in the system.

Using the revised definitions of relative scarcity absolute scarcity can now be redefined:

A particular material can be said to be scarce with respect to a geo-political system if the total amount available to the system is such that, for want of material, at least one organization in the system experiences relative scarcity.

The above definitions of relative and absolute scarcity will be called second level definitions. These will constitute the working definitions to be used to study the behaviour of organizations in the following chapters.
CHAPTER 5
PROBLEM DEFINITION

The concept of scarcity was introduced and developed in the last two chapters, and working or second level definitions of absolute and relative scarcity were obtained. These can now be used in the study of behaviour of organizations in the context of scarcity. While these concepts have potential for application to most aspects of organizational behaviour, only some of these will be pursued in the present study. This chapter is devoted to development of the boundaries of the study and a definition of the problem to be analyzed.

Antecedents of Scarcity

It has been mentioned earlier that there are three possible antecedents of scarcity: (i) reduction in supply, (ii) increased demand, and (iii) reduction in the ability to acquire essential material, i.e., reduced purchasing power. Any definitive study of scarcity must address itself to all of these variables. It will be recalled from the introductory chapter that the focus of this study is on the exhaustion of natural resources. Accordingly, the present analysis is limited to organizational consequences of reduction in supply. Changes in demand and purchasing power will be considered only when they have a direct bearing upon reduction in inputs.

The distinction between supply on the one hand and demand and purchasing power on the other is operationalized as follows: Litterer (1973: p. 25) distinguishes among input, transformation, maintenance, regulation, and output functions. The various functions are presented
in Figure 12. Maladies in the transformation, maintenance, and regulation functions will result in reduced production. Reduction in demand or increased competition may result in lowered sales. While purchasing power may be independent of production/sales in the short run (especially in government owned service organizations), reduced output will, over time, lead to reduction in revenue. Lowered income, in its own turn, will then result in reduced inflows of essential goods, with consequent further reduction in output. The ability to acquire essential goods and the input of these goods are thus mutually interdependent. There is, in effect, an input-revenue-input loop: a reduction in one ultimately results in the reduction of the other.

A disturbance may be introduced into the revenue-input loop in two ways: by altering either the purchasing power, or by changing the level of inputs. Depending upon how they affect this loop, the various antecedents of scarcity can be divided into two categories: those which result first in reduced purchasing power and those which affect first the input of essential material. Lowered productivity, poor sales, or externally imposed financial penalties are examples of the former category. Monopolistic action by suppliers, reduction in import quotas, and increase in aggregate demand with respect to availability are instances of the second type. The former category influences the inputs into an organization by first lowering its purchasing power. The latter directly result in reduced inputs by reducing supply. (In this instance the purchasing power can be said to be no longer sufficient to insure inputs at the historical level.)
FIGURE 12

FUNCTIONS IN AN ORGANIZATION

(Taken from Litterer, 1973: p. 25)
In keeping with the aim of the inquiry, analysis will be limited to study of the second type of phenomena, i.e., changes which result in reduced inputs because of reduction in the availability of the particular material. Factors which effect organizational resources first will be ignored.

Matter-energy and Information

All inputs into organizations may be broadly classified as either matter-energy or information. Some of the latter (as well as the former) are essential to organizational survival, and it is possible that organizations may fail because of scarcity of information inputs. The latter are however qualitatively different from matter-energy inputs in the present context:

One of the assumptions basic to the Club of Rome doomsaying is that the stock of matter-energy decreases with consumption—resulting in scarcity. The stock of information does not however diminish the consumption in a manner similar to that for tangible goods. Given the general concern with the exponentially decreasing levels of natural resources as a consequence of increased consumption, the present study focuses upon analysis of matter-energy inflows. Information inputs are considered only as they relate to inflows of tangible goods.

The Problem

The focal problem can now be defined. The present paper is concerned with the organizational consequences of absolute scarcity of matter-energy type of goods (where the scarcity is caused by a reduction
in total supply). The subsequent chapters describe some of the possible responses of an organization faced with reduced availability of raw material in its geo-political environment.

Before proceeding with the study of the consequences of a reduction in supply however, it is necessary to first establish the circumstances under which reduced availability will have organizational consequences. In order to do this it is necessary to distinguish among natural and other antecedents of scarcity.

Natural Scarcity

Naturally available raw material typically must be (i) extracted and (ii) processed before final consumption. According to their role in

1 Naturally occurring goods can be dichotomized as follows:
Regenerative goods: those which replace themselves over time, e.g., cattle, fish, grain, agricultural land, and timber.
Nonregenerative goods: those which for all practical purposes cannot replace themselves, e.g., building stones, metal ores, fossil fuels, and diamonds.

At any given point in time there are certain stocks or levels of both types of goods in nature. For the nonregenerative goods the total availability for use is determined, in the limit, by the total stock. Consumption of such goods always results in a depletion of stock, the rate of depletion being a direct function of the rate of consumption. Unless there is a complete recycling, consumption at any finite rate will, over time, result in total depletion. (It must be noted however that recycling requires expenditure of energy, a hitherto nonregenerative good, and thus cannot be continued indefinitely.)

In contrast to nonregenerative goods, regenerative goods may be used indefinitely— as long as the rate of consumption does not exceed the rate of regeneration. If the rate of consumption is greater than the latter however, the total stock will diminish. This will cause a positive feedback loop to be set up, and will result in a progressive lowering of the rate of regeneration and hence of the total stock. If the rate of consumption is lowered to become equal to or less than the rate of regeneration at any subsequent time, the (reduced level of) stock will then last indefinitely. It must be noted however that the Malthusian scenario assumes that the rate of consumption of regenerative goods exceeds their rate of regeneration.
the processes prior to consumption, organizations may be categorized as either suppliers or consumers with respect to a particular good: The former extract the good and supply it to consuming organizations, while the latter either consume it, or process the material and pass it on for consumption by other units.\textsuperscript{2,3}

Extraction is subject to the law of diminishing returns to scale, and assuming that technology remains constant, the cost of extraction (and hence price) increases with a decrease in stock. The process of extraction requires an investment in certain factors. An increase in the total demand for these factors causes their price to be bid up, resulting in an additional increase in the cost of the focal good. Either antecedent (i.e., reduction in supply of the good or increase in demand for a factor of production) results in a leftward shift of the supply curve. It may be noted that, in contrast to the demand for the factors of production, an increase in demand for the good (either due to increased consumption per unit or an increase in the total number of consumers) will cause the aggregate demand curve to shift to the right.

\textsuperscript{2}The above distinction corresponds in some ways to that made by Clark (1940) between primary and secondary industry. Organizations in the service or tertiary industry which consume matter-energy are included in the class of consuming organizations.

\textsuperscript{3}The suppliers concern themselves with the extraction of both nonregerative and regenerative goods. In either case they typically own or have access to a stock of raw material, e.g., mines, oil wells, timber, and deep-sea fishing, from which material can be extracted at various rates. It may be noted however that there are certain regenerative goods for which stocks do not exist in the sense that the word has been used so far. The suppliers own instead certain factors (e.g., land) into which the good is input in the form of "seed", which then grows, resulting in a stock of the good. Organizations in the agriculture, horticulture, pisciculture, and animal breeding industries are examples of the above. Depending upon the context, these may be treated either as consumers of seed, or suppliers of primary goods.
The leftward shift of the supply curve due to depletion of stock is subsumed under Malthus' (1798: p. 16) first natural cause: limits to the power of "production in the earth". The leftward shift of the supply curve due to increased demand for factors, as well as the rightward shift of the demand curve for the goods supplied, arise from his second natural cause: the power of "population". Using Malthusian terminology therefore these antecedents of scarcity will be called Natural causes.

Contrived Scarcity

The Natural causes for scarcity experienced by consuming organizations have been discussed above. Before some of the other antecedents of scarcity are studied however it is necessary to digress and define deficient and surplus geo-political systems.

Deficient and surplus systems

The total supply of a good within a particular geo-political system is the aggregation of the amount available at discrete locations in the system. Similarly, the total demand is the aggregation of the individual demands of the consuming organizations. The various sources of supply and demand are typically unevenly distributed. If the total supply is more than the total demand within a geo-political system, the system is defined as a surplus system; if the demand is more than the endogenous supply the system is then a deficient system.  

4 It may be noted that geo-political systems constitute one level of analysis, and their constituent organizations are at the next lower level. Deficient systems may thus experience absolute scarcity, causing organizations within the systems to experience relative scarcity.
Type I Antecedents

In order that organizations in deficient systems may survive it is necessary that the focal good is imported from a surplus system. It is assumed that during the nonscarcity steady state (i.e., the prior "normal" period) the total imports are equal to the gap between demand and endogenous supply. The polity of the surplus system may however intervene and order a reduction of imports, either due to domestic reasons or as political action against the deficient system. This will cause the latter to experience absolute scarcity. The deficient system may similarly cause imports to be reduced, again because of either political or economic reasons. The polity of either system may also affect supply by imposing a price ceiling on the produce of the supplying organizations—causing the latter to reduce supply to the level determined by the intersection of the supply curve and the imposed price.

It may be noted that the various interventions described above result in a reduction of the total supply, and that historical amounts of the particular good are no longer available at any price. The supply curve terminates, as it were, in a vertical line to the left of the original point of equilibrium. The pre- and post-intervention equilibria are presented in Figure 13. Interventions of the type discussed in the above paragraphs will be called Type I interventions.

Type II Antecedents

In contrast to the Type I antecedents of contrived scarcity

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5 The cross-system flow of goods may be reduced by either limiting the absolute quantity transferred or by manipulating the excise structure.
FIGURE 13

CONSEQUENCES OF INTERVENTION—1: REDUCTION IN THE TOTAL AMOUNT AVAILABLE TO THE GEO-POLITICAL SYSTEM

Price

aggregate supply curve after intervention

aggregate supply curve before intervention

aggregate demand curve

0 A B Quantity

OB Total quantity available before intervention

OA Total quantity available after intervention
described above, there is another type of intervention which may allow historical amounts of the good to be acquired at a **higher price**: The suppliers may, for example, arbitrarily increase their profit margin or price per unit. This will cause the supply curve to shift upwards (or left). If the consuming organizations are prepared to pay the higher price, the demand curve will, in effect, shift to the right, resulting in equilibrium at the original quantity of consumption. These shifts in the supply and demand curves are presented in Figure 14. Interventions which result in historical quantities being available at higher prices will be called Type II antecedents of scarcity.

It is possible that the demand curve may not shift far enough to the right, and that the new equilibrium quantity may be less than the original level. The probability of a post-intervention equilibrium at the historical level is, in fact, rather low. The extreme case above has been presented as an ideal type merely to facilitate distinction between two possible scenarios: where more (or the historical level) of the good is not available at any price; and where, provided additional revenue can be raised, a particular organization can buy as much as it needs (or used to consume).

**Effect on Consuming Organizations**

As noted above, the Type I antecedents of scarcity, if allowed to prevail, will inevitably result in absolute scarcity. The consequences of Natural and Type II interventions are not as obvious, and need to be examined in some detail:
There is no change in the total quantity purchased by the consuming organisations.
A leftward shift in the supply curve or a rightward shift in the aggregate demand function of the consuming organizations will cause an increase in unit price. A particular organization may either continue to expend earlier amounts of money and reduce inputs, or somehow generate additional revenue and thus maintain inflows at the historical level. If it adopts the former course, or if additional funds are obtained by re-allocation from other goods, the organization experiences relative scarcity (by definition). It is possible however that consuming organizations may be able to pass on all the extra expense to their buyers, with no consequent reduction in the intake of either essential or inessential goods. The increase in revenue will cause the aggregate demand curve of the consuming organizations to shift to the right, resulting in an equilibrium of the type described in Figure 14. In such a case the Natural and Type II antecedents do not necessarily result in scarcity for the consuming organizations.

The Individual as the Customer

Let us continue with the above argument: An increase in expense will cause the supply curve of the consuming organization to shift upwards (or left). This, in turn, will cause the aggregate supply curve of the product (produced by the focal as well as other organizations) to move up.

6 Funds may typically be transferred from inessential goods. When the amount of other essential goods consumed is more than the minimum required (according to the production function), money may also be diverted from the procurement of these goods.
The product is purchased by either individuals or the polity (social good). The aggregate demand curve for the former typically slopes to the left, and an upward shift of the supply curve will result in market equilibrium at a higher price/lower quantity. Unless the aggregate demand curve for the individuals moves far enough to the right to fully compensate for the shift in the supply curve, the total quantity sold will diminish. Reduced sales will, over time, result in reduction of the total intake of the focal good by the consuming organizations (in the aggregate). The particular geopolitical system will therefore experience absolute scarcity.

**Increased Demand**

It has been suggested above that organizations will experience scarcity unless the aggregate demand curve for their product shifts far enough to the right. Let us examine the antecedents of such a shift for an aggregation of individuals. The possible reasons are:

(i) A change in the preference hierarchy of the constituents i.e., an increased desire for the focal good;

(ii) An increase in the per capita income of the particular aggregation; and

(iii) An increase in the number of consumers.

It is possible that a change in tastes may be contemporaneous with a reduction in supply, such that demand may increase *inspite* of an

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7 If it is purchased by another organization, the latter becomes a consuming organization; and the argument may then be repeated till, finally, the product is purchased by either an individual or the polity. If it is totally consumed by an organization (i.e., does not constitute part of a finished product), then as long as the organization is able to pass on the increase in cost to its customers as part of the price of some of its other products, it will not experience scarcity.
increase in prices. The above contingency is relatively unlikely. It is possible however that demand may increase with price without a change in the preference hierarchy. The inferior goods of economics, e.g., oleo-margarine and potatoes (in Ireland in the 19th century) are a case in point (Ferguson, 1972: p. 69). The demand for certain status enhancing goods also increases, within limits, with price—the phenomenon of conspicuous consumption. Sales of some luxury cars increased in 1974, for example, inspite of a severe slump in the auto industry in general (Vancouver Sun, December 21, 1974: p. 2; February 9, 1975: p. 1). Expectations of a depression may also result in a temporary increase in consumption—a desire to "splurge while you can for tomorrow you die". See, for example, articles titled Revelry and Apprehension (Time, January 13, 1975: p. 6) and Doom Boom (Time, February 3, 1975: p. 48). The expectations pointed out above are however relatively few and/or transient in their nature; and it is reasonable to conclude that, in general, individuals do not increase their consumption of goods as a result of increase in prices.

With regard to the second point above (i.e., increase in per capita income), as long as the purchasing power of the customers increases enough to offset the increased cost of inputs, the consuming organizations will not experience scarcity. Here again there is no prior reason for an increase in cost to the consuming organization being associated with an increase in the income of the buyers. (Historically however the two have been contemporaneous in expanding economies. An increase in per capita income during the 60s in the USA, for example, correlated with increased per capita consumption of automobiles—notwithstanding increased cost of
Similarly, there is no reason to believe that an increase in prices will be associated with an increase in the number of consumers. The third possibility however presents an interesting paradox: While an increase in population results in an increase in consumption of natural resources, if there is no drop in per capita income however, increased aggregation may also prevent organizations from experiencing scarcity.

It may be noted that the last two points highlight an important challenge to technology: In order that organizations may avoid experiencing scarcity in the face of dwindling reserves of natural resources, technology must insure an increase in per capita income in real terms—even in the face of a possible increase in the focal population.

Technology may also be instrumental in preventing scarcity by (i) providing substitutes to the organization at comparable cost, or (ii) by not allowing the law of diminishing returns to prevail (by offsetting increase in cost of extraction by technological innovation).

It is important to note the difference in the two possible consequences of technological intervention. In the case of the interventions mentioned in this section, technology is instrumental in preventing a reduction of supply to the consuming organizations. In the instances pointed out in the earlier section however, technological intervention prevents the
organizations from experiencing scarcity as a consequence of reduction in supply.

The present study is concerned with the behavioural consequences of scarcity. While technology may intervene to delay or hasten the advent of scarcity, such intervention will not affect the arguments in the paper. Consequently all of the possible effects of technology (including changes in transformation, maintenance, and regulation technology) will be ignored in the ensuing analysis.

The Polity as the Customer

The purchase of the produce of a consuming organization by individuals has been discussed above. Let us now examine purchase by the polity. In contrast to the demand curve of individuals, the curve for the polity may be a vertical line—for certain goods within a particular price range. The demand curves for some of the products consumed by the Department of Defence and NASA, for example, tend towards zero elasticity. In such (relatively few) instances Natural and Type II antecedents may not, in the short run, result in the consuming organizations experiencing scarcity.

It may be noted that the vertical demand curves of the "money is of no concern" type of consumers do not imply an unusual type of indifference curves (i.e., different from those presented, e.g., in Figure 16, Appendix 3).

Technology may also intervene in a third way and directly affect the level of natural resources; causing them to increase as a consequence of innovation, or decrease as a result of its externalities: For example, development of improved seeds led to an increase in the world production of wheat—the Green Revolution (Friedman, 1973). The use of DDT on the other hand was responsible for, among other things, reduced reproduction among lake trout (Burdick et al., 1964).
The inelasticity arises rather from the fact that the resources available to them are not limited in the sense that they are for the individual or the typical organization. The polity, for example, may increase its revenue relatively easily by additional taxation or borrowing; and may thus absorb the increased cost passed on by the processing (i.e., consuming) organization. Since the increase in revenue must ultimately come from the individual and organizational constituents of the system, there are limits to the inelasticity of the demand curve of the polity. Thus, unless there is an increase in per capita real income, a leftward shift of the supply curve must result, in the long run, in the consuming organizations experiencing scarcity.

In summary then, a reduction in total availability (Type I antecedent) will inevitably result in absolute scarcity. A leftward shift of the supply curve (Natural and Type II antecedents) however will result in the consuming organizations experiencing scarcity in the long run if there is no corresponding increase in the real income of the ultimate consumers. It is possible however to reverse Type I antecedents and to avoid experiencing the consequences of Natural and Type II changes in the short run. Such reversal and short run avoidance strategies are examined in the next chapter.
CHAPTER 6

ABSOLUTE SCARCITY

The problem was defined in the previous chapter: the paper seeks to study the organizational consequences of reduced availability of matter-energy type of goods. The conditions under which such a reduction would result in absolute scarcity were also examined. Organizational responses to absolute scarcity will be analyzed in this chapter.

Organizational responses to scarcity may be broadly categorized as follows:

(i) Attempt to reverse (where possible) the antecedents of scarcity.

(ii) If reversal strategies are not successful, seek to avoid the consequences of the above adverse changes.

(iii) If avoidance is not possible, i.e., the organization is experiencing scarcity, strive to minimize the effects of scarcity.

As will become evident shortly, most of the strategies relevant to items (i) and (ii) above are extraorganizational in nature. In contrast, a majority of the responses designed to mitigate the effect of relative scarcity tend to be intraorganizational. The two must therefore be dealt with separately. Intraorganizational consequences of scarcity are examined in the next chapter. The various reversal and avoidance strategies are described below. In the interest of parsimony these strategies are presented in bare outline, and are illustrated with examples drawn from the current North American scene. Theoretical discussion of the implications of these strategies is reserved for the end of the chapter. Let us first
consider reversal strategies.

REVERSAL STRATEGIES

While Natural scarcity is the inevitable consequence of certain "natural" laws (see p. 73), contrived scarcity results instead from deliberate reflective action. Since such scarcity is "contrived" by definition, it is, at least in principle, reversible. Thus it is possible that powerful consuming organizations, or organizations of such organizations, may prevail upon the contrivers of scarcity to reverse their action. They may bring pressure upon those responsible by, for example, mobilizing public support, lobbying within the industry and the government, and by legislation. Some examples of contrived antecedents and illustrations of attempts at their reversal are presented below.

Type I: Reduction of Total Availability

A ceiling on the price that may be charged by the supplying organization may cause it to limit supplies.

It is argued, for example, that the present price ceiling is discouraging producers of domestic oil and natural gas from further exploration, and is therefore causing them to limit supplies. There is pressure upon the U.S. Administration to withdraw this ceiling (Time, November 18, 1974: p. 85).

Organizations may discontinue marginal products and services.

Railroads and buslines, for example, may sometimes discontinue (or threaten to withdraw) certain marginal services. This is expected to result in

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1 It was pointed out in the previous chapter that unless there is an increase in the level of natural resources it is not possible to reverse the antecedents of Natural scarcity. Technological intervention may result in an increase in the stock of natural resources. But since technology is assumed to be constant, the antecedents of Natural scarcity are irreversible.
scarcity for the commuters. Organizations of consumers or the polity typically either pressure the suppliers into continuing with the service (Perrow, 1970: pp. 101-112) or subsidize them.

Excessive exports of goods may result in the domestic market experiencing scarcity.

Under such circumstances attempts are made to limit exports, or at least insure that adequate amounts are available within the system. Increase in domestic prices, for example, resulted in President Ford ordering a reduction in the export of wheat to Russia in 1974.2

Type II: Increase in Price

Organizations may sometimes arbitrarily increase prices.

Some of the larger steel firms, e.g., U.S. Steel, had recently posted increases in prices which were causing their consumers to experience scarcity. Responding to lobbying, President Ford jawboned these firms into rolling back their prices.

The above list of antecedents (and relevant examples) is not meant to be exhaustive; but has been presented merely to illustrate the possibility of reversal of contrived antecedents of absolute scarcity. Assuming however that reversal is not possible, the operating problem for the focal organization then becomes:

how to insure that it does not experience the consequences of the various antecedents, i.e., does not experience relative scarcity.

Scarcity results in certain costs for the focal organization. Avoidance of the consequences of scarcity will involve a transfer of these costs to other elements of the environment. It is submitted that (A.1) an organization would rather penalize the

2Craig Pinder provided this example.
'guilty' than the innocent party. It follows that it would seek to impose costs on the contrivers of scarcity rather than any other element. Thus, other things being equal

(B.1) an organization will prefer reversal rather than avoidance strategies.

Strategies aimed at avoidance of the consequences of absolute scarcity will be used only when the reversal strategies have failed. Some avoidance strategies are discussed below.

AVOIDANCE STRATEGIES

The various avoidance strategies can be broadly categorized into (i) those which seek to reduce the uncertainty of inflows, and (ii) those which are aimed at avoiding reduction in the quantity of inputs. For reasons explained below the former strategies will not be examined in detail. Discussion will focus instead on the latter avoidance strategies.

Reduction of Uncertainty

Uncertainty reduction strategies have been discussed by, among others, Hanna, Kizilbash, and Smart (1975), Meitz and Castlēman (1975), and Moncza and Fearon (1974); their prescriptions are summarized below. In order to avoid uncertainty regarding procurement of materials

3 Certain primitive notions will be introduced in the course of the discussion in this chapter. These will be used as foundational statements on which the subsequent argument will be based. No attempt will be made however to provide any argument in support of these assertive statements. Such statements will be numbered A.1, A.2, ... Conclusions derived from these primitives or other arguments will be presented in the form of propositions and will be numbered B.1, B.2, ... Since a particular proposition may be determined simultaneously by several variables, no attempt will be made to maintain a correspondence between the As and Bs.
organizations are required to (in brief):

1. Improve the "image" of the company, thus causing the suppliers to want to do business with it.

2. Insure availability through volume buying, long-term contracts, or vertical integration.

3. Assist vendors in supplying by providing financial, technical, and managerial assistance.

4. Where mutual interdependence can be established, enter into barter or "reciprocity" agreements.

5. Equalize power relative to the supplier through joint purchase action (i.e., several consuming organizations may pool their needs) or by developing alternative sources of supply.

6. Require the customers to provide the raw material or obtain a price protection agreement.

The above strategies of reduction of uncertainty regarding availability of material are important for the survival of the firm, and may become critical in the context of scarcity. These are however traditional and do not present novel theoretical implications. This line of inquiry will therefore not be pursued. It will be assumed for the purpose of this chapter that the organization has reasonable information in the short run about how much input to expect. Discussion will focus instead on strategies which seek to prevent a reduction in the total quantity of inflows.

Avoidance of Reduction in Inputs

It was pointed out in Chapter 5 that unless there is an increase in the real income (or product) of the consuming population, any of the antecedents of scarcity will result, in the long run, in the geo-political system experiencing absolute scarcity. One of the outputs of most organi-
izations is a contribution to national product. An increase in such contributions however requires greater throughput and/or increased efficiency. The former possibility is ruled out by the very fact of scarcity. And as long as organizational and other technologies are held constant (see p. 81), the particular group of consuming organizations cannot increase their contribution to national product. Thus, for the purpose of the present paper, absolute scarcity cannot be avoided in the long run by action by the affected organizations. Possible strategies of avoidance of the consequences of Natural and contrived antecedents in the short run are discussed below.

Relative scarcity has been defined as that which causes a reduction in slack, diminution of size, or, in the limit, failure. In order to successfully avoid experiencing relative scarcity therefore, an organization must neither permit reduction in intake, nor allow its reserve of uncommitted resources to be depleted. In other words the organization must

(i) continue to buy the same amount of the good at the historic price.

(ii) If the price increase is unavoidable, buy historical amounts at a higher price, but arrange to pass on the increased cost to others.

(iii) If it is forced to absorb higher costs, the organization must renegotiate the price of other goods so as to offset the increase in the price of the focal good.

It is possible that other organizations may increase their contribution to the natural product (if they are not experiencing scarcity) and thus counter the effect of absolute scarcity. Barring pressure from the polity however, it is unlikely that these other organizations will increase their contribution at the behest of the afflicted organizations, solely to alleviate problems of the latter. The possibility is therefore being ignored.
(iv) If none of the above are possible, the organization must attempt to reduce expenses which do not result in the acquisition and consumption of private goods.

The various response strategies are explained and illustrated below. Again, no attempt has been made to be exhaustive.

Buy at the Historic Price

A reduction in supply will cause the price of the good to be bid up. The supply curve will in effect shift to the left. The price at equilibrium is obtained by the intersection of the aggregate supply and demand curves. If, by forcing other consuming organizations to reduce intake, the focal organization can arrange for a compensatory leftward shift of the aggregate demand curve, then the price will be bid down. (E.g., there is pressure upon utilities to charge higher rates from the big consumers of electricity so that smaller consumers are not penalized. *Time*, February 24, 1975: p. 24) It may thus be possible to obtain a pre-intervention market price even after a reduction in supply. The shifts in the supply and demand curves are presented in Figure 15. It may be noted that this strategy results in penalizing other organizations which are competing for the focal input.

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5 See Appendix 2 for the distinction between private and public goods.

6 It is assumed that, unlike the "runaway shops" in the garment industry which used to relocate to avoid paying higher wages (Carpenter, 1972: p. 547-51), the organization cannot escape from the geo-political system. That is, it must "stay home and fight the 'in-law' battle" (Thompson, 1967: p. 30).

7 Traditional strategies, e.g., increasing the market and/or reducing competition within the geo-political system are being ignored; these are commonly applied in the context of abundance as well. The strategies discussed here are relevant, in principle, to environmental abundance. It is believed however that they are more suited to, and will find greater application in scarcity.
FIGURE 15
REDUCTION IN AGGREGATE DEMAND CORRESPONDING TO A REDUCTION IN SUPPLY

There is no change in market price (the total quantity transacted is however reduced)
An organization may use the following strategies to successfully impose higher prices on its individual or organizational customers or the general public:

1. Enter into cost-plus contracts with its customers or otherwise legitimize increase in prices.

E.g., in some of the Department of Defence contracts, profit is based on a percentage of expected costs (Goodhue, 1972: p. 97). To help the utilities with their financing difficulties, regulatory commissions in many states allowed increases in fuel costs to be passed on directly to customers (Time, February 24, 1975: p. 24).

2. Arrange for subsidies or other financial assistance for the ultimate consumer.

E.g., the U.A.W. requested the Canadian government for lower government subsidized interest rates for car buyers (Time, January 20, 1975). This strategy is also subsumed in Henry Ford II's lobbying for a 10% tax cut in 1975 for individuals making $25,000 or less (Time, February 10, 1975: p. 49).

Since the consumer is subsidized the penalty is spread across the larger set of tax-payers. Thus the customer has to bear only part of the increase in cost. Assuming that the population of consumers is a fraction of the total population, the increase in cost to the individual will be negligible. For the purpose of the present argument therefore it will be assumed that (i) the individual customer is not penalized at all and that (ii) the cost is borne wholly by the residual set of tax-payers.

3. Reduce competition by imposition of tariffs and quotas.

E.g., the Canadian Textile and Clothing Board has recently introduced some quotas on South Korean and Japanese imports (Time, February 24, 1975: p. 7). The Jones Act specifies that only ships flying the U.S. flag can haul cargo between U.S. ports (Time, October 7, 1974: p. 34).
4. Costs may be passed on directly to the residual set of tax-payers (i.e., without involving the customer in the transaction) by arranging for subsidies or "easy" loans to cover increase in costs.

E.g., Pan Am's fuel bill increased by $194 million in 1974 (Time, March 3, 1975: p. 20), causing it to apply for a subsidy. Farmers want relief in the form of emergency loans to offset increases in feed prices (Time, November 18, 1974: p. 79). If the insurance rates or wages go up in the shipping industry, the government pays the bill (Perrow, 1970: p. 157).

Renegotiate Prices

It is possible that under scarcity, an organization may be able to obtain other essential goods at lower prices, and resultant savings used to offset the increase in cost of the focal good.

For example, labour contracts may be negotiated with the labour and management both taking wage and salary cuts. Hugh Hefner of Playboy Enterprises has recently taken a 25% pay cut in response to scarcity experienced by his organization (Time, February 10, 1975: p. 55). Henle (1973) reports six instances of employees accepting lower wage rates under similar circumstances. Because of widespread scarcity Prime Minister Trudeau suggested that "everyone will have to accept a slightly reduced salary ..." (Time, February 10, 1975: p. 8).

It may be noted that in all these instances the costs are borne by organizational personnel.

Instead of a direct reduction in raw material prices, suppliers may sometimes assist consuming organizations by facilitating purchase of the higher priced finished good.

E.g., some suppliers of automotive parts are paying rebates to their employees for buying new cars (Time, February 3, 1975: p. 15B).
Elimination of Other Outflows

Organizations sometimes incur cash outflows which are not part of a typical exchange transaction. That is, they pay out money, e.g., in the form of taxes, without receiving any private good in return. Any public good consumed cannot be directly linked with a particular outflow, and services are not expected to be withdrawn if payment is avoided legally. If such expenses can be curtailed, the organization will not experience relative scarcity: The savings can be diverted towards purchase of the focal good; also, there is no reduction in the consumption of the public good.

Pressure for reduction of such outflows is reflected in the following examples:

The Canadian government recently announced $100 million worth of tax write-offs for corporations (Time, February 3, 1975: p. 4). The U.S. Government is considering a lower corporate income tax rate (Time, January 20, 1975: p. 14). A strip mining bill passed by the U.S. House and the Senate was to have extracted fees from coal companies to restore the surface torn up by strip miners. President Ford vetoed the bill because it would have "hampered domestic coal production" (Time, January 13, 1975: p. 54).

Use of the above strategies results in penalizing the tax-payers.

DISCUSSION

Possible strategies for reversal of absolute scarcity and avoidance of relative scarcity were presented above and illustrated briefly. The illustrations used were drawn from varied contexts and were deliberately chosen to illustrate certain characteristics of organizational behaviour. Some of these characteristics are discussed below.
Commercial and Political Strategies

None of the strategies mentioned above are, in principle, exclusive to scarcity. They can all be, and have been, used under abundance. (Indeed, it is possible that particular organizations are operating in an environment of abundance because they have successfully used these strategies.) Similarly, the strategies traditional to abundance continue to remain relevant under scarcity. The two are not meant to be mutually exclusive, but rather to supplement each other. There are however certain patterned variations in the choice between the "abundance" strategies and those illustrated above.

It may be noted that the strategies traditional to abundance are "commercial" in nature. That is, they tend to be limited to marketing, production, financial, and other strategies of like nature. These strategies have a strong disciplinary base, and enjoy a firm foundation both in theory and in real life. They are taught in schools of business and are widely known and used. They constitute, in effect, the guiding values of lower and middle management, and to some extent, of top management. And, what is important, they have been historically successful in exploiting the environment.

In contrast to the commercial strategies, the various reversal and avoidance strategies described above tend to be political in nature.  

It may be argued that cost-plus contracts and renegotiation of wages are more commercial than political in nature. It may be pointed out however that cost-plus contracts are more characteristic of wartime, i.e., operation under a predominantly political climate where the usual (commercial) criteria of organizational efficiency become almost irrelevant (Katz and Kahn, 1966: p. 168). Any management or union official involved in the downward renegotiation of wage and incentive agreements will vouch that the proceedings are more political than commercial.
In contrast to the above, the political strategies relevant to the business world do not have a firm disciplinary base, and are not taught in conventional schools of business. Knowledge of the relevance of these strategies is generally acquired through experience at the top management or institutional levels. Political strategies do not, by definition, constitute the guiding values of the world of commerce and are not used extensively.

To reiterate, commercial strategies are well known and have been successful in the past. In contrast, political strategies are not as well known and have found little application. According to the rule of biased search (Cyert and March, 1963: pp. 121-2) therefore, the problem or the environment is perceived in "commercial" terms; and as long as they are successful, the former strategies are preferred over political strategies.

There are a few exceptions however. Perrow (1970: pp. 154-155), for example, points out that Consolidated Edison of New York, the nation's largest gas and electricity utility, has historically used a political strategy in preference to commercial strategies. He explains however that by training and tradition Con Ed officials have developed a political bias, and that they perceive the environment in political terms. It follows then, that as long as they are successful, Con Ed will continue to prefer political over commercial strategies. It is emphasized however that this is an exception to general patterns of behaviour.

To summarize, then, organizations have historically tended to use only one set of strategies to respond to environmental contingencies.
In the case of business organizations these strategies have typically been commercial in nature.

All strategies are however subject to the law of diminishing returns. Because of depletion of natural resources and/or increase of population, there is less slack in the environment. Any single set of strategies are thus no longer sufficient to insure adequate returns to organizational effort. It is submitted that

(A.2) The transition from an organizational experience of abundance to the possibility of relative scarcity is an indicator of the exhaustion of the potential of historical strategies.

In order to survive in the context of scarcity therefore, organizations must supplement traditional strategies. In other words, in order to avoid experiencing relative scarcity,

(B.2) business organizations will increasingly adopt political strategies to supplement existing commercial strategies.

It follows that

(B.3) the institutional subsystems (Parsons, 1960) will increasingly supplant the managerial as the leading subsystem. 10,11

9 In sad confirmation of the rule of simple-minded search (Cyert and March, 1963: p. 121) however, organizations persist in using traditional responses (see, e.g., Perrow, 1970: Ch. 5) — sometimes even to the point of extinction.

10 Thelen (1960) uses the concept of leading system to designate "a component system whose output exerts the greatest influence on the inputs of other systems, and through this, controls the interaction of the suprasystem."

11 Even though they may all be essential the various subsystems are not equipotential in their influence or the total system. It has been observed, for example, that during abundance "a coordinating (managerial) system ... (tends to be) permanently leading" (Katz and Kahn, 1966: p. 63).
Preference Among the Political Strategies

It has been suggested above that political strategies as a set are expected to be increasingly used under scarcity. Criteria for establishing an order of preference among these strategies will be introduced in this section. Prescriptions regarding choice of strategies will also be made.

In the context of scarcity, the world is a shrinking-sum (or at best, a zero-sum) game. Thus any advantage accrued to the focal organization must be offset by at least an equivalent disadvantage to another organization or sector of society. It may be noted however that different elements of the environment possess varying degrees of slack. Thus they vary in their ability to absorb disadvantages. Also, these elements vary in their "distance" from the focal organization. That is, the cause-effect chains linking organizational action to punitive consequences for these elements vary in their length.

It is submitted that, other things being equal,

(A.3) organizations will prefer strategies which redound against elements which possess more rather than less slack, and are

(A.4) distant rather than near.

Also

(A.5) organizational personnel, the set of individual customers, and the residual set of tax-payers may be ranked in that order as possessing increasing amounts of slack (largely because of increasing size) and increasing distance from the organization.
It follows from application of the slack and distance criteria that, in order to avoid scarcity,

(B.4) organizations will prefer to impose costs on tax-payers rather than customers, and
(B.5) customers rather than organizational personnel.

In other words, organizations will prefer to obtain subsidies, public loans, and tax write-offs rather than force higher costs on the customers or, what is least desirable, renegotiate wages. If the customers can be subsidized for their purchase however, the penalty is transferred to the residual set of tax-payers. The organization will then be "indifferent" between tax write-offs, etc., on the one hand and passing on higher costs (to the tax-payer through the customer) on the other hand.

It is believed that

(A.6) the residual set of tax-payers possess more slack and are also more distant than any particular organization in the organization set.

It follows that, other things being equal

(B.6) the focal organization will seek action against the tax-payer rather than any particular organization in the organization set.

It is suggested that when there is absolute scarcity in the geo-political system, all organizations consuming the focal good will feel the pinch. Thus, other things being equal, organizations which compete for the particular good (i.e., similar organizations) will have less slack than compared to those which supply other essential goods or consume the organizational output. That is,

(A.7) dissimilar organizations will have more slack than the similar organizations.

It follows from application of the slack criterion that

(B.7) the focal organization will seek to penalize
the supplying or customer rather than competing organizations.

In other words, the organization will negotiate lower prices for the other essential goods or charge higher prices for its output rather than attempt to force other similar organizations to reduce intake of the focal good.

Because of the supplier-customer relationship however it is suggested that

(A.8) the focal organization is relatively "close" to its suppliers on the one hand and customer organizations on the other hand. In contrast, it is relatively distant from other similar organizations.

It follows from application of the distance criterion that

(B.8) the focal organization will seek action against competitors rather than dissimilar organizations.

It may be noted that, under the foregoing assumptions, the distance rule results in a preference order which is the reverse of that obtained by application of the slack rule. As explained below however, these two rules will remain in conflict only in the short run.

The slack available with an organization may change over time. The focal organization will however always remain closer to the dissimilar organizations than similar organizations. Application of the slack criterion (as well as environmental scarcity) will result in reduction of slack available with similar organizations. When slack across the two sets of organizations is balanced (or, in the extreme, totally eliminated) the slack rule will cease to operate. The distance rule will then be used
to choose from among the various political strategies. Thus conflict
between the two rules is expected only in the earlier stages of scarcity.
In other words, the organization has a choice in the beginning. To
express it in yet another way, the organization is permitted the luxury
of equifinality before the scarcity becomes severe.

Let us summarize the foregoing. In an attempt to avoid the
consequences of absolute scarcity, the focal organization may seek to
pass on costs to any of the following elements:

(i) aggregations of individuals: organizational personnel,
    individual customers, and the residual set of tax-payers.

(ii) organizations: similar or competing organizations, and
dissimilar or supplying/customer organizations.

These elements are rank ordered according to the slack and distance
rules in Table I.

It may be noted that in all cases the focal organization will
prefer to pass on the costs of scarcity to the tax-payers rather than
any of the other elements. Thus

(B.9) the organization will prefer strategies which
result in (i) subsidies for their individual
 customers (in the form of, e.g., easy loans or
 lower tax rates) and/or (ii) easy loans, subsidies,
tax write-offs, and/or lower tax rates for them-
selves, over any of the other political strategies.

It may also be noted that second in the overall order of
preference,

(B.10a) the organization will prefer in the long run to
penalize similar rather than dissimilar organizations.

That is, it will prefer, for example, vertical integration rather than
TABLE I

RANK ORDER OF ELEMENTS ACCORDING TO THE SLACK AND DISTANCE RULES

<table>
<thead>
<tr>
<th>Decision rule</th>
<th>Slack or Distance</th>
<th>Distance</th>
<th>Slack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order of preference</td>
<td>Residual set of tax-payers</td>
<td>Residual set of tax-payers</td>
<td>Residual set of tax-payers</td>
</tr>
<tr>
<td>High Preference</td>
<td>Individual consumers</td>
<td>Similar organizations</td>
<td>Dissimilar(^1) organizations</td>
</tr>
<tr>
<td>Low Preference</td>
<td>Organizational employees</td>
<td>Dissimilar organizations</td>
<td>Similar Organizations</td>
</tr>
</tbody>
</table>

\(^1\)This rank order is expected to be temporary. In the long run the order will be reversed, and similar organizations will be preferred over dissimilar organizations.
cooperating with other similar organizations to (negotiate lower prices for inputs or fix higher prices for customers).

Interorganizational Posture

But the preferred strategy above results in accrual of benefits to all the consuming organizations (or the entire industry) at the expense of the tax-payer. Thus it subsumes a pressure for cooperation among similar organizations. The remaining strategies, in contrast, require the focal organization to compete with other similar organizations, especially in the long run. Following from the preference order above therefore, it is suggested that, in the context of scarcity, organizations will prefer cooperative over competitive strategies. (Thus the possible short run conflict between the slack and distance criteria will be preempted by the overarching necessity to cooperate.)

In the previous chapter it was pointed out that all of the antecedents of scarcity will, in the long run, result in the geo-political system experiencing absolute scarcity. It must therefore be realized that the cooperative strategies of scarcity avoidance can be expected to succeed in the short run only. (There are limits to the slack available with the tax-payer.) Unless it is possible to reverse the antecedents of scarcity, horizontal coalitions (i.e., coalitions of similar organizations) are bound to be unstable. Thus organizations will, in the long run, be forced to adopt a competitive posture. As the pie continues to shrink, the strategies vis-a-vis similar organizations will tend towards those characteristics of "So Long Sucker" (Rapoport, 1970: Ch. 18), a game in which coalitions are perceived to be and are indeed unstable.
It may be noted that the foregoing prescription for competition in the long run is reinforced by that obtained by using the distance criterion. It will be argued later that scarcity contains, rather paradoxically, several drives for growth. Increase in size is however antithetical to the requirement of cooperation among similar organizations. Also, there is a qualitative difference between interdependence among similar organizations on the one hand and dissimilar organizations on the other hand: Aid in the latter case is expected to improve the chances of survival of the donor. In the former case however it might imperil the aid-granting organization itself. All the foregoing thus constitute an overwhelming argument in support of proposition B.10a (which may be restated as follows):

(B.10b) Organizations prefer competitive over cooperative strategies in the long run.

It is suggested that by observing interorganizational behaviour it is possible to identify organizational perceptions of the duration and severity of scarcity: The norms of cooperation within competition indicate historical abundance (or perhaps, mild and temporary scarcity). In his investigation of industrial corporations Perrow (1970), for example "repeatedly found that short-term competitive advantages were not seized... (even though) competition did seem to be quite strong" (pp. 124-125). "Dog eat dog" behaviour on the other hand is indicative of severe and long run scarcity. To illustrate: "If there were one hundred people and there was food for ten, and ninety of these hundred had to die, then I would make mighty (expletive) sure that I would not be one of those ninety, and I'm quite sure that my morals and ethics
and so on would change (emphasis added) very radically to fit the jungle situation" (Maslow, 1965: pp. 70-71).

It has been argued above that in order to survive in the long run organizations must compete with other similar organizations. In order to do so successfully however they must cooperate with other dissimilar organizations: Competitors pose constraints and contingencies for the focal organization. The organization subject to rationality norms will thus seek power over remaining sections of its task environment (Thompson, 1967: p. 36). That is, in order that it may act without regard for the actions of other similar organizations (p. 31), the focal organization will seek to obtain power with respect to dissimilar organizations. However, acquisition of unilateral power is not easy.

The relevant dissimilar organizations are also typically faced with constraints and contingencies, and seek power. These latter organizations may obtain power through cooperating with other similar (to them) organizations. If however there are no such organizations (as in the case of, e.g., a monopoly, or a quasi-independent community or city) or cooperation is not possible (these organizations too may be facing scarcity), then they will seek power with respect to dissimilar (to them) organizations. Once again, it will not be easy to obtain unilateral power.

Power can however be obtained through interdependence. The greater the interdependence the greater the total power. Since the focal organization can compete successfully with other similar organizations only by obtaining power relative to dissimilar organizations, it follows that
the long run competitive strategies contain a built-in drive towards greater interdependence with dissimilar organizations.\textsuperscript{12,13}

(If the dissimilar organizations do not need to cooperate, however, the prior probability of survival of the focal organization will be considerably lowered.)

**Power**

The task environment of the focal organization can be conceptualized as an "organization set" (Evan, 1966), with each organization being assigned a particular role or roles. While interdependence facilitates performance of the various roles, it also increases the potential for disruption of the role of one organization by another; and the greater the interdependence, the greater is the potential for disruption. Since power varies as the degree of interdependence, it is suggested that

**Definition:** the greater the potential for disruption of the role performance of a particular organization by another, the greater the potential power of the latter over the former.

Katz and Eisenstadt (1960) and Parsons and Bales (1955) have developed a similar definition: power flows through a disruptive potential. Katz and Eisenstadt identified the disruptive potential—a power phenomenon in the context of socialization of immigrants by Israeli bureaucrats, while Parson and Bales did so in parent-child relationships. The present definition is different from theirs however in that it stresses that the

\textsuperscript{12} As argued in the next section, even if there are no competitors, e.g., in the case of a monopoly, the organization will, in the context of scarcity, seek to establish interdependence.

\textsuperscript{13} This corresponds to the observation by Emery and Trist: "turbulent organizations require some relationship between dissimilar organizations whose fates are basically, positively correlated" (1965: p. 29).
potential for power, and not power, varies with the potential for disruption. Let us examine the significance of this difference.

It is necessary to distinguish between two types of potential for disruption: (i) a potential which can be realized by purposive behaviour, and (ii) potential which cannot be realized through deliberate action. As instances of the former, an organization may, e.g., prevail upon suppliers to absorb certain costs (Perrow, 1970: pp. 122-123) or obtain monopoly profits from consumers. Exploitation of this type is permitted by society. The second possibility is developed and illustrated in the following paragraphs:

In addition to its suppliers and customers, an organization is also interrelated with the community (Blau and Scott, 1962: p. 199; Perrow, 1970: pp. 131-2).

Organizational strains may thus be transmitted to the surrounding community. "The community itself can become socially disorganized as a result of tension within the industry or plant" (Berelson and Steiner, 1964: p. 617). Because of recession in the automotive industry, for example, 3 out of 4 workers in Chicago may be idle (Time, October 28, 1974: p. 71). Oshawa, in Canada, "is like a ghost town when G.M. lays off" (Time, January 20, 1975: p. 8). Apathy, anomie, and crime may be some of the social consequences of organizational strain.

Organizations thus enjoy certain power with respect to communities because of their disruptive potential for the latter.¹⁴

¹⁴ The social benefits of continuation of organizational activity do not appear on its balance sheet. There has been some stress lately for the organization to absorb some of the hidden costs—the externalities—of doing business (see, e.g., Hardin, 1968). It is suggested that there is corresponding justification for the firm to formally recognize and enjoy its hidden benefits.
It is suggested however that, in contrast to power over other organizations, power over the community cannot be exercised deliberately. While manipulation of other organizations is permissible, there are severe moral and social sanctions against deliberate exploitation of the community—specially when organizational action is expected to result in disruption of the social fabric.

Even though an organization may not be able to blackmail the community into cooperation, it is possible however to realize its potential power over the latter under certain special circumstances: While unable to secure an advantage by threatening to disrupt the community unless it concedes to organizational demands, the organization may consciously exercise its potential for disruption if it can establish that it is not doing so deliberately. That is,

\[(B.12)\text{ an organization can obtain support from the community (or other elements in the organization set) when, and only when, it can convince the latter that it has no desire to disrupt it, but is helpless in the face of circumstances.}^{15}\]

The community may come to the aid of an organization which is unable to survive through its own efforts. This help may take many forms:

"Unions, employees, municipalities, customers, and suppliers may (for example) band together to try to save a firm that is in trouble in order to protect the income or services that it has provided them. Collectively they may make major attempts through the state and federal government to promote legislative, administrative, or judicial actions that will help the firm to survive." (Dill, 1965: p. 1094)

\[15\text{ Just as society may impose inefficiencies upon organizations under emergencies, e.g., war, organizations too may subject the community to inefficiencies in times of stress, e.g., scarcity.}\]
The board of education in San Francisco, for example, was constrained to eliminate certain sports in some schools because of financial difficulties. The local parents and businessmen reacted to the possible disruption by raising $71,200 in private donations to rescue the teams (Time, March 3, 1975: p. 22).

The subsidies enjoyed by shipping, air, and agriculture industries are examples of aid by the polity to avoid social disruption.

It has been pointed out that there are two types of potential for disruption; and the type that concerns us here cannot be exercised deliberately, but may be realized if helplessness can be established. The distinction between the potential for disruption and the probability of realization is important. While the former varies with organizational size and interdependence, the latter is a function of the inability of the organization to survive without help from others. The greater the helplessness, the greater is the likelihood that the organization can mobilize support from the community; or, in other words,

\[(B.13) \text{the possibility of exercise of power increases with organizational helplessness.}\]

Emerson (1962) points out that "dependence can be seen as the obverse of power" (Thompson, 1967: p. 30). That is, the less dependent an organization is upon others in its organization set, the more power it enjoys relative to them. To express it differently, the less dependent the organization, the greater is the likelihood that it can get the others to do what they would not do otherwise. This relation-

16 To illustrate: (i) Consider the request for a glass of water in the middle of the night by a sick spouse or a small child. The greater the helplessness of the patient or the child to help themselves, the greater is the likelihood that the partner or the parent will respond to the need. (ii) The greater the possibility that a swimmer is truly drowning, rather than playing a prank, the greater is the likelihood that the lifeguard will come to his aid. (iii) It has been the experience of many Christians that the more dependent they are on God, the more "power" they enjoy over him, i.e., the more responsive He is to their prayer (see, e.g., Murray, 1965).
ship is true of the first type of potential for disruption.

Helplessness in the face of environmental scarcity however implies that the organization is now increasingly dependent upon the community and the polity for survival. Under normal circumstances exchange among members of the organization set is based upon an ongoing quid pro quo. When failure is threatened however, they may respond in manners they would not otherwise. But this is the definition of power: "A has power over B to the extent that he can get B to do something B would not do otherwise" (Dahl, 1957: pp. 202-3). Thus in the case of the second type of potential, given a certain potential for disruption,

(B.14) the more dependent the organization is upon others, the more power it enjoys over them. 

It is necessary however to qualify the above observation. It has been argued that when a particular organization is experiencing scarcity, there is increased likelihood of another member of its organization set coming to its aid. This "willingness" to aid must however be distinguished from the ability to help. The total aid is necessarily limited to less than or equal to organizational slack. If the "donor" organization is itself experiencing scarcity, it will be unable to help. Power of the focal organization over another is therefore inversely related to the degree of scarcity experienced by the latter. If all the

While the above argument has been developed using the community as the member which comes to the aid of the distressed organization, others in the organization set, e.g., suppliers may also help the focal organization in order to avoid the disruptive consequences of the latter's failure. Grant's, for example, one of the big chains which market consumer goods in the USA, is currently experiencing a scarcity of resources. Its creditors are cooperating by deferring loan payments. "Not only Grant's is at stake: were the chain to collapse, many of the 8,000 or so firms that supply it would topple as well" (Time, January 27, 1975: p.68). Similarly suppliers to the auto industry are offering subsidies and sweeteners to employees who buy new cars (Time, February 3, 1975: p. 15B). It is emphasized however that such help is less likely to materialize when there is little chance of the donee's failure.
members of the organization set are experiencing scarcity, organizations have little disruptive power over each other. (They continue to have disruptive potential however. The foregoing is therefore another argument for the need to distinguish between the potential for disruption and the ability to exercise it.)

Two types of potential for disruption have been identified: (i) a potential which can be realized through purposive behaviour, and (ii) potential which cannot be realized through exploitative action. The former can be exercised both during abundance as well as under scarcity. As argued above the latter type, while relevant in principle across both abundance and scarcity, can be realized only in the context of scarcity. It follows that

\[(B.15) \text{ an organization can exercise greater power over those with whom it is interdependent during scarcity than during abundance.}\]

Summary

Let us summarize the foregoing discussion of power. The following definition was introduced:

The greater the potential for disruption of the role performance of a particular organization by another, the greater the potential power of the latter over the former.

Two types of potential for disruption were identified.

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18 Power has been traditionally equated in OT with the ability to cope with uncertainty. See, e.g., Hickson, et al. (in Scott and Cummings, 1973: pp. 540-550) for treatment of intraorganizational power, and Thompson (1967: p. 34) for interorganizational power. It is believed (and the section on Power is cited as evidence for the belief) that the certainty-power conceptualization cannot do proper justice to the ramifications of interorganizational power in the context of scarcity.
(i) a potential which can be realized through purposive behaviour, and

(ii) a potential which cannot be exercised in a similar fashion, i.e., realized through deliberate exploitative action.

The underlying concept and the implications of the second type of potential were developed in detail. It was pointed out that this potential can be realized only when the focal organization is helpless in the face of circumstances, and that the possibility of exercise of power increases with organizational helplessness.

According to the traditional definition of power, i.e., that based upon the first type of potential,

the less dependent an organization is upon others, the more power it enjoys relative to them.

Arguing from the second type of potential however, it was pointed out that

the more dependent an organization is upon others, the more power it enjoys relative to them.

It was suggested that the latter potential can be realized only during scarcity. It follows that

an organization can exercise greater power over those with whom it is interdependent during scarcity than during abundance.

Size and Interdependence

It was pointed out above that in order to avoid experiencing relative scarcity, organizations will (i) seek power over (ii) dissimilar
organizations. Other things being equal, power varies with size and interdependence. In their attempt to insure long run survival therefore, organizations under norms of rationality will seek

(B.16) growth, and

(B.17) greater interdependence with dissimilar members of the organization set.

In addition to the reason identified above, scarcity, rather paradoxically, contains several other drives for growth. It has been noted, for instance, that large size is associated with ease of acquisition of supplies, and may be either a cause or effect. Setting up subsidiaries, for example, reduces fluctuations and unpredictability of raw materials (Katz and Kahn, 1966: p. 92); the large purchaser exercises considerable power over the smaller supplier (Perrow, 1970: pp. 122-123); and the small firm experiences difficulty in obtaining supplies (Burns and Stalker, 1961: p. 70). Starbuck (1965: pp. 463-4) discusses other reasons why larger organizations may better survive both a depression (low availability) as well as environmental fluctuations (in supply). It is suggested that this pressure for growth has major implications for the structure of the market:

If the antecedents of scarcity cannot be reversed and cooperative strategies fail, the geo-political system will no longer be able to sustain the historical level of organizational activity. The total volume of business will therefore be reduced. Other things being equal, it is expected that the smaller firms will
be the first to fail under scarcity.  

Partly due to the low survival potential of the smaller firms, and partly due to the drive for growth among the survivors, (B.18) the market will be characterized by a relatively small number of large firms, which are highly interdependent with other dissimilar elements within the geo-political system.

If the degree of availability of natural resources stabilizes at a particular (low) level the various competing organizations will constitute an ultra-stable system (Ashby, 1960). A further increase in scarcity will however strain the oligopoly. The organizations then have the following options: (i) continue to compete till one or more fail (allowing the others to then operate under relative abundance), or (ii) divest and merge.

But the surviving organizations are relatively large organizations, highly interdependent with the other elements in the task environment. Failure of any of these giants is therefore expected to have serious repurcussions on the role performance of the other interlinked dissimilar elements, and is expected to seriously disrupt the socio-economic system. Divestment and merger is however not expected to produce shock waves of such intensity. In order to minimize the adverse consequences of worsening scarcity therefore, it is suggested that there will be external pressure

Some of the many reasons for higher probability of failure of small organizations derived from the foregoing discussion are: (i) less slack in absolute terms and hence low capacity to absorb environmental contingencies, (ii) less power and hence less likelihood of receiving any benefit from the slack of other organizations, and (iii) low ability to control the environment. For other reasons see Crum (1953), Mansfield (1962), Osborn (1951), Starbuck (1965), and Steindl (1945).
upon the oligopolistic organizations to merge. Thus in contrast to the negative social values associated with monopoly during abundance, it is suggested that

(B.19) under scarcity there will be a social preference for monopolistic rather than oligopolistic markets. 20

A Note on Interdependence

Environmental abundance has in the past resulted in economic growth. Growth, in turn, results both directly and indirectly in increased complexity and interdependence: According to Stogdill, for example "temperate lands provide enough food and materials to support large, complex and densely populated societies" (1971: p. 41). Where materials were not available in abundance there has been little or no growth: "In Arctic lands (for example) only small, loosely organized bands have been able to find the food, clothing, and materials necessary for survival" --p. 41). Both Emery and Trist (1965) and Terreberry (1968) have noted the evolution of environments from a low degree of interdependence to turbulent fields, and have identified economic growth as a primary antecedent. Thus historically (i.e., during abundance) there has been a positive causal correlation between the degree of availability of material and interorganizational symbiosis.

While growth and consequent interdependence were triggered by, among other things, environmental abundance, it is suggested that interorganizational symbiosis has now acquired a life and momentum of its own.

20 It may be noted that the foregoing external pressure for merger is independent of and different from the pressure for increased size under norms of rationality referred to in footnote 19 and discussed earlier in this section.
The phenomenon of interdependence has been dislinked from material abundance, and there is no reason to believe that as natural resources diminish the turbulent fields will revert to lower evolutionary stages. In fact, as argued in the foregoing section, the imperatives of survival under scarcity will result in

\[(B.20) \text{a negative causal correlation between the availability of material and interorganizational symbiosis.}\]

That is, the lower the degree of availability the higher will be the degree of interdependence.

Summary

Various extraorganizational strategies have been described in this chapter: It was suggested that organizations will respond to scarcity by attempting first to reverse its antecedents. Failing this they will, through cooperative strategies, seek to avoid the consequences of scarcity. It was pointed out however that such strategies are expected to succeed in the short run only. In the long run therefore organizations will seek to avoid, through competitive strategies, the consequences of absolute scarcity.

Avoidance of relative scarcity is facilitated by increased power over dissimilar organizations. Other things being equal, organizational power, i.e., potential for disruption, varies with size and the degree of interdependence with dissimilar organizations. It was suggested therefore

\[\text{21 Only a nuclear holocaust or a Club of Rome type of doom (or a catastrophe of similar proportions) is expected to "wipe out" interorganizational interdependence (along with most of society). Under these circumstances the economy will have to start from square one--with minimal or no potential for future growth.}\]
that competitive survival strategies contain a built-in drive for greater size and interdependence.

Absolute scarcity will result in reduction of the total level of activity in the geo-political system. It was argued that, other things being equal, this reduction will result in extinction of the smaller organizations. The pressures for interdependence and growth, along with the demise of the smaller organizations, will result in an ultra-stable oligopoly. Failure of any of these surviving giants is expected to seriously disrupt the social fabric. It was suggested therefore that expectations of progressive scarcity will result in a social preference for monopolistic rather than oligopolistic markets.

In the process of developing and discussing the various reversal and avoidance strategies, it was possible to identify certain characteristics of scarcity which are distinct from those under abundance. These are summarized in Table II and are contrasted across scarcity on the one hand and abundance on the other.

If the strategies described in this chapter do not succeed the organization will, by definition, experience relative scarcity. Intra-organizational responses to such scarcity will be studied in the next chapter.
## TABLE II
DIFFERENCES BETWEEN ABUNDANCE AND SCARCITY

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abundance</th>
<th>Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equifinality</strong></td>
<td>More (organisations have a choice)</td>
<td>Less (little or no choice)</td>
</tr>
<tr>
<td>Amount of equifinality</td>
<td>Commercial or (rarely) political</td>
<td>Commercial and political</td>
</tr>
<tr>
<td>1. Perception of the organizational environment</td>
<td>Commercial or (rarely) political</td>
<td>Commercial and political</td>
</tr>
<tr>
<td>(i.e., problem defined as )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>commercial or political</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Extraorganizational strategies</td>
<td>Commercial or (rarely) political</td>
<td>Commercial and political</td>
</tr>
<tr>
<td>3. Rank order of importance between commercial and</td>
<td>Commercial or (rarely) political</td>
<td></td>
</tr>
<tr>
<td>political strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Commercial</td>
<td>i. Political</td>
<td></td>
</tr>
<tr>
<td>ii. Political</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Interorganizational posture</td>
<td>Competitive or cooperative</td>
<td>Short run: cooperative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long run: competitive</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional/preferred definition</td>
<td>i. Certainty ➞ power</td>
<td>Potential for disruption ➞ potential for power</td>
</tr>
<tr>
<td></td>
<td>ii. Potential for disruption ➞ power</td>
<td></td>
</tr>
<tr>
<td><strong>Amount of power</strong></td>
<td>Low: limited to that which can be realised</td>
<td>High: that which can be realised through</td>
</tr>
<tr>
<td></td>
<td>through purposive behavior only</td>
<td>purposive behavior plus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>that which cannot be realised through</td>
</tr>
<tr>
<td></td>
<td></td>
<td>deliberate action</td>
</tr>
<tr>
<td><strong>Power-dependence association</strong></td>
<td>Negative: power increases with independence</td>
<td>Positive: power increases with dependence</td>
</tr>
</tbody>
</table>
TABLE II (cont'd.)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abundance</th>
<th>Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market</strong></td>
<td>Nearer to the classical competitive market</td>
<td>Oligopolistic: relatively small number of large organizations. In the extreme, monopolistic</td>
</tr>
<tr>
<td>Type of competition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social perception of monopolies</td>
<td>Disfavoured</td>
<td>Preferred</td>
</tr>
<tr>
<td><strong>Interdependence</strong></td>
<td>Less</td>
<td>More</td>
</tr>
<tr>
<td>The degree of interdependence subsumed in the drive for survival</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Direction of causal correlation between the availability of supplies and inter-organisational interdependence</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>Against growth</td>
<td>For growth (monopoly)</td>
</tr>
<tr>
<td>External pressure</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Predilection for growth subsumed in the drive for survival</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td>Managerial</td>
<td>Institutional</td>
</tr>
<tr>
<td>Leading subsystem</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 7
RELATIVE SCARCITY

Organizational responses to absolute scarcity were described in the previous chapter. That is, strategies aimed at reversal of antecedents or avoidance of consequences of scarcity were examined. It was suggested that if an organization was unsuccessful in this endeavour it would, by definition, experience relative scarcity. Relative scarcity has various consequences for organizational behaviour. Some of these will be examined in this chapter.

Relative scarcity has been defined (Ch. 3) as that which causes an organization to

(i) take up slack, or
(ii) divest, and reduce in size, or
(iii) fail.

It will be assumed that the organization in question possesses slack. The first consequence of relative scarcity therefore will be reduction in this slack. A study of the intraorganizational consequences of scarcity should therefore properly begin with analysis of the ramifications of slack reduction.

Slack

It is important to distinguish among the following phenomena in the consumption of matter-energy type of goods: (i) the price paid, (ii) the amount bought, (iii) the amount utilized, and (iv) the installed capacity for utilization. Organizational inefficiencies may arise because: (a) The quantity utilized is less than that required to maximize returns on capital invested. E.g., a processing plant may be run at half capacity.
(b) The amount utilized may be less than the quantity purchased. I.e., there may be wastage. And (c) the price paid may be inflated due to e.g., imperfections in the factor market.

Corresponding to the above it is possible to distinguish among the following phenomena relating to membership of the organizational coalition: (i) the resources or price paid, (ii) the members' demands, (iii) their contributions, and (iv) the installed capacity for utilization of the members' contributions. Again, inefficiencies may arise because: (a) The total contributions do not exhaust the potential of the invested capital, e.g., a hospital manned by a skeleton staff, (b) The demands may exceed their contributions, e.g., in the case of feather-bedding by unions. And (c) the resources paid may be in excess of demands, e.g., executives are provided with services and personal luxuries in excess of those required to keep them.

Inefficiencies of the type (a) above will (in both cases) be called investment inefficiencies. Similarly, those of types (b) and (c) will be called utilization and payment inefficiencies respectively.

Slack was defined in the economic model of resource allocation (p. 47) as expenditure on inessential goods. It was suggested that even though such goods were not essential for organizational continuity, they had a nonzero utility of consumption for the ruling coalition. Thus as long as the organization had resources in excess of those required to insure complete investment efficiency, it would enhance utility by purchasing inessentials.
The formal economic model permitted only one outlet for excess resources: consumption of inessential goods. It is now suggested that in addition to acquisition of inessentials, excess resources may be used to develop and sustain (though not always deliberately) utilization and payment inefficiencies with respect to essential goods.¹

Cyert and March (1963) present the following examples of payment inefficiencies:

"stockholders are paid dividends in excess of those required to keep stockholders (or banks—sic) within the organization; prices are set lower than necessary to maintain adequate income from buyers; wages in excess of those required to maintain labour are paid; executives are provided with services and personal luxuries in excess of those required to keep them; subunits are allowed to grow without real concern for the relation between additional payments and additional revenue; (and) public services are provided in excess of those required" (p. 37).

Caught in a resource squeeze an organization may discover a hitherto unknown utilization inefficiency. Reder (1947) reports, for example, that after losses of about fifty million dollars for the first three quarters of 1946, the Ford Motor Company "announced that it had found methods of reducing operating costs (for a given volume of output) by about twenty million dollars per year." Cyert and March (1963: p. 242, n. 18) report two other cases of utilization inefficiency: While the organizations under reference were presumably aware of the existence of excess staff the matter was ignored; utilization efficiency was improved (staff was fired) only when the organizations were forced to respond to scarcity.

¹Members of the ruling coalition contribute different types of expertise. Inasmuch as this knowhow is essential for the survival of the firm, it is an essential good. Since a particular member may be replaced by another (or a computer) with similar expertise, the individual himself cannot be classified as essential.
Baumol (1959) documents an instance of deliberate acquisition of utilization inefficiency: The management of a particular firm realized that the profit which it was going to show in its forthcoming annual report would be unusually large. Hastily, an office modernization program was launched with the objective of "bringing the year's earnings into line and avoid spoiling the stockholders" (p. 90).

In order to facilitate study of the intraorganizational consequences of scarcity therefore, the definition of slack will be enlarged to include expenditure on sustenance of

(i) utilization inefficiencies with regard to essential goods, and

(ii) payment efficiencies with regard to essential goods, as well as expenditure on

(iii) acquisition of inessential goods.²

It has been observed that abundance is conducive to acquisition of slack. Average costs, for example, rise with organizational success (Cyert and March, 1963: pp. 38, 90)—utilization inefficiency; similarly, when the rate of improvement in the environment outruns the upward adjustment of aspirations, there is increase in organizational slack (Cyert and March, 1963: p. 37)—payment inefficiency. Conversely, environmental scarcity will result in taking up of slack. Organizational responses to scarcity however differ with differences in expectations regarding the future availability of inputs:

²It may be noted that the Cyert and March (1963) definition of slack is limited to payment inefficiencies with respect to members of coalitions only: "slack consists in payments to members of the coalition in excess of what is required to maintain the organization (i.e., meet their demands)" (p. 36).
Reduction in the availability of the essential good can take place along one of three basic modes:

(i) The supply may be reduced and then after some time increase again to its pre-intervention level (or there about):

(ii) it may diminish and then stabilize at a low level (but not so low as to cause failure); and

(iii) it may continue to shrink till the organization fails.

The organization will experience relative scarcity (by definition) under mode (i) as long as the supply is under a particular threshold, and will continue to do so under mode (iii) as long as it survives. While reduction in supply will cause the organization to take up slack—whether under mode (i), (ii), or (iii)—it is suggested that expectations of the prevalence of the various modes will have important implications for the organizational response to scarcity. Behaviour under each mode will therefore be studied separately.

MODE (i)

(Temporary reduction in supply)

In Chapter 5 it was pointed out that the various antecedents of scarcity could be divided into two groups: those which resulted in a definite reduction of availability within the geo-political system—Type I antecedents, and those where historical amounts could still be made available at a higher cost—Natural and Type II antecedents. While at least one (or more) organization(s) would be forced to reduce intake in the former instance, there is no prior reason why a particular organization may not strive to maintain consumption as usual. Thus, irrespective of
the type of antecedent, as long as it can raise enough funds, an organization need not experience scarcity. Assuming that, at least in the present North American culture, an organization would rather "contain" (i.e., maintain historic levels of activity) than shrink, the operational problem under mode (i) is: shortage of financial resources.

Because of the expectations associated with mode (i) the various responses to scarcity are expected to be of a "temporary" nature. The organization will, for example, attempt to borrow money to tide over a transient squeeze. If it is not possible to raise additional resources in the short run however, it will attempt to reduce (i) utilization inefficiencies, (ii) payment inefficiencies, or (iii) intake. As explained below, no attempt will be made to reduce investment inefficiencies.

Reduction of investment inefficiencies involves one of two things: (i) increased intake of essential goods, or (ii) divestment of excess capacity. The former alternative is infeasible because of shortage of funds. Idle capacity does not represent an ongoing cash outflow, and hence does not contribute to the operational problem. Expectations of future abundance do not justify divestment of machinery and plant (and the necessary concomitant reorganizational expenses). It is suggested therefore that under mode (i)

(C.1) organizations will not attempt to reduce investment inefficiencies.  

As pointed out in Chapter 6, footnote 3, the letters C.1, C.2, ... will be used to number the propositions describing organizational behaviour under mode (i) scarcity. Similarly, letters D.1, D.2, ... will be used to number propositions relating to strategies in response to mode (ii) scarcity; letters E.1, E.2, ... will be used to number propositions which are relevant to survival under mode (iii) scarcity. The sequence of letters A.10, A.11, ... (continued from Chapter 6) will identify logical primitives, i.e., statements which stand unsupported in the body of the paper but are used as foundational premises for some of the prescriptive material.
The strategies used to reduce utilization inefficiencies are discussed below.

**Utilization Inefficiency**

A major reduction in utilization inefficiencies requires, among other things, an increase in individual productivity. It has been generally observed that utilization efficiency of personnel is lowest in the technical core (e.g., through feather-bedding, foot dragging, and other entrenched low productive labour practices) and in the bureaucratic sections of an organization. Production norms in the technical core are typically established after detailed investigation by industrial engineers and prolonged negotiation between labour and management. Any appreciable increase in productivity would thus require intensive renegotiation along with additional investment in and reorganization of the plant. It has been observed that production in bureaucracies drops to and then continues at the minimum acceptable level (March and Simon, 1958: p. 44). An appreciable increase in productivity would therefore require conversion to a non-bureaucratic structure.

Reduction of the utilization inefficiency, whether of the technical core or in the bureaucratic sections, will therefore require restructuring of the organization. But "a change of internal structure (is perceived) as a threat" (Katz and Kahn, 1966: pp. 92-93), and such action would not be justified by the expectations of transience of the scarcity. It is suggested therefore that under mode (i)

(C.2) concerted remedial action will not be directed at the major bases of personnel utilization inefficiency.
Assuming that potential exists, an attempt at substantial reduction in the utilization inefficiency of material will also require reorganization and structural change. But such changes will be avoided. Thus under mode (i) expectations

(C.3) there will be only marginal reduction in the utilization inefficiency of material goods within the organization.

It also follows that since any search which might result in a prescription for reorganization will be precluded under mode (i),

(C.4) search for solution of the utilization efficiency problem (for both men and material) will tend to be local, routine, and nonintensive.

Payment Inefficiency

Goods

Prices of goods are typically determined by market forces. If the focal organization is a monopoly, or if it is part of an oligopoly which is acting in collusion, it may be able to prevail upon its suppliers to obtain lower prices. But such cooperative strategies have already been discussed in Chapter 6. Also, it has been assumed for the purpose of the present chapter that such strategies have failed.

The organization may attempt to use its interdependence with the supplier as a leverage to obtain lower prices. It is suggested however that the expectations of transience will be shared by the supplier also. Hence the latter will not expect the potential for disruption caused by failure of the former to be realized. Under mode (i) therefore,
(C.5) the focal organization will have little or no power over its supplier.

Assuming that payment inefficiencies exist, it follows that

(C.6) a single organization (acting alone) will not be able to obtain a lower price for its material inputs.

(It may at best succeed in negotiating deferred payment or other similar relaxations. But these are subsumed in organizational attempts to "borrow money", etc.—see beginning of the section.)

Personnel

Cyert and March (1963: p. 37) suggest that those in a position of power tend to accumulate more slack. The managerial subsystem is the leading subsystem under abundance (Katz and Kahn, 1960: p. 63; Cyert and March, 1963: pp. 240-241). Because they control the "strategic contingencies" (Hickson, et al., 1971) the managers enjoy relatively high power. It follows that they possess most slack. Because they are powerful however, it is relatively more difficult to get them to surrender the excess. It is suggested therefore that under mode (i)

(C.7) the organization will limit itself to negotiating concessions from the relatively "weak" members, i.e., the nonmanagerial personnel.

For example, recession's first victims are always at the lower end of the labour pyramid: the blue-collar worker, office-staff, and sales help. (Time, February 17, 1975: p. 34).

Reduction in payment inefficiencies to nonmanagerial personnel may take two forms: (i) those with long range implications, and (ii) "one point in time" action with no implications for the future. The former would involve, for example, reducing wage rates, while the latter would
be limited to e.g., deferment of pay raises. It is suggested that

(A.10) scarcity under mode (i) will be associated with relatively low levels of anxiety.

Also, if the phenomenon is truly temporary and local, there will be relatively little pressure on the employees to lower aspiration levels. Consequently the personnel will be resistant to any reduction which has long range implications. It is suggested therefore that under mode (i)

(C.8) organizational attempts at improvement of payment efficiencies will be limited to one point in time actions, such as curtailment of yearly bonus or paid vacations, etc.

When scarcity is widespread (i.e., there is a dearth of alternative employment opportunities) but is expected to be temporary, employees may volunteer to go on shorter work-hours to avoid layoffs.

See, e.g., action by employees of the Star-News (Time, February 10, 1975: p. 55) and similar (unsuccessful) attempts by workers of MacMillan Bloedel (Vancouver Sun, January 18, 1975: p. 4). The labour union at Kelsey-Hayes Canada Limited voted for a three-week month for similar reasons (Vancouver Sun, January 18, 1975: p. 4).

While helping the workers, such action is not expected to result in any reduction of company cash outflows. It is suggested however, that where a climate such as the above prevails, the organization is in a better position to obtain one point in time concessions from its employees than otherwise.

Slichter, Healy, and Livernash (1960), in a survey of employee behaviour under conditions of general abundance, observed that whenever scarcity resulted in a particular organization having to reduce its payroll,
unions typically preferred lay-offs to reduced hours. The examples in the foregoing paragraph drawn from an environment of relatively widespread scarcity indicate a reversal of preference. It is suggested therefore that

\[(C.9)\quad \text{union preference between lay-offs and reduced hours is an index of the degree of localization of scarcity.}\]

Local solutions to the problem of utilization inefficiency of material, along with one point in time action to reduce payment inefficiencies of personnel, may together suffice to alleviate scarcity. If these strategies are unsuccessful however, the organization will have to reduce consumption.

Reduced Consumption

Under norms of rationality an organization experiencing scarcity will dispense with expenditure on inessential goods. The distinction between the two types of goods is objective and is based on organizational purpose. A majority of the expenses are either clearly essential, e.g., purchase of steel for an automobile factory, or clearly inessential, e.g., donations to charity. Organizational resources are however expended on a variety of goods, e.g., training programs, where the distinction is not obvious.

It has been observed that there is typically considerable variance between the personal goals of members and subunits on the one hand and the organizational purpose on the other hand (Cyert and March, 1963). The distinction between the organizational purpose and personal goals tends to be lost during abundance. The deviant goals, by definition,

\[\text{Craig-Pinder brought this to my notice.}\]
involve consumption of inessential rather than essential goods. It follows that during abundance there is a further loss of distinction between the nonobvious essential and inessential goods.

Because of the low level of anxiety associated with mode (i) scarcity, there is little pressure to objectively distinguish among the nonobvious category of goods. It is suggested that instead of attempting to identify inessential goods and discontinuing consumption, organizations will use the following decision rules to reduce expenditure under mode (i):

(C.10) organizations will

(i) discontinue consumption which results in (obviously) low rather than high return;

(ii) discontinue consumption which constitutes more rather than less of a drain on working capital;

(iii) discontinue consumption where the return is difficult rather than easy to measure;

(iv) discontinue consumption where resumption is expected to cost less rather than more;

(v) discontinue consumption which disturbs the existing structure less rather than more; and

(vi) discontinue consumption which serves the nonorganizational goals of members with low rather than high power.

Rules (i) and (ii) are rather obvious and will not be commented upon. Rule (iii) will result in priority to, e.g., elimination of training programs and curtailment of R & D types of activity. Under rule (iv) preference will be given to laying off of unskilled workers. Skilled trades, e.g., welders, will be retained however, even though they represent more of a drain on working capital; since they enjoy a high demand
elsewhere, they will be difficult to re-hire. The popularity of across
the board budget slashes is evidence of operation of rule (v). Such a
reduction serves two purposes: (a) there is minimal disturbance of the
power structure: and (b) where the reduction is not excessive, it is not
necessary to restructure the flow of activities. Application of rule (vi)
results in preference for elimination of activities like the salesmen's
convention rather than a "business" trip for the president.

Resources obtained by reducing consumption/elimination of goods
according to the above rules may then be diverted to purchase of the focal
good (or goods). If adequate quantities of the latter good can now be
acquired, the operational problem of insufficient resources is resolved.
The focal good may now be consumed in historical amounts, or at a slightly
reduced rate to correspond to other reductions in intake.

It is possible however that the organization is still unable
to purchase sufficient quantities of the particular good, resulting in
reduced output. It is suggested that because of expectations of transience
of scarcity, the organization will seek to retain its customers. Under
mode (i) scarcity therefore

(C.11) the organization will ration its output
and allocate it among its several customers.

Reduced output poses contingencies for the customers. Thus

(C.12) the focal organization will enjoy a potential
for disruption or potential power relative to
its customers.

It follows that under mode (i) scarcity the organization will
be able to secure advantages from its customers, thus enabling it to
resolve, in part, the operational problem of shortage of financial resources. It is suggested however that this power is expected to be short-lived, and that abundance will result in loss of power. It is believed that, in order to avoid retaliatory action during abundance, the focal organization will not exploit its customers. Thus under mode (i) (C.13) the organization will not realize all of the potential for disruption or potential power relative to its customers.

Drastic Measures

The strategies of reduction of inefficiency and consumption described above are relatively mild. If marginal reduction in inefficiency and consumption fails to resolve the problem, the organization will be forced into a major curtailment of activities. Extensive restructuring will be avoided however. In addition to posing a psychological threat, restructuring requires a major cash outlay. Change in structure is thus expected to compound the cash problem. Also, since the scarcity is expected to be only temporary, the organization will have to incur another major expenditure to revert to the original structure when the situation is normalized. It is submitted that the organization will seek to avoid this double penalty.

To summarize, even if marginal remedies fail to alleviate scarcity (i.e., generate enough financial resources) and it is necessary to resort to drastic measures, under mode (i) (C.14) organizations will avoid extensive restructuring to reduce consumption.
Rather than undertake extensive restructuring to reduce consumption, it is suggested that under mode (i)

(C.15) an organization will temporarily close down one or more of its structurally independent units.

Instead of reorganizing in response to the present scarcity, for example, Chrysler planned temporary closure of three of its six car plants and one of two truck plants (Vancouver Sun, January 11, 1975: p. 8). These units are, by definition, functionally autonomous and are also typically decentralized. Their closure is thus not expected to disrupt the activity of the rest of the organization. Also there is no special penalty associated with resumption of activity by these units.

In case the above is not successful, or the organization does not have any structurally independent units, it will be forced to reorganize. Alternatively, it will actively seek to be acquired by another firm. While the preference between the two is by no means clear, it is suggested that the hope of a more viable future will encourage the organization to retain its identity. In other words, other things being equal, under mode (i)

(C.16) an organization will prefer extensive reorganization to being taken over by another firm.

If both strategies fail however, the organization will be forced to close down.

Organizational responses to a scarcity that is expected to be short-lived have been discussed above. The various strategies described tend to be coping strategies seeking temporary solutions, and are only
marginally different from those used during periods of nonscarcity. These are summarized and contrasted with those used under mode (ii) in Table III (pp. 153-5).

MODE (ii)

(Reduction in supply permanent but not enough to cause failure)

It was mentioned earlier that under mode (ii) the organization expects the availability of the focal good to diminish considerably and then stabilize at a relatively low level. It is believed that the expectation of permanent contingencies posed by the environment will cause the organization to undertake a thorough reassessment of both itself and the environment. It will be assumed for the purpose of this section that, as a result of this reassessment, the organization will decide to retain its original mission in its essence; and that its over all character and identity will remain unchanged. In other words, the focal good will continue to remain essential. Given this general constraint, some of the intraorganizational changes in response to mode (ii) scarcity are described below.

Under mode (ii) availability is expected to stabilize at a sub-historic level. In contrast to mode (i) therefore behaviour under mode (ii) is expected to be adaptive and, if necessary, radically different from that in the past. It follows that under the latter mode

(D.1) search behaviour will be general or global rather than local, nonroutine rather than

---

5 It is also assumed that there is no basic change in the values of the organizational personnel—withstanding the various anxieties associated with operation under mode (ii). In other words, employees will continue to react to organizational demands for, e.g., cooperation and obedience, in near historical ways.
routine, and intensive rather than nonintensive.

While adaptive responses will include reduction of both internal inefficiencies and consumption, it is suggested that these will be drastic and will involve change of structure. Thus while the operating problem in the case of mode (i) was shortage of cash, in this case it will be: reorganization to function at a particular low level of activity. The initial discussion focuses on reorganization for reduction of consumption.

**Reduce Consumption**

It was noted under mode (i) that the organization will tend to discontinue consumption of inessential goods—inasmuch as goods can be clearly identified as being inessential, and that this can be done without structural change. Inessential goods will be discontinued under mode (ii) too. But there will be a basic difference in the selection and weeding out process.

Under mode (i) identification tended to be based upon the nature of the good itself. In the latter mode, in contrast, identification will be based rather on the relationship of the good with the goal it is intended to serve. Thus, for example, the subsidized canteens in the tire as well as the accessories plants of an automobile factory may be discontinued during an austerity drive under mode (i). Under mode (ii) however the subsidized canteen in the tire plant may be considered to be inessential along with the whole plant. The canteen in the accessories plant may, on the other hand, be classified as essential.
When the scarcity was expected to be short-lived the criteria used to determine discontinuation tended to be relatively superficial and subjective. **Expectations of a permanent scarcity will however result in use of more objective criteria** and the abandonment decision is expected to be taken after an intensive and in-depth search involving organizational goals.

**Goals**

An organization may be conceptualized as a coalition of individuals and subgroups who may have substantially different preference orderings (Cyert and March, 1963: p. 27). Organizational goals are a subset of the totality of these individual goals, and are derived by bargaining among members of the coalition. Agreement over goals is however typically not complete. Some goals are recognized as "explicit objectives" (March and Simon; 1958: p. 126) and are said to be "essential, continuous, and operative" (Cyert and March, 1963: p. 117). There is "considerable disagreement and uncertainty" (Cyert and March, 1963: p. 28) about other goals however. These latter tend to reflect more the idiosyncratic preferences of individuals and subgroups and contribute only marginally to the organizational purpose. The organization thus is "a coalition having a series of more or less independent goals imperfectly rationalized in terms of more general goals" (Cyert and March, 1963: p. 78; emphases added). The goals that are not central to the organizational purpose will be called "nonessential" goals.

It has been observed that
"Organizations functioning in a benign environment can satisfy their explicit objectives with less than a complete expenditure of organizational 'energy'. As a result, a substantial portion of the activities in the organization is directed towards satisfying individual or subgroup goals" (March and Simon, 1958: p. 126).

In other words, surplus resources are used to service the nonessential goals.

"When resources are relatively unlimited, organizations need not resolve the relative merits of subgroup claims. Thus, these claims and rationalizations for them tend not to be challenged" (March and Simon, 1958: p. 126). This has two consequences: (i) All the members of the coalition are not aware of all the organizational goals, and (ii) objective criteria are not used to choose among investment alternatives (see, e.g., Cyert and March, 1963: pp. 48-54). Thus the various subunits are not aware of each other's financial commitments; and investment decisions, for example, are made on the basis of "suitably powerful support within the organization" (Cyert and March, 1963: p. 79) rather than after, say, a cost-benefit analysis.

To summarize: during nonscarcity the organization typically spends money on many activities which are

(i) not central to the organizational purpose and, since all participants are not aware of these activities,

(ii) do not have the concurrence of all the members of the coalition, and

(iii) are not necessarily justified even in terms of opportunity foregone.
The following changes are expected to take place under mode (ii) scarcity: The proponents of various nonessential goals will have to compete for resources on more objective grounds. In the process of defending them therefore, the goals will become more sharply defined. Also, a greater proportion of the coalition will become aware of the existence of such goals. Under mode (ii) the organization expects a reduced intake of the focal good. Thus the output and resultant revenue is also expected to be reduced. It will therefore no longer be possible to service the historical level of marginal or nonessential goals. Thus depending upon the expected level of essential activity, some of the latter goals will be discontinued. It follows then that under mode (ii) scarcity

\[ \text{(D.2)} \text{ an organization will have a narrower set of better defined and more internally consistent goals.} \]

Thus even though "organizational goals cannot normally (i.e., during abundance) be described in terms of a joint preference ordering" (Cyert and March, 1963: p. 28), it is suggested that under scarcity they will more nearly resemble a Guttman-type scale.

It has been noted earlier that some of these goals represent demands of particular members of the coalition. But "demands adjust to actual payments and alternatives external to the organization" (Cyert and March, 1963: p. 36). Adjustment may take place either by withdrawal of individuals from the coalition or by retraction of the demands. Since their demands are not expected to be met in the future, and assuming that

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It will be argued later that survival under scarcity will require tighter internal control. This "need for control and coordination (also) creates a strain toward greater goal consensus" (Downs, 1967: p. 263).
the environment presents other investment opportunities, it is suggested that some members will withdraw from the coalition. Thus it is possible that under mode (ii)

(D.3) the ruling coalition will be smaller.

Also, because of withdrawal of nonessential demands,

(D.4) the ruling coalition will be better identified with the residual set of goals.

It follows that, as compared to operation under abundance, under mode (ii) scarcity

(D.5) there will be a higher potential for exercise of referrent power.

Demarketing

Reduced consumption and elimination of certain organizational goals will be operationalized in, among other things, (i) abandonment of certain products and (ii) divestment of surplus machinery and plant. The second possibility will be discussed in a later section.

It has been observed that during abundance organizations seek to market a complete product line (Kotler, 1967). In contrast"one of the responses to the current shortage economy has been for companies to prune their product lines with the idea of maximizing profits by making the most efficient use of materials and energy. The result is that lower-profit-margin products are dropped in favour of those offering higher margins.

General Electric Co., for instance, has dropped blenders, fans, heaters, humidifiers and vacuum cleaners. Shell Chemical Co. has reported
dropping production of styrene butadiene rubber, isoprene rubber and fertilizers.

Due to this product reduction drive, some marketing experts see American businesses moving away from full-line product concepts that emphasized sales rather than profits" (McLean, 1974: p. 38). To express the foregoing in formal terms: In order to reduce material consumption in the long run, under mode (ii)

(D.6) organizations will produce historic quantities of the more profitable goods rather than reduced quantities of its total product line.

Abandonment of products will require, among other things, a reprogramming of consumer expectations, requiring them to be satisfied with less than more. It follows that under mode (ii) scarcity, instead of applying the marketing strategies traditional to abundance,

(D.7) organizations will seek to "demarket" their products.\(^7\)

\(^7\) Demarketing has been defined by Kotler and Levy (1971) as "that aspect of marketing that deals with discouraging customers in general or a certain class of customers in particular on either a temporary or permanent basis." (p.75) McGuire (1974) documents the experience of some utilities with demarketing. "From the standpoint of directing, motivating and utilizing their salesmen, energy firms find themselves in an unusual bind. As one utility company executive observes, 'It is interesting sport to convert salesmen of long standing from avid 'sellers' of our product to avid 'discouragers' of the use of our products.' The vice-president of another utility says, 'We've reached the ludicrous situation where the more effective 'selling' job we do, the lower our net revenues will be.'

Overall, utilities have undergone some radical shifts in sales manpower and its deployment. A few report having made these and other changes long before the current crisis hit. One Western utility executive explains: 'In anticipation of this event [i.e., the current shortage], two and a half years ago we began a complete reversal of our marketing efforts. We ceased all promotional activities and began intensive conservation-of-energy campaigns. This effort has resulted in halving our rate growth... We suspect that our growth rate will be reduced to zero, or maybe even reversed.' This firm has now cut its sales force to one-third its previous size and retrained the survivors to carry out missionary programs stressing the conservation of energy." (p. 7)
It has been argued above that reduced consumption will involve reassessment of organizational goals; and many activities involving major outflows will be eliminated. It is possible that discontinuation of these inessential or marginally relevant activities will bring the residual activities to the desired level. Thus, the various penalties associated with reduction in size notwithstanding, it may not be necessary for the organization to reduce payment and utilization inefficiencies. But since elimination of goals will require reorganization anyhow, it is suggested that under norms of rationality

\[(D.8) \quad \text{the firm will take advantage of the re-organization and force a restructuring to reduce utilization and payment inefficiencies.}\]

The necessity of having to force the change may not be immediately apparent. It is suggested that even when inefficiencies are obvious organizations hesitate to take corrective action. For example:

"In many cases firms do finally perform the radical surgery involved in cutting out an unprofitable line of territory but this usually occurs after much heart-searching and delay" (Baumol, 1959: p5 48).

Continuing in the same vein, Levitt (1974) suggests that the sales force is more amenable to pruning of "yesterday's winners" during scarcity than otherwise. Also,

"New things introduced into any organization require a certain amount of internal sell. The dislocations created when the old norms are bypassed offer an ideal opportunity for the introduction of new ideas and new attitudes. That is the time, for example, to get R & D support for reengineering products to achieve improved economy and perhaps reduced (though still acceptable) specifications; for altering manufacturing methods in ways that in other times might have been unacceptable either to the engineering department or the union;"

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Likert (1967) notes however that organizations may sometimes overrespond in their zeal for elimination and payment inefficiencies. (Gordon Walter brought this to my notice.)
for new sales and reporting procedures that were otherwise anathema--indeed for trimming a variety of costly operations and procedures which prosperity previously allowed to proliferate" (p. 7: emphasis added).

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Payment Inefficiencies

Goods

The various essential inputs can be divided into two categories: (i) the focal input which is scarce, and (ii) those which are not. Reorganization will result in reduced consumption of both types of goods.

The supplier of the scarce good enjoys a certain power over the consuming organization, and the latter will not be able to negotiate a lower price. Thus it will not be possible to eliminate payment inefficiencies of the focal good. (This also follows from the definition of scarcity.)

Suppliers of the nonscarce goods will themselves experience a "demand" scarcity as a result of reduced sales. If it is assumed that the mode (ii) scarcity is widespread (i.e., not just localized to the focal organization) then the demand scarcity experienced by the supplying organizations will be compounded by similar quantity cutbacks by other consuming organizations. Because of scarcity the suppliers are expected to possess little slack. It is suggested therefore that under mode (ii) scarcity

(D.9) the focal organization will be able to obtain only marginal (if any) price reductions on other essential goods if the scarcity is widespread.

Any advantages accrued will be limited to either a "one point in time" sweetener, e.g., a special rebate on a particular order, or absorption
of incidentals, e.g., insurance, by the suppliers.

It is possible that mode (ii) scarcity may be localized to a particular organization. Action by a contriver, e.g., a monopolist, who seeks to penalize only the focal organization may result in the latter experiencing local (but permanent) scarcity. Under such circumstances its suppliers of other essential goods are not expected to experience relative scarcity. Other things being equal therefore, under mode (ii)

\[(D.10) \text{ the organization will be able to obtain some price concessions on other essential goods if the scarcity is local.}\]

Personnel

It is possible that under mode (ii) scarcity (a) an organization may fail if it does not obtain significant reductions in its payroll. Also, (b) abandonment of certain goals and reduced consumption will result in some of the staff being rendered surplus. The organization is thus in a position to exercise both types of potential for power through its potential for disruption of the lives of its employees through lay-offs: The possibility (a) above will allow it to realize that potential which cannot be exploited deliberately, while (b) will allow it to realize that potential which can be obtained through purposive behaviour. It follows that

\[(D.11) \text{ an organization enjoys more power over its employees during mode (ii) scarcity than during abundance.}\]

It was pointed out that under mode (i) scarcity the organization will limit itself to negotiating concessions from the relatively weaker
members of the organizational force, and that these members possess relatively little slack. Because of both its greater power and need for more concessions under mode (ii), it is suggested that the organization will be constrained to obtain remissions from the stronger but potentially more rich sources, i.e., the management. Thus, under mode (ii) scarcity (D.12) the organization will obtain concessions from all personnel.

The following quotes are presented in support of the above proposition as it applies to managerial and nonmanagerial personnel respectively:

"The current slump is painfully hitting corporate managers and administrators, who in the past were relatively immune from layoffs. In January unemployment among managers hit the highest point in more than 15 years." (Time, February 17, 1975: p. 34; emphasis added)

Since, for example, some managers will be laid off, it is suggested that the organization will have power relative to the remainder, and will therefore renegotiate their salaries. The Time article above documents the willingness of a particular manager "to take a 15% reduction in salary."

"In Horse Shoe Bend, Idaho (pop. 700), Theodore Hoff Jr. closed his Hoff Lumber Co. mill last month because sales had fallen through the floor boards. In all, 325 workers were laid off, devastating the town's economy. Those workers--plus 80 more Hoff employees at a mill in Rexburg, Idaho--got together and figured out a plan to return to work. They decided to take a 10% pay cut, put off a scheduled 9% cost of living increase, and eliminate overtime pay." (Time, March 3, 1975: p. 22; emphasis added)
It has been pointed out above that mode (ii) scarcity is expected to result in (a) layoffs and (b) reduced wages. It is believed that under such circumstances

(A.11) employees will prefer reduced wages to being laid off.

It follows that under mode (ii) scarcity,

(D.13) unions will bargain for security of employment rather than wages.

While discussing payment inefficiencies of goods it was pointed out that when scarcity is widespread the focal organization will have little power relative to its suppliers. In contrast it will enjoy more power in relation to its employees. It is believed that

(A.12) in comparison to the supplying organizations, organizational personnel typically possess more proportional slack.

That is, an average employee is better able to survive, e.g., a 10% reduction in wages; in contrast, organizational survival may be rather seriously effected by a 10% reduction in income.

It follows from both the power and slack differentials between suppliers of other essential goods on the one hand and organizational employees on the other hand that under mode (ii) scarcity

(D.14) there will be greater potential for reduction of payment inefficiencies with respect to personnel as compared to goods.

(It also follows that attempts at a second pay revision will have a low prior probability of success.)
Utilization Inefficiencies

It has been pointed out that survival under mode (ii) scarcity will require reorganization. Also, the search for solutions to the material utilization problem is expected to be intensive and nonroutine. It is suggested that intensive nonroutine search, along with the opportunity to restructure material flows and processing, will result in elimination of utilization inefficiency. Formally, under mode (ii)

\[(D.15)\quad \text{organizations will be able to eliminate utilization inefficiency of materials.}\]

It may be noted however that it is not necessary that changes in material utilization and consumption are recognized as past inefficiencies. The organization may merely strive to improve its rate of utilization; for example,

"The Los Angeles Times has reduced page size by a fraction of an inch to conserve costly paper, and the Miami Herald will follow suit next month. The Herald and others are switching from an eight-column format, at least partly to save on wasted white space between columns. Papers like the Minneapolis Tribune, Houston Chronicle and Boston Globe are now cramming ten columns onto their classified pages instead of the usual eight" (Time, February 10, 1975: p. 55).

In the previous section it was pointed out that under mode (ii) the organization exercises a relatively large amount of power over its employees. It is suggested that because of this power, and in the process of laying off, restructuring (see below), and reorganizing to adapt to scarcity,

\[(D.16)\quad \text{the organization will be able to eliminate all major sources of personnel utilization inefficiency.}\]
Investment Inefficiencies

It has been pointed out that the organization will take advantage of the need to reorganize and will reduce payment and utilization inefficiencies. Organizational responses to investment inefficiencies are discussed below.

In organizational design it is typically assumed that "technology set(s) the constraints around which the organization manipulate(s) its variables" (Thompson, 1967: p. 66). Blau and Scott (1962: p. 177) note that organizational "demands" originate at the technological core, and that the rest of the organization (and by implication, the environment) is then designed to cater to these demands. It is suggested that the centrality of the technological core is characteristic of abundance. It is submitted (and argued below) that

the transition from abundance to mode (ii) scarcity results in a change in the terms of reference used to design the technological core, and that

the production subsystem is subservient to environmental imperatives under scarcity.

Let us examine the above suggestions: Supplies are expected to fluctuate around a particular mean, whether around the high level input during abundance or the low level inflows under mode (ii). It is suggested that in the former case the technology is designed to handle only minor increases above the mean. There are two reasons for this: (a) Given a particular market demand, the output is expected to be at the optimal or near optimal level. Any increase in output beyond this level is expected to provide low marginal utility. (b) Additional capacity carries with it
a fairly high opportunity cost. It is suggested therefore that during abundance any short-term increase in the availability of raw material is ignored.  

If the market demand for the finished good does not shrink to correspond to reduction in the availability of the focal good however, any increase in output above the low level mean under mode (ii) will provide a high marginal utility. Thus the organization will design its technical core to exploit any short-term increases in availability of raw material. In other words,

\[(D.17)\] the technology typical of mode (ii) scarcity will be more flexible than that of abundance.

Unidirectional flexibility (geared to increases above the mean only) can be obtained in two ways:

(i) By not divesting the original equipment (or selling off only parts of it), and

(ii) using an "inferior" technology.

The latter means will be discussed first.

Inferior Technology

Woodward (1965) identifies three types of production technology: unit and small-batch (made to order goods); large-batch, assembly, and mass production (e.g., mass produced cars); and process production (e.g., oils, chemicals, and pharmaceuticals). These are ranked in that order along several characteristics. Unit technology, for example, is most

9 "When the environment outruns aspiration-level adjustment, the organization secures, or at least has the potential of securing, resources in excess of its demands. Some of these resources are simply not obtained—although they are available" (Cyert and March, 1963: p. 37; emphases added).
flexible. Process technology requires the highest degree of certainty regarding availability of raw materials, rigid quality control of inputs, and can process the largest volume per unit time. Because of its high throughput process technology results in the lowest cost per unit, but also represents the highest outlay.

It is suggested that in order to obtain increased flexibility the organization will "down-grade" its technology from, e.g., process to mass, or from mass to unit. In other words, under mode (ii)

(D.18) the organization will use a relatively "inferior" technology.

Since the total throughput will be reduced it is suggested that downgrading will be required anyhow (the "superior" technology is expected to be grossly inefficient for low volume production). Also, the organization is expected to be willing to relax quality control in favour of obtaining additional quantities of low quality material. Since the inferior technology requires relatively low capital outlay it is suggested that the high returns expected to be obtained from short-term increases in supply justify the investment in excess capacity. By its very nature however, the inferior technology is relatively inefficient. Thus,

(D.19) the per unit cost of processing during mode (ii) will be higher than that during abundance and mode (i).

Surplus Capacity

It was noted above that an organization can exploit short-term increases in raw material by not divesting all of its equipment and thus retaining spare capacity. If the scarcity is widespread, i.e., other
organizations are also divesting, or the machinery and plant are special purpose, then divestment is expected to bring relatively low returns. Thus the opportunity cost of not divesting will be relatively low (in contrast to that for excess capacity during abundance), and the penalty for retention will not be severe.

Increased flexibility is however only one of the reasons for not divesting. Mode (ii) assumes, among other things, that the organization will be able to survive on its own. Thus a merger is not necessary for survival. Lack of necessity notwithstanding, it is suggested that the organization may retain surplus capacity and use that as a basis for merger. This may lead to several advantages: Sale of idle plant will result in a one point in time cash flow. Merger, in contrast, will secure continuous cash inflows. Also, the organization will then enjoy various synergies, both of increased size as well as those arising out of complementary and/or supplementary capacities.

Because of (i) the need for greater flexibility, (ii) low opportunity cost, and (iii) possible leverage in the case of a merger, it is suggested that under mode (ii)

(D.20) an organization will retain surplus production capacity.

The imperatives of mode (ii) scarcity require an elimination of all utilization and payment inefficiencies. In contrast, it follows from propositions D.18 and D.20 that under mode (ii)

(D.21) the organization will seek to retain (particular types of) investment inefficiencies.
Adaptive responses which anticipate a considerable reduction in, and subsequent levelling off of, material supplies were examined above. These are summarized in Table III and compared with corresponding strategies under mode (i).

The foregoing strategies were designed to prepare the organization for survival in a milieu of scarcity, and were generally descriptive of the transitional processes. The "new" organization will be different in many ways from the original. Certain steady state characteristics of the redesigned organization are discussed below. Their consequences for organizational processes and structures are examined later.

Organizational Characteristics

Without attempting to define environmental abundance, it is suggested that an organization can, in a milieu of abundance, take its inputs for granted. An organization may, for example, plan future growth without expecting availability of raw material to become an operating constraint. Under such circumstances it can be said that the organization is "certain" about the future availability of matter-energy inflows. Thus while abundance and certainty are conceptually distinct phenomena, it is suggested that there is a necessary empirical correlation between the two: abundance of materials is associated with a high degree of certainty regarding their availability. Indeed,

(D.22) certainty of availability of material may be subsumed in the definition of abundance.

Parallel to the above relationship, scarcity has been empirically
### TABLE III

**COMPARISON OF CERTAIN INTRAORGANIZATIONAL RESPONSE STRATEGIES UNDER MODE (ii) WITH THOSE UNDER MODE (i) SCARCITY**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mode (i) (Temporary reduction)</th>
<th>Mode (ii) (Permanent reduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational problem</td>
<td>Shortage of financial resources</td>
<td>Reorganization for a low level of activity</td>
</tr>
<tr>
<td>Level of anxiety associated with the reduction in supply?</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Temporal perspective of organizational responses</td>
<td>Temporary</td>
<td>Permanent</td>
</tr>
<tr>
<td>Type of strategy</td>
<td>Coping</td>
<td>Adaptive</td>
</tr>
<tr>
<td>Characteristics of search behaviour</td>
<td>Local, routine, and nonintensive</td>
<td>General, nonroutine, and intensive</td>
</tr>
<tr>
<td>Attitude towards change of structure</td>
<td>Only as a last resort</td>
<td>An integral part of the adaptive strategy</td>
</tr>
<tr>
<td>Effect on organizational goals</td>
<td>(i) Little change. Temporary suspension of some activities</td>
<td>(i) Reassessment of goals. Those which are not central to the organizational purpose will be discontinued.</td>
</tr>
<tr>
<td></td>
<td>(ii) Relatively vaguely defined</td>
<td>(ii) Better defined</td>
</tr>
<tr>
<td></td>
<td>(iii) May continue to allocate resources to nonessential activities</td>
<td>(iii) The residual set of goals will be internally consistent</td>
</tr>
<tr>
<td></td>
<td>(iv) Larger set of goals</td>
<td>(iv) Smaller set of goals</td>
</tr>
<tr>
<td></td>
<td>(v) Larger coalition</td>
<td>(v) Smaller organizational coalition</td>
</tr>
</tbody>
</table>
TABLE III (CONTINUED)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mode (i) (Temporary reduction)</th>
<th>Mode (ii) (Permanent reduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to <strong>investment</strong> inefficiencies</td>
<td>Ignored; no change</td>
<td>Certain type of investment inefficiencies are deliberately incurred</td>
</tr>
<tr>
<td>Response to <strong>utilization</strong> inefficiencies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) material</td>
<td>Will obtain only a marginal reduction in both cases</td>
<td>Will obtain a substantial reduction in both cases</td>
</tr>
<tr>
<td>(ii) personnel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Response to **payment** inefficiencies                                           | Will have no power over suppliers
Therefore will not obtain any reduction in the cost of goods
1. Will obtain concessions (from personnel) which do not have any implications for the future
2. Will obtain concessions from nonmanagerial personnel only                      | Will have power over suppliers, but the latter will have little slack.
Hence will obtain minor concessions only
1. The concessions obtained will have implications for the future
2. Will obtain concessions from all organizational personnel                      |                                                                                                |
| Reduction of **consumption**                                                     | Subjective                                                                                    | Objective                                                                                       |
| 1. Mode of distinction between nonobvious essential and inessential goods       | Discontinue consumption which
(i) has obviously low rather than high returns
(ii) results in high rather than low drain on working capital                        | By reference to the organizational purpose, i.e., the set of residual goals                     |
| 2. Criteria used for discontinuation of consumption                              |                                                                                               |                                                                                                |
TABLE III (CONTINUED)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Mode (i) (Temporary Reduction)</th>
<th>Mode (ii) (Permanent reduction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. (cont'd)</td>
<td>(iii) is easy rather than difficult to measure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(iv) is easy rather than difficult to resume</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(v) disturbs the existing structure less rather than more</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(vi) is supported by coalition members who have low rather than high power</td>
<td></td>
</tr>
<tr>
<td>3. Effect on the product line</td>
<td>Will manufacture reduced quantities of the full range of products</td>
<td>Will manufacture historical quantities of the more profitable products</td>
</tr>
<tr>
<td>4. Strategy used to obtain major reductions in consumption</td>
<td>Closure of structurally independent units</td>
<td>Divestment</td>
</tr>
<tr>
<td>Marketing strategy</td>
<td>Rationing of output</td>
<td>Demarketing</td>
</tr>
<tr>
<td>Consequences for the technical core</td>
<td>No change</td>
<td>Will obtain (i) surplus capacity, with a technology which is (ii) inferior, (iii) flexible, and (iv) inefficient</td>
</tr>
</tbody>
</table>
observed to be associated with a high degree of uncertainty. McGuire (1974) in a Conference Board poll of senior marketing executives, for example, observes that "shortages tend to enshroud marketing planning with an impenetrable fog of uncertainty...Management doesn't know from one week to another when the plant will be shut down" (p. 5). Similarly, McLean (1974) in reporting reactions to material scarcity quotes a senior executive as confessing "I don't know what's going to happen next week" (p. 37). While we are not convinced that there is a necessary prior correlation between scarcity and uncertainty, it is believed that under mode (ii)

\[D.23\] organizations will experience a higher degree of uncertainty regarding availability of material as compared to that under abundance.

It has been mentioned earlier (Chapter 2, pp. 30-31) that the technical core typically operates on a closed-system logic, and that it is sealed off from input variations by, among other things, buffering, smoothing, or leveling. These processes are however characteristic of abundance. Since there is little or no slack during scarcity, it is not possible to dampen input fluctuations.\(^\text{10}\) It was also pointed out that temporary environmental improvements during abundance are typically ignored (Cyert and March, 1963: p. 37). It was argued that under scarcity, in contrast, the organization seeks to exploit any increases in availability; hence there is no attempt to eliminate input fluctuations (above the mean). It is suggested therefore that because of (i) increased environmental uncertainty, and lack of (ii) ability and (iii) desire to smooth out

\(^{10}\) "Slack operates to stabilize the system in two ways: (1) by absorbing excess resources...during relatively good times; (2) by providing a pool of emergency resources...during relatively bad times" (Cyert and March, 1963: p. 38).
environmental variations

(D.24) the organization will be designed to handle a higher degree of externally induced uncertainty under mode (ii) than under abundance.

It has been argued above that organizations cannot/will not attempt to reduce externally imposed uncertainty. It is believed that they have a limited total capacity to absorb or respond to uncertainty. In order that they may fully exploit environmental uncertainty, it is suggested that organizations must minimize internally generated uncertainty. "We would expect...that organizations facing many contingencies would exhibit quite rigorous control over those variables they do control" (Thompson, 1967: p. 78). Thus

(D.25) under mode (ii) organizations will be designed such that the level of internally induced uncertainty is less than that during abundance.

It was pointed out in Chapter 2 that abundance is characterized by, among other things, a certain "leisure", a high degree of optimism, and a low level of anxiety. In contrast, the focal organization would have experienced the trauma of coming to terms with the environment, viz., enforced reduction of personal and organizational aspiration levels, acceptance of below aspiration-level payments, layoffs, and reorganization. Also, survival under scarcity is expected to be more of a continuing struggle than under abundance. Since the scarcity is expected to endure there will be no cause for optimism or lessening of anxiety. In brief,

(D.26) the organization will operate in a crisis climate under mode (ii).
Under abundance the work loads of the various subsystems were typically predictable and reasonably balanced. Because of the immediacy of their contributions the sales and production functions were the largest and the most important (Perrow, 1970a). Under mode (ii) however, assuming that demand does not shrink to a corresponding level, sales is expected to be a sinecure (see, e.g., Kotler and Levy, 1971: pp. 74-75); and the production subsystem will be required to coordinate with purchasing rather than sales. Production work loads will vary depending upon the availability of material, and both sales and production will be expected to experience "feast or famine" conditions. The procurement subsystem will become important and will always remain under pressure. Thus under scarcity it is expected that

\[(D.27)\] the organization will experience wide variations in the level of activity, both across subsystems at a given time, and within a subsystem over time.

It has been suggested earlier (Chapter 2, pp. 27-29) that an "abundant" environment is rich in the number of alternative solutions to a particular problem. A scarce environment, in contrast, presents very few alternatives. Under mode (ii) therefore the various subsystems will have limited options. Also, as argued in Chapter 6, reduced slack results in increased interorganizational interdependence. Extrapolating from that argument it is suggested that elimination of slack will also result in increased intraorganizational interdependence. Formally, under mode (ii) scarcity

\[(D.28)\] the various subsystems will experience a low degree of manoeuvrability, i.e., the number of possible solutions to a particular problem will diminish; and
(D.29) the various subsystems will be increasingly dependent upon others for their role performance.

Summary

The various steady state characteristics of mode (ii) scarcity are summarized in Table IV and compared with those during abundance. Their consequences for organizational processes will now be examined.

Organizational Processes

Coordination

It has been pointed out above that organizational subsystems will have reduced action alternatives under scarcity. Also, the actions of each subsystem will be increasingly constrained by those of its neighbours. Reduction in both prior options as well as freedom to exercise them at the subsystem level will greatly limit the total number of feasible system or joint solutions. It follows that

(D.30) attainment of a satisfactory organizational strategy will require more coordination under scarcity than in abundance.

According to Thompson (1967) coordination may be achieved by (i) standardization, (ii) planning, and (iii) mutual adjustment. Coordination by standardization involves establishment of routines and rules, and "requires that the situations to which they apply be relatively stable (and) repetitive...enough to permit matching of situations with appropriate rules" (p. 56). Because of increased uncertainty it is suggested that coordination by standardization will not be viable under mode (ii).
## TABLE IV

### COMPARISON OF CERTAIN ORGANISATIONAL CHARACTERISTICS

ACROSS ABUNDANCE AND MODE (II) SCARCITY

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abundance</th>
<th>Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of certainty regarding availability of material</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Consequences of the degree/certainty of availability of material for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Organisational design</td>
<td>a. Designed to cope with a relatively low degree of externally induced uncertainty</td>
<td>a. Designed to absorb a high degree of externally induced uncertainty</td>
</tr>
<tr>
<td></td>
<td>b. Relatively low emphasis on reduction of internally generated uncertainty</td>
<td>b. Designed to minimise internally generated uncertainty</td>
</tr>
<tr>
<td>2. Organisational climate</td>
<td>Relatively &quot;easy&quot;</td>
<td>&quot;Crisis&quot; climate</td>
</tr>
<tr>
<td>3. Level of subsystem activity</td>
<td>Relatively stable</td>
<td>Wide variations in the level of activity, both across subsystems at a given time, and within a subsystem over time</td>
</tr>
<tr>
<td>4. Number of response alternatives available to the subsystems (degree of equifinality)</td>
<td>Many</td>
<td>Few</td>
</tr>
<tr>
<td>5. Degree of subsystems interdependence</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
Scarcity typically results in delays in receiving supplies. McLean (1974) in his survey of the consequences of a shortage economy reports for example that

"Perhaps the most common (consequence) is the need for long lead times to get vital supplies. James E. Dymond, president of Aquamatic, Inc., a valve manufacturer in Rockford, Ill., (e.g.) says the delivery of gray iron castings for use in valves has gone from a normal eight weeks to 45 weeks.

An order for heavy, specialized equipment to dig coal, for instance, normally used to be filled in three or four months, (another respondent) recalls. Now, waits from 18 to 24 months are commonplace. It takes as long as eight months to get bearings, a shelf item, from suppliers."

(p. 37)

Thus planning under mode (ii) should encompass a longer time horizon as compared to that under abundance. 11

The uncertainty associated with scarcity however makes it difficult to plan ahead. McGuire (1974) in his article Living with Scarcity, for example, reports that "several management say they're unable to see more than three or six months ahead' because the uncertainty which accompanies shortages makes forecasting manpower, advertising or promotion needs a hazardous and sometimes futile task" (p. 5). But the inability to see ahead is antithetical to the requirement for a longer time horizon. Since planning will be difficult, it follows that coordination by planning will not be viable under mode (ii).

Since coordination by standardization and planning are both

11It is understandable that in an environment of extreme abundance, as in some tropical islands, where the natives anticipate complete fulfillment of felt needs (in general), there is little pressure to plan ahead and the population is content to live, as it were, from one day to the next.
inappropriate, it follows that under mode (ii) scarcity

(D.31) organizations will coordinate internal
activity by mutual adjustment.

There will thus be a high level of feedback, both horizontal and vertical,
and increased decision activity. Thompson (1967) points out however that
this mode of coordination is costlier than the other two (p. 56). Thus

(D.32) the cost of coordination of internal
activity will be higher during scarcity
than under abundance.

Even though coordination will be by mutual adjustment it will
still be necessary to prevent deviance from the various mutually agreed
upon sets of behaviours. Control strategies which seek to insure
compliance are discussed below.

Control

Reduction of slack results in a reduced margin for error; an
error which is not critical under normal circumstances may result in
organizational failure during scarcity (Starbuck, 1965: p. 464). It
follows from the arguments antecedent to proposition D.25 as well from
as the need to minimize the possibility of error that

(D.33) the organization will exercise more
control over internal activities during
scarcity than under abundance.

Control may be exerted through several categories or phases of
activity. Tannenbaum (1968: p. 275-276) identifies three phases:
legislative or decision-making, which involves the process of deciding
upon the rules, policies, and general actions of the organization;
administrative, i.e., the day-to-day interpreting, expediting, and
carrying out of legislative decisions; and sanctions, which entails the meting out or withholding of rewards and punishments in the process of enforcing rules and standards. The impact of scarcity on decision-making will be examined later. Its influence on the latter two phases are discussed below.

Administrative Control

An organization can exercise top-down control if its "resources are assured" (Thompson, 1967: p. 133). This is not the case under mode (i). It has been observed that "the all-powerful chief can maintain... (unilateral) control only to the extent that he is not dependent on others within his organization" (p. 132). But as pointed out earlier, scarcity will result in a high degree of intraorganizational interdependence. Because of both shortage of resources and high interdependence it follows that under mode (ii)

(D.34) the organization will not be able to use strategies of unilateral or autocratic control.

It also follows that, in contrast to that under abundance,

(D.35) there will be low potential for exercise of legitimate power under mode (ii) scarcity.

It has been observed that when "superiors (are) in some respects dependent on their subordinates, their dependence constrains them to refrain from using authoritarian or coercive measures in performing their duties and to rely, instead, on more personal, nonbureaucratic means of motivating cooperative effort" (Blau and Scott, 1962: p. 232). Also,
"organizations operating in rapidly changing and highly uncertain environments tend to rely heavily on informal structures and procedures" (Downs, 1967: p. 266). The importance of being able to respond to environmental uncertainty has been noted earlier. It follows from the above that

(D.36) administrative controls under mode (ii) will tend to be more informal than formal, or nonprogrammed rather than programmed.

Control Through Sanctions

Monetary rewards are one of the many means of increased motivation (Lawler, 1973). Increased motivation is expected to, in the final analysis, result in increased productivity. A system of individual rewards thus, among other things, encourages individual productivity.

Increased productivity has two implications: It will result in increased output and will therefore require increased inflows. Also, variations in the output of different individuals will result in coordination problems—which can be resolved only through development of intermediate inventories. But environmental scarcity will make it difficult to either increase intake or develop material buffers. Thus, under scarcity, increases in individual productivity are at best self-defeating, or at worst dysfunctional. It is suggested therefore that

(D.37) organizations under mode (ii) will not use individual rewards as a controlling device.

It follows that compared to that during abundance,

(D.38) there will be low potential for exercise of reward power under scarcity.
Even though increases in productivity will not be encouraged, it will be necessary for the employees to maintain production. In order to motivate them to this end, it is suggested that

\[(D.39) \text{organizations under mode (ii) will use system rewards as a controlling device.}\]

(E.g., the Scanlon Plan—Katz and Kahn, 1966: pp. 381-388.)

Deviant behaviour is one of the many sources of error in an organization. It has already been pointed out that an error which is not critical under normal circumstances may however result in organizational failure during scarcity. In order to minimize deviant behaviour therefore, it is suggested that

\[(D.40) \text{organizational sanctions will be more severe under mode (ii) than in abundance.}\]

A sentry who falls asleep during a peacetime maneuver will be disciplined: during war he will be subject to a court-martial. (But, because of the high degree of interdependence severe sanctions cannot be applied too frequently. It follows therefore that there will be an intermediate potential for exercise or coercive power.)

Decision Making

It has already been mentioned (Chs. 2, pp. 19-21) that during abundance, conflict among nonessential goals is resolved through bargaining. That is, "disagreement over goals is taken as fixed" (March and Simon, 1958: p. 130), and allocation decisions are arrived at by processes which tend to be characteristic of "gamesmanship": "We can identify a bargaining process by its paraphernalia of acknowledged conflict of interests, threats, falsification of position, and (in
general--sic) gamesmanship" (March and Simon, 1958: p. 130). Under scarcity however, the goals are no longer taken as fixed, but are rather tested for consistency with other objectives, and involve, among other things, information gathering and cost-benefit analysis. But these latter are analytical processes. It is suggested therefore that under mode (ii)

(D.41) resource allocation decisions will involve analytical rather than bargaining processes.

It has been suggested by Cyert and March (1963) that organizations resolve goal conflict by, among other means, factoring its "decision problems into subproblems and assign(ing) the subproblems to subunits in the organization" (p. 117). These units then deal with these problems in terms of local rationality. That is, local decision centres make local decisions satisficing local conditions. This is a viable mode of decision making because, according to the authors, these subunits use, inter alia, "acceptable-level" rules: Since "the demand constraints do not uniquely define a solution" (p. 118), the joint solution obtained by "summing up" the local decisions satisfies the larger organizational demand.

Cyert and March observe however that "acceptable-level decision rules "tend to underexploit the environment and thus leave excess resources (slack) to absorb potential inconsistencies in the local decisions" (p. 118). It is suggested that in times of scarcity there will be little or no organizational slack to absorb inconsistencies among local decisions. Also, the organization cannot afford to under-exploit the environment. It was pointed out earlier that environmental scarcity may result in considerable reduction in the availability of
satisfactory alternatives. (Fewer needles in the haystack.) The prior probability of obtaining a satisfactory joint solution through satisficing local conditions is therefore also reduced. It follows from the foregoing then that acceptable-level decision rules will not be used for decentralized decision making in mode (ii).

It is possible however that the various decision centres may use optimizing strategies to solve local problems. But, given a certain degree of interdependence, this requires strong assumptions about an "invisible hand" in enforcing proper decisions on a system of local rationality. "Consistency requires that local optimization by a series of independent decision centres result in overall optimization" (p. 118). We are persuaded along with Cyert and March that such an invisible hand does not operate in organizations; and optimization at local levels tends to result in suboptimal joint solutions. Thus whether the subunits use acceptable-level rules or optimize, decentralized decision-making is bound to be unsatisfactory. While the above argument was presented in the context of conflict-resolution, it can be generalized to the totality of organizational decision-making.

It follows from the foregoing argument that under mode (ii)

(D.42) organizations will be less likely to factor their problems, and

(D.43) organizations will be less likely to rely on decentralized decision making.

It has been noted that, in addition to reduced availability, scarcity may also result in increased uncertainty. Reduced availability
of material inputs is expected to result in reduction in monetary resources. A reduced budget in turn will lead to pressure on organizational subunits towards coordination and discussion, i.e., a greater need for joint decision making (Kornhauser, Dubin, and Ross, 1954). Increased uncertainty of inputs is expected to result in scheduling problems. This in turn will lead to increased pressure on the participants to control the timing of activities that impinge upon their own roles—another impetus to joint decision-making (Sherif and Sherif, 1956). Also, "unlimited resources tend to decrease the demand for joint decision-making" (March and Simon, 1958: p. 126). Thus it is suggested that because of reduced budgets and greater uncertainty,

(D.44) scarcity will result in greater need for joint decision-making within the organization.

Participants in the organizational coalition make certain agreements on entry, and develop some mutual control-systems, e.g., a budget or allocation of functions, for enforcing them. These side payment agreements are however typically incomplete, and do not anticipate effectively all possible future situations. The members accordingly indulge in secondary bargaining to elaborate and revise the original coalition agreements. It has been observed that under normal circumstance (i.e., during nonscarcity) such bargaining occurs under relatively tight constraints. "Much of the structure (of the mutual control-systems) is taken as given" (Cyert and March, 1963: p. 33). This is true primarily because "organizations have memories in the form of precedents, and individuals in the dominant coalition are strongly motivated to accept the precedents as binding" (p. 33).
It has been pointed out above that under scarcity the set of organizational goals is expected to shrink. The various mutual control-systems will therefore have to be redesigned. Thus there will be no precedents to guide the participants, and the organization will operate, as it were, without a memory. It is suggested therefore that not only will scarcity result in renegotiating of primary agreements but that, during the first few years of transition, even secondary bargaining will manifest a certain lack of structure (i.e., less will be taken for granted). To extrapolate from the foregoing:

(D.45) While in the case of abundance, adaptive behaviour required learning of new associations, survival under scarcity will require deliberate unlearning of old associations as well as learning of new associations.

In summary then, under mode (ii), conflicts among the residual goals will tend to be resolved through analytical processes, and less use will be made of precedents and past structures. Decision problems will not be factored. Organizational subunits will lose their autonomy, and decisions will be either coordinated across the subunits (joint decision-making) or handed down from the overarching level (centralized decision-making).

(Because of high organizational interdependence there will be an increase in the importance of decision-making, coordinating, and conflict-resolution skills. It follows that there will be a high potential for exercise of expert power. The various bases for intraorganizational power can thus be ranked as follows: expert and referent power--high, coercive

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12 Lack of structure is manifested in organizations after some exceptionally drastic organizational upheaval (Simon, 1953).
power—intermediate, and reward and legitimate power—low potential.\textsuperscript{13})

Conflict

The problem of intraorganizational conflict has been alluded to in the foregoing section. It is discussed below in greater detail.

There are generally two types of intraorganizational conflict:

(a) Conflict arising out of the differential logic of different subunits/functions. E.g., the production function requires a long unbroken run, while the logic of the sales function in contrast demands several different short runs. (b) Conflict arising out of allocation of scarce resources. E.g., the conflict over budgetary allotments. Scarcity under mode (ii) contributes to both types of conflict.

Since there is less of a cushion to absorb internal variations, the subunits become increasingly dependent upon each other for their role performance. This results in the need for joint decision-making. But "the existence of a positive felt need for joint decision-making...will generally have (a) positive effect on the amount of potential conflict" (March and Simon, 1958: p. 121). To repeat,"potential for conflict...increases with interdependence" (Thompson, 1967: p. 138).

It has been noted that mode (ii) scarcity contains a pressure for a joint preference ordering. This will result, among other things, in higher intracoalitional conflict of the second variety: "Potential for conflict within the dominant coalition increases as external forces require internal compromise on outcome preferences" (Thompson, 1967: p. 138). Organization with slack "...generate less internal friction concerning resource allocation among their various sections" (Downs, 1967: 138).

\textsuperscript{13}Since the present study is limited to examination of the consequences of scarcity at the macro level of analysis, no attempt has been made to examine in detail its ramifications for intraorganizational power.
p. 270). But, as resources decrease, intraorganizational relations become "more nearly a strictly competitive game" (March and Simon, 1958: p. 126) and "intergroup conflict tends to increase" (p. 126).

It has been observed that "growth tends to reduce internal conflicts in an organization" (Downs, 1967: p. 264). That is, it contains a tendency for conflict to be confined within certain limits. "...(G)rowth takes the edge off distributional conflicts--if everyone's absolute share of income is increasing there is a tendency not to fight over relative shares, especially since such fights may interfere with growth and even lead to a lower, absolute share for all" (Daly, 1971: pp. 239-240). In contrast, adaptation to mode (ii) will require divestment and shrinkage instead of growth, and will thus result in increased conflict.

The traditional strategy of conflict resolution: making concessions alternately to the conflicting parties (Katz and Kahn, 1966: p. 95) cannot be used to resolve interdepartmental differences because of lack of surplus. As an alternate device, Cyert and March (1963) suggest that organizations may resolve conflict by using local rationality, acceptable-level decision rules, and sequential attention to goals. It was argued earlier that less use will be made of problem factoring and acceptable-level decision rules under scarcity. Thus the first two procedures will not be available for conflict resolution. Use of sequential attention assumes the existence of a "time buffer between goals (which) permits the organization to solve one problem at a time" (p. 118). It also assumes that the various problems can be satisfactorily resolved, at least for certain lengths of time. It is suggested that under modes (ii) and (iii) the material input problem may
not be at all amenable to satisfactory resolution, i.e., it will *always* pose an operating constraint. Since the assumption fundamental to the concept of sequential attention will not hold under scarcity, it follows that this procedure too will not be available for conflict resolution.

It follows from the foregoing that potential for intraorganizational conflict will increase under mode (ii) because of

(a) elimination of loose couplings,

(b) scarcity of resources, and

(c) reduced absolute shares for members of the coalition.

Also the traditional procedures for conflict resolution will no longer be viable. It is expected therefore that the organization will be characterized by a higher level of conflict. It is necessary however to qualify this conclusion.

It was mentioned earlier that mode (ii) scarcity will result in a retraction of some demands. Expectations of continued scarcity will cause a downward adjustment of aspiration levels, and the organization will be redesigned, as it were, to correspond to the realities of the future. Insofar as the residual demands are realistic and the reorganization is appropriate, it is suggested that there will be a reduction in the potential for conflict. It has also been observed that "in the face of a threat from the outside, a human group, unit, or society subordinates its internal conflict" (Berelson and Steiner, 1964: p. 622). It has been pointed out that operation under mode (ii) is in a way similar to living under a threat. It is suggested therefore that the members of the coalition
will themselves tend to keep conflict under control.

It has been argued that scarcity will result in greater potential for conflict. Certain conflict reduction/resolution mechanisms unique to the mode will however become operative under mode (ii). It is not possible therefore to make any predictions about the total level of conflict after the transition without further investigation.  

Summary

The various processes characteristic of mode (ii) scarcity are summarized in Table V and compared with those during abundance. The consequences of scarcity for organizational structures are discussed below.

Structure

Katz and Kahn (1966) observe that "An organization in a relatively stable environment with some assurance of inputs into the system will require less attention to changes in structure than an organization in a rapidly changing environment" (p. 331). It follows that under scarcity more attention to changes in structure will be required. But organizational structure cannot be changed frequently. Thus, in order that the organization can adequately exploit environmental changes and the consequent variations in internal work loads, a "changeability" will have to be built into the structure. Other things being equal therefore,

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14 It is believed however that coalition members will not be able to make the transition from abundance to scarcity successfully: they will live, in part, on their memories of "better days" and will hence always remain dissatisfied. (The March and Simon general model of adaptive motivated behaviour (see, pp. 16-18) truly reflects, in our opinion, the North American culture.)
TABLE V

COMPARISON OF INTRAORGANISATIONAL PROCESSES PARTICULAR TO
MODE (ii) SCARCITY WITH THOSE CHARACTERISTIC OF ABUNDANCE

<table>
<thead>
<tr>
<th>Process</th>
<th>Abundance</th>
<th>Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Degree of coordination</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Mode of coordination</td>
<td>Coordination by standardisation, or planning, or mutual adjustment*</td>
<td>Coordination by mutual adjustment</td>
</tr>
<tr>
<td>3. Cost of coordination</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Amount of control exercised</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>over intraorganisational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Potential for application of</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>unilateral or autocratic control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mode of administrative</td>
<td>Formal or informal*</td>
<td>Informal</td>
</tr>
<tr>
<td>control</td>
<td></td>
<td>(nonprogrammed)</td>
</tr>
<tr>
<td>4. Type of reward systems used</td>
<td>Individual and/or group rewards*</td>
<td>Group rewards</td>
</tr>
<tr>
<td>as a controlling device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Potential for use of</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>individual rewards as a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>controlling device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Severity of sanctions</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Process</td>
<td>Abundance</td>
<td>Scarcity</td>
</tr>
<tr>
<td>---------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td><strong>Bases of power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Potential for exercise of legitimate power</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>2. Potential for exercise of reward power</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>Decisionmaking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Amount of decision-making activity</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>2. Processes used for resource allocation decision-making</td>
<td>Bargaining</td>
<td>Analytical</td>
</tr>
<tr>
<td>3. Use of problem factoring as a decision-making strategy</td>
<td>More</td>
<td>Less</td>
</tr>
<tr>
<td>4. Preference between centralised or decentralised decision-making</td>
<td>Can use either strategy, i.e., decision-making may be either centralised or decentralised*</td>
<td>Centralised decision-making preferred</td>
</tr>
<tr>
<td>5. Preference between unilateral or joint decision-making</td>
<td>Can use either strategy, i.e., decision-making may be either unilateral or joint*</td>
<td>Joint decision-making preferred</td>
</tr>
<tr>
<td>6. Degree of reliance on past structures and precedents for decision-making</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Learning behavior</td>
<td>Survival facilitated by learning new associations</td>
<td>Survival facilitated by (i) learning new associations as well as (ii) unlearning old associations</td>
</tr>
</tbody>
</table>

*These are instances of a high degree of equifinality under abundance*
(D.46) the organization will need a more **flexible** structure under mode (ii) than during abundance.

It has already been pointed out that communication under scarcity will tend to be informal rather than formal. The experimental work of Sherif and case studies of organizations show that the presence of a threat to the life of an organization will "result in an increase in the congruence of the formal and informal communication structures" (Triandis, 1971: p. 70). That this is antithetical to mechanistic structures (Burns and Stalker, 1968: pp. 119-122). As argued in Chapter 2 (pp. 29-30) some of the other assumptions underlying mechanistic organizations do not hold under scarcity. It follows therefore that

(D.47) management systems of organizations under mode (ii) will tend to be **nonmechanistic** rather than mechanistic.\(^{15}\)

Berelsen and Steiner (1964) in their inventory of scientific findings observe that "an organization is more likely to be strongly centralized during external crises than during normal periods" (p. 370). It has been argued above that operation under scarcity will be characteristic of that under a crisis. It has been observed that "authority... is more decentralized" (p. 270) in organizations with slack (Downs, 1967). Scarcity however results in reduction of slack and requires a high degree of coordination of intraorganizational activities. Operation under a crisis climate together with a high need for coordination will have the following consequence:

\(^{15}\) Burns and Stalker (1968) identified two mutually exclusive forms of management systems: mechanistic and organic. It is suggested that these two descriptions do not exhaust the totality of the various forms of management systems. Thus nonmechanistic is not necessarily organic, but covers instead all the residual forms.
(D.48) authority within an organization will be more centralized under mode (ii) than in abundance.

(It may be noted however that centralization of authority is only one of the possible means of coordination.)

Melman (1958) has defined control in terms of the ratio of administrative to production personnel. It follows from the need for increased control and coordination that (D.49) organizations will have a higher ratio of managers to workers during scarcity than in abundance.16

Leading Subsystem

It has been pointed out that organizations are expected to have little or no slack under scarcity. Thus they are highly interdependent upon other organizations and the community for their survival. (Note: under certain circumstances slack can also be defined in terms of independence.) Also, they are expected to manipulate these latter elements to obtain certain concessions and advantages. It has been observed that, other things being equal, the facility with which such support is obtained varies as the degree of "legitimization" of the organization or its social image (Thompson, 1967: p. 88). But such legitimization is the function of the institutional level (Parsons, 1951).

It was suggested in the previous chapter that organizations will increasingly use political strategies to solve economic problems. But political strategies fall in the domain of the institutional subsystem.

16 Computerized information systems are not likely to replace human managers because the former are both relatively more expensive and inflexible.
Thus, while the managerial subsystem is typically the leading subsystem during abundance (Katz and Kahn, 1966: p. 63; Cyert and March, 1963: pp. 240-241), it is suggested that, because of the foregoing reasons, the institutional subsystem will become the leading subsystem under mode (ii).

Continuing with the above argument, it is possible to make the following rather broad generalization:

<table>
<thead>
<tr>
<th>Environment</th>
<th>Focus upon</th>
<th>Leading subsystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growing</td>
<td>Growth, innovation</td>
<td>Managerial</td>
</tr>
<tr>
<td>Steady-state</td>
<td>Stabilization</td>
<td>Supervisory (management by exception)</td>
</tr>
<tr>
<td>Shrinking</td>
<td>Scrambling for survival</td>
<td>Institutional</td>
</tr>
</tbody>
</table>

Purchasing Subsystem

Ammer (1974) conducted a survey of 750 U.S. company managers to obtain their views of their purchasing departments. Not surprisingly, his respondents maintained that little attention was paid to the purchasing activity during normal times (i.e., abundance), and the procurement function did not/was not expected to exercise any degree of discretion. "As long as material flows in a reasonably smooth fashion from suppliers, management is simply not interested in what is happening in the purchasing department" (Ammer, 1974: p. 37). He also found that the procurement subsystem was typically coupled to the technological core and "served", as it were, the production subsystem.

Since it must be free to respond to environmental uncertainties during scarcity, it is suggested that the purchasing subsystem will have
to be uncoupled from the production function. "When materials...are
difficult to obtain, the structures responsible for their procurement
must face more completely toward the outside world and divorce themselves
in part from the production...function" (Katz and Kahn, 1966: p. 81). It
has been observed that in the event of a crisis, the purchase activity is
temporarily taken over by top management (largely because the former is
not designed to handle critical responsibilities). When scarcity is
expected to be the prevalent mode however, it is suggested that under
mode (ii)

\[(D.51) \text{ the procurement function within the organization will be restructured so that it is an outward-facing loosely coupled unit able to exercise high levels of discretion.}\]

It must be pointed out that the purchasing subsystem will not
be a boundary-spanning unit in the sense in which the term is used by Thompson
(1967). According to Thompson a boundary spanning unit mediates between
the environment and the closed-system core and its actions are determined
largely by the logic of the latter. "(O)rganizations subject to
rationality norms seek to isolate their technical cores from environmental influences by establishing boundary spanning units..." (p. 67). Thus while
giving priority to the demands of the production subsystem, purchasing may,
in the extreme, attempt to obtain a compromise between the certainty require-
ments of the technical core and the environmental uncertainty. It would
thus trade-off the degree of availability with the certainty of availability.

\[17\text{There is a striking parallel in the personnel function:}
"The securing of personnel for given periods of time in industrial organizations through contacts with unions is not handled through the personnel officer but through a vice president in charge of industrial relations." (Katz and Kahn, 1966: p. 81)\]
Under scarcity, in contrast, the purchasing unit will not seek such trade-offs. It is suggested that under mode (ii)

(A.13) an organization will prefer

(i) high expected availability of material together with high uncertainty of availability over
(ii) low expected availability of material together with high certainty of availability.

It follows that the procurement function will be more part of the environment, as it were, leaving the technical core to absorb fluctuations and uncertainty.

Summary

The consequences of mode (ii) scarcity for organizational structures are presented in Table VI and compared with those under abundance.

Net Efficiency

Abandonment of nonessential goals, withdrawal of some coalition members, and demarketing of certain products will result in a smaller sized organization. While organizational survival will be insured by these changes, there are certain penalties, e.g., loss of economies of scale and specialization in personnel and programs, associated with the shrinkage. Also, there will be an increase in cost due to use of inefficient technology, increased decision-making and communication activity, and a larger managerial component. On the other hand, reorganization is expected to result in continuing benefits due to reduction in payment and utilization inefficiencies as well as elimination of marginal activities. Without further investigation however it is not possible to
TABLE VI
Comparision of Certain Organisational Structures Particular to Mode (ii) Scarcity with Those Under Abundance

<table>
<thead>
<tr>
<th>Structural Characteristic</th>
<th>Abundance</th>
<th>Scarcity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of flexibility as a requirement for survival</td>
<td>Can be either high or low*</td>
<td>High: High</td>
</tr>
<tr>
<td>Viability of the mechanistic form of management structure</td>
<td>Viable under certain circumstances</td>
<td>Not viable</td>
</tr>
<tr>
<td>Locus of authority</td>
<td>May be either centralised or decentralised*</td>
<td>Centralised</td>
</tr>
<tr>
<td>Ratio of management personnel to workers</td>
<td>Relatively low</td>
<td>High</td>
</tr>
<tr>
<td>Leading subsystem</td>
<td>Managerial</td>
<td>Institutional</td>
</tr>
<tr>
<td>Characteristics of the purchasing subsystem</td>
<td>(i) &quot;serves&quot; the production and sales subsystems</td>
<td>(i) independent of the production and sales subsystems</td>
</tr>
<tr>
<td></td>
<td>(ii) structured as a boundary spanning unit</td>
<td>(ii) &quot;closer&quot; to the environment than under abundance</td>
</tr>
</tbody>
</table>

* Indicates a high degree of equifinality.
predict whether the post-adaptive organization is more or less efficient than either (i) a similar organization of the same size during abundance, or (ii) itself before reorganization.

Adaptive strategies under mode (ii) scarcity were discussed above. The implications of survival under reduced availability and increased uncertainty were examined, and their consequences for organizational processes and structures analyzed. Certain norms of rationality were developed. Organizational responses to expectations of continuing reduction in essential goods will now be examined.

MODE (iii)

(Continuous reduction in availability of supplies)

The assumptions underlying a mode (ii) scarcity included a high prior probability of survival (as a consequence of certain adaptive responses). When there is no expectation of the availability of supplies stabilizing however, the organization cannot survive as an independent entity. It is foredoomed to failure. Assuming that the organization will prefer continuity (in some form) to closure, it is suggested that the operational problem under mode (iii) will be: **merger or consolidation**.

"A merger is a combination of two corporations where only one survives. The merged corporation goes out of existence...**Consolidation** ...involves the combination of two or more corporations whereby an entirely new corporation is formed" (Van Horne, 1974: p. 605). Alternatively, one company can purchase effective working control of another company and act as a holding company. No distinction will be made among these three alternatives however for the purpose of the present analysis. The focal
organization will be called the "seller" and the referent organization will be termed the "buyer" in all cases.

It is suggested that in order to "survive" the focal organization may seek

(i) horizontal integration,

(ii) vertical integration, or

(iii) merger with a totally dissimilar organization.

The buyer seeks certain advantages and synergies in the acquisition. Horizontal and vertical integration provide some synergies. It will be assumed for the purpose of the argument in this section that, because of these synergies, and other things being equal, the buyer will prefer vertical or horizontal integration over consolidations of any other type. This preference will however result in certain power for the seller relative to the buyer. It follows therefore that the focal organization will prefer vertical or horizontal integration over sale to any other buyer. Preference between horizontal and vertical integration is examined below.

Horizontal integration was identified in Chapter 6 as essentially a cooperative extraorganizational strategy. It was also pointed out that such strategies have low prior probabilities of long-run success: since the potential buyer is similar to the seller, the former will also experience scarcity. Thus, the buyer will also be looking for merger opportunities under mode (iii). Consolidation with another "stricken" organization will not however substantially increase its chances of survival. It is suggested therefore that, other things being equal,
under mode (iii)

(E.1) organizations will not seek to merge with other similar organizations.

There are two possibilities of vertical integration: upward and downward. Downward integration requires the buying organization to be a customer of the focal organization. It may be noted that scarcity will result in reduction of output of the latter. This output may be either essential or inessential for the potential buyer. If it is essential, then mode (iii) scarcity for the seller implies similar scarcity for the buyer. That is, the customer organization too expects to fail in the long run due to continuing reduction in the availability of its essential good. Since the seller is unable to forestall scarcity (for itself) its acquisition will not resolve the material supply problem of the potential buyer. Hence there is little incentive for the latter to merge with its supplier. The focal organization therefore has little power with respect to its customer organization, and cannot obtain any special advantages from the latter.

If the output of the focal organization is not essential for the potential buyer, then scarcity for the former will not necessarily result in scarcity for the latter. I.e., there is no inevitable penalty associated with the merger. Thus given a choice among (i) consolidation with a totally dissimilar organization, (ii) upward integration with a company whose output is essential to it for survival, and (iii) upward integration with an organization whose output is not essential for survival (and where all three are experiencing mode (iii) scarcity), it is suggested that the potential buyer will prefer the last
alternative. This preference will result in power for the focal organization with respect to its customer organization, and it will be able to obtain some advantages in the consolidation. It follows that, under mode (iii),

(E.2) the focal organization will prefer downward integration with a buyer for whom its output is not essential over a customer organization for whom its output is essential.

Three alternatives can be identified with respect to upward integration. The particular organization may seek to merge with

(i) its supplier of the focal essential good, where the scarcity is contrived by the latter;

(ii) supplier of the focal essential good, where the supplier has no control over the availability of the particular good; and

(iii) supplier of any of the other essential goods consumed by it. 19

Each has different implications for the consolidation.

It is possible that a particular supplier may force its customer organization into a merger (or liquidation) by refusing to supply goods till the latter submits to the takeover. After the consolidation has been accomplished however, supplies may be resumed and the (now acquired) focal organization may operate as it did before scarcity. It may be noted that under mode (iii) the seller is, by definition, helpless.

18 Because of the assumption made in the beginning of the section, the buyer will prefer integration to merger with a dissimilar organization. It may be noted that the preference for the supplier of inessential goods is only relative to the other alternatives, and does not imply a strong preference in absolute terms.

19 It is believed that upward integration with a supplier of inessential goods will not present any special synergies. Such mergers are therefore expected to be similar to those with "totally dissimilar" organizations.
Thus, all possible buyers exercise equal power with respect to it. The contriver of scarcity however has a definite prior interest in the acquisition. This interest gives the seller some power in relation to the buyer. It is expected therefore that, other things being equal, the focal organization will be able to obtain a better deal from the architect of its demise than from any other organization. It is therefore suggested that under mode (iii), when the scarcity is contrived by the supplier, the focal organization will seek to merge with the latter.

It may be noted that alternative (ii) above is similar to downward integration where the output of the focal organization is essential for the potential buyer. For reasons discussed earlier, it is suggested that there is little incentive for upward integration with the supplier of the focal good when the latter has no control over its inputs.

The technology of an organization is designed to process, by definition, its essential goods. The organization may fail because of nonavailability of a particular good. It may be revived (or failure prevented) by redesigning it, i.e., by changing its goals and the technology, such that the focal good is no longer essential. If the change is marginal then it will be possible to retain and use most of the existing technology. It is suggested that the supplier of the nonscarce essential good may acquire the focal organization and, by making some changes, revive it. Thus it will obtain a definite advantage from the merger. Expectations of this advantage will result in power for the seller relative to the buyer. It may be noted however that this power will be less when compared to that over the contriver of scarcity (because the latter does not have to make any changes --incur costs--to revive the acquired organization.)
It follows from the above that, under mode (iii),

(E.3) the focal organization will prefer upward integration in the following order of priority (from high to low):

(i) with the contriver of scarcity;

(ii) the supplier of nonscarce essential goods;

and

(iii) the supplier of the focal good, where the supplier cannot increase its output at will.

Let us now compare preferences across upward integration possibilities on the one hand and downward integration possibilities on the other hand. It is believed that contrivance of scarcity suggests the strongest possible prior interest in the merger. Because of the resultant power, it is suggested that consolidation with the contriver of scarcity will be given highest priority.

The advantage accrued to the supplier of the nonscarce essential good will vary inversely as the amount of change necessary to revive the acquired organization. If this change is not expected to be extensive, it is suggested that the focal organization will give preference to integration with the supplier of the nonscarce good over downward integration. It is difficult to predict merger preferences when the change is expected to be extensive.

The consolidations resulting either from upward integration with the "helpless" supplier of the focal good (i.e., where the supplier cannot increase output at will), or from downward integration where the output of the focal organization is essential for the customer organization, are
both foredoomed to failure under mode (iii). It is suggested therefore that under mode (iii)

\[(E.4)\] the focal organization will prefer merger with totally dissimilar organizations over either

(i) the supplier of the focal good when the latter is not the contriver of scarcity, or

(ii) the customer organization where the output of the focal organization is essential to the latter.

Summary

It was assumed that when supplies of the essential good are expected to continue to diminish, afflicted organizations will seek to merge or consolidate with other organizations. Arguing on the basis of buyer interest and resultant power for the seller, certain prescriptions for preferences among merger alternatives were made. This section concludes the study of organizational responses to relative scarcity. The viable organization, i.e., the organization likely to survive during scarcity, will be briefly described in the next (and concluding) chapter.
CHAPTER 8

SCARCITY AND THE ORGANIZATION

The concluding chapter will begin with a brief reference to the work done in the previous chapters.

Summary

Organizations enjoy considerable equifinality under abundance. They are free to choose from among several alternate structures or strategies, and the choice is in a very real sense "arbitrary". Under scarcity however lack of availability of raw materials becomes the operating constraint. This results in shrinkage of the set of organizational alternatives. In the limit, the organization has no freedom and, in order to insure survival, must operate in certain specific ways. These patterns of behaviour follow from the imperatives of scarcity and are not in any way arbitrarily determined. It was suggested that so far there is no knowledge in OT of scarcity related survival behaviour. Evidence to this effect was presented in Chapter 2. An attempt was made in the present thesis to develop such an understanding.

The concept of scarcity was defined, developed, and operationalized in Chapters 3 and 4. The focal problem: consequences of reduction in availability of matter-energy inputs for organizational behaviour, was defined in Chapter 5. Certain prescriptions for interorganizational behaviour were developed in Chapter 6. The particular strategies to be used under norms of rationality, i.e., to insure survival under scarcity,
Different modes of scarcity were identified in Chapter 7:

It was noted that scarcity may be (i) temporary, (ii) permanent, but not so severe as to cause failure in the long run, and (iii) gradually worsening scarcity such that the organization expects to fail in the long run. Organizational responses to the three modes of scarcity were discussed. (It may be noted that by observing intraorganizational strategies it is possible to identify organizational expectations of the mode of scarcity.) Prescriptions for behaviour under norms of rationality were developed.

The various prescriptions in Chapters 6 and 7 were presented in propositional forms. Most of these are directly testable. It is suggested that these propositions may be used as bases to obtain empirical data particular to scarcity and to contrast it with behaviour characteristic of abundance.

The "Scarcity" Organization

It is believed that an understanding of behaviour appropriate to mode (ii) is crucial to an appreciation of the difference between abundance and scarcity. Over 50 propositions which describe various organizational characteristics and strategies under mode (ii) scarcity were presented. The more critical of these propositions are summarized.
in Figure 16 as a diagrammatic description. These describe an organization which is expected to be viable under conditions of permanent scarcity.

It may be noted that the organization as described in Figure 16 contains an inherent inconsistency. It was pointed out in Chapter 7 that authority tends to be centralized during a crisis (proposition D.48). Centralized authority is typically associated with unilateral or autocratic control. But because resources are not assured the top echelon cannot exercise unilateral control (proposition D.34). The two imperatives are thus mutually contradictory. This anomaly is resolved below.

Complete Certainty

It is possible to identify three types of uncertainty regarding availability of material: (i) complete certainty, (ii) medium uncertainty, and (iii) high uncertainty.

When there is complete (or a very high degree of) certainty regarding supplies, the organization can plan its size, structure, and level of activities to correspond to the availability of inputs. The level of inputs will be reduced under mode (ii) scarcity. But if the organization can make the transition from a high to low level of activity successfully—and the various coalition members can lower their aspiration levels to suit—the now smaller organization will operate under conditions of relative abundance. The low level of inflows will be adequate for the organizational purpose, and will not pose an operating constraint (unless

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Discussion with Peter Frost was helpful in arriving at the conclusions stated in this and the next two sections.
FIGURE 16
APPARENT INCONSISTENCY WITHIN THE ORGANIZATION

SCARCITY

Reduced slack

Decision problem not factored

High interdependence

High need for coordination

Decision-making

Coordination by

(i) Joint

or

(ii) Centralized

Crisis climate

Resources not assured

Low tolerance for internally induced uncertainty

Wide variations in the level of organizational activity

Strict controls

Informal controls

Multilateral controls

Authority

Centralized

High degree of externally induced uncertainty

Organization must be flexible

INCONSISTENCY
of course, the organization seeks to grow again). The structure of the new organization may be similar to any of the viable structures under abundance, e.g., bureaucratic.

Medium Uncertainty

A medium level of uncertainty coupled with scarcity of supplies will result in a certain degree of anxiety. This will result in some (but not high) pressure for centralization of authority. The interdependence posed by the uncertainty as well as scarcity however subsume a need for coordination by mutual adjustment and joint decision-making. It is believed that the latter pressure will be strong enough to override the tendency towards centralization. These dominant interactive processes will be compatible with the need for multilateral controls, and thus there will be no internal inconsistency.

The various characteristics peculiar to operation under scarcity accompanied by a medium level of uncertainty are presented in Figure 17 as a diagrammatic description. It is submitted that

the organization described in Figure 17 is ideally suited to operation under scarcity when the uncertainty regarding availability of material is of a medium level.

This ideal type will be labelled the medium uncertainty scarcity organization.

High Uncertainty

Scarcity of organizational inputs may sometimes be associated with a high degree of uncertainty regarding their availability. It is submitted that under such circumstances the organization will be character-
FIGURE 17
THE MEDIUM UNCERTAINTY SCARCITY ORGANIZATION

SCARCITY
(relatively low level of anxiety)

Reduced slack

* Decision problem not factored

High need for coordination

* Joint decision making

* Coordination by mutual adjustment

Resources not assured

High degree of externally induced uncertainty

Low tolerance for internally induced uncertainty

* Strict controls

* Informal or non-programmed controls

* Multilateral controls

Wide variations in the level of organizational activity

* Organization must be flexible. I.e., relatively loose job descriptions, varying spans of control, greater heterogeneity within the subunits, high speed of response to non routine stimuli, less reliance on SOPs, and flexible technology, etc.

* Key descriptors
ized by a high degree of anxiety and will truly operate in a crisis climate. A high level of anxiety however triggers regressive forces in individuals and causes them to indulge in immature patterns of behaviour (Maslow, 1965; 1970). It is suggested that as the level of anxiety mounts, the employees at the lower hierarchical levels will abrogate their decision-making and control responsibilities. Also, they will cease to exercise authority, and the locus of authority will revert to those more used to exercise of discretion. In other words the locus of authority will be centralized by default. It follows that in the highly stressful situations the top echelon will exercise unilateral control.

A high degree of uncertainty subsumes a pressure for speedy response to environmental changes. The cost of joint decision-making under extreme uncertainty will be prohibitively high—both in terms of the coordinative effort required and the time taken. Consequently, both decision-making and coordination will be centralized. This change will be in harmony with the pressure for centralization of authority because of the high level of anxiety. Thus there will be no internal inconsistencies during operation under scarcity associated with high uncertainty of availability.

The various characteristics peculiar to operation under scarcity accompanied by high uncertainty are presented in Figure 18 as a diagrammatic description. It is submitted that the organization described in Figure 18 is ideally suited to operation under scarcity when the uncertainty regarding availability of material is high.
Figure 18
The High Uncertainty Scarcity Organization

SCARCITY
(high level of anxiety)

- Reduced slack
- * Crisis climate
- Resources not assured
- High degree of externally imposed uncertainty

- *Decision problem not factored
- *High interdependence
- High need for coordination
- INCONSISTENCY resolved through abrogation of responsibility by the lower hierarchical levels
- Low tolerance for internally induced uncertainty
- Wide variation in the level of organizational activity
- *Centralized decision-making
- *Cooperation by centralized authority
- *Authority centralized
- *Strict controls
- *Informal or non-programmed controls
- *Unilateral controls
- *Organization must be flexible. I.e., relatively loose job descriptions, varying spans of control, greater heterogeneity within subunits, high speed of response to nonroutine stimuli, less reliance on SOPs and flexible technology, etc.

* Key descriptors
This ideal type will be labelled a high uncertainty scarcity organization.

OT: Scarcity and Abundance

It may be noted that neither of the two ideal types above correspond to any of the traditional descriptions of organizations, e.g., bureaucratic, mechanistic, or organic. While they have certain characteristics in common with each of the organizational descriptions found in traditional OT, as a composite they are unique. Also, while any one or all of the various traditional types of organizations may be equally viable under abundance, it is suggested that the organizations described above have the highest probability of survival under scarcity.

It is pointed out that the descriptions of the two scarcity organizations reflect a reversal of some of the conventional wisdom in OT. Under abundance it is customary to associate centralized and autocratic structures with low uncertainty, and a high level of intraorganizational interaction is recommended for operation under high uncertainty. In the case of scarcity however the reverse is true. As argued above, when the uncertainty is low there is a high level of interaction, with the various elements participating in decision-making and exercising multilateral control. In the case of high uncertainty (under scarcity) however authority is centralized with the top echelon exercising unilateral control.

Concluding Remarks

Descriptions of two types of organizations which are appropriate to scarcity were presented above. It is suggested that under norms of
rationality, and given a particular degree of environmental uncertainty, the prescriptions underlying one or the other ideal type will be used to design an organization. It is believed that such an organization will be viable.

It must be pointed out however that the study encroaches upon a yet unexplored territory. It is not possible to anticipate the totality of the consequences of depletion of natural resources. Malthusian scarcity may perhaps result in disruption of individual values as well as the social fabric. Such a chaos will undermine all the basic assumptions of the dissertation and the foregoing will be reduced to a mere academic exercise.

To end on a more optimistic note however, it is pointed out that man is (or at least has been) innovative and creative, and has exhibited a remarkable proclivity for survival. Perhaps when hard pressed he will be innovative in the organizational context, and organizations even more suitable to operation under scarcity will be designed.
REFERENCES


APPENDIX 1

AN ALTERNATIVE DEFINITION OF SCARCITY

In the interest of generalizability an attempt was made to develop a definition of scarcity which could be applied to all levels of analysis. Such a definition was developed using some of the concepts of utility theory. It was found however that, in addition to being limited in its scope, the definition did not provide many fruitful leads in the study of scarcity related behaviour. Consequently this definition was set aside and another definition more appropriate to the context was developed. The utility based definition is presented below as a matter of interest.

The following behavioural proposition and law of economics both use the notion of utility:

(i) "Human beings seek to maximize satisfaction (or utility)" (Ferguson, 1972: p. 1), and

(ii) Utility is maximized when an individual arranges his consumption such that "every single good is bringing him marginal utility just exactly proportional (sic) to its price" (Samuelson, 1973: p. 433).

It must be remembered that before an analysis of scarcity can have any meaning it is necessary to posit a historical period of non-scarcity. Let us assume therefore that there is a system which does not experience scarcity in the steady state, and that it has allocated resources such that its utility is maximized. Assume now that there is a relative change in the utilities of consumption of the various goods,
such that the demand or utility per unit consumption of a particular good increases. In order to maximize total utility the system will attempt to consume more of the focal good (by reallocating resources from the other goods and reducing their consumption) such that the marginal utility of consumption of the last unit consumed per unit price of each good is again equal. In order to acquire additional quantities of the particular good however it will be necessary to enter into an exchange transaction with a supplying system. (It may be noted that the system is already involved in an ongoing transaction for the quantity of the good consumed before the change in demand.)

The exchange transaction for the additional quantity of the good may result in the following outcomes for the supplying system: It may result in an increase in its total utility, no change in utility, or a decrease in total utility. If the latter, it is expected that it will not willingly enter into the transaction. Under such conditions, i.e., when the transaction cannot be completed because of the unwillingness of the supplying system, the demanding system is said to experience scarcity, and the focal good is scarce. Scarcity can now be defined:

A particular good is scarce with respect to a particular system if the marginal utility of consumption of the last unit per unit price of that good is, for reasons beyond the control of the system, higher than the corresponding utility for other goods.

It may be argued that coercion or threat has disutility, and if the supplying system were to take this into account it may "increase" total utility by submitting to the exchange. Use of force is however inadmissible: it is assumed that when a system is constrained in any way from acting in its perceived best interest the calculus of utility
is disrupted. The disutility of a threat is not, in this context, "additive". The foregoing argument leads to another definition of scarcity:

If a particular system has to resort to threat or violence to obtain a particular good, then that particular good is scarce.

**Advantages and Shortcomings**

As mentioned earlier the above definitions have the advantage of being applicable to systems at all levels of analysis as long as they can be shown to act as integrated units. The definition can thus be used to explain the scarcity of certain commodities, e.g., food, as a consequence of increased demand by a geo-political system, e.g., India. Another advantage of the above definitions is that one of them specifically takes note of and covers the possibility of use of force in the context of scarcity. The definition used in the dissertation lacks these advantages.

The utility based definitions of scarcity have two major shortcomings which more than offset the advantages discussed above: No distinction is made between essential and inessential goods; and there is no provision to cover the consequence of a change in the relative utilities of the supplying system, viz., reduction in supply.

It has been shown in the dissertation that, because of their different behavioral implications, it is important to distinguish between essential and inessential goods in an analysis of scarcity. There is also a qualitative difference between the behavior of organizations with respect to essential goods on the one hand and individuals with respect
to essential goods on the other hand. Thus because of its inability to
distinguish between essential and inessential goods, the utility based
definition is severely limited in its study of scarcity motivated behaviour.

An increase in the utility of consumption of a particular good,
either due to a change in tastes or a reduction in availability, may cause
the supplying system to charge a higher price. Given a fixed level of
resources, the demanding system will have to reallocate resources such
that the marginal utility of consumption of the last unit of each good is
proportional to its new price. Since this adjustment will result in a
reduction in the intake of each good without any change in the respective
utility schedules, the total utility of the demanding system will be
reduced. As long as the marginal utility of consumption of the last unit
per unit price for each good is equal however, none of the goods consumed
can be said to be scarce. It may thus be noted that, while depletion of
natural resources is one of the primary antecedents of scarcity, reduced
supply can, according to the above definition, never result in scarcity.

Two of the major shortcomings of the utility based definition
of scarcity have been discussed above. Since these more than offset the
advantages it possesses, it was decided not to develop the definition any
further. An alternate definition was developed and has been discussed in
the body of the dissertation.
APPENDIX 2

LIMITATION TO THE APPLICABILITY OF THE FIRST LEVEL DEFINITION

According to the first level definition of relative scarcity a good can be said to be scarce with respect to a particular system if for want of the good the system perishes over time. This definition, as mentioned earlier, cannot be generalized to the societal level of analysis. The reasons for this limitation are discussed below. ¹

The definition of relative scarcity can be analyzed to identify, among others, the following characteristics:

(i) In order to survive the system must receive inputs from outside sources.
(ii) The focal input must be essential to the system's survival.
(iii) It must be possible to identify the demise of the system.

As shown below none of these requirements are fulfilled in the case of a society.

In order for individuals and organizations to survive it is necessary that they receive inputs from outside the system. A society may, in contrast, not require any inflows from outside; the "island economy" society may be entirely self-sufficient.

While a society does not receive inputs from outside the system in the manner of individuals and organizations, it does however consume

¹Comments by Craig Pinder have helped tighten the argument in this appendix.
certain goods generated from within the system. These can be classified as social or public goods, i.e., purchased by the polity, in contrast to private goods purchased directly by the individual or the organization. Concrete for construction of dams and highways, steel for railroads, and armaments for the military are possible examples of social goods. While all of these, along with some others, may together be essential for the survival of the society, it is suggested that if any one of these were to be removed, the society would not collapse. Thus none of these are individually essential in the sense that some private goods are essential for individuals and organizations.

The death of an individual is an unambiguous phenomenon, and the transition from life to death is typically well marked and abrupt. Similarly the failure of an organization is relatively well defined, and it is possible to accurately pinpoint the event. In the case of a society however, the transition from a society on the one hand to a totally disorganized mass of human beings on the other hand is gradual. It is not possible to identify, in a manner similar to the above, the point in time when a society cases to be a society.

Because of the various shortcomings pointed out above, the first level definition of relative scarcity cannot be applied to the societal level of analysis.²

²It may be noted that air, water, and sunshine, the free goods of traditional economics, constitute exceptions to the above argument. These are received from outside the system and each one of them is individually essential for survival. If these become scarce then, for the purpose of analysis of behaviour with respect to these goods, the society can be treated as a single unit; and it is also then relatively easy to identify its demise. Thus only in the case of air, water, and sunshine can the definition of relative scarcity be generalized to the societal level of analysis. It may also be noted that the possibility of water, sunshine and
air becoming scarce is quite real (see, e.g., Beeton (1965) for a study of the eutrophication of the St. Lawrence Great Lakes; Harte and Socolow (1971) for reduction of the receipt of radiation from the sun due to the albedo effect of particulates; and Lave and Seskin (1970) for the effect of air pollution on health); and any viable model for analysis of scarcity at the societal level must be able to handle these variables.
APPENDIX 3

DEVELOPMENT OF THE CONCEPT OF SCARCITY:
HUMAN BEINGS AND THEIR AGGREGATIONS

The first level concepts of relative and absolute scarcity were introduced in Chapter 3, and were subsequently developed in the context of organizations and their aggregations. In this appendix individual human beings and their aggregations will be used as the focal systems to develop these concepts.

It was mentioned earlier that, wherever possible, work should proceed towards an integrated body of knowledge. Scarcity of certain inputs result in lack of satisfaction of certain needs. Analysis of scarcity or deficiency motivated behaviour of human beings can therefore be appropriately grounded in need theory.

The theory of human needs is used as a starting point in the exposition of the concept of scarcity in this appendix. The basic postulates of need theory are used to justify choice of certain tools of microeconomic analysis. Goods or need satisfiers which are essential to survival are then distinguished from those which are not essential. Demand and Engel curves for both types of goods are developed. Consumption behaviour of the aggregation is then studied in relation to variations in the availability of these goods on the one hand and the level of resources on the other hand.
Need Theory and Microeconomic Analysis

In need theory in psychology all human beings are said to have certain basic needs which constitute a hierarchy of prepotency (e.g., Alderfer, 1969; Maslow, 1970). An imperative of these needs is that they require fulfillment, and cause the individual to seek and consume need satisfiers. As long as a particular need is unfulfilled it motivates behaviour and the relevant satisfier is perceived to be important. After enough of the satisfier has been consumed however, i.e., when the need has been fulfilled, the particular good is no longer perceived to be important. The individual is then motivated by the less prepotent need in the hierarchy. Other need satisfiers then become the source of satisfaction. These are sought in their turn and the process of consumption of goods towards the satisfaction of needs continues indefinitely.

The imperative of human needs on the one hand, and the inverse relationship between the amount of consumption and the importance of the good on the other hand, are reflected in the two fundamental propositions of human behaviour in economics:

1. "Human beings seek to maximize satisfaction (or utility)" (Ferguson, 1972; p. 1), and

2. "As the amount consumed of a good increases, the marginal utility of the good tends to decrease" (Samuelson, 1973: p. 431).

The indifference curve, a basic tool of microeconomic analysis, subsumes the notion of diminishing marginal utility: the more there is of a particular good, the less the value of the last unit. Demand and Engel curves, the second order tools, subsume both of the above assumptions.
The indifference, demand, and Engel curves are used to present the concept of Malthusian scarcity for individual human beings and their aggregations. Let us consider first the distinction between essential and inessential goods.

**Essential and Inessential Goods**

All human beings have certain instinctoid needs, e.g., the physiological needs and the need for self-actualization (Maslow, 1970). The needs are satisfied by consumption of particular need satisfiers. The hunger need is satisfied, for example, by eating food, and the need for self-actualization by the freedom to create and innovate. Some of these need satisfiers or goods are essential to survival, others are not. Satisfiers of the physiological needs, e.g., air, food, and water are critical for existence; satisfiers of any of the other needs, e.g., freedom, are however not essential.

**Indifference Curves**

Human beings typically consume a large variety of need satisfiers leading to varying degrees of need satisfaction. Total satisfaction (which can also be called utility of consumption) depends upon the rate of consumption of the respective goods. An increase in consumption, within limits, leads to an increase in total satisfaction or utility. It may be noted however that it is possible to substitute varying quantities of one good for another without any change in the level of satisfaction or utility. An individual may derive, for example, the same level of satisfaction from one unit of food and six units of clothing on the one hand as from two
units of food and three units of clothing on the other hand. In other words, he is indifferent between the two combinations. The above and other food-clothing combinations that yield equal satisfaction can be plotted as an "indifference curve". Two such curves are presented in Figure 19. The curve nearer the origin represents a lower level of total utility of consumption of the two need satisfiers.

The curves are drawn concave when viewed from the top because they illustrate a property which seems most often to hold true in real life and is called the law of substitution (Samuelson, 1973):

"the scarcer a good, the greater its relative substitution value; its marginal utility rises relative to the marginal utility of a good that has become plentiful" (p. 441).

In other words, the less there is of a particular good the less is an individual inclined to substitute it for another; and the more there is of a particular satisfier the greater the tendency to replace parts of it with another.

Indifference Curves: Essential and Inessential Goods

It was noted earlier that all goods can be categorized as either essential or inessential. Let us now assume that all essential goods can be represented by a hypothetical good E; which serves as a proxy, as it were, for the universe of essential goods. Similarly, let us assume that all the inessential goods can be represented by another hypothetical good I. An individual thus consumes only two goods E and I. It follows that he needs a certain minimum amount of E for survival: if he consumes

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1This example is taken from Samuelson (1973: p. 441).
FIGURE 19

INDIFFERENCE CURVES

Clothing

higher total utility

lower total utility

Food
less than this amount over any length of time he will die. He may however consume varying amounts of I without endangering survival.

When the individual has more than the critical amount of the essential good he may be inclined to exchange some of it for the inessential commodity. When he is operating at the margin however, i.e., he has barely enough E for survival, he will generally be unwilling to substitute any portion of it for I. This varying propensity for exchange is presented in the form of indifference curves in Figure 20. The vertical line at Q represents the minimum quantity necessary for survival. (It may be noted that there is no corresponding line for the inessential good.) The indifference curves are therefore asymptotic to this line and lie solely in the region to the right of the critical line. There are no curves in the area to the left of the line.

Resource Allocation

Individuals seek to maximize utility. Consumption of different need satisfiers generally result in different rates of increase in satisfaction or utility. The rate of increase of utility of consumption of a particular good also decreases with an increase in the quantity consumed. Thus, assuming limited resources, in order to maximize utility the individual must consume different goods at different rates.

It is reasonable to assume that human beings typically have limited resources. There is a definite limit, for example, to one's strength, salary, or property. If resources were unlimited the individual would consume increasing amounts of each good as long as the total utility of consumption kept on increasing, and would stop when utility began to
FIGURE 20

INDIFFERENCE CURVES: THE ESSENTIAL AND THE INESSENTIAL GOOD—INDIVIDUALS

**Quantity of inessential good**

**Quantity of essential good E**

0Q: Minimum quantity of the essential good necessary for survival
decline. Limited resources however require that, in order to maximize utility, he should allocate them "wisely" across different goods.

For convenience of analysis let us assume that all the different types of resources can be represented by one hypothetical resource $R$. The optimal allocation of $R$ across $E$ and $I$ is depicted in Figure 21. Depending upon the current prices of the two goods, a budget line can be obtained. Let $EI$ be the budget line: the individual will consume $OE$ amount of the essential good if he expends all the resources on it; and will consume $OI$ amount of the inessential good if he allocates all his resources to the latter. The tangent of the budget line with the highest indifference curve will determine expenditure on the two goods. The line $EI$ is tangential to indifference curve 1 at L. At this point the marginal rate of substitution of $I$ for $E$ equals the ratio of the price of $I$ to the price of $E$. The utility of consumption is maximized under equilibrium if the individual consumes $OA$ units of $E$ and $OI$ units of $I$. Allocation leading to any other rate of consumption will be suboptimal.

Reduction in Supply of $E$ and $I$

Let us now assume that the equilibrium is disturbed and that one or more of the following changes occur: there is either an increase in the need or desire, a reduction in the availability of the particular satisfier, or a reduction in the level of resources. An increase in need will result in an increase in the demand for the particular good and its price will be bid up. Similarly a decrease in availability will result

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2 See Ferguson (1972) Chapter 2 for detailed discussion and proof of optimality.
FIGURE 21
OPTIMAL ALLOCATION OF LIMITED RESOURCES
ACROSS THE ESSENTIAL AND INESSENTIAL GOODS

Quantity of I
I
B
Q
A
E
Quantity of E

OQ: Minimum quantity of essential goods necessary for survival.
in increased prices. Let us assume that either because of increased
demand or decreased supply prices go up. The consequences of this change
are explored with the help of the budget line and indifference map
presented in Figure 22.

Let us assume that the price of I goes up without any change in
the nominal price of E. The budget line will then shift from EI to EI',
and will be tangential to indifference curve 2 at M. The quantity of I
consumed will reduce from OB to OB'. A further increase in price will
result in a further counterclockwise shift in the line, till in the limit
the line coincides with the X-axis. This has been shown by line EI.'
The quantity of the inessential good consumed in this instance will be
zero; and the individual will consume OE units of E. If the price of I
is plotted against the amount of I consumed, the resultant demand curve
will be asymptotic to the Y-axis. In other words as the price per unit
of the good increases to infinity, the quantity consumed will tend to zero.
The demand curve for the inessential good is presented in Figure 23.

Let us now assume instead that there is an increase in the price
of E with the nominal price of I remaining constant. The budget line EI
will therefore turn clockwise to E'I in Figure 22, and will be tangential
to indifference curve 3 at N. The individual will now consume OA' units
of E instead of OA. Let us assume that indifference curve 4 represents
the minimum total utility necessary for survival. A further increase in
price will result in the budget line turning clockwise till it is
tangential to curve 4. The individual will now consume OQ units of E and
zero units of I. Any further increase in price of the essential good will
FIGURE 22

THE EFFECT OF PRICE CHANGES ON THE CONSUMPTION
OF ESSENTIAL AND INESSENTIAL GOODS

OQ: Minimum quantity of essential goods necessary for survival
FIGURE 23
DEMAND CURVE FOR THE INESSENTIAL GOOD

Price per unit of I

Quantity of I consumed
result in his being unable to consume the minimum amount of the essential good necessary for survival, and will perish. Thus at prices higher than the critical level there will be zero consumption of both E and I. If the price of E is plotted against the amount of E consumed, the resultant demand curve will terminate abruptly at a point where the quantity of E consumed is equal to the critical amount necessary for survival. The demand curve for the essential good is presented in Figure 24.

Reduction in the Level of Resources

Assuming that there is no change in the prices of E and I let us investigate the effect of a reduction in the level of resources. A reduction in R will result in the budget line shifting towards the origin parallel to the original budget line. This change is depicted in Figure 25. Let us assume that the line has shifted from EI to E11, and is tangential to indifference curves 1a at P. The consumption of E and I will reduce from OA and OB to OA1 and OB1 respectively. (It may be noted that the rate of decrease in consumption of I is more than that of E.) If R is reduced still more the line will shift till it is tangential to indifference curve 4. At this point the quantity of the essential good consumed is 0Q, and the amount of the inessential good consumed is zero. Any further reduction in income will result in the individual being able to procure enough of the essential good to survive, and will perish, resulting in zero consumption of E. If the level of resources is plotted against the quantity of E and I consumed, the resulting Engel curves will be of the shape presented in Figure 26.
FIGURE 24

DEMAND CURVE FOR THE ESSENTIAL GOOD FOR
AN INDIVIDUAL

Price per unit of E

Y

0 Q

X

Quantity of E consumed

OQ: Minimum quantity of the essential good necessary for survival
FIGURE 25
EFFECT OF REDUCTION IN INCOME ON CONSUMPTION
OF ESSENTIAL AND INESSENTIAL GOODS

OQ: Minimum quantity of essential goods necessary for survival.
CONSUMPTION AS A FUNCTION OF THE LEVEL OF RESOURCES
ESSENTIAL AND INESSENTIAL GOODS—INDIVIDUALS

OQ: The amount of the essential good necessary for survival

OR: The level of resources necessary for survival
Aggregate Behaviour

Development of demand and Engel curves for essential and inessential need satisfiers for a single individual have been discussed above. Let us assume that there are several individuals, all of them identical in their levels of resources and their patterns of consumption. The aggregate demand and Engel curves for the two goods will therefore be similar to the individual curves presented in Figures 23 and 24. The demand curve for I will be asymptotic to the Y-axis, while that for E will terminate at a point corresponding to the minimum amount necessary for survival of all the individuals in the aggregation. The Engel curves for the aggregate will terminate at a point corresponding to the critical level of resources for the aggregation; at this point the consumption of I will be zero and that of E will be equal to the minimum necessary for survival. The curves are similar to those presented in Figure 26.

Changes in Supply of the Essential Good

Let us now study the aggregate consumption behaviour consequent upon changes in the availability of the essential good. Assume that demand does not increase. As the supply of E decreases its price will rise and consumption fall till it reaches the critical level. As the supply decreases still further however, the total amount of E available will be less than that required for survival of all the individuals. Thus at the margin at least one person will die. This critical point is represented by J in Figure 27.

A reduction in the size of the aggregation will result in the demand curve shifting left, intersecting the supply curve at K₁; a further
FIGURE 27

LOCUS OF INTERSECTION OF THE AGGREGATE SUPPLY AND DEMAND CURVES FOR THE ESSENTIAL GOOD FOR INDIVIDUALS

Y

Price per unit of E

X

Quantity of E

OQ: The amount of the essential good necessary for survival of one individual

OQ₁: The amount of the essential good necessary for survival of all the individuals in the aggregation
reduction in supply will cause the supply curve to move upwards, till at $J_1$ the quantity of $E$ consumed is the minimum for the survival of the residual aggregation. Reduction in the availability of the essential good beyond this point will cause another death, and the supply and (residual) demand curves will now intersect at $K_2$. The curves $KJ, K_1J_1, K_2J_2, \ldots, K_nJ_n$ represent the locus of intersection of the supply and demand curves of the essential good.

If the aggregation is large enough, i.e., the points $J, J_1, J_2, \ldots$ are close enough to each other, the locus of intersection to the left of $J$ can be approximated by the straight line $J_nJ$ in Figure 28. The point $J_n$ corresponds to the minimum amount of $E$ necessary for the survival of the last individual. It may be noted that the price of $E$ does not rise beyond the critical point. Also, when the supply curve moves to the right (because of increased availability) from, say, $C$ in the critical region, the locus of intersection will not move right along the horizontal line; it will instead move southeast along the residual demand curve $CD$ to the left of the original demand curve.

Changes in the level of Resources

Let us now analyze variations in aggregate consumption associated with changes in the level of resources. Let us assume that there is no change in either supply or demand. As aggregate resources decrease, consumption of both $E$ and $I$ will reduce; till at the critical level the amount of the inessential good consumed is zero, and only the minimum amount of the essential good necessary for survival is consumed. The aggregate Engel curves corresponding to the foregoing reduction in resources

\footnote{Comments by Vance Mitchell were helpful in the development of the argument in this section.}
FIGURE 28

LOCUS OF INTERSECTION OF THE AGGREGATE SUPPLY AND DEMAND CURVES FOR THE ESSENTIAL GOOD FOR INDIVIDUALS:

APPROXIMATE REPRESENTATION

\[
\begin{align*}
\text{Price per unit of } E \\
\text{OQ: The amount of the essential good necessary for survival of one individual} \\
\text{OQ}_1: \text{The amount of the essential good necessary for survival of all the individuals in the aggregation.}
\end{align*}
\]
are presented in Figure 29. If the level of resources is decreased still more the aggregation will be unable to acquire the minimum $E$ necessary for survival. At the margin at least one person will die. If it is assumed that certain material resources survive him, i.e., he has some resources, e.g., property, in addition to strength, skills, and information, then the total level of the residual resources may be sufficient for the survival of the rest of the aggregation.

If aggregate resources continue to dwindle beyond $R_1$ in Figure then the Engel curve for the residual population will be of the shape $FF_2$; $OO_2$ being the minimum $E$ required for their survival. If resources fall below $R_2$ then a second person will die, and the Engel curve of the residual will be of the shape $F_2F_3$. As resources continue to diminish more and more people will die, till at level $R$ there is only one survivor who will consume $OO$ units of $E$. $GF_n$ is the Engel curve for the last individual. If the level of resources increases from any point, say, $R_3$ below the critical level, the consumption of $E$ and $I$ will be determined by Engel curves of the residual aggregation; and curve for $I$, $R_3I_3$, will begin at $R_3$, and that for $E$, $F_3F_3'$, will be a continuation of the curve $F_3F_2$.

It may be noted that if the points $F$ and $G$ are joined by a straight line then the various points $F_2$, $F_3$, ..., $F_n$ will all lie along this line. If the number of individuals in the aggregation is large such that the points $F_2$, $F_3$, etc., are close to each other, then the various Engel curves below $F$ will lie close to the straight line $FG$. The portion of the Engel curve below $F$ is accordingly approximated by a straight line in Figure 30.
FIGURE 29
CHANGES IN AGGREGATE CONSUMPTION CORRESPONDING TO VARIATIONS IN THE LEVEL OF RESOURCES: INDIVIDUALS

\[
\begin{align*}
\text{Resource Level} & \quad \text{Inessential good} & \quad \text{Essential good} \\
R_1 & \quad I_3 & \quad F\_3^1 \\
R_2 & \quad F\_3 & \quad F\_3 \\
R_3 & \quad F\_n & \\
R & \quad R & \quad Q_1 \\
0 & \quad 0 & \quad Q_2 \quad Q_1 \\
Q & \quad \text{Quantity of goods consumed}
\end{align*}
\]

\(OQ\): The amount of the essential good necessary for survival of one individual

\(OQ_1\): The amount of the essential good necessary for survival of all the individuals in the aggregation

\(OR\): The level of resources necessary for survival of one individual

\(OR_1\): The level of resources necessary for survival of all the individuals in the aggregation
Figure 30

Changes in aggregate consumption corresponding to variations in the level of resources: Individuals—approximate representation

-OQ: The amount of the essential good necessary for the survival of one individual

-OQ\(_1\): The amount of the essential good necessary for survival of all the individuals in the aggregation

-OR: The level of resources necessary for survival of one individual

-OR\(_1\): The level of resources necessary for survival of all the individuals in the aggregation
Changes in Supply of the Inessential Good

Let us now study the aggregate consumption behaviour of the inessential good. Let us assume that demand does not increase. The rate of consumption of I will then depend upon one or more of the following factors: (i) the supply of I, (ii) the level of resources, and (iii) the supply of E. If the availability of the inessential good reduces and tends to zero, its price will rise and tend to infinity, and consumption will fall and tend to zero. If the level of resources falls the rate of consumption will fall, till at the critical level the consumption of I is zero. If there is a reduction in the availability of the essential good (with no corresponding reduction in its demand) its price will increase. This will result in a transfer of resources from I to E with a drop in the consumption of the former. As supply of E continues to diminish, less and less of I will be consumed, till when E is at the critical limit the consumption of I will be zero.\(^4\)

Relative and Absolute Scarcity

Absolute scarcity has been defined earlier as that which leads to the extinction of at least one unit in the system. It follows from the arguments in this chapter that aggregations may experience absolute scarcity for one or more of the following reasons:

\(^4\)While reduced availability of I results in some reduction in the consumption of E, the effect is marginal when operating near the critical limit. Since we are interested in behaviour at or near the critical limit only, this effect has been ignored in the analysis of the aggregate consumption behaviour of the essential good.
(i) An increase in demand for essential goods,

(ii) A decrease in the availability of these goods, and

(iii) A reduction in the level of resources or the ability to acquire the goods.

Holding the level of resources constant, either of the first two reasons may lead to the total demand exceeding the total supply at the critical price. With supply and demand constant the third might result in the aggregation being unable to procure enough of the good at the prevailing market price.

In formal terms therefore a good can be said to be scarce in the **absolute** sense if:

(i) The locus of intersection of the supply and demand curves is a horizontal straight line (Figure 28); or

(ii) The Engel curve is a sloping straight line to the left of the critical point (Figure 30).

It was assumed so far that the aggregation was comprised of individuals with identical demands and resources. It if is assumed however that one particular person needs more of E than the rest in order to survive but has the same R, or needs the same amount of E but has less R than the rest, then he will be the first to die as a consequence of the changes described above. Such a person will experience relative scarcity.

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It can be argued that the ability to pay, or the power to acquire, is subsumed under the demand function. This is generally true in the long run in the case of inessential goods like cars and stereos; the demand curve shifts to the left in response to a decrease in income, and vice versa. In the short run however (which in the case of larger systems, e.g., countries, may be several years) demand is independent of the level of resources.

The demand curve for goods that are **essential** for survival, e.g., food, is relatively independent of the level of income; an individual’s demand curve does not move left beyond a certain point even in the long run in response to reductions in purchasing power.
Differences Between Individuals and Organizations

The foregoing exposition is parallel to (though more detailed than) that in Chapter 3 of the dissertation. While development of the concepts of absolute and relative scarcity have revealed many similarities at the first level of abstraction, there are some differences between individuals and organizations. These are discussed below:

It may be noted that the loci of intersection of the aggregate supply and demand curves for goods consumed by human beings are different from those for organizations. (See Figures 28 and 9 respectively.) This is because of the different relationship between the goods and individuals on the one hand and goods and organizations on the other hand: In the former case the property of being essential or inessential is intrinsic to the good; and an inessential (essential) good will always remain inessential (essential) to human survival. If, for example, the hypothetical inessential good I were to vanish overnight, the survival potential of its consumers will not be affected in the least. If however, the essential good E were to disappear, all the human beings would die. In contrast to human beings, the goods consumed by organizations derive their property of being essential or inessential from the organizations themselves. Thus if good A, for example, were to be withdrawn only some of the organizations would perish; all A's would fail, but none of the B's would be affected.

Again, if the price of the essential good E was fixed (in an impossible scenario) above the critical price, two things would happen: no E would be consumed, and everybody would die. In the case of organizations however, if the price of, say, A was fixed above the critical
level, some A would still be consumed, and only some organizations would perish.

The aggregate Engel curves for goods consumed by humans are also different from those for goods consumed by organizations. (See Figures 30 and 11 respectively). Here again the difference arises from the nature of the relationship of the good to the consuming unit. In the case of human beings, the Engel curves for essential goods are qualitatively different from those for inessential goods. In the case of organizations however the goods cannot be classified a priori as essential or inessential. Because of the diversity of organizations in real life, a large variety of goods can be categorized as essential in one or the other context. They can, for similar reasons, be classified as inessential in other contexts. Thus each good is partly essential and partly inessential. The Engel curves for any two goods consumed by organizations are thus not as dissimilar to each other as the Engel curves for essential and inessential goods are for human beings. Thus even if A*s and B*s were not identical, the aggregate Engel curves for A and B would be more similar to each other, than the corresponding curve for E is to I.

Second Level Definitions

The first level definition of relative scarcity was useful for a formal development of the concept of scarcity. It was noted however that the definition was not applicable to most of the areas of interest in a study of scarcity related behaviour in organizations. In order to increase its relevance therefore the definition was expanded to a second level in the context of organizations.
The first level definition is similarly limited in its coverage of scarcity motivated behaviour of individual human beings. According to this definition a good can be said to be scarce with respect to an individual if its lack results in his death. A dead human being is however of limited interest to the student of behaviour; and as long as the subject is alive, no material can by definition be scarce. In order to include further areas of interest in the case of scarcity related human behaviour therefore, it is necessary to modify the definition of relative scarcity.

According to need theory in psychology, human behaviour is motivated by unfulfilled needs: If a particular need is not satisfied, i.e., an individual is unable to consume adequate quantities of certain need satisfiers, then his behaviour is determined in part by the particular need. According to Maslow's (1970) hierarchical theory of needs if a particular need is satisfied, the next higher need then governs behaviour. If it is only partly satisfied however, the individual remains fixated at that level, and the higher need does not emerge. If on the other hand, the need is not satisfied at all, i.e., the particular need satisfiers are not available at all (or available in quantities below a certain threshold), then the individual regresses to the next lower need.

According to the Third Force psychologists (see, e.g., Goble, 1972) both the needs and the hierarchical progression are instinctoid phenomena. It is in the "nature of things" that man progresses from the lower to the higher needs; and an individual who is unable to reach the top of the hierarchy may be labelled "sick". It has been noted above that progression along the hierarchy depends upon the degree of availability of certain need satisfiers. If enough of certain goods are not
available progress is arrested. The individual is then fixated at a particular need level, and his behaviour may consequently be classified as pathological. In the extreme case lack of certain inputs may cause him to regress; inducing a definite (undesirable) qualitative change in behaviour.

The implication of scarcity for human behaviour have been pointed out above. Lack of need satisfaction results in changes which are important in the extra- and the intra-organizational contexts. Maslow (1970) has argued for the importance of the self-actualized person to society. Both content and process psychology theorists of motivation (e.g., Miner and Dachler, 1973) recognize the ill effects of lack of availability of certain need satisfiers in the organizational context. Because of its importance to the student of human behaviour it is only proper that the antecedents of such undesirable behaviour are included in a second level working definition of scarcity.

In the case of organizations, the definition of relative scarcity had been enlarged to incorporate the following consequences of lack of a particular good: (i) taking up of slack and reduction in size, and (ii) under certain circumstances, prevention of further growth. The definition of relative scarcity for human beings is enlarged below to parallel this modification:

A particular need satisfier can be said to be scarce with respect to a particular human being if the quantity of the good available to him is such that it causes the individual to

(I) regress to the next lower level need, or
(II) remain fixated at that particular need level.
Similarities and Differences

The second level definitions of scarcity for individuals and organizations were both developed from the same first level definition. Because of their common origin the two are similar in certain respects. Since they deal with different types of subjects however, there are some differences between them. These similarities and differences are examined below.

Both organizations and individuals consume matter-energy-information. In the case of organizations each input serves a particular purpose which is relatively invariant. Steel and information on stocks, for example, are acquired for definite purposes; and the needs they serve do not change very much over time. In the case of human beings, in contrast, one particular input may serve several needs at the same time; or it may satisfy different needs at different times. Again, the information needs of an organization are largely of the "cognitive" type. In contrast the information inputs in the case of the individual have a substantial conative content; and it is this latter which is responsible for movement across the need hierarchy.

In the case of organizations, any reduction in consumption of matter-energy would necessarily result in a corresponding reduction in slack or size. If the reduction is only marginal however, there would be no qualitative change in the organization. A relatively large reduction on the other hand would result in a structural change. In the context of psychological variables there is no parallel to "slack" or "size". (Although lack of certain items, e.g., food, may result in loss of weight, the primary effect is limited to lowering of the level of
activity, i.e., decreased "organizational efficiency"). But, like the organization, a small reduction in input would not result in a qualitative change; it would require a relatively large reduction to result in fixation and then regression.

In the case of organizations an essential good is always relevant to the functioning of the organization; there is no change in its importance for the continuation of the organization. In the case of individuals however, once the person has regressed to a lower need, the higher need does not by definition motivate behaviour. The satisfier of the higher need is then no longer relevant: it is no longer "essential" in the sense that the corresponding good is always essential for an organization. Thus while the role of a particular good does not change with a reduction in the size of the organization, its importance for the individual varies with regression in the need hierarchy.

It has been noted that reduction in inputs may result in qualitative changes in human behaviour: a safety motivated person is quite different from, for example, another who is motivated by the love needs. They result in effect in a change in the nature of the individual. While reduced inputs may lead to structural changes in the case of an organization, they will not, unless there is a change in organizational goals, result in a change in the "nature" of the organization in a manner similar to that for an individual. Thus while scarcity may result in a change in "kind" for individuals it can be argued that it only results in a change in "degree" for organizations.

First and second level definitions of scarcity in the context
of individuals have been developed in this appendix. Certain similarities and differences have been pointed out between individuals on the one hand and organizations on the other hand. At the first level the definition of scarcity was common to both individuals and organizations. Because of reduced abstraction however, the two second level definitions reflect the peculiarities of individual human behaviour on the one hand and organizations on the other hand. Thus, while similar in many respects, the two definitions are not interchangeable.

The second level definitions of scarcity for human beings can be applied to the study of behaviour outside the organization as well as micro level organizational behaviour. Because of our present interest in macro theory however these definitions have not been developed further. It is hoped that these will be used at a later date towards a theory of micro behaviour in a context of Malthusian scarcity. For the present we are content with merely establishing these definitions as a foundation for a future integrated theory of scarcity related organizational behaviour that will encompass both macro and micro levels of analysis, and will also have relevance to scarcity motivated behaviour outside the organizational context.