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Volume Title: Problems in the Study of Economic Growth

Volume Author/Editor: Universities-National Bureau

Volume Publisher: NBER

Volume ISBN: 0-87014-192-9

Volume URL: <http://www.nber.org/books/univ49-1>

Publication Date: 1949

Chapter Title: Theories of Socioeconomic Growth

Chapter Author: Joseph J. Spengler

Chapter URL: <http://www.nber.org/chapters/c9512>

Chapter pages in book: (p. 45 - 114)

III

Theories of Socio-Economic Growth

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## Contents

- I Tentative Statement of Problem
- II Tentative Point of Departure
- III Representative Theories of Social Growth
  - 1 The Logistic Theory of Growth
  - 2 Exhaustion of Critical Natural Resources and/or of Relatively Unoccupied Space
  - 3 The Emergence of Higher Levels of Integration
  - 4 Activation by a Creative Minority
  - 5 Change in Biological Composition of Population
  - 6 Price Movements
  - 7 Proportion in Growth
  - 8 Theories of Growth-Stages
  - 9 Changes in Culture or in Cultural Configurations
  - 10 Miscellaneous Determinants of Growth
- IV Are Societal Laws of Growth Discoverable?

This report was initially undertaken on the supposition that social scientists occasionally had hinted at and sometimes had formulated laws of principles suited to describe and explain the course of growth (i.e., the rise, the stationary condition, or the fall) of such large collectives (or 'social organisms') as societies, states, cultures, and 'civilizations'. It was supposed that an assay of the literature would frequently suggest and sometimes reveal logically tenable and empirically testable principles respecting the rise and/or fall of larger collectives. A great deal of seemingly relevant historical, sociological, economic, political, and anthropological material has been examined. Relatively more attention has been given to historical, sociological, and socio-economic writings than to others because the former have been more immediately concerned with the subject under discussion. More attention has been given to the works of English and American writers than to those of continental scholars.

In the course of preparing this report it became evident that the principles being sought for in the literature were formulated with less frequency than had been anticipated, and then, as a rule, with a smaller amount of precision than empirical testability calls for. In consequence the emphasis of this report was shifted. Attention was given to the statement of the problem of growth and to a summation of the principal theories of the process of socio-economic growth that had been outlined in the literature examined.

This report is divided into four main parts. In Part I an attempt is made to state in tentative, theoretical terms the problem of growth as it is conceived here. In Part II consideration is given to the magnitudes that may be employed to represent growth, and a point of departure is suggested. In Part III, which constitutes about three-fourths of this report, the theories

of socio-economic growth are classified under nine heads, and each type of theory is described. In Part IV consideration is given to the possibility of discovering satisfactory laws of economic growth. The works cited, together with occasional supplementary matter, are indicated in the list of footnotes appearing at the end of this report.

### I Tentative Statement of Problem

The past, present, and future state, or course, of growth of a large society needs to be represented by some operationally definable magnitude or complex of magnitudes. For the sake of brevity let us call this magnitude (or complex of magnitudes)  $\underline{M}$  and its incremental rate of growth  $\underline{M}'$ . Let us then define as rising or expanding any society characterized by a positive  $\underline{M}'$  and an increasing  $\underline{M}$ ; as stationary, any society with a zero  $\underline{M}'$  and a constant  $\underline{M}$ ; and as declining or contracting, any society with a negative  $\underline{M}'$  and a diminishing  $\underline{M}$ .

If this type of definition be accepted, it is essential that various short-period movements (e.g., seasonal, cyclical, irregular) be eliminated from the index of  $\underline{M}$  employed so that this index represents the long-run trend or drift of the society. Analyses of the how and the why of the long-run drift may take the short-period movements into account in so far as they exercise a determinable influence upon the long-run trend.

Selection of some magnitude to serve as index of a society's course of growth does not imply that the referent of this index is that society's primum mobile. The very nature of social reality precludes this implication, since the various isolatable sources of movement in a society, even though marked by some autonomy and some novelty-creating power, are interdependent, and interdependent in such a way as to exclude the possibility of unchanging

lead-lag interrelationships. In fact the magnitude employed will almost inevitably be a variable much more dependent than independent, yet suited to facilitate the discovery and analysis of the ways in which sources of movement or change affect M and M'.

Time may be important and space is important because change in magnitude takes place in the womb of time and space. Since time is accessible to all societies, it may be neglected unless the object of study is the rate of change per period of time. The space aspect of change in magnitude is always important, however, because of the limitations space helps to impose either upon the rate and volume of growth (i.e., M' and M), or upon the direction of growth, or upon all these aspects of growth.

Account may be taken of the spatial factor through the division of growth into two types, the vertical and the lateral. A magnitude grows by ingesting and digesting its environment and transmuting this environment into itself; it remains stationary when influx just balances efflux; and it declines when, because efflux exceeds influx, environment absorbs a part of the magnitude residing in that environment. If a magnitude has no space into which to spread, it can grow only by exploiting more intensively its already given environment and absorbing more of the content of that environment. This type of accretion may be called vertical growth. If a magnitude can and does spread through a greater and greater extensity of space and in the process absorbs more and more of this expanding environment, its growth may be described as lateral in character. If a magnitude is increasing in both manners its growth is vertical-lateral in form. Similarly, negative growth may be negatively-vertical, negatively-lateral, and negatively-vertical-lateral in nature. If the environment merely absorbs part of the magnitude,

the contraction is negatively vertical; if the magnitude is contracting because the space accessible to it is shrinking, the contraction is negatively lateral; if the magnitude is being absorbed by its environment in both respects, the contraction is negatively vertical-lateral.

In practice the distinction between vertical and lateral, though highly significant, is somewhat blurred. Societies may differ greatly respecting both the amount of the space under their sovereignty and the amount of essentially empty (for the purposes of our discussion) space that is readily susceptible of being brought under their control. Again a society to which space limitation makes only vertical growth accessible may slightly offset its lack of opportunity for lateral expansion by importing materials from other environments and incorporating them into the magnitude registering this society's vertical growth. Yet again, although vertical growth does not necessarily imply lateral growth, lateral growth usually presupposes vertical growth; moreover, negatively lateral contraction apparently tends to issue out of negatively vertical contraction.

In one respect at least lateral growth sometimes must be distinguished sharply from vertical growth. Lateral growth may be defined to consist either in (a) the expansion of a society into essentially unoccupied space, or in (b) the seizure by one society of a portion of another society's space and population. Growth under condition (a) will not entail an increase in growth-checking heterogeneity that is substantially different in nature and amount from that which accompanies vertical growth. Under condition (b), however, lateral expansion is accompanied by considerable growth-checking heterogeneity, at least until such time as the seized population is culturally integrated into that of the society doing the seizing.

Certain assumptions may be made respecting the growth determinants of a society. While it may be postulated that a society usually is inert and indisposed to expand, it is much more in accordance with reality to suppose that a society normally tends to grow by absorbing its environment until obstacles arise to prevent further growth and perhaps even to bring about contraction. It is convenient and compatible with reality to suppose that the determinants of a society's growth are both internal and external to that society.

## II Tentative Point of Departure

Inasmuch as scholars have differed respecting the magnitudes they have selected to represent growth, we are free to select a magnitude to serve as a point of departure in centering the present discussion upon economic and related aspects of growth. Let  $\underline{A}$  stand for per capita net product of goods and services;  $\underline{P}$  for the aggregate population composing a society; and  $\underline{AP}$  for the aggregate net product of that society. Let  $\underline{A}'$ ,  $\underline{P}'$ , and  $\underline{A}'P + \underline{AP}'$  represent, respectively, the incremental rates of growth of  $\underline{A}$ ,  $\underline{P}$ , and  $\underline{AP}$ . Of the magnitudes possibly suited for the present discussion,  $\underline{A}$  and  $\underline{AP}$  seem to be the most satisfactory in that one or the other or both will be sensitive to and reflect many if not all of the changes taking place in the society. Accordingly, it may usually be supposed that a society is rising, stationary, or declining according as  $\underline{A}'$  and  $\underline{A}'P + \underline{AP}'$  are positive, zero, or negative. (It is assumed, as stated earlier, that short-period movements have been eliminated from our indices.) The significance in terms of social process of changes in these incremental values is not determinable until the changes have been 'casually' linked with antecedent changes and events. It is conceivable that such a determination may reveal  $\underline{A}$  or  $\underline{AP}$  still to be increasing



even though in other parts of the society there already are underway processes that will bring about a diminution in  $\underline{A}$  or  $\underline{AP}$ .

It should be noted parenthetically that  $\underline{A}$  is not in itself an adequate measure of man's material welfare.  $\underline{A}$  is not adjusted for the manner in which total net product is distributed, or for the amount of leisure per capita that is available jointly with  $\underline{A}$ . If  $\underline{A}$  is adjusted for these two circumstances it constitutes a reasonably adequate measure of man's material welfare. Moreover, if these and other circumstances are held constant, the movement of  $\underline{A}$  serves as a reasonably accurate measure of the change in man's material welfare.<sup>1</sup>

The level of per capita net product (i.e.,  $\underline{A}$ ) in any particular society has many determinants. None of these determinants is completely independent. On the contrary, each is connected, usually in a manner involving mutual interdependence, with a greater or lesser number of the remaining determinants. While these determinants are interrelated and not always physically separable one from another, they are analytically distinguishable. Working lists of the determinants of the level of per capita net product therefore may be prepared. While such lists may differ in organization, they may not differ in aggregate content, if they are to prove equally useful to the analyst. The use of such a list is essential, moreover, to the study of the growth of per capita net product, since otherwise the effects of some of the determinants may be overlooked.

There follows a working list of twenty determinants of the level of per capita net product, nineteen of which are specifically identified and one of which does duty as a residual category within which may be placed product-governing forces that, while not significant at present, may become significant.

- 1 Age composition of the population;
- 2 Biological composition of the population;
- 3 Health composition of the population;
- 4 Material equipment (i.e., resources, productive machinery, etc.) per worker;
- 5 State of the industrial arts;
- 6 State of the educational, scientific, and related cultural equipment of the population;
- 7 Make-up of the prevailing value-system: in particular, the values of the socio-economic leaders and the values which significantly affect economic creativity and the disposition of man to put forth economically productive effort;
- 8 Dominant character of the politico-economic system: is it free-enterprise, mixed, social-democratic, or totalitarian in character?;
- 9 Effectiveness and stability of the rules, institutions, and legal arrangements designed to preserve economic, political, and civil order;
- 10 Degree of cooperation and amity obtaining between the groups and classes composing the population;
- 11 Degree to which the population's pattern of consumption is adjusted to its pattern of resource-equipment;
- 12 Flexibility of the institutional structure and physical apparatus of the economy;
- 13 Relative amount of vertical and horizontal mobility characteristic of the population;
- 14 Internal geographical distribution of economic activities;
- 15 Exchange relations obtaining between the economy under study and other economies;
- 16 Degree of specialization and division of labor in effect;
- 17 Scale of economic organization and activity prevalent;
- 18 Relative amount of complete, partial, and disguised unemployment present;
- 19 Distribution of the power to make and execute entrepreneurial decisions;
- 20 Residual factors which, though not significant at present, may become significant.

Each determinant must be so defined as to make it analytically and operationally distinguishable from the others. Even so, each determinant, when thus defined, will be found to be related to some other determinant or determinants; and the whole group will be discovered to constitute a network of more or less interdependent elements. No one of these elements will be found always to act as a prime mover that initiates change and compels other elements to adjust thereto. In theory, at least, we may conceive of each determinant as behaving sometimes as an independent variable that acts autonomously and imposes upon other elements the need to undergo adjustive or adaptive change, and at other times as a dependent variable that responds adaptively to pressure put upon it by other variables that have acted autonomously.

The twenty determinants enumerated above may be arranged into eight groups, the members of each group possessing certain properties in common. The eight groups follow. After the adjective describing each group are given its members which are identified by the Arabic numbers preceding them in the above list.

- I Demographic: 1, 2, 4;
- II Material: 4;
- III Cultural: 5, 6, 7;
- IV Political: 8, 9, 10;
- V Structural: 11, 12, 13;
- VI Relational: 14, 15;
- VII Organizational: 16, 17, 18, 19;
- VIII Residual: 20

The level of per capita net product is governed by the twenty determinants listed above. It follows that a change in this level (i.e.,  $\Delta$ ) will follow upon a change in any one of these determinants. This change may be positive or negative accordingly as the determinant undergoes change that is favorable or unfavorable to the growth of  $\Delta$ . If the determinants remain

constant,  $\underline{A}$  will remain constant. If some determinants change in one direction and others in an opposite direction,  $\underline{A}$  will increase, remain unchanged, or decrease accordingly as the net effect of these changes is positive, zero, or negative.

The twenty determinants differ widely in their capacity to produce changes in  $\underline{A}$ . Determinants 1, 3, and 7-19 are each capable of exerting only a finite and relatively small amount of influence upon the growth of  $\underline{A}$ . For example, there is a limit to the extent to which the age composition of a population may be altered in a manner favorable or unfavorable to the growth of  $\underline{A}$ . There is a limit likewise to the extent to which  $\underline{A}$  can be affected adversely or favorably by changes in the location of economic activities. Determinants 5 and 6, by contrast, are capable of exercising an income-increasing or decreasing effect that is both more or less continuous and quantitatively significant. Determinant 4 likewise appears capable of affecting  $\underline{A}$  continuously but in a lesser measure than determinants 5 and 6. Determinant 2 may affect  $\underline{A}$  for a long time but in a manner quantitatively much inferior to determinant 4. In the light of what has just been said, it is evident that growth of  $\underline{A}$  will be governed predominantly by the movement of determinants 5, 6, and 4; that is, by changes in man's industrial arts, in his cultural equipment, and in his material equipment.

If  $\underline{AP}$  is selected to represent the course of growth of a society, it becomes necessary also to account for the movement of the aggregate population  $\underline{P}$ . The magnitude of  $\underline{P}$  is governed by one or more of three factors: the annual rate of natural increase, the annual net rate of immigration or emigration, and the acquisition or loss of territory. The first of these factors, the most important by far, is regulated principally by the

circumstances controlling mortality and those elements in a people's value system which condition procreation. The second and third factors reflect socio-economic differences obtaining between the society under study and other societies.

When AP is selected to represent the course of societal growth, it becomes necessary to recognize that a change in P may operate through the medium of some or all of the twenty determinants of A listed above. In some instances A will be affected adversely; in others it may be affected favorably, or it may not be affected at all. For example, the capacity of determinants 5, 6, 7, 8, and 9 to affect A is not materially altered by changes in the size of the population (i.e., P). Nor does it appear likely that an increase in P will significantly affect A through the medium of determinants 2, 10, 12, and 19. An increase in P may affect A adversely through the medium of determinants 11 and 14-18, but it need not necessarily have this effect. An increase in P will affect A adversely through the medium of determinant 4, and it may at least temporarily affect A adversely through the medium of determinants 1, 3, and 13.

In the next section we present summary accounts of various theories of societal growth. While none of these theories treats A or AP as the overriding index of growth, each of these theories purports to throw light at least indirectly upon the course of A and AP.

### III Representative Theories of Social Growth

This section outlines various theories of growth, detailed consideration of which may disclose logically acceptable principles susceptible of empirical verification or nonverification. The theories treated here relate to larger social units or societies.

## 1 The Logistic Theory of Growth

It is the purpose of a theory of growth to represent the sequential changes manifested by the unit (organism, association, society, etc.) whose change in magnitude is under examination. If the sequence of changes regularly manifested by all such individual units closely conforms to some given function, "such that the implications of the formula are in accord with the assumptions basic to the phenomenon observed, and such that evaluations of the parameters of the formula determined from random samples are mutually consistent", we have (Will observes) a statistical law of growth which "expresses a probable, rather than a certain, inference". If the formula connects the sequential changes as required by established knowledge, if this knowledge is approximately complete, and if the formula fits the observations almost perfectly, we have a rational law virtually devoid of uncertainty. If, on the contrary, there is little previous knowledge ~~re-~~  
~~specting~~ the sequence of changes manifested, then the formula, even though it fits very well the set of observations it describes, is empirical in character and not necessarily descriptive of change sequences in other growing units. If the defect of paucity of knowledge is corrected and both approximate perfection of fit and full consistency with the implications of the formula continue to be realized, the formula takes on the character of a rational law. If, however, extrapolation of the formula leads to absurd results, or if it does not continue to fit observations closely, it is not even a satisfactory empirical formula.<sup>2</sup>

Growth formulae presuppose, among other things, that the unit under consideration undergoes changes in magnitude within an environment. Representation of a unit's growth by a mathematical formula requires certain

assumptions. (1) The unit must be capable of growing and susceptible, if conditions are favorable enough, of a constant geometrical rate of increase. (2) The rate of growth must always be a finite and continuous quantity, but not necessarily geometric. (3) The magnitude of the unit is a positive quantity. (4) The growth of the unit tends toward restriction within definite bounds. This follows from the nature of growth and the milieu in which it takes place. The growing unit increases its magnitude by absorbing and converting into itself the surrounding environment. If this magnitude were not finite the unit might grow geometrically. But the environment is finite, and this finiteness imposes a limit on the aggregate growth of the unit even when the increase of the latter is not restricted by its own internal relations. If the environment is heterogeneous in character, if not all components of the environment are substitutable for one another, and if growth requires various non-substitutable components of the environment, then the external limit to the growth of the unit will be imposed by the most scarce of the irreplaceable components of the environment.<sup>3</sup> (5) Growth is a function of time and therefore subject to the influence of various factors whose effects may change through time. (6) The basic conditions of growth are not subject to disturbing influences that may significantly alter the course of growth. For if a growth-influencing factor different from those that have operated within the historical period of the unit's growth become operative, the initially selected growth formula no longer fits the facts; it must be replaced, if possible, by a new formula consistent with both the old and the new facts.<sup>4</sup>

Because these six assumptions are taken into account by the logistic formula, and because this formula has often been found to represent population

growth, cultural diffusion, and other kinds of increase satisfactorily, it probably ranks first among the formulae supposedly suited both to depict observed facts and to make for consistency between previously established knowledge and the implications of the formula itself.<sup>5</sup> For like reasons the Gompertz curve has also been used. Since the logistic and the Gompertz growth curves are asymptotic, neither formula provides for the possibility of a decline in the magnitude of the unit whose growth is being studied.

The logistic curve resembles both the normal frequency ogive and the Gompertz. Let  $L$  stand for the logistic and  $L'$  for its first derivative;  $N$  for the normal frequency ogive and  $N'$  for its first derivative (i.e., the normal curve);  $G$  for the Gompertz and  $G'$  for its first derivative. The derivative in each case represents the successive increments of growth (i.e., first differences) of the parent trend curve plotted against time.  $L'$  closely resembles  $N'$ , and  $N$  usually represents given data nearly as well as does  $L$ ; for  $L$  is constructed on the supposition that the growth increments of the reciprocals decline by a constant percentage, and in the case of both  $L'$  and  $N'$  the increments of growth rise to and then decline from a maximum in a regular and symmetrical manner.<sup>6</sup> By contrast  $G'$  is slightly skewed, for  $G$  describes a series in which the growth increments of the logarithms are declining by a constant percentage. All three parent curves are based upon the assumption, therefore, that the increments of growth of the unit in question increase regularly from a very low value to a maximum and then decline regularly toward zero as a limit. The task of the growth theorist is to discover, in the event that such a curve represents observed growth with high precision, the mechanism and the linkages which compel the unit to grow in the manner indicated.



Let us suppose (as H. Hart does) that in a diffusion situation there inheres a maximum number of possibilities of diffusion such that  $p$  represents the proportion of these possibilities already achieved and  $q$  the proportion yet to be achieved. The number of pregnant contacts at any time is proportional to  $pq$  and the cumulative number of combinations effected is proportional to the integral of  $pq$ . If with  $p + q = 1$ , we select the particular  $p$  values .1, .2, .3, .4, .3, .2, .1 and the correspondent  $q$  values .9, .8, .7, .6, .5, .4, .3, .2, .1, the  $pq$  values to which the increments of growth correspond are: .09, .16, .21, .24, .25, .24, .21, .16, and .09. If we plot these increments against time we get an approximation of  $L'$ , and if we summate them we get an approximation of  $L$ .

Before we consider this problem further let us examine the findings of Hornell Hart who has assembled more than 100 instances in which the logistic type of curve closely conforms to the recorded observations of growth, usually (in those cases in which  $L$  has been contrasted with  $N$  or  $G$ ) more closely than the Gompertz or the normal frequency ogive.<sup>7</sup> He reports the logistic as satisfactorily representing the growth of the following magnitudes or units: human and subhuman populations; the number of functions performed by given governmental units; agricultural and industrial production, by country; inventions and patents; other indices of economic growth; the diffusion of specific cultural traits (e.g., use of educational institutions, motor vehicles, and forms of communication; spread of given types of state legislation; development of various civic movements and social practices); indices of social efficiency (life expectancy, speed records for horizontal motion, non-stop airplane flights; per capita incomes; the area of empires; man's power to kill and to kill at a distance, etc.). Hart concludes,

therefore, that the close conformation of the data to the logistic pattern probably is an expression, not of chance, but of 'some law of nature', which the study of diffusion phenomena may reveal.

It has already been noted that asymptotic growth curves such as the logistic must be defective factually and theoretically in respect to their capacity to represent and predict subsequent growth whenever the basic conditions of growth cease to be stable and the parameters of the forecasting formula cease to remain unchanged. (a) Since the logistic formula presupposes the existence of an asymptotic maximum value, it is unsuited to forecast a decline in the magnitude of the unit whose growth is being studied. (b) For the same reason the logistic cannot foretell the movement of the index of growth on to a higher and different curve. Hart proposes compound logistic curves as a partial solution of difficulty (b).

"Throughout the entire sweep of history and prehistory, the power of human beings to achieve their basic purposes has been increasing at accelerating speed, with local and temporary stagnations and setbacks. This long-run acceleration has taken place through series of logistic and Gompertz surges, having higher and higher rates of increase."

These upsurges, which are remindful of the emergence of higher social levels as postulated by dialectical materialism, "are often inaugurated, disrupted, or terminated by crises, such as basic inventions, ...discoveries, ...wars, ... and major economic depressions". This hypothesis (which seems to be shared in part by a number of sociologists) runs counter at times to the logistic postulate of a declining rate of increase; it offers no satisfactory basis for long-run prediction; it does not seem to take into account the fact that the larger the ratio of the magnitude of the growing unit to its controlling environment, the more likely are limitational factors to impose a declining incremental rate of growth and to prevent an upsurge.

With respect to income, population, and territorial data, all of which are closely related to our index AP (see sec. II above), Hart finds: (a) in the 1930's per capita income and wages in Euro-American countries appeared to be moving onto a new and higher logistic curve; (b) population growth usually has not deviated far from the path delineated by a logistic; (c) it is probable that the rise of airpower will greatly increase the area under one government just as the replacement of landpower by seapower did in the modern period.

The upshot of our discussion for the theory of the rise and fall of societies seems to be as follows: (1) The logistic is still an empirical and not a rational curve; it is not well suited for prediction relative to times much forward from the present; it does not yet rest upon knowledge of the social mechanism that links successive growth events. (2) The logistic can be employed to depict the growth of a society only if relevant and representative indices of growth can be established. (3) Despite its shortcomings the logistic may be employed empirically to isolate growth phenomena and discover the causes of deviations from a seemingly satisfactory function. It has theoretical merit in that it emphasizes both the internal determinants of growth and the increasingly powerful external limitations imposed by environment. If logistic curves were employed, in so far as statistically feasible, to represent all measurable growth and diffusion phenomena for each society; if these curves were carefully compared and correlated within each society; and if intersociety comparisons then were made to discover intersociety differences; then a basis, largely empirical but somewhat rational, for a theory of societal growth might be established.

2 Exhaustion of Critical Natural Resources and/or of Relatively Unoccupied Space

This approach is similar to but less orderly than that treated under (1); moreover, it does not postulate an upper limit and it admits the possibility of decline.

According to this theory, in so far as socio-economic activity is founded upon the exploitation and use of particular resources, their exhaustion (partial or complete) imposes upon the society the necessity either of discovering substitutes or of redirecting economic activity so as to free the economy of dependence upon the resources in question. If, in the event of such exhaustion, the society is unable or unwilling to pursue either of these corrective courses, there results a crisis which may even be succeeded by the decline of the affected society.

In the past a decline in soil fertility, usually attributed to a shrinkage in rainfall or to soil-exhausting agricultural practices, has been advanced as an explanation of the economic decline of ancient Rome, of the English enclosure movement, of important American social developments, of significant Eurasian migrations, of adverse Chinese agricultural conditions, etc.<sup>8</sup> Today, with the material basis of modern society consisting of minerals as well as of land, concern is expressed respecting the prospective exhaustion of each of these material elements.<sup>9</sup>

Analysis along lines of resource exhaustion calls for a distinction between forms of exhaustion that are inevitable and unavoidable, (e.g., of oil, coal), and forms that can be averted. For in the latter case the locus of the cause of resource exhaustion must be sought in the alterable culture and practices of the society and not in the invariant properties of its material base.

Among the resources singled out for special treatment space has been accorded most attention. Many American historians, of whom F. J. Turner was the principal if not the first, have dwelt upon the importance of a single geographic factor, the frontier. All of them have found in the modes of life prevalent at the frontier the source of various American socio-economic practices, and some have found in the supposed opportunity workers had of moving to or toward the frontier a kind of 'safety valve' that eased when it did not prevent social pressures and group conflict in the long settled eastern parts of the United States. In consequence, these historians infer, the 'disappearance' (at or near the turn of the century) of the western frontier has contributed and is still contributing greatly to the production of changes (e.g., the increased emphasis upon a collective provision of socio-economic security) in the conduct-determining American value-system and to the accentuation of the struggle aspect of relations between 'labor' and 'management' and between other important interest-groupings of the population. Upon the appearance of Lord Keynes's 'general theory' its exponents (particularly A. H. Hansen) incorporated the closed-space theory of the Turnerites into the Keynesian explanation of the course of economic events and made the disappearance of frontier areas for lateral growth a major component of the mature-economy-stagnation account. For the present discussion the issue of the controversy over the effects of the supposed disappearance of open space is: Does the passing of the frontier tend to set in motion a series of events which carry the economy of a society into a stationary or a declining phase? How are these event linked?<sup>10</sup>

The approach of geopolitics may be described as a closed-space approach. Its two leading exponents, Friedrich Ratzel and H. J. Mackinder, have implied

that, because of cultural and other imperatives that are geographic in origin, the emergence of a single world empire is in prospect. This implication raises two distinct questions: What is the source of the expansionist imperative? Given such an imperative, what will be the geographic channels of expansion? The answer to the first question must be socio-cultural in character. For example, if societies differ markedly respecting the rules to be applied in external, intersociety relations, the need for common rules may lead to the establishment, through alliances and/or conquest, of larger areas within which one set of rules becomes operative; and this process may continue in the modern world until, through agreement or through the initial imposition of force by the stronger society or group of societies, a single set of rules is operative throughout the world. If, for the indicated or some other cultural reason, a society or group of societies is under pressure to expand, the pathways of this expansion will be governed largely by the principles of political and military geography. The literature of geopolitics, therefore, is more suited to indicate the pathways of expansion than to disclose whether or not expansion will take place.<sup>11</sup>

Several writers have suggested that frontier areas are peculiarly suited to facilitate human progress. The 'industrial evolution' took place in Western Europe rather than elsewhere, concludes C. E. Ayres,<sup>12</sup> because Western Europe, being the frontier region of Mediterranean civilization, could adopt the technological accumulations of that civilization and yet for the time being remain free of its accumulated institutional rigidities. Western Europe was able, therefore, to respond freely to the new inventions and discoveries introduced during the early modern period and get the industrial revolution underway before institutional rigidities got the upper hand.

F. J. Teggart<sup>13</sup> notes that new idea systems tend to flourish at the frontiers separating diverse cultures.

"Human advancement follows upon the mental release, of the members of a group or of a single individual, from the authority of an established system. This release has, in the past, been occasioned through the breaking down of previous idea-systems by prolonged struggles between opposing groups which have been brought into conflict as a result of the involuntary movements of peoples. What follows is the building up of a new idea-system, which is not a simple cumulation of the knowledge previously accepted, but the product of critical activity stirred by the perception of conflicting elements in the opposed idea-systems."

Teggart's approach permits him to put an expansionist interpretation upon factors (such as diminution in rainfall) which compel men to migrate and thus precipitate collision and conflict between diverse cultures at the termini of routes of migration. Basically the theories of Ayres and Teggart suggest this: When peoples bearing two diverse cultures are thrown into contact under circumstances that prevent either culture from swamping the other, individuals will be freed from the grip of each culture and a new culture conducive to human advancement will come into being.

The existence of an open frontier may have facilitated economic growth not only by conducing to the dissipation of institutional rigidities, but also by producing conditions favorable to a mass demand. The development of a mass demand calls for at least two circumstances, a relatively high wage level and a sufficient amount of like-mindedness in the consumer population to induce them to purchase standardized and, therefore, relatively cheap, consumer goods. If a frontier is open and land is to be had on relatively favorable terms, the wage level will be relatively high. This was the case in eighteenth and nineteenth century America. If the frontier attracts migrants of diverse ethnic, national, and familial backgrounds, tastes and attitudes will be fluid rather than set; and there will be opportunity for the

development and spread of similar tastes to which the producers of standardized articles may cater. This, too, was the case in eighteenth and nineteenth and early twentieth century America. It is quite likely, therefore, that the long-continued existence of an open frontier in America contributed appreciably to the rise of those mass production consumer goods industries which appear to have played an important part in maintaining and even accelerating her rate of economic growth.

An analysis analogous to that of the role of the opening and the closing of space may be made and is being made of the spread of what might be called the urban frontier. For the urbanization of the population apparently is operating today, as it has at times in the past (e.g., Hellenistic, Roman, late Medieval times), to produce significant changes in the value-systems of societies, changes which could bring about the decline of the affected societies.

Analysis of the behavior of the firms composing an industry suggests that the advent of the later retarded-growth stage is accompanied by a diminution of the competition operating in the earlier rapid-growth stage. It is likely that a careful analysis of the economic behavior of the components of a state or society moving (usually as a result of the slowing down of population growth consequent upon the widespread adoption of the small family system) into the retarded-growth stage would reveal a concomitant accentuation of social processes resistant to further growth.<sup>14</sup>

### 3 The Emergence of Higher Levels of Integration

With the emergence in a society of a higher level of organization (e.g., conversion of many small geographical units into one large one), growth rates surge to new and higher levels. This approach to the problem of growth stems from both the emergent evolutionists and the historical materialists.<sup>15</sup>



Joseph Needham has described this approach as follows:

"The world we know is compounded of Organization and Energy;...the world is a series of levels of organization, integration, and complexity;... these levels occur both in time (evolutionary succession) and in space (morphological envelopes)."<sup>16</sup>

"As we rise in the evolutionary scale from the viruses and protozoa to the social primates there is: (1) a rise in the number of parts and envelopes of the organism and the complexity of their morphological forms and geometrical relations; (2) a rise in the effectiveness of the control of their functions by the organism as a whole; (3) a rise in the degree of independence of the organism from its environment, involving diversification and extension of range of the organism's activities; (4) a rise in the effectiveness with which the individual organism carries out its purposes of survival and reproduction, including the power of molding its environment."<sup>17</sup>

This approach, while here directed principally to organic life, is deemed generalizable to social life; it seems to emphasize collective and communal life and to play down that of the individual.<sup>18</sup>

Illustrative of this approach as well as of the closed space view is R. Glenday's analysis of the future of the British economy. An economy is built up over the years through the specialization and reciprocal adaptation of the population and the environment. Because of the increasing resistance encountered by growth under the present organization of the economy, it will either become stationary or disintegrate unless the basic structure of the economy is reorganized in a manner analogous to that which accompanied the change-over from the medieval to the modern system in the eighteenth century. Industrial society is in its last phase, and the "service state" is in the offing. Waves of growth are described as "the result of an economic system undergoing an enlargement in its capacity and a continuous rise in its level of organization"; and growth as consisting of two successive phases, the alteration of the structure to permit the new wave to start, and the wave itself.

"Economic evolution must...be pictured as a series of revolutions: times of discontinuous qualitative changes in structure alternating with longer periods of continuous quantitative modifications of these novelties in structure, by a process involving progressive specialisation and adaptation. Such specialisation and adaptation entails a progressive loss of freedom by the separate individual unit elements of the system to fit them for the form of economic life chosen for the community. If external circumstances change suddenly or growth in some important organ within the group is allowed to proceed to the point of upsetting the group mode of life adopted, then the system, being unable to evolve further in the direction selected, has no alternative to dissolution and extinction. Each stage in this advance has not only involved a change in the form of the system as a whole but also a prior regrouping into larger and more compact 'bricks' of the constituent units out of which the new whole has to be built."<sup>19</sup>

The historical materialist assumes that change is ever present in a society, with every sufficient quantitative change operating to transform that which is changing and to cause new qualities to emerge.

"While there is continuous change, there are also relative stabilities, temporary unities reached as a result of the complex interpenetration, the interplay of forces, energies and elements which come into contact with one another. While everything is on the move, the very interplay of movements forms patterns distinguishable as such for a greater or lesser period of time."<sup>20</sup>

Within the socio-economic system "the relations in which men stand" to technics and forces of production "and to one another in respect to them", change as these forces and technics change. The changes are caused by struggles among the several classes, each of which includes members with a common relationship (e.g., control, or its opposite) to the means of production.

"The progressive improvement of any system of technics reaches a point where its further advance, or, in other words, the most efficient utilization of the possibilities it now presents, is obstructed and impeded by the prevailing system of economic relationships."

Then, because the class structure can no longer absorb the developing forces of production, and despite the interests of the ruling class, the prevailing economic system "must eventually be modified radically to accommodate further technical change."<sup>21</sup> In this way a higher level of organization is introduced.

The economic factor is treated as the free variable, the prime mover, cumulative changes in which eventually transform that part of the superstructure with which they come to be in contradiction. Technological (i.e., agronomic and engineering) developments

"produce difficulties that put the existent class system (i.e., 'the relations of men to each other in production') into a state of unstable equilibrium. Segments of the social superstructure are involved in the economic problem insofar as they obstruct or assist in its solution. A process of social reconstruction gets under way."<sup>22</sup>

Although the exponents of historical materialism believe that it can be made to serve as a theory of any particular social system (e.g., feudalism, capitalism, socialism, communism, etc.),<sup>23</sup> they usually employ it to explain the supposedly forthcoming decline of 'capitalism' and its supersession by socialism, to show how the development and accentuation of 'contradictions' during the so-called monopoly and imperialism phases of capitalism will generate its downfall.<sup>24</sup> Whether it is expected that these contradictions will suffice, particularly in the relatively near future, if unassisted by war, is not too evident in Soviet writings.<sup>25</sup>

With respect to what has been said several conclusions follow:

(1) The concept of emerging higher levels of organization should prove useful in the analysis of the growth, but not of the decay, of societies, provided that the changing level is defined in operational terms that are relevant to the specific magnitudes under consideration. (2) The 'economic factor' if operationally defined, may be employed as a point of departure in the study of growth; but it may not, in the light of present knowledge and theory, be treated as an independent variable and a prime mover. The economic factor, while perhaps the most important of all the variables in social organization, is still but one of many variables, to which it is

functionally related in both a dependent and an independent sense. Much more than has been done remains to be done before the actual role of the economic factor in different cultures can be appraised, before we know how much play and therefore lag there is in the collection of variables that comprise an essentially closed and interdependent system, and before we can comprehend the comparative novelty-creating power of the variables comprising a societal system.<sup>26</sup>

#### 4 Activation by a Creative Minority.

That growth is primarily the result of the activity of a creative and innovating minority is the conclusion of A. Toynbee, J. Schumpeter, and V. Pareto, among others. It should be noted, however, that this conclusion as such is inadequate. For even though the paramount role of the creative minority be granted, it does not determine the particular forms that the creative efforts of this minority will assume. If there is a high degree of complementarity among these various forms, then all will flourish in about the same measure at the same time. If there is relatively little complementarity, the forms may be many or few, the actual number depending at any time upon the specific cultural climate then in effect.<sup>27</sup> In any event, the extent to which the course of economic growth is associated with the activity of the creative minority is governed by the degree to which this minority is economically creative.

(a) The unit of study selected by Toynbee<sup>28</sup> is the civilized society, or civilization. He identifies twenty-six such units. Five of them are described as arrested; of the remaining twenty-one, six emerged from primitive life while fifteen stemmed from previous civilizations. Of the twenty-six units, sixteen are dead, nine are broken down, and only one, our own Western, is still alive and active.

Each of these civilizations, Toynbee believes, had its origin, not in 'superiority' of race or in ease of environment, but in the capacity of the populations generating the civilization to respond successfully to a challenge that was neither so weak as to fare as a stimulus, nor so strong as to be insurmountable. For some successful populations this challenge consisted in the necessity they were under to cope with a hard environment, or to bring virgin soil under cultivation; for others, in the penalization (e.g., slavery) imposed upon them by some other temporarily master population; for still others, in crushing defeats, or in continual pressure against their frontiers from without. "Growth occurs when the response to a particular challenge is not only successful in itself but provokes a further challenge which again meets with a successful response." When, on the contrary, a challenge is so great as to cause the responding population to introduce an inflexible social system, its capacity to make successful responses to further challenges is atrophied, and its civilization becomes an arrested one.

Growth is given a particularized meaning by Toynbee. It does not consist in increasing control over material environment, or in the military and political expansion of a society at the expense of neighboring societies. It consists in the progress of a society towards self-determination; in the release of its energies (occasioned by its initial overcoming of material obstacles) "to make responses to challenges which henceforth are internal rather than external, spiritual rather than material." Growth "involves differentiation between the parts of a growing society" whereas disintegration is accompanied by standardization.

The breakdown of a civilization is at hand when its period of growth comes to an end; when a society no longer is able, either by readapting its old institutions or by establishing appropriate new institutions, to accommodate and develop the new social forces released by its creative members.

Of crucial significance in Toynbee's theory is the "creative minority", upon whose behavior depends the course of a society's civilization. "All growth originates with creative minorities of individuals, and their task is twofold: first the achievement of their inspiration or discovery, whatever it may be, and secondly the conversion of the society to which they belong to this new way of life." The conversion of the mass comes about through their willingness to imitate the creative minority and render its members allegiance. The breakdown of civilization takes place when, because of the failure of the creative power of this minority, the majority withdraw their allegiance and mimesis (i.e., imitation of the creative minority), and the consequent division of the society into parts ends its social unity. The breakdown, therefore, is internal rather than external. It does not originate in a decline in technique and a resultant loss of control over environment; neither does it originate in external military aggression and consequent geographical contraction — a type of challenge that sometimes even provides the very stimulus needed to rouse a civilization from its torpor.

Toynbee finds that "a group which successfully responds to one challenge is rarely the successful respondent to the next." For this failure, loss of creativity on the part of the creative minority is responsible. This loss may assume various forms. For example, it may issue out of a

society's idolization of an ephemeral institution or of an ephemeral technique, and its consequent failure to develop and/or adopt an appropriate new institution or technique. Again it may originate in suicidal militarism, i.e., in the practice of continuous aggression which unites the neighbors of the aggressor against him and eventually exhausts his power and resources.

When the creative minority loses its creative power, the unity of the society is destroyed and it becomes exposed to external attack. The creative minority, unable any longer to command the voluntary mimesis and allegiance of the majority, becomes a dominant minority which now must rely upon force and/or upon the establishment of a relatively inflexible social system to maintain control over the mass and preserve the status quo. The majority in consequence becomes "a reluctant and alienated 'proletariat'", an "inner proletariat" that includes all who feel "themselves 'in' but not 'of' the society." A parallel change takes place in populations surrounding the society whose creative minority has become a dominant minority. For these populations, friendly to the cultural influence of the civilization in question so long as it was growing, now become hostile to it, with the result that a military frontier is established between this civilization and the surrounding "external proletariat." The pressure of one or both of these proletariats tends eventually to complete the disintegration of the civilization whose creative minority has ceased to be creative.

Toynbee's method of analysis, as applied by him to the lone actively surviving though tottering civilized society, is not as revealing as it might be. Presumably, because of the great shrinkage in the size of what Toynbee calls the external proletariat of the Western World, this group

constitutes no great danger to the Western World. But Toynbee does find in Western Society a great potential internal proletariat which includes the man-power of ten disintegrating civilizations, the populations of primitive societies, and the large number of members of the intelligentsia who are not disposed to render allegiance to such creative minority as still exists. His discussion suggests, however, that disintegration can yet be averted and Western Society's capacity for self-determination restored if it is reinvigorated by Christianity and transmuted into a Respublica Christiana.

For purposes of the present discussion Toynbee's principal suggestions are: (a) the course of a civilization (e.g., its rise and/or fall) is governed by the degree of creativeness characteristic of the creative minority; (b) the primum mobile is to be found within a society; (c) improvement in technique and increase in the degree of control exercised by a society over its environment are not closely associated with the state of a society's growth (as defined by Toynbee), and may even be taking place at the very time a society's real civilization is declining. These suggestions, to be of use, must be employed in conjunction with a valid theory of process, of which there is little evidence in Toynbee's work.

(b) Schumpeter's analysis of the fundamental role of the innovating entrepreneur (who is much more than an entrepreneur) in giving shape and content to economies is confined to the modern period during which capitalism rose and flourished.<sup>29</sup> By innovation is meant either (a) the recombining of a given quantity of productive factors in such manner as to augment their exchange value significantly, or (b) the recombining of productive factors in such wise as to produce a given good at an appreciably lower relative factor cost than has theretofore obtained. Under competitive



capitalism the innovation arises out of the conjunction of a creative entrepreneur with something like a new invention or a new mode of organization that will constitute a basis for recombination. The innovation gives its entrepreneurial executor a differential advantage that will last until the innovation and its secondary improvements are generally adopted, and allows him, through his realization of augmented profits and his increased borrowing power, greatly to expand the affected industrial units under his control. A great stimulus is imparted to firms and industries both complementary to and competitive with the innovator's, the former receiving the stimulus of an upsurged market, the latter being compelled to apply the innovation (or its equivalent) or suffer elimination; and lethargy is shaken even in circles that do not fall strictly within the complementary and the competitive categories. The innovation process in general, and in particular the successive waves of influence issuing from a given group of closely related innovations while it is being incorporated into the economy, are intimately linked, Schumpeter attempts to show, with the various economic movements registered within an economy; and the economy itself behaves much more jumpily than is suggested by the principle Marshall adopted from Leibniz, "nature never makes leaps".

While the innovator is treated as the principal prime mover, he is not free of the social climate in which he operates and which is in part the outcome of prior innovations. As trustified capitalism replaces competitive capitalism, the innovating process passes from the small and often new firms dominated by individuals to large, impersonal, bureaucratized firms that rely upon specialized and organized research; and the industrial leader who is chosen by the associated selective system is no longer

uniquely the man who made the firm's success possible, but a man who, though he may have had little to do with such success as a firm has had, possesses the earmarks of political acceptability rather than qualities bespeaking technical competence. Meanwhile the routinization of innovation and technological progress, together with the general acceptance of the principle of continual change, are rendering the entrepreneurial function obsolete; while the elimination by trustification of many small entrepreneurs and the increasing removal of the entrepreneurial function from both executive and stockholder are dissolving the bourgeois class whence innovators have largely come in the past. These circumstances, together with the seemingly associated changes in ideology, are slowly operating, Schumpeter's analysis suggests, to decompose capitalism and replace it by another system.

Studies of the past illuminate the historical role of the entrepreneur, but they do not reveal much respecting the future because of the fundamental difference between a society in which rule-of-thumb predominated and one in which routinized science prevails.<sup>30</sup> Thus Pirenne found that in Europe, in the millenium closing with the nineteenth century, during each of the alternating epochs of freedom and control, a new set of capitalists, distinct as to origin from those it replaced, superseded the earlier set whose families, unwilling or unable to adapt to the changing circumstances of business, moved into the aristocracy, the bureaucracy, and the rentier groups.<sup>31</sup> The entrepreneurial function and the innovation process were not, however, routinized and bureaucratized, and so differed from what prevails today or may prevail in the future.

Of the various possible points of departure for the study of the growth of societies, the innovator probably is superior to any alternative; for since he is at the center of the growth process, one can sense from his vantage all the principal checks to and facilitators of innovation. However, Schumpeter's account of the recent history of the innovator and his suggestion that the latter will not be needed under socialism is not too convincing. Routine, as Whitehead notes, is the basis of social life and the source of practical efficiency and societal stability. But routine, while more fundamental than understanding, cannot costlessly take its place; for complete routine is incompatible with novelty-producing instability or with such progress as issues from the generation and the judicious adoption of novelty.<sup>32</sup> Yet there is a strong presumption that under socialism political selection will operate, much more than does present (or prospective) economic selection, to ~~shift~~ into positions of politico-economic power those whose sole god is routine.<sup>33</sup> Accordingly, appraisal of the behavior and prospective growth of a social system must take into account how innovators are chosen, how they in turn choose among the potentialities accessible at any time, and how they respond to the prevailing value system.

The effects of innovation are conditioned also by the nature of the economy into which they are introduced. If the economy is competitive and flexible an innovation tends to step up the rate of growth of welfare. If, however, an economy is dominated by monopoly, this rate of growth will be influenced in a lesser degree.<sup>34</sup>

(c) Pareto's theory of interclass circulation assumes a society hierarchical in structure and with power concentrated in the hands of an elite whose number is very small relatively to that of the non-elite. Accordingly,

if individuals differ in respect to their concrete values and action tendencies and if there is interclass mobility of individuals, a relatively small movement of persons from the non-elite into the elite can greatly modify the composition of the latter in respect to values and action tendencies and, because of the large amount of power concentrated in the hands of the elite, produce a significant change in the societal system. Thus, if there are two kinds of individuals I and II; if the elite and the non-elite comprise, respectively, 8 and 92 percent of the population, with I and II forming half of each category, then if two non-elite I's (i.e., one-forty-sixth of the non-elite population) replace two (i.e., one-fourth) elite II's, the I's become ascendant in the elite of which they now constitute three-fourths. The behavior of the elite will be changed significantly while that of the underlying non-elite mass will remain substantially unchanged.

Real society, as Pareto conceived it, corresponds to this hypothetical society. There are two classes of residues, Class I and Class II, highly significant for the present discussion. Persons in whom Class I, the "instinct of combinations", predominates, are innovating, inventive, projecting, scheming; disposed to avoid conflict, to circumvent obstacles, and to use direct methods; inclined to prefer the present, the material, and the individual to their opposites. Persons in whom Class II, the "persistence of aggregates", predominates are steadfast, direct, willing to accept conflict and use force, given to traditionalism rather than innovativeness, lacking in cleverness, and disposed to prefer the future, the ideal, and the collectivity (e.g., family or state) to their opposites. In sum, then, a typical society consists of two kinds of individuals whose

action tendencies are rather at opposite poles. Accordingly, how the society is run will depend largely upon whether I or II dominates the elite; while any change in the composition of the latter, resulting from interclass circulation that replaces I (or II) in the elite by II (or I) from the non-elite, will markedly alter the elite and its collective behavior tendencies. Typically, Pareto suggests, the II's (lions) seize power only gradually to give place to the I's (foxes) who are better adapted to execute ruses and other power-holding tricks until I's dominate; the I's, however, overindulge their fox-like traits until they are again overthrown by the II's. In economic matters the I's are speculators whereas the II's are rentiers and savers, while in ideology the I's favor science and skepticism and the II's, religion, ideals, etc. Whence, since the ascent of the I's into political power is also accompanied, as a rule, by an increase in their economic power, bursts of economic prosperity and skepticism tend to characterize the initiation of rule by the I's. Even a supposedly production-depressing state policy such as protectionism tends to be more than offset by the stimulus and support it imparts to innovating, industry-creating I's.<sup>35</sup> Pareto noted that some conditions favor interclass circulation more than others.

The significance of Pareto's analysis for the theory of societal growth lies not so much in the theory itself as in its emphasis upon the importance of social mobility or intergroup circulation of individuals in a society when (as in most cases) its class and social structure is hierarchical and when the composition of the stream of persons moving into the upper portions of the social pyramid differs significantly from that of the population occupying these upper portions. For such circulation can greatly influence conduct-determining values and action-tendencies in a society even though

the overall composition of the society remains essentially unchanged. The significance of political, economic, and social circulation for economic and related growth needs to be thoroughly explored.

#### 5 Change in Biological Composition of Population.

Continuous dysgenic selection can bring about the decline of a society, particularly if the composition of the ruling classes undergoes a decline parallel to that of the whole population; while continuous eugenic selection can produce an opposite set of effects. In either case, the influence of biological selection would manifest itself very slowly, and the direction and character of the manifestation would be determined by the specific culture of the affected population.

The information relevant to human biological selection is not as adequate nor as critically interpreted as is required. Huntington<sup>36</sup> presents evidence intended to show that favorable biological selection accounts in appreciable degree for the accomplishments of a number of people (e.g., Icelanders, Parsis, New England Puritans, Jews). While the decline of Rome has sometimes been attributed to dysgenic selection,<sup>37</sup> most of the discussion of dysgenics in human societies relates to the prospective future. Specifically it is contended, and supporting statistical data are offered, that in a mobile, democratic society such as Great Britain or the United States, the level of intelligence is falling because in the genetically inferior strata net natural increase is higher than among the genetically superior.<sup>38</sup>

The most fully developed biological theory of the rise and fall of nations is that of C. Gini. A demographic upsurge on the part of a nation originates, as a rule, in crossbreeding between appropriately differentiated strains of this nation, or between this nation and some other

appropriately differentiated nation. This upsurge is accentuated at first by the fact that, since each generation derives from a small and relatively more fecund fraction of the preceding generation, the nation's natural fecundity increases. Meanwhile, however, the germinal cells of the population gradually undergo exhaustion until this force more than balances the force of past hybridization and selection. Then demographic decline sets in unless it can be averted through a new resort to reinvigorating crossbreeding. Military, economic, and political rise and decline tend to be associated with the demographic rise and fall of nations.<sup>39</sup>

Intergroup differences in population growth, whether the result of natural increase or of net migration, are more important, in the short run at least, on cultural than on biological grounds. Individuals are bearers of cultures and value-systems even as they are carriers of genes. If individuals differ widely in respect of culture and system of values, differential rates of growth will significantly alter the cultural composition of the population and thus set in motion changes which can alter the basic drift and emphases of the culture and value-system characteristic of a society and produce profound political, economic, and other changes. Such a change took place in the Graeco-Roman world and has probably been initiated more than once since.<sup>40</sup>

Gini's theory, if it is to be employed in the study of growth, must be combined with other theories, for it is logically and factually inadequate as it stands. That continuing change in the biological composition of a society's population will ultimately and significantly influence its course of growth is incontestable. Of probably greater importance than the biological consequences of intergroup differences in growth, however, is the great change that such differences may produce in the cultural and value-

system composition of a society's population.

## 6 Price Movements.

Rising prices have contributed to economic growth both by facilitating capital formation and by dissolving stagnation-producing social arrangements; sharply falling prices have exercised an opposite effect. Because price movements leave tracks they constitute an empirically satisfactory means of getting at aspects of the problem of growth. Analysis of past price movements may be of less significance for the future, however, than some other analyses, insofar as fortuitous movements of the sort registered in the past are prevented from taking place in the future.

For suggestions of the influence of past price movements we may turn to the works of E. J. Hamilton, Lord Keynes, and F. Simiand.

Professor Hamilton has shown in a number of papers how profit inflation consequent upon a long sustained lag of wages behind prices contributed greatly to the rise of capitalism and the revolutionary character of eighteenth century industrialization. During the two centuries succeeding 1500 the profits flowing from the East India trade and the rise of prices relative to wages occasioned by the influx of American treasure were employed to build up capital equipment. Again in the second half of the eighteenth century the lag of wages behind prices provided the stimulus that caused industrial development to move at a revolutionary rather than at an evolutionary pace.<sup>41</sup> Hamilton has indicated also the superiority, as an economic stimulus, of gently rising to falling prices.<sup>42</sup>

Lord Keynes suggested that Economic History might be rewritten from its beginnings in terms of the stimulating effects of inflation and the constrictive influence of deflation; that it might be shown how Sumeria and



Egypt and the lands on the Mediterranean and the Persian Gulf drew stimulus from the monetary metals of Arabia and Africa; how the dispersal by Alexander of the precious metal reserve of Persia caused that great outburst of economic progress in the Mediterranean, whose fruits ultimately passed into the hands of Rome; how subsequent deflation destroyed Rome; how medieval stagnation issued out of a deficiency in the supply of money in use and was dissolved by its increase; and how in modern times capitalism and industrial progress were nourished by rising prices.<sup>43</sup>

According to Simiand economic progress stems from the alternating rise and fall of prices in the shorter and in the longer runs. During the upswing many ventures get under way and factor prices rise, but toward the close of this phase productive efforts relax and productivity falls. During the subsequent phase prices decline with product prices falling more than factor prices, cuts in which are resisted. Hence rationalization and effort are intensified in order to bring productivity into line with relatively high factor prices and relatively low product prices; as a result output per worker rises. Moreover, rationalization during the falling phase is facilitated by capital accumulated during the rising phase. The technological factor therefore is passive in character just as are division of labor and population growth; for while they are sources of economic progress, they actually are adopted only under the stimulus of price movements. It follows that there can be economic progress only in a money economy and then only if money flows to the economy, from gold mines and agencies supplying paper money, in such manner as to preserve alternating price movements.<sup>44</sup>

## 7 Proportion in Growth

Endurance of increase in magnitude probably presupposes that growth be not at too rapid a rate to permit integral incorporation of the new increments into the growing unit, and that the relative homogeneity of the growing unit not be undermined by a too great differentiation of its parts resulting from unbalanced growth. The history of the growth of both national states and business firms will supply examples of nonendurance of growth for either of these reasons. And the history of the growth of societies and their subdivisions will probably reveal that there is order in growth, great deviation from which is to the disadvantage of the growing unit.

That an orderly principle of organization underlies growth in time and space is suggested by G. K. Zipf's findings respecting what he calls the "hypothesis of the minimum equation" according to which "work is always minimized in human behavior". According to this equation

"the sum of the products of all masses moved, when multiplied by their 'work distances' (as defined) will be a minimum.... On the basis of this analogue ["in which certain assumptions were made"] we deduced some equations about the number, relative sizes, and spacings of the communities, as well as about the number and diversity of their manufacturing, distributing, and other activity, including the number and lengths of trips and other movements within the system."<sup>45</sup>

Zipf's study suggests that the endurance of growth and of societies subject to growth is conditioned by their rate of growth, by the extent to which the comparative growth of the components of the growing unit remains in balance, and in general by the degree to which the growth of the growing unit corresponds to known and necessary patterns of growth in time and space.

## 8 Theories of Growth-Stages

The nineteenth century witnessed the formulation of the theory that an

economy passes through a sequence of growth-stages, and sometimes the drawing of the inference that the rate at which an economy proceeds through these growth-stages may be stepped up by state - or some other form of collective intervention. This type of theory had been anticipated, of course, by a variety of writers (e.g., Petty, Turgot, Condorcet, Saint-Simon, Comte). It was treated at some length by a number of historical economists in the last century (e.g., F. List, Hildebrand, Schmoller, Bucher, Ely). It has been made use of in the United States particularly by N. S. B. Gras, who conceives of an economic society as passing typically through five successive socio-economic stages: collectional; cultural nomadic; village; town; and metropolitan. While the various stage theories are of some use in indicating in a summary fashion the course of development through which a society probably will pass in moving from a primitive to a modern industrial level, they throw only a limited measure of light upon the forces of growth.

In recent years, several economists have sought to discover and plot the course of growth which economies, particularly Western economies, have traced during the past several centuries. Thus, according to Walther Hoffman, the industrially most advanced countries (e.g., Great Britain, Germany, United States) have proceeded through three stages. In Stage I, consumer-goods industries (= C) predominate over industries (= K) which produce capital goods, the ratio of C to K (measured in terms of output) lying between 4:1 and 6:1. The dominance of C in Stage I is attributable sometimes to the high development of the clothing industry, and sometimes to the development of industries that produce other necessities and luxuries. Stage I give place to Stage II in consequence of the fact that

the capital-goods industries grow more rapidly than the consumer-goods industries. The ratio of C to K in Stage II economies lies between 2.5:1 and 1.5:1. In Stage II, as in Stage I economies, the consumer industries are dominated either by clothing industries or by industries that produce other necessities and luxuries.

When a country has passed into Stage II, the production of capital goods tends to continue to grow more rapidly than that of consumer goods, but the superiority of the rate of growth of the former over that of the latter is much less pronounced than during the period when the same country was moving from Stage I into Stage II. Accordingly, in Stage III countries, the ratio of C to K is somewhat, but not pronouncedly, lower than in Stage II countries. This ratio lies between 1.5:1 and 0.5:1. In Stage III countries, the capital-goods industry is dominated, as a rule, by its iron, metal-ware, machine, and chemical branches.

According to Colin Clark, too, economies pass through three stages. In the first stage, employment is predominantly primary in character. In the second stage, employment in manufactures comes to the fore. In the third stage, employment in the services becomes prominent.

The analyses of both Hoffman and Clark suggest that a representative economy, in developing from a primitive to an advanced level, tends to traverse a predictable course through a sequence of comparatively predictable and identifiable stages. This finding, if valid, is of great significance for countries in an early phase of industrial development; for it suggests into what channels it is preferable that labor and capital be directed if a country's economy is to progress satisfactorily. This finding, therefore, has commanded the interest of those whose concern is

acceleration of the industrialization of countries that are comparatively preindustrial in character. Presumably, as W. Leontief's input-output approach is developed and given more of a time-dimension, it will be used to improve the application of the cruder findings of Hoffman and Clark.

Analysis of family budgets, classified by amount of income and standardized for size of family, suggests that as family income rises, the consumption and employment structures of economies will change along the general lines indicated by the studies of Clark and Hoffman. A similar conclusion is suggested by studies of the changes of family budgets and consumption patterns through time. Evidently, therefore, a theoretical basis, founded upon the behavior of individual and/or familial, and governmental-unit consumers, can be provided for evolutionary tendencies of the sort discovered by Hoffman and Clark. Such a theory, of course, must assume a high degree of consumer sovereignty and freedom.<sup>46</sup>

#### 9 Changes in Culture or in Cultural Configurations.

Of all the theories or explanations of the course of growth of societies, that which runs in terms of culture (broadly defined) or of cultural configuration is logically the most adequate albeit the most difficult to formulate effectively. This approach has been developed principally by sociologist and anthropologist students of culture. As a rule, economists, because of their manner of defining the scope of economics, have eschewed this approach. Partial exceptions are to be found, however, in writers such as Veblen with his emphasis upon the primary importance of the material or technological base of society, Max Weber and W. Sombart with their emphases upon the spiritual or subjective aspects of economic systems, Durkheim with his awareness of the social aspects of division of labor, Pareto with his recognition that an adequate explanation of societal

development must be much more inclusive than the purely economic, and in some degree those followers of Marx who are alert to the role of non-economic factors.

A cultural theory of growth seeks its explanation within the culture itself, attaching relatively little weight to the purely material environment which (within limits) is or can be given shape by the culture. A cultural theory may be morphological in character as is O. Spengler's,<sup>47</sup> according to which every culture, having risen and become a distinct and integrated unity of the aspects of life of the population producing and bearing it, flourishes and then declines. This type of theory offers no more than insights into the processes of growth and decay. Again a theory may be essentially empirical as is that of A. L. Kroeber<sup>48</sup> who shares some but not all of Spengler's views and who rejects the conclusion that cultures are individual entities (like higher organisms), necessarily subject to a regular and cyclical path of behavior, and doomed to die after having once flourished. Kroeber found evidence of temporary outbursts of aesthetic and intellectual endeavors in all the higher civilizations he examined. (He made no analysis of economic data, he reports, because it was not to be had in sufficient quantity.) Cultural patterns become differentiated, selective, and specialized, and tend to develop in certain directions until the attainable limits of this development have been reached; then there usually ensues a stationary state of growth, or a lull during which the culture is reconstituted preparatory to further growth. Whether "a whole culture can die of itself through internal causes or inherent aging" Kroeber does not say, for he construes the death of a particular culture (or form of culture) to be its replacement by some other. His data and analysis suggest, however, that the type of culture most likely to give place to others without materially

altering their content is a small one when exposed to the continuous impact of a large one.

The most extensively developed of the cultural theories is that of P. A. Sorokin.<sup>49</sup> It is not enough to indicate that human culture is the sum total of everything created or modified by interacting individuals. It is necessary to discover the cement that holds the isolated components of a culture together, after these have been selected and shaped so that they can coexist. This cement Sorokin calls "logico-meaningfulness". In other words, the elements that make up a culture do not constitute an integrated whole until they have been bound together and made comprehensible by "a central meaning, idea, or mental bias" that permeates all the components, gives sense and significance to each of them, and in this way makes cosmos of a chaos of unintegrated fragments. Integrated cultural systems are to be distinguished, therefore, in terms of their major premises, that is, their basic conceptions of the nature of reality, the nature of the needs and ends to be satisfied, the extent to which they are to be satisfied, and the methods of satisfaction employable.

Many possible systems of integrated culture are conceivable, yet because of limitations inherent in cultural change they have not developed. The actual systems that man has evolved have been either predominantly Sensate (with stress upon immediately sensible reality, carnal needs, and adjustment of environment to individual), or predominantly Ideational (with stress upon transmateral reality, spiritual need, and adjustment of individual to environment), or Idealistic (which is a balanced synthesis of the two preceding types). Moreover, while cultural systems inevitably change through time, the pathways of change have been restricted, the process of

cultural change having slowly swung man back and forth between the purely Sensate and the purely Ideational poles. By means of indices relating to selected and necessarily coexisting cultural components (e.g., art forms, systems of knowledge and truth, ethical values, relationships among individuals, classes, and peoples) Sorokin traces the super-rhythm of socio-cultural change through the inevitable order of phases: Ideational, Idealistic, Sensate, Ideational, etc. In ancient times culture changed from the Ideational through the Idealistic to the Sensate phase which prevailed in the closing centuries of Graeco-Roman domination; this last phase was followed successively by the Ideational, the Idealistic and, in the fourteenth century, the Sensate. This Sensate phase, now overripe, will give way again to an Ideational phase.

The source of change is immanent in the culture. (Sorokin calls it the "principle of immanent self-determination of the system's destiny"). Although the course of change is circumscribed by limits inherent in a culture at given times, there is considerable room for variation in the unfolding of the potentialities immanent in the cultural system and in the changing of the milieu of the cultural system itself.

Sorokin's analysis suggests, not a rise and fall of cultures in their economic and other aspects, but a supersession of one phase by the next. Sorokin finds long economic waves to be associated, but not closely, with the rise and decline of the main types of culture. Economic conditions, judged by contemporary Sensate standards, tend to be lower in Ideational than in Sensate cultures; they improve as the culture swings from the Ideational to the Sensate phase, reaching a high peak under the Idealistic and a maximum level under the Sensate just before it begins to decline and



with it the economic level. The Sensate culture apparently tends to generate forces that undermine economic welfare whereas the Ideational, though essentially disdainful of economic well-being, may generate forces that improve the economic situation and prepare the way for its subsequent flourish. With respect to economic organization Sorokin finds long swings between totalitarianism and laissez-faireism, but not a perpetual trend in either direction, with swings toward totalitarianism fostered by increases in economic inequality and adverseness of economic conditions.<sup>50</sup>

Unlike Sorokin some exponents of cultural change assume that significant change usually (or always) manifests itself initially in the technological or material basis of a culture and then imposes upon other components of the culture the necessity of adaptation. MacIver's analysis reveals the weakness of this approach. He divides being into three dynamic realms, the physical, the organic, and the conscious; and the conscious realm into three orders, the cultural (having to do with value configurations), the technological (which includes basic technology, together with the economic and political systems which organize technology), and the social (which consists in the web of relationships that embrace individuals and groups). His analysis further suggests that although the orders of conscious being are somewhat interdependent, this interdependence is quite loose in many respects. Thus with the same technological base, widely varying political and economic systems may be associated. In general his analysis seems to suggest that the primary locus of cultural change is the value-system found in the cultural order, and that institutional change issues out of the striving of men to realize values in situations imperfectly equilibrated by institutions.<sup>51</sup>

The upshot of the cultural theories seems to be two-fold with respect to the economic rise and fall of societies. (1) A high rate of economic growth can be realized in societies with differing cultures provided that the regnant value systems stress material ends and technological progress. (2) A high rate of economic growth presupposes compatibility between the economic and the non-economic components of a cultural system. Incompatibility, on the contrary, makes for a falling off in the rate of growth. The cultural approach suggests also that cultural change is accompanied not so much by the rise or fall of a society as by the supersession of one cultural form by another; and that, therefore, the measurement of rise and/or fall presupposes an arbitrary standard of measurement such as AP, outlined in Section II.

#### 10 Miscellaneous Determinants of Growth.

In Section II a list of the determinants of per capita net product was presented. Not all of these have been treated by the authors under review, nor is it possible amply to consider them here. The rise and fall of societies is affected, or is said to be affected, by a number of factors which may just be noted here.

(a) Population growth. Population growth is often treated as if it is an essentially independent variable upon whose movement the growth of an economy largely depends. If growth is defined in terms of AP ( see Section II above), it follows that there is a high degree<sup>52</sup> of dependence of growth upon the movement of population. A more fundamental analysis indicates, however, that population and population growth are essentially resultants of past and present value systems and levels of economic activity (for upon these gross reproduction largely depends) and of the determinants of

mortality. While a change in the population variable may affect economic variables which in turn after a time influence the population variable,<sup>53</sup> the initial source of the change is predominantly nondemographic in character. Changes in the population variable are of use to students of growth principally as indicators of more fundamental changes in the subjective and/or the objective apparatus of the society.<sup>54</sup>

It should be noted also that, because of changes in the structure of populations, a population unit may respond differently today than in the past to conditions affecting mortality or natality. Prior to the nineteenth century all populations resembled in structure those of the Orient today and those of earlier centuries. Mortality and natality were high, and populations failed to grow only when mortality balanced or rose above natality which, by modern standards, was relatively high. With improvements in medicine and the gradual introduction of effective contraceptive methods, natality fell, but for long not so rapidly as mortality. Hence population grew with unusual rapidity in many countries until natality had moved to a relatively low level. In the Western World, therefore, population has undergone five types of evolution. (1) The rate of population growth, formerly high, has descended in the neighborhood of the zero level, and probably will remain here even though mortality should fall somewhat more. (2) In consequence of (1), the capacity of Western countries to provide emigrants has almost disappeared. (3) In consequence of the decline in mortality and natality, the age structure of Western populations has changed from an Oriental type to what may be called a Western type. (4) Because of the decline in the size and the net reproduction of farm populations, their capacity to provide urban recruits, while still positive,

has become relatively low. (5) Fertility differentials within populations which were accentuated by the introduction of contraception are gradually disappearing as the practice of contraception spreads. Oriental populations, by contrast, still face these five types of demographic evolution. It may be added also that, because conception can be effectively controlled, natality may be more sensitive to fluctuations in the level of family income than in the past.

(b) Civil order. Civil order is primarily a resultant issuing out of the relative homogeneity of a society's culture and value-system and the willingness and capacity of the ruling class or the strategically situated classes to use force if necessary; it also has some of the earmarks of an independent social variable. In modern societies civil order tends to prevail except in periods when the power structures that fix dominator-subject relations are giving place to new power structures.<sup>55</sup>

Civil order is a precondition of economic growth which presupposes an absence of great uncertainty regarding the content and enforcement of the rules regulating interpersonal intercourse. In fact, even the quasi-disorder presently being produced by the immoderate demands of large economic pressure groups is unfavorable to economic growth and, if intensified, will have to be settled by force and in a manner calculated to bring an effective power-structure into being.<sup>56</sup> Both the source of civil disorder and its specific relation to the level of economic activity require the attention of students of societal growth.

(c) War. War acts directly and indirectly to influence the growth indices of societies. While some of these indices are little affected, others have their continuity broken by war. In extreme cases, as Toynbee

shows, militarism eventually brings about the destruction of a society. War may prepare the way for a redistribution of power within a society, or for a reorganization of its activities. Thus E. Halevy observed prior to World War II that it was from the state administration of World War I "far more than from Marxist doctrine that all post-war socialism derives."<sup>57</sup> While war usually issues out of somewhat known circumstances, it must also be treated as something independent of the culture of which these circumstances are a part, for war, if it gets under way, can produce unpredictable changes in that culture. Perhaps the most fruitful research approach is the discovery of reasons for the differential response of growth indices to the impact of war.<sup>58</sup>

(d) Purely economic determinants of growth. Inasmuch as this paper purports to deal with the more inclusive theories of societal growth, no detailed attention is given to purely economic governors of growth. Several of these may be noted, however. Thus a high rate of economic growth presupposes that investment and income grow at a sufficiently high rate, and this in turn presupposes adequate action either by investors or by the government or by both together.<sup>59</sup> Again there is the problem of developing and industrializing underindustrial countries. If factors of production were perfectly mobile in the shorter and the longer runs there would be no real problem. But this is not the case. There is roughly one kind of ecological growth through time suited to the needs of old and heavily populated countries such as India,<sup>60</sup> and another and somewhat different kind of ecological growth through time suited to the needs of new and less densely populated countries such as are found in Latin America. Judicious use of such ecological patterns would accelerate national economic growth in the affected areas.

#### IV Are Societal Laws of Growth Discoverable?

Examination of the works of historians indicates that almost without exception they avoid giving expression to anything characterizable as a law or even a somewhat restricted empirical generalization;<sup>61</sup> they are content to say that such and such assisted, or accounted for, such and such. For this (quite proper) avoidance of generalization the basic approach of the historian, together with the nature of his data, is responsible. The objects of his study are unique and individual units with specific and definite location in time and space.<sup>62</sup> While he assumes that particular events appropriately associated in time are manifestations of an underlying process and are interconnected, he does not try to squeeze out time and space and infer that the same, or a quite similar, sequence of events will recur. He does not assume that quite similar sequences have occurred or may occur at other times and places and that, consequently, a law or principle can be formulated to describe such sequence in a generalizable manner. It is because the historian approaches his subject matter as he usually does, therefore, that he does not seek, as do scientists in other fields, to discover patterns and uniformities in the events manifesting the process of societal growth (or decay).

It is accepted in various quarters that the historian of social processes cannot discover principles with much predictive value. There is too much that is essentially accidental in character. The utmost that he can do is to formulate "generalizations of quite limited validity" relating to the past.<sup>63</sup> Even historians employing a Marxian approach admit finding it impossible to forecast the course of economic development under capitalism because of the indeterminacy inherent therein. For he cannot foretell the

occurrence of the creative responses and other circumstances on which depend the emergence of new industries and the consequent offsetting of the supposed tendency of the organic composition of capital to rise and of economic stagnation to set in.<sup>64</sup> History has been compared in respect to capacity to predict to geophysics (the physics of earthquakes, meteorology, etc.) because lack of knowledge of the initial conditions (i.e., analogues of position, velocities, and masses in physics), even when it has been sufficiently overcome to permit the discovery of an historical 'law', greatly restricts its use for purposes of prediction.<sup>65</sup> It has been asserted, moreover, that the frequency of divergent phenomena (i.e., phenomena such as individual action "where from a small beginning increasingly large effects are produced") in human affairs greatly reduces the predictability of the course of social processes.<sup>66</sup>

Several difficulties beset the path of the student of the rise and fall of societies. (1) It is impossible to select a self-contained unit that is isolated from all other units (or that can safely be viewed as if it were isolated from all other units) and can be treated as a closed system. Great care must be exercised, therefore, lest what is internal in origin is treated as external, or what is external is looked upon as internal.

(2) The units that are selected for study (states, societies, civilizations, cultures, etc.) are not homogeneous, but differ in greater or lesser measure one from another. These differences are primarily spatial in selective origin when the units chosen for comparison are of the same time period, and temporal in selective origin when the units considered are from different time periods. If the units selected for study were

absolutely homogeneous except for differences in age of unit where such differences exist; and if the behavior of an individual unit were not subject to any unpredictability arising from an uncertainty principle similar to that which makes unpredictable the movement of an individual particle; then a minute and detailed analysis of the course of growth of any particular unit would disclose what internal behavioral acts are creative (i.e., generative of action or of novelty), what responses are adaptive (adjustments either to creative acts or to adjustment-action issuing out of a creative act), and how these various actions (or events) are sequentially connected and revealing of underlying growth processes; and it would discover a rational law or principle of growth on the basis of which the growth of any other unit of like age can be indicated or predicted. Because of the differences that obtain among units, however, this kind of approach to the discovery of principles of societal growth is out of the question.

(3) Since it is not possible to derive a general principle of growth from careful study of a single unit truly typical of a homogeneous world of such units, a comparative statistical study of many units must be undertaken. This study can yield reasonably satisfactory results, however, only if the units selected for study are sufficiently similar. If, under these circumstances satisfactory correlations are obtained, they still cannot disclose an acceptable principle of growth until it is shown that substantially similar links bind together the sequences of relevant events in each of the units studied. Whether such linkage can satisfactorily be established is still open to question in view of the actual difference among cultures.<sup>67</sup>



(4) Even if the conditions just indicated are met and a seemingly satisfactory principle of growth is established on the basis of a comparative study of units not too unlike to disclose such a principle, a significant contingency will still remain respecting the future applicability of this principle. Will the correlations, the linkages, and the sequences stay put through time; or will they change for reasons not implicit in and inferable from the data? In the latter event, the derivation of a satisfactory generalization capable of describing and predicting growth must await the discovery of the principle of change affecting the nexus between events.

(5) If as the societal system evolves, novel elements or novel relationships come into being in a measure (quantitative and/or qualitative) sufficiently great in relation to the elements and relationships that endure, then the basis of the linkages underlying the observed correlations will be undermined and the supposed law of growth will have to be reformulated. Since, as cultures do evolve, what we have called novelties (elements and relationships not theretofore known) come into being, it is probable that a final and unchanging principle of societal growth can never be formulated, that the empirical principles which are formulated will have to be recast periodically if they are to remain useful. If the universe of societies were characterized only by cyclical behavior, and not continually disturbed by novelties, a satisfactory and persisting empirical law of growth probably could be formulated.

At present no satisfactory theory of societal growth exists. Such a principle can only be discovered gradually, originally through essentially empirical research and ultimately through the disciplining of the empirical findings by abstract theory. As a beginning toward uncovering such a

principle, the national state may be chosen as a unit, and a comparative study may be made of all states. Data, statistical and otherwise, usually are reported by state. States which resemble one another rather closely may be grouped for some purposes of analysis. In every case detailed attention must be given to establishing linkages between relevant events and processes in each of the national units studied.

FOOTNOTES

1  
It should be noted that neither  $A$  nor  $AP$  is represented as an index of a psychic magnitude or aggregate.

2  
This discussion is based upon H. S. Will, "On a General Solution for the Parameters of any Function with Application to the Theory of Organic Growth", Annals of Mathematical Statistics, VII, 1936, pp. 186-87; A. B. Wolfe, "Is There a Biological Law of Human Population Growth?", Quarterly Journal of Economics, XLI, 1927, pp. 557-94, and "Vital Statistics, Empiricism, and the Mechanism of Nature", South-Western Political and Social Science Quarterly, VIII, 1927, pp. 107-21; F. C. Mills, "On Measurement in Economics", in R. G. Tugwell, ed., The Trend of Economics, New York, 1924, pp. 37-72; Josiah Royce, "The Mechanical, the Historical and the Statistical", Science, XXXIX, 1914, pp. 556-57. See also A. F. Burns, Production Trends in the United States Since 1870, New York, 1934; S. Kuznets, Secular Movements in Production and Prices, New York, 1930; Walther Hoffman, Wachstum und Wachstumsformen der englischen Industriewirtschaft von 1700 bis zur Gegenwart, Jena, 1940, pp. 168 ff.; and George Garvy, "Kondratieff's Theory of Long Cycles", Review of Economic Statistics, XXV, 1943, pp. 203-20. Aspects of the problem here treated are discussed further below.

3  
On the role of limitational factors see my "Aspects of the Economics of Population Growth", Southern Economic Journal, XIV, 1947-48, pp. 123 ff., 233 ff.

4  
This paragraph is based upon Will, op. cit., pp. 170-71, and Wolfe, op. cit.

5  
On the logistic curve see Wolfe, op. cit.; Will, op. cit.; R. Pearl, The Biology of Population Growth, New York, 1925, and Medical Biometry and Statistics, Philadelphia, 1940; V. A. Kostitsyn, Mathematical Biology, London, 1939; A. J. Lotka, Elements of Physical Biology, Baltimore, 1925, and Theorie Analytique des Associations Biologiques, Part II, Paris, 1939; D'Arcy W. Thompson, On Growth and Form, London, 1944, Ch. 1-3; C. P. Winsor, "A Comparison of Certain Symmetrical Growth Curves", Journal of Washington Academy of Science, XXII, 1932, pp. 73-84; L. Hogben, Genetic Principles in Medicine and Social Science, New York, 1932.

6  
The logistic may also be skewed. See Will, op. cit.

7  
Hornell Hart, Can World Government be Predicted by Mathematics?, privately printed, Durham, 1943; "Logistic Social Trends", American Journal of Sociology, L, 1945, pp. 337-52 (includes bibliography); "Depression, War, and Logistic Trends", ibid., LII, 1946, pp. 112-22; "Was There a Prehistoric Trend from Smaller to Larger Political Units?", ibid., XLIX, 1944,

pp. 289-301; "The Logistic Growth of Political Areas", Social Forces, XXVI, 1948, pp. 396-408; "Technological Acceleration and the Atomic Bomb", American Sociological Review, XI, 1946, pp. 277-93, "Expectation of Life as an Index of Social Progress", ibid., IX, 1944, pp. 609-21; The Technique of Social Progress, New York, 1931.

8

On ancient Rome see V. G. Simkhovitch, Toward the Understanding of Jesus, New York, 1937, pp. 84-139, and E. Huntington, "Climatic Changes and Agricultural Exhaustion as Elements in the Fall of Rome", Quarterly Journal of Economics, XXXI, 1917, pp. 173-208. For critical appraisals of these views see A. P. Usher, "Soil Fertility and Exhaustion", ibid., XXX, 1923, pp. 385-411; M. Rostovtzeff, "The Decay of the Ancient World and its Economic Explanations", Economic History Review, II, 1930, pp. 197 ff.; E. Ginzberg, "The Decline of Antiquity", The Social Studies, February, 1935, pp. 82-90; M. Hammond, "Economic Stagnation in the Early Roman Empire", Journal of Economic History, VI, Supplement VI, 1946, pp. 63-90; R. Turner, The Great Cultural Traditions, New York, 1941, chap. 20. The other cases referred to are treated in H. Bradley, The Enclosures in England, New York, 1918; A. Craven, Soil Exhaustion in Virginia and Maryland, 1606-1860, University of Illinois Studies, XIII, 1925; W. C. Bagley, Soil Exhaustion and the Civil War, Washington, 1947; James C. Malin, Essays on Historiography, Lawrence, 1946; Mabel P. Lee, Soil Exhaustion in China, New York, 1921; S. F. Markham, Climate and the Energy of Nations, New York, 1944, chap. 5.

9

See R. Strausz-Hupé, The Balance of Tomorrow, New York, 1945; F. Osborn, Our Plundered Planet, New York, 1948; W. Vogt, Road to Survival, New York, 1948; James Fairgrieve, Geography and World Power, London, 1920; J. R. Whittaker, "World View of Destruction and Conservation of Resources", Annals of the American Association of Geography, XXX, 1940, pp. 143-62; also my paper, "Aspects..", cited in note 3 above. See also H. F. Williamson, "Prophecies of Scarcity or Exhaustion of Natural Resources in the United States", Proceedings of the American Economic Association, XXXV, 1945, pp. 97-109; Malin, op. cit.

10

For bibliography on literature relating to the frontier see Malin, op. cit. and H. A. Williamson, ed., The Growth of the American Economy, New York, 1944, pp. 110 ff., 377 ff. On the sociological role of the frontier see J. G. Leyburn, Frontier Folkways, New Haven, 1935, esp. pp. 229 ff. On non-American frontiers see, e.g., Owen Lattimore, "Origins of the Great Wall of China", Geographical Review, XXVII, 1937, pp. 529-49 and "Inner Asian Frontiers", Journal of Economic History, VII, 1947, pp. 24-52; H. Heaton, "Other Wests Than Ours", ibid., VI, Supplement VI, pp. 63-90; R. Kobner, "The Settlement and Colonisation of Europe", in The Cambridge Economic History, Vol. I, Cambridge, 1941 (other chapters in this work relate in part to the expansion of the frontier). The safety-valve doctrine has been discussed rather extensively. On it see, e.g., C. H. Danhof, "Economic Validity of the Safety-Valve Doctrine", Journal of Economic History, I, Supplement I, 1941, pp. 96-106. On cultural aspects of the

frontier, see A. L. Kroeber, Configurations of Culture Growth, Berkeley, 1944, pp. 798, 817. See also Frederick Alexander, Moving Frontiers, An American Theme And Its Application to Australian History, Victoria, 1947.

11

See R. Strausz-Hupé, op. cit. and Geopolitics, New York, 1942; F. Ratzel, Politische Geographie, Munich, 1897, 1923; A. Gyorgy, Geopolitics, Berkeley, 1944; H. J. Mackinder, Democratic Ideals and Reality, New York, 1942. Mackinder's account of sea and land based power and of the manner in which land powers have employed flanking movements to overcome sea powers is suggestive. Concerning the size and form of the ideal state, see Derwent Whittlesey, The Earth and the State, New York, 1944, pp. 22, 586-87. Apparently no effort has been made to apply the pure theory of dimensions to geography, presumably because the great heterogeneity of resource, climatic, and other distributional patterns renders a purely theoretical approach impracticable. Concerning the role of the frontier in international relations see H. B. George, The Relations of Geography and History, London, 1924; C. B. Fawcett, Frontiers, Oxford, 1918, and The Bases of a World Commonwealth, London, 1941; R. Peattie, Look to the Frontiers, New York, 1944.

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C. E. Ayres, The Theory of Economic Progress, Chapel Hill, 1944, Chap. 7.

13

F. J. Teggart, The Processes of History, New Haven, 1918, pp. 75-76, 85, 151-52.

14

See M. Abramovitz, "Monopolistic Selling in a Changing Economy", Quarterly Journal of Economics, LII, 1938, pp. 207-14. On retardation of growth see Burns, op. cit., and Kuznets, op. cit.

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W. M. Wheeler, Emergent Evolution and the Development of Societies, New York, 1928, R. Redfield, ed., Levels of Integration in Biological and Social Systems, Lancaster, 1942.

16

In a review of Redfield's book in Science and Society, VII, 1943, p. 190; see also his essay in P. A. Schilpp, ed., The Philosophy of Alfred North Whitehead, Evanston, 1941, p. 251.

17

"On Science and Social Change", Science and Society, X, 1946, p. 226; see also his Herbert Spencer lecture, Integrative Levels: A Revaluation of the Idea of Progress, Oxford, 1937. Cp. A. B. Novikoff, "The Concept of Integrative Levels and Biology", Science, CI, 1945, pp. 209-15; and V. J. McGill and W. T. Parry, "The Unity of Opposites: A Dialectical Principle", Science and Society, XII, 1948, pp. 418-444.

18

Wheeler (op. cit., pp. 44, 45) has written: "Evolution by atrophy certainly accompanies an advance in social integration in the insects.... Turning to man we notice a similar regressive development of the individual as civilization proceeds...the eventual state of human society may be somewhat like that of the social insects — a society of very low intelligence combined with an intense and pugnacious solidarity of the whole." However, such writers as W. I. Vernadsky indicate that the biosphere has given place to the noosphere in that mind and thought are changing the world. See "The Biosphere and the Noosphere", American Scientist, XXXIII, 1945, pp. 5 ff.; also E. LeRoy, Les Origines Humaines et l'Evolution de l'Intelligence, Paris, 1931.

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R. Glenday, The Future of Economic Society, London, 1944, p. 278, also pp. 6, 8, 11, 19, 291-294, and chaps. 15-16, (his italics). See also his Economic Consequences of Progress, London, 1934, and "Long Period Economic Trends", Journal of the Royal Statistical Society, Pt. III, CI, 1938, pp. 511-52. Des Mouvements Economiques Généraux (Louvain, 1947), by L. H. Dupriez, is not discussed in this connection because it does not clearly pose a particular hypothesis.

20

J. Somerville, Soviet Philosophy, New York, 1946, pp. 167, 172-75.

21

Ibid., pp. 6-9, 15-16, 19. See also L. S. Feuer, "Dialectic and Economic Laws", Science and Society, V, 1941, pp. 336-61; K. Ostrovitianov, "Basic Laws of Development of Socialist Economy", ibid., IX, 1945, pp. 239, 241.

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L. S. Feuer, "The Economic Factor in History", Science and Society, IV, 1940, esp. pp. 179-83; also "Ethical Theories and Historical Materialism", ibid., VI, 1942, pp. 242-72.

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P. M. Sweezy, "Marxian and Orthodox Economics", Science and Society, XI, 1947, pp. 225-33. See also M. Dobb, Studies in the Development of Capitalism, London, 1947.

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E.g., see P. M. Sweezy, The Theory of Capitalist Development, New York, 1942; Eugene Varga, Two Systems, New York, 1939, and (with L. Mendelsohn) New Data for V. I. Lenin's IMPERIALISM, New York, 1940; V. D. Kazakevich, "Contrasting Two Economic Systems", Science and Society, V, 1941, pp. 43-60; J. Kuczynski, "Productivity and Exploitation under Capitalism", ibid., X, 1946, pp. 248-59. See also (unsigned) "Teaching of Economics in the Soviet Union", American Economic Review, XXXVI, 1944, pp. 501-30.

25

See E. Varga, Soviet Views on the Postwar World Economy, and N. A. Voznesensky, The Economy of the USSR during World War II. Both works have been published in translation by the Public Affairs Press, Washington, 1948. Voznesensky writes (*ibid.*, p. 2): "Lenin and Stalin warned the socialist homeland again and again of the inevitability of historical battles between imperialism and socialism and prepared the peoples of the USSR for these battles. Lenin and Stalin explained that wars which a working class, having defeated its own bourgeoisie, wages in the interests of its socialist homeland and the interests of strengthening and developing socialism are lawful and holy wars.... Only he who unconditionally protects the USSR is an internationalist, for it is impossible to solve the problems of the international revolutionary workers movement without protecting the Soviet Union."

26

For critical appraisals of the Marxian type of historical theory see P. A. Sorokin, Contemporary Sociological Theories, New York, 1928, chap. 10; M. M. Bober, Karl Marx's Interpretation of History, Cambridge, 1949. Bober concludes that "Marx's theory is a key that fits many locks but opens few doors." See *ibid.*, p. 346.

27

Concerning the overwhelming influence of culture in primitive societies see Ruth Benedict, Patterns of Culture, New York, 1934. According to A. L. Kroeber, while it is genius that most fully expresses culture patterns and values, the content of this expression is largely conditioned by the prevailing cultural climate (Configurations of Culture Growth, Berkeley, 1944, pp. 8-9). No cultural "activity need be present in a culture with a force sufficient to reach high values, even if others do rise to that level; nor is there an important relation of time or order of appearance between the several activities." "On the whole, ethnic or national energy and higher cultural energy tend to be related" (*ibid.*, pp. 762-63, 840-44). While Kroeber's study relates to the recorded life span of human history, it includes no information respecting wealth and population. On the role of value systems in orienting human behavior see also T. Parsons, Structure of Social Action, New York, 1937, and Essays In Sociological Theory Pure and Applied, Glencoe, 1949.

28

A Study of History, 1934, 1939. For purposes of the present discussion I use D. C. Somervell's summary of Toynbee's argument. See the one-volume abridgment of the first six volumes, pp. 567-90. I have gone through the six volumes and find this summary of Toynbee's argument to be as accurate as possible, given the limitation of space.

29

Schumpeter's theory is developed in The Theory of Economic Development, Cambridge, 1934; treated historically and integrated with cycle theory in Business Cycles, New York, 1939, esp. chaps. 3, 6-7, 14-15; examined in respect to prospective decline of capitalism in Capitalism, Socialism, and Democracy, New York, 1942, ch. 12-14. His theory of economic change is

discussed also in the Review of Economic Statistics, XVIII, 1935, pp. 2 ff.; in The Journal of Economic History, VII, 1947, pp. 149-59, and ibid., Supplement, VII, 1947, pp. 1-9; and in Economica, VII, 1927, pp. 286-311. In "The Instability of Capitalism", Economic Journal, XXXIX, 1929, pp. 384 ff. he distinguishes between the operation of the innovation process in competitive capitalism and that in "trustified" capitalism. H. Pirenne's views which appeared in several papers in 1914 are set forth again in a pamphlet Les periodes de l'histoire du capitalisme, Paris, 1922. The changing role of the entrepreneur in Great Britain is treated by E. Lipson in his A Planned Economy or Free Enterprise, London, 1944. See also L. H. Jenks' application of Schumpeter's innovation concept to American railroad history, "Railroads as an Economic Force", Journal of Economic History, IV, 1944, pp. 1-20, and J. E. Holmstrom's detailed account of how the transportation innovations affect economies, Railways and Roads in Pioneer Development Overseas, London, 1934.

30

In the nineteenth century, as A. N. Whitehead observes, the process of change, which formerly "was slow, unconscious, and unexpected", became "quick, conscious, and expected", consequent upon the invention of the very "method of invention". Science and the Modern World, New York, 1925, pp. 140-41.

31

See Pirenne, op. cit.

32

Adventures of Ideas, New York, 1933, ch. 6.

33

See C. O. Hardy, "Schumpeter on Capitalism, Socialism and Democracy", Journal of Political Economy, LIII, 1945, pp. 353-56.

34

See B. S. Keirstead, The Theory of Economic Change, Toronto, 1948. See also Edward Ames and Allen R. Ferguson, "Technological Change and The Equilibrium Level Of The National Income", Quarterly Journal of Economics, LXII, 1948, pp. 441-458, and Moses Abramovitz, "Savings and Investment: Profits vs. Prosperity", American Economic Review, XXXII, 1942, Supplement No. 2, Part 2, pp. 53-88. For a narrower approach to the problem of economic change than that of Keirstead see Sidney Merlin, "The Theory of Economic Change", Quarterly Journal of Economics, LIX, 1945, pp. 185-205.

35

These matters are treated by Pareto principally in his Mind and Society, New York, 1935, ch. 12-13. For a more detailed summary see Parsons, op. cit., pp. 278-88, and my "Pareto on Population", Quarterly Journal of Economics, LVIII, 1944, pp. 571 ff., LIX, 1944, pp. 107 ff., esp. pp. 116-29. See also on the whole question of social mobility, P. A. Sorokin, Social Mobility, New York, 1927. On the business elite, see C. W. Mills, "The American Business Elite, A Collective Portrait", Journal of Economic History, V, 1945, Supplement V, pp. 20-44.



36

E. Huntington, Mainsprings of Civilization, New York, 1945, Part II; a bibliography of his own pertinent studies is included.

37

E.g., F. C. S. Schiller, "The Ruin of Rome", Eugenics Review, XVIII, 1926, pp. 1-11; this discussion is based largely upon Seeck's work. M. Rostovtzeff rejects the biological decay argument. See, e.g., his A History of the Ancient World, New York, 1930, II, pp. 360-66.

38

F. Lorimer and F. Osborn, Dynamics of Population, New York, 1934, p. 190; R. B. Cattell, The Fight for Our National Intelligence, London, 1937, pp. 12-13, 42-44; F. H. Hankins, "Is Our Innate Intelligence Declining?" American Journal of Mental Deficiency, XLVII, 1942, pp. 25 ff. Cyril Burt's survey in England is yielding results similar to Cattell's. See also Dr. S. Peller's argument to the effect that a "group of phenotypically superior families is of no greater potential value to the nation's future generations than is the large group of those families that are humble at present and were so also in the past". See "World Reconstruction and the Concept of Distribution of Mental Abilities in Races, Nations, and Social Strata", Journal of Social Psychology, XXIII, 1946, p. 181.

39

G. Gini's papers (in English) on this subject appear in Population (Harris Foundation Lectures, 1929), Chicago, 1930, pp. 1-140, and the American Journal of Sociology, XXXVI, 1930, pp. 241-50 ("The Future of Human Populations"). For criticisms of Gini's theory see F. H. Hankins, "Civilization and Fertility", Eugenics Review, XXXI, 1931, pp. 145 ff.; G. A. Lundberg, "The Biology of Population Cycles", Social Forces, IX, 1931, pp. 401 ff. G. Dahlberg has pointed out that in human populations inbreeding is not frequent enough nor between closely enough related individuals to affect population composition perceptibly. See his "Inbreeding in Man", Genetics, XIV, 1929, pp. 421-54. Hybrid vigor and/or disharmony consequent upon racial mixing has been attributed to the supposed fact that the trait in question depends upon multiple genes, some but not all of which come from each of the mixing racial strains. See W. Scheidt, "Untersuchung über Rassenmischung", Arch. Rass. -u. Gesellschafts-Biologie, XXII, 1929, pp. 255-69.

40

See R. Turner, The Great Cultural Traditions, II, pp. 1325-33. During ancient Rome's thirteen centuries, Turner shows, three distinct populations successively evolved; in China, at least two population changes occurred; among the Phoenicians, Greeks, Persians, and the people of India similar changes occurred; only the Hebrews, through their closed religious culture, escaped these demographic influences. J. Kummey writes ("The Problem of Differential Fertility", Population, II, 1935, pp. 20-21): "No student must neglect the metabolism of population changes and the accompanying social changes in culture, religion, language, and politics. War and migrations of peoples have been of primary importance in social development. In differential fertility a valuable clue is obtained for tracing the ever-recurrent disturbances in law and custom, and the new equilibriums that consequently rise."

41

"American Treasure and the Rise of Capitalism (1500-1700)", Economics, 1929, pp. 338 ff.; "Profit Inflation and the Industrial Revolution, 1751-1800", Quarterly Journal of Economics, LVI, 1942, pp. 256 ff.

42

"Money and Economic Recovery in Spain under the First Bourbon, 1701-1746", Journal of Modern History, XV, 1943, pp. 192 ff.; "Origin and Growth of the National Debt in Western Europe", Proceedings of the American Economic Association, XXXVII, 1947, pp. 118-30. Professor Hamilton has, however, pointed to the limitations of price history and to the operation of other change-producing agencies. E.g., see "Use and Misuse of Price History", Journal of Economic History, IV, Supplement IV, 1944, pp. 47 ff., and "The Decline of Spain", Economic History Review, VIII, 1938, p. 168. Among the causes of Spanish decadence subsequent to the discoveries he includes, besides unpredictable price changes, many practices and institutional conditions that were present in Spain: e.g., primogeniture, mortmain, vagabondage, deforestation, redundancy of ecclesiastics, contempt for manual labor and arts, indiscriminate alms, monetary chaos, and oppressive taxation. Cf. H. C. Lea who traced Spanish decadence to "pride, conservatism and clericalism". See his Minor Historical Writings (A. C. Howland, ed.), Philadelphia, 1942, pp. 220-33.

43

A Treatise on Money, New York, 1930, II, ch. 30. H. Michell has shown that the three occasions when great masses of gold and silver were suddenly thrown upon the world's markets (Alexander's dispersal of Persian reserves; the treasure of Mexico and Peru; gold discoveries in the nineteenth century) were followed by great upsurges which, however, were succeeded by "political convulsions of a disastrous nature". See "The Impact of Sudden Accessions of Treasure upon Prices and Real Wages", Canadian Journal of Economics and Political Science, XII, 1946, pp. 1-17, and "The Edict of Dioclitian: A Study of Price Fixing in the Roman Empire", ibid., XIII, 1947, pp. 1-12. See also N. J. Silberling, The Dynamics of Business, New York, 1943, ch. 3-6.

44

See R. Marjolin, "Francois Simiand's Theory of Economic Progress", Review of Economic Studies, V, 1938, pp. 159-71. This summary is based upon all of Simiand's works which are cited by Marjolin.

45

G. K. Zipf, "The Hypothesis of the 'Minimum Equation' as a Unifying Social Principle: With Attempted Synthesis", American Sociological Review, pp. 627-50, esp. p. 650; National Unity and Disunity, Bloomington, 1941; also Human Behavior and the Principle of Least Effort, Cambridge, 1949. See also J. Q. Stewart, "Empirical Mathematical Rules Concerning the Distribution and Equilibrium of Population", Geographical Review, XXXVII, 1947, pp. 461 ff., and "Concerning 'Social Physics'", Scientific American, May 1948, pp. 20 ff.

46  
See Colin Clark, Conditions of Economic Progress, London, 1940; Walther Hoffman, Stadien und Typen der Industrialisierung, Jena, 1931. On industrialization see A. J. Brown, Industrialization and Trade, Royal Institute of International Affairs, London, 1943; F. Hilgerdt, Industrialization and Foreign Trade, League of Nations, Geneva, 1945; A. O. Hirschman, National Power and the Structure of Foreign Trade, Berkeley, 1945; K. Mandelbaum, The Industrialization of Backward Areas, Oxford, 1945; E. Staley, World Economic Development, ILO, Montreal, 1944. On consumption patterns see, e.g., C. C. Zimmerman, Consumption and Standards of Living, New York, 1936 and R. G. D. Allen and A. L. Bowley, Family Expenditure, London, 1935. See also W. E. Moore, "Primitives and Peasants in Industry" and "Theoretical Aspects of Industrialization", Social Research, XV, 1948, pp. 44-81, 277-303; and H. W. Singer, "Economic Progress in Underdeveloped Countries", Social Research, XVI, 1949, pp. 1-11.

47  
O. Spengler, The Decline of the West, New York, 1939. Space does not permit consideration of the approaches of Veblen, Weber, Pareto, Durkheim, and Sombart. However, the views of Weber, Durkheim, and Pareto are summarized in part by Parsons, op. cit., and "Capitalism in Recent German Literature: Sombart and Weber", Journal of Political Economy, XXXVI, 1928, pp. 641 ff., XXXVII, 1929, pp. 31 ff.; those of Sombart by M. J. Plotnik, Werner Sombart and His Type of Economics, New York, 1937; and those of Veblen by J. Dorfman, Thorstein Veblen and His America, New York, 1935. See also A. Salomon's series of articles on Weber in Social Research, I-III, 1934-36. On Marxian sociology see files of Science and Society and E. F. Guthrie, "Historical Materialism and its Sociological Critics", Social Forces, XI, 1941, pp. 172 ff.

48  
Kroeber, op. cit. (see note 27 above), pp. 761, 798, 819-28, 839-45.

49  
P. A. Sorokin, Social and Cultural Dynamics, New York, 1937, 1941. The cultural theory is outlined in Vol. I, Part I; the why and how of sociocultural change in Vol. IV, Part III. Sorokin criticizes Toynbee's approach on two grounds: (a) Toynbee's units (civilizations) are not real species of society, but mere "conglomerations of various civilizational objects and phenomena"; (b) his "conceptual scheme of genesis, growth, and decline of civilizations" therefore provides no adequate explanation of sociocultural change. See "Arnold J. Toynbee's Philosophy of History", Journal of Modern History, XII, 1940, pp. 374 ff.

50  
Economic conditions are discussed in Vol. III, ch. 8; the organization of economic and other systems in ibid., ch. 7, H. Hart, partly on the basis of Sorokin's data, criticizes his conclusion that the present Sensate culture will undergo transformation into an Ideational culture that rejects the methods and values of contemporary society. See "Sorokin's Data Vs. His Conclusions", American Sociological Review, IV, 1939, pp. 635-46.

51

R. M. MacIver, Social Causation, New York, 1942, pp. 130, 163, 272-87, 293-306, 330-33, 343-44, 366, 382; also Society, New York, 1937, Bk. III. Concerning the alleged priority of material change see W. Ogburn, Social Change, New York, 1922; J. Schneider, "Cultural Lag: What Is It?", American Sociological Review, X, 1945, pp. 787 ff.; H. A. Phelps, Principles and Laws of Sociology, New York, 1936, pp. 389 ff. See also F. S. Chapin, Cultural Change, New York, 1928, who concludes (ibid., pp. 424-25) that "the fundamental processes of cultural change are: (1) invention, (2) accumulation, (3) selection, (4) diffusion". For an account of the development of political processes and arrangements, see W. C. MacLeod, Origin and History of Politics, New York, 1931. For a brief criticism of the cultural lag theory see also my "The Role of the State in Shaping Things Economic", Journal of Economic History, VII, Supplement VII, 1947, pp. 126-27.

52

In some measure P and A are inversely related if a population is beyond the optimum; for A is governed in part by material equipment which is constructed out of many of the very productive agents that are employed to produce P. E. C. Olson has prepared formulae which indicate the role of employed population in accounting for international differences in production, and which therefore tend to throw some light on similar differences in time. See "Factors Affecting International Differences in Production", Proceedings of the American Economic Association, XXXVIII, 1948, pp. 502-22.

53

E.g., see J. Akerman, "Bevölkerungswellen und Wechsellagen", Schmollers Jahrbuch, LXI, 1937, pp. 91-98, 460-67; A. Losch, same title, ibid., pp. 455-60, "Wirtschaftschwankungen als Folge von Bevölkerungswellen", ibid., LX, pp. 39-52, and "Die Vergreisung -- wirtschaftlich gesehen", ibid., pp. 677-85. See also W. Abel, Jahrbucher für Nationalökonomie und Statistik, CXLII, 1934, pp. 670-91.

54

In the ancient and pre-ancient world improvement in economic conditions was succeeded by growth in population. See G. Childe, What Happened in History, New York, 1946. According to Childe (ibid., p. 275) "progress is real if discontinuous. The upward curve resolves itself into a series of troughs and crests. But...no trough ever declines to the low level of the preceding one, each crest out-tops its last precursor". While Childe's analysis suggests the importance of the technological and the economic factors, it does not disclose anything like a 'law' of history. Until the late nineteenth century economic improvement continued to be followed by population growth in all countries. Today, however, this relationship no longer is universal, augmentation of output sometimes resulting merely in augmented per capita income and/or leisure.

55

Cf. on power structures, N. S. Timasheff, An Introduction to the Sociology of Law, Cambridge, 1939, Part III. On the hierarchical character of the distribution of power see also G. Mosca, The Ruling Class, New York, 1939.

Several recent articles on consensus and on informal and small-unit organization may have implications for the analysis of societal order: L. Wirth, "Consensus and Mass Communication", American Sociological Review, XIII, 1948, pp. 1-14; Walter Firey, "Informal Organization and the Theory of Schism", ibid., pp. 15-24; and P. Selznick, "Foundations of the Theory of Organization", ibid., pp. 25-35.

56

See J. M. Clark's Alternative to Serfdom, New York, 1948, ch. 5; also M. W. Reder, "The Theoretical Problems of a National Wage-Price Policy", Canadian Journal of Economics and Political Science, XIV, 1948, pp. 46-61, and my "The Problem of Order in Economic Affairs", Southern Economic Journal, XV, 1948, pp. 1-29.

57

L'Ère des Tyrannies, Paris, 1938, p. 214.

58

Concerning the influence of war see N. J. Silberling, op. cit., ch. 3-6, C. W. Wright, ed., Economic Problems of War and Its Aftermath, Chicago, 1942; J. U. Nef, "War and Economic Progress, 1540-1640", Economic History Review, XII, 1942, pp. 13-38, and "Wars and the Rise of Industrial Civilization, 1640-1740", Canadian Journal of Economics and Political Science, X, 1944, pp. 36-78. See also G. Wright, A Study of War, Chicago, 1942, respecting the causes and immediate effects of war.

59

See E. D. Domar, "Capital Expansion, Rate of Growth, and Employment", Econometrics, XIV, 1946, pp. 137-47; also B. Higgins, "To Save or Not to Save", Canadian Journal of Economic and Political Science, XIV, 1948, pp. 98-112. Domar has treated this subject also in "Expansion and Employment", American Economic Review, XXXVII, 1947, pp. 34-55, and "The Problem of Capital Accumulation", ibid., XXXVIII, 1948, pp. 777-795. See also R. F. Harrod, Towards A Dynamic Economics, London, 1948; Joan Robinson, "Mr. Harrod's Dynamics", Economic Journal, LIX, 1949, pp. 68-85; and T. C. Schelling, "Capital Growth and Equilibrium", American Economic Review, XXXVII, 1947, pp. 864-876.

60

F. Hilgerdt, Industrialization and Foreign Trade, League of Nations, 1946, ch. 4. Considerable information is given in my paper cited in note 3 above. The time-oriented ecology of growth in the past is suggested by detailed data relating to occupational trends. See footnote 46 and text above.

61

The discovery of so-called laws has often been announced, particularly by sociologists. E.g., see K. D. Har, Social Laws, Chapel Hill, 1930. Several decades ago, E. P. Cheyney, having announced that "history...has been subject to law", enumerated six "laws", three of which are not laws and three of which are not valid. See his Law in History, New York, 1927, pp. 1-29.

E. Zilsel's (Die Entstehung des Geniebegriffs; Ein Beitrag zur Ideengeschichte der Antike und des Fruhkapitalismus, Tuebingen, 1926, pp. 324-26) list of hypothetical laws is not much more helpful.

62

"Historical knowledge is concerned with individual objects or events, with individual persons, nations, or institutions having a definite date or position in time. Statistical knowledge...[is] concerned with numerical relations in multitudes...in which individual differences are ignored.... A world of which statistical knowledge is possible is then a world in which there are variations which are in part individually unforeseeable and unpredictable, and therefore, inexplicable, but in which certain laws or regularities prevail". See M. R. Cohen, "The Statistical View of Nature", Journal of the American Statistical Association, XXXI, 1936, pp. 328, 340; The Meaning of Human History, La Salle, 1947, ch. 2, 4. Cf. J. Royce, "The Mechanical, the Historical and the Statistical", Science, XXXIX, 1914, p. 556.

63

See M. Curti et al, Theory and Practice in Historical Study, Bulletin 54 of the Social Science Research Council, New York, 1946, pp. 138-39, also pp. 136-37; also G. P. Gooch, "Some Conceptions of History", Sociological Review, XXXI, 1939, pp. 233-47. Regarding the circumstances under which historical principles can be inferred see P. Meadows, "The Scientific Use of Historical Data", Philosophy of Science, XI, 1944, pp. 53-58; S. Lebergott, "Chance and Circumstance: Are Laws of History Possible?", Journal of Philosophy, XLI, 1944, pp. 393-411. M. Mandelbaum, "Causal Analysis in History", Journal of the History of Ideas, III, 1942, pp. 20 ff., and "A Critique of Philosophies of History", Journal of Philosophy, XLV, 1948, pp. 365-77. Of interest also in respect to laws of development are K. Popper's "The Poverty of Historicism" (Economica, XI, 1944, pp. 86 ff., 119 ff., XII, 1945, pp. 69 ff.) and The Open Society and Its Enemies, London, 1945. How the historian introduces his general attitudes into history is well illustrated by V. G. Simkhovitch's series of articles on "Approaches to History", Political Science Quarterly, XLIV-XLIX, 1929-34. See also A. H. Johnson, "Whitehead's Philosophy of History", Journal of History of Ideas, VII, 1946, pp. 1-6.

64

E.g., see L. S. Feuer, "Indeterminacy and Economic Development", Philosophy of Science, XV, 1948, pp. 225-41.

65

E. Zilsel, "Physics and the Problem of Historico-Sociological Laws", Philosophy of Science, VIII, 1941, pp. 567 ff.

66

I. Langmuir, "Science, Common Sense and Decency", Science, XCVII, 1943, pp. 1-7. Difficulties attendant upon efforts to predict the course of economic events have been treated or touched upon also by F. S. C. Northrop, The Logic of the Sciences and the Humanities, New York, 1947, ch. 13;

J. Marschak, "Economic Structure, Path, Policy, and Prediction", Proceedings of American Economic Association, XXXVII, 1947, pp. 81-86; Whitehead, Science and the Modern World, pp. 63-66.

67

The basic difference between Western and Eastern cultures is well illustrated by F. S. C. Northrop in The Meeting of East and West, New York, 1946. Difficulties attendant upon the establishment of linkages between isotemporal movements are evident, for example, in studies of the association of political and economic movements. E.g., see Silberling, op. cit., ch. 4; J. Akerman, "Political Economic Cycles", Kyklos, I, pp. 107-17; W. W. Rostow, "Business Cycles, Harvests, and Politics", Journal of Economic History, I, 1941, pp. 206-21; C. E. Labrousse, La crise de l'economie francaise à la fin de l'ancien regime et au debut de la revolution, Paris, 1944. Difficulties attendant upon the establishment of linkages between succeeding events are evident in studies of revolution and of the circumstances under which revolution entails both a redistribution of power and a change in the basic politico-economic structure. E.g., see L. M. Lachman, "Social and Political Revolutions", Journal of Social Philosophy, III, 1937, pp. 24-38; L. Gottschalk, "Causes of Revolution", American Journal of Sociology, L, 1944, pp. 1-8; and N. S. Timasheff's account of changes in social mobility in Russia, "Vertical mobility in Communist Society", ibid., pp. 9-21.