THE GROWTH OF ADMINISTRATION
WITHIN UNIVERSITIES
THESIS FOR THE DEGREE OF Ph. D.
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ABSTRACT

THE GROWTH OF ADMINISTRATION
WITHIN UNIVERSITIES

by

Robert O. Richards

The issues of administration growth in relation to growth in total organization size, and of factors contributing to administration growth, are investigated through longitudinal and cross-sectional analysis of American public four year institutions of higher education.

Variables included in this study involve number of administrators (those at all levels of central administration holding decision making, non clerical positions), size of the total organization (enrollment and number of faculty), organizational complexity (number of academic departments), age (from date of founding), budget (income or expenditures), type of institution (state, land grant, etc.), and region.

Two propositions are stated:

1. The growth direction proposition: The ratio of administrators to organization size does not increase as the organization grows; it either remains constant, or more likely, decreases as the organization grows.

2. The growth factors proposition: Administrative component size is influenced more by organization size than by complexity, budget, goals, age, or external environment.

Longitudinal analysis includes observations of administration size, number of faculty, enrollment, number of departments, type of institution, and expenditures at five year intervals between 1900 and 1960. Cross-sectional analysis includes almost all American four year public

universities and colleges (N=261), and involves the variables of administration size, faculty, enrollment, income, age, type of institution, and region. Data for longitudinal analysis has been gathered through field trips to the subject universities, and is drawn from catalogues, financial reports, and other archival documents. Data for cross-sectional analysis is drawn from Biennial Survey of Education data published by the U.S. Office of Education.

Findings from both research phases strongly support the growth direction proposition; five of the six universities in the longitudinal sample display a diminution in the ratio of administrators to total organization size over time, and plotting of a regression line for these variables displays a similar pattern in the cross-sectional sample.

In study of the second proposition, both the longitudinal and the cross-sectional data confirm the significance of organization size in relation to administration size. But in each instance, the size factor is accompanied by one other variable in displaying discernible relationship to the number of administrators. In the case of the longitudinal analysis, number of departments reveals some tendency to be related to administration size; in the cross-sectional data, type of university reflects a similar tendency.

Durkheim's conceptualization of the division of labor in society provides an explanatory framework for ordering expected relationships between variables pertaining to organizational structure. Simply stated, Durkheim maintained that social structure is most influenced by internal characteristics, and less so by external environment. Variables employed

in the present research are ordered as internal, environmental, and as linkage factors between these two. Results of this study can then be readily interpreted in terms of the ordering principle extrapolated from Durkheim. Those factors more immediate to the internal structure show a stronger relationship to administration size than is apparent between the latter size and factors less immediate to that structure.

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Robert O. Richards

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In Memorium

J. O. Richards

Mary Margaret Richards

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Completion of the longitudinal phase of this research was dependent upon the cooperation of officials at the six universities studied. Their institutions remain unidentified at their request, which necessitates that they too must remain anonymous in public thanks.

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Mary E. Richards provided crucial assistance at every phase of the work. Indeed, there is difficulty in distinguishing where her roles as invaluable colleague and World's Greatest Wife diverge.

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CHAPTER I

THE PROBLEM

The purpose of this study is to observe effects of various organization characteristics upon changes in administration size. The form of organization examined is the American university; however, results of this undertaking should contribute to formal analysis of organizations in the general case.

This research continues the quest for resolution of the issue which growth of administrative overhead creates in the experience of organizations. This problem has shaped both ideology and policy as bureaucratization has increasingly dominated the social order. Such concern is well reflected in both public debate and the literature of organization theory.

Public Concern and Popular Beliefs about Administrative Growth

The issue of organization size and growth has constituted an abiding theme in non-sociological study and commentary about the modern social order. As bureaucratization emerged as a process definitive of industrial society, its consequences to both man and community were subjected to agonized, if not painstaking, scrutiny. Novelists from Balzac and Gogol to Orwell and Kafka, and social commentators from Veblen to W. H. Whyte, Jr., have questioned the purported rationality of bureaucratic structure, norms, and behavior.

Such commentaries express widespread concern that bureaucracy both fails to meet the needs of those whom it is intended to serve, and distorts the personalities of those who are to serve it. Merton has limned out the "bureaucratic personality" who experiences such a distortion, exchanging bureau norms for culturally prescribed goals.

Bureaucracy has also become a subject of ideological and political concern. Thus, conservative critics of "big government red tape" are joined by liberal and radical leftist advocates of "new politics" in decrying bureaucratic "excesses" believed to culminate in ruinous impersonality and greed.

A corollary to this charge of administrative rapacity is the accusation that the growth of the administrative component tends to outstrip any increases in production which it is intended to coordinate. Thus administration is described as maintaining its power by amassing greater power through growth in personnel. Independent of any amount of supportive evidence, this contention is a most popular one, appealing to the desire to control the impersonal character of bureaucratic authority, and seemingly confirming the conception of administration as irrational in form as well as in motive.

Probably the most familiar version of the disproportionate administrative growth argument was advocated by C. Northcote Parkinson (1957), whose image of a blundering and power hungry leviathan has attracted considerable attention and acceptance. Indeed, Parkinson's wry vision of administration is modern folklore compared to the scant recognition accorded outside the social sciences to Max Weber's (1958, 1964)

description of bureaucracy as a rational, effective, efficient means of fulfilling collective functions.

Parkinson directed his discussion of bureaucratic administration to the proliferation of decision making officials. He maintained that a disproportionate growth of administration was motivated by the need for such officials to secure status and power, and not by demands of increased output. His criticism was thus double-barreled: administration is (1) inefficient, and its inefficiency is caused by (2) its irrational motivation; i.e., irrational in terms of its relevance to organization mandate and goals.

Despite the facetiousness of Parkinson's essay, the questions raised by his proposition have posed a substantial challenge to serious students of administration: What direction indeed does the growth of administration take, and what factors shape that growth? Such very elementary questions are yet to be definitively investigated. Hopefully this research offers significant evidence in the quest for answers to these questions.

This popular conception of burgeoning bureaucratic growth has been shared by some sociologists. Frequently cited is the observation of Theodore Caplow (1957, p. 502):

> Large groups apparently devote a larger proportion of their resources to their own operation than do small groups. It can be argued that the necessities of large-scale communication and control require proportionately less self-maintenance. There is an almost universal belief that the administrative and overhead components of any organization increase out of proportion to the increases in its size. There are remarkably few studies bearing directly on this point, however.

As will be seen shortly, the only part of Caplow's statement borne out by review of the literature is his last sentence.

Nonetheless, wariness about the benefits of burgeoning bureaucratic administration is reflected in a number of critical commentaries, including those observing recent trends in universities. That the administrative component has indeed grown out of hand is accepted as a point of fact:

> A lush undergrowth of nonteaching administrators is choking the groves of Academe. The most striking change in American higher education has not been in the increase of students, buildings, and courses...but the phenomenal growth of administrative personnel. This largely nonteaching bureaucracy, which has shot up like a child with abnormal glands, today equals, at some institutions, the number and cost of the teaching staff (Stroup, 1966, p. 3).

One dean recommended to his university a cutback in development of administrative staff while warning "We have piled assistant deans and assistants to the dean, man on top of man, until this structure has reached mountainous proportions" (Stroup, p. 3).

But is it indeed the case that such a trend can be validated in the experience of any number of universities, or in the experience of other forms of organizations?

Theoretical Significance of the Research Problem

The issue of administrative growth touches upon central issues of sociological concern. First, to the extent such growth represents development of a societal specialization, this issue involves basic societal structuring: the division of labor. Second, to the extent such growth represents emergence of a particular means of social control, this issue

involves basic societal structuring: the division of labor. Second, to the extent such growth represents emergence of a particular means of social control, this issue involves one of the master processes of social change associated with a developed society: bureaucratization. These two concerns are a part of the "classical tradition" in sociological literature, and have shaped much of the inquiry into the social order to the present day.

First issue to be considered here is specialization within division of labor. Explaining specialization within an organization is akin to the problem of explaining the organization of society itself--how many and what kind of roles are required within what kind of societal unit? The "first order" nature of this question may be reflected in the primacy it received in some of the earliest sociological writings.

Spencer noted that "In societies, as in living bodies, increase of mass is habitually accompanied by increase in structure" (Coser and Rosenberg, 1957, p. 507). He was conscious of the role of administration as a prerequisite to expansion of growth within a social unit:

> The headless clusters, wholly ungoverned, are incoherent, and separate before they acquire considerable sizes; but along with maintenance of an aggregate approaching to, or exceeding, a hundred, we ordinarily find a simple or compound ruling agency--one or more men claiming and exercising authority that is natural, or supernatural, or both. This is the first social differentiation (Coser and Rosenberg, 1957, p. 508).

Spencer observes in development of tribal society a further proliferation of organizational "clusters, ... and a differentiation analogous to that which originally produced a chief, now produces a chief of chiefs. . . . Clearly, then, complication of structure accompanies

increase of mass" (Coser and Rosenberg, 1957, p. 509).

Spencer's statement might form a plausible hypothesis for contemporary analysis of organization component growth. Durkheim's discussion of the division of labor displayed a similar recognition of the centrality of social unit growth to explanation of the social order. However, Durkheim questioned the importance Spencer attributed to environment for internal differentiation within organizations. He further disagreed with Spencer's alleged practice of implying causality from the function of organization roles (Coser and Rosenberg, 1957, pp. 513-18).

The second issue refers to a specific form of specialization--bureaucratization. Weber's presentation of this topic displayed an insight into the modes of organizational structure which accompany emergence of rational authority. As Gouldner (Lipset and Smelzer, 1961, pp. 80-81) has further pointed out, in the nature of bureaucratic authority Weber found a principle of social structure transcending political ideologies and norms.

Many American sociologists of the last three decades have accepted the challenge of Weber's insight, paying particular attention to bureaucratic behavior. More recently there has been resurgence of interest in the characteristics of the formal structure within which that behavior occurs. Of course, study of the administration growth issue requires such concern with organization structure. Not only does such inquiry tap ideological concerns of the larger society; to delineate the course of administration growth and the correlates of that growth is to contribute to development of a coherent theory of organization structure.

The Setting: Universities and Colleges as Appropriate Units of Organizational Analysis

"Organization" as a generic term

Before the analysis of universities' structures can be related to larger sociological concerns, the use of the theoretical concept intermediating between this subject and study of the larger social order must be clarified. A plethora of terms have been used, more or less synonymously, to describe contemporary organizations: "large scale," "complex," "formal," "modern," are some of the more common terms used in conjunction with organization analysis. "Bureaucracy" is another term employed, either in describing the administration of such organizations, or the organization itself. Each of these expressions would seem to be emphasizing a particular perspective upon the same organizational phenomena. Interestingly enough, books bearing each of these terms in their titles tend to involve the same topics, covered by the same literature. It is instructive that the most comprehensive compendium of materials in this area is titled simply The Handbook of Organizations. Deriving direction from that device, the term "organization" will be employed consistently in this study, with the understanding that it implies all those attributes associated with bureaucratic administration and large scale, complex, formal organizations.

Universities as a class of organizations

Universities and colleges represent a specific class of organizations; that is, such institutions evolve and develop in terms of processes which characterize organizations in general. At their maturity,

universities exhibit the same general characteristics so frequently analyzed within the context of the firm as typical of organizations.

In the study of administration as a component of organization, no writer has been more influential in defining the meaning and significance of bureaucracy than Max Weber. Udy extrapolated seven characteristics of "rational bureaucracy" from Weber's writings: (1) hierarchical authority structure, (2) a specialized administrative staff, (3) rewards differentiated according to office, (4) limited objectives, (5) performance emphasis, (6) segmental participation, and (7) compensatory rewards. Udy emphasized elements of contradiction among these aspects, as others had before him (Udy, 1959, pp. 791-795). However, his condensation of these several predominant attributes of Weber's ideal type indicates the essence of rationalized authority characteristic of organizations in which decision making and enforcement are articulated in terms of organization goals.

G. Lester Anderson has reviewed the extent to which universities fit such a general class of organizations, and furthermore, the extent to which they are specifically bureaucratic in their structure, in

> that its members (trustees, administrators, faculty, staff, students, etc.) . . . are organized to accomplish a purpose or purposes, that the interrelationships of the members are ordered by a system of authority and reward, that decisions are made by administrators, and that the behavior of the members is lawful though variable, and hence predictable. Consequently, general principles regarding organizations should have relevance to the organization of colleges and universities. Second, colleges and universities have the characteristics of bureaucratic organizations. . . . (Anderson, 1963, pp. 4-5).

Anderson continues by citing Weber and Gouldner, indicating the relevance of their formularizations of bureaucratic structure to study of universities. He notes that universities are bureaucratic in the operation of instruction, research, and service units. Nonetheless, Anderson goes on to suggest that the bureaucratic aspects of universities are largely mitigated by "collegial" authority resting in the power of the faculty. As will be argued later, this return to the theme of universities as "communities of scholars" seems more relevant to describing the ideology which sanctions authority in academia than to describing a locus of organizational authority.

There is some precedent for analysis of institutions of higher education within the context of organization studies. Boland (1966) successfully dealt with university administrations in the parlance of organizational analysis, investigating the variables of organizational complexity, administrative specialization, and administrative centralization within universities. Fred R. Ford (1963) has provided a case history of the growth of administrative, clerical, and other support personnel within a university, which recorded a process that could just as easily have been observed in the growth of any moderately sized firm.

Bureaucratization of the university

Bureaucratization as an historical process has been documented in governmental and industrial contexts; it can also be observed in academia. Within the population of state universities, those which have grown from traditionally integrated collegial structures to bureaucratically

operated organizations have done so within a relatively short period of time. Although American universities ranged from an enrollment of a few hundred to a few thousand in 1900, their organizational structure was in almost every case very simple. In that year, the national mean of college faculty sizes was only twenty-four (Clark, 1963, p. 38).

During the period prior to the turn of the century, university administration per se could hardly be discerned as a distinct organizational component. The president served as the only administrator, and in most cases, his authority rested primarily upon his role as simply the most elevated among his faculty peers, rather than upon specialized role attributes specifically attached to the administrative position of president.

The authority networks, division of labor, operating norms, etc. of American institutions of higher education prior to 1900 could appropriately be described within a community model characterized by gemeinschaft integration and mechanical solidarity. Thus, the turn of this century seems an appropriate point at which to begin observation of those bureaucratization processes which have brought many such institutions to their present state. First, the role of university president took on its specialized administrative case. Thorstein Veblen cryptically described the transfer of discretionary powers formerly held by the faculty into the hands of the new "captain of erudition," the university president.

In this earlier period, the role of president as "monocratic chief" (Weber, 1947, pp. 337-340) was, to varying degrees, limited by the advisory role of the faculty, with no other organizational elements

interposed in decision making and execution. Nonetheless, a cresive growth of administrative hierarchy soon resulted in a distinct distribution of organizational authority through managerial, technical, and clerical personnel.

The extent of this development appears in the reorganization of university administration into a corporate form. The decision on the part of one major university to incorporate in 1930 was recognized at the time by its president as a major structural transformation in the growth of the university. Since World War II, these processes of formalization of the administration structure have rapidly expanded with the maturing of these institutions. At several of the universities studied which presently exhibit highly proliferated and complex administrative structures, personnel who had been associated with the university since the decade marking the end of World War II stated that it "seems only yesterday" that, in the words of one administrator, "the administration consisted of the president, his secretary, and whomever was handy."

General Research Concerns

The "exploratory" nature of this study

What this study aims to accomplish is the coupling of a general proposition concerning growth rate with exploratory investigation of the interrelationships of several possible causal variables associated with that growth rate.

Nowadays scholars might well hesitate before wittingly appending the description "exploratory" to their study; "exploratory" has become

a euphemism applied ex post facto to those treatises whose authors fear that their motivations, methods, and/or revelations could not pass a scrutinous test of reason. But as Udy (1965, p. 684) observes in his conscientious critique of comparative analyses in organization research, the present state of the art is such that he who argues too boldly that his study meets criteria for formally testing theoretically derived hypotheses lays himself open to the charge of pretentiousness. Udy notes that the groundwork of categorical constructs, heuristic hypotheses, and even definitions of constants and variables which must precede formal hypothesis testing is lacking as a cresive development in the literature.

Considerations of design and data analysis

A unique feature of this research lies in employment of both longitudinal and cross-sectional studies of the administration size issue, providing an opportunity to observe the consistency of results gained from each research design.

As Udy (1965, p. 684) notes, in the course of such an inquiry, statistically delineated analysis may be performed not for classical hypothesis testing (which it may superficially resemble), but simply for

> ease of manipulation of data, ease of presentation, and explicit description of what the research is doing anyhow. . . . Actually, only the "hypothesis" that there is in fact some relationship is "tested." More precisely, the problem is to answer the question, What is the relationship? But it is often expedient to run variables against one another using statistical techniques and present the results in statistical form. . . .

Use of statistics in this study conforms to Udy's treatment in that they are used for expository purposes rather than in the formal testing of hypotheses. In instances where tests of statistical

significance are performed, "acceptance" or "rejection" of these propositions may yield additional description of these selected aspects of organization growth.

Administration: an operating definition

In light of the attention which bureaucratic administration has received, it is rather remarkable that the concept has proven so elusive as a generic term in the study of organization. This is a matter of no small importance; it makes considerable difference when one is positing an administrative growth pattern if he includes technical and clerical support personnel, as well as managers and other officials in policy making capacities.

This study employs a definition of administration in which attention is focused upon those who in some way contribute to the coordinating functions of policy determination and execution. These are the officials, executives, and/or managers--those at all levels of the central administration who in some way contribute to formation and execution of those decisions which comprise the organization's operating policies. It is, after all, these officials whose very existence as loci of power and authority is rationalized on the basis of the efficiency which they engender within organizations. That efficiency of course would be brought into serious question if it were found that such personnel multiply out of proportion to the growth of the organization they are to administer.

CHAPTER II

LITERATURE, THEORY, AND PROPOSITIONS

Introduction

Traditionally, research advances as theoretical propositions and empirically derived findings reciprocally contribute to a cumulative literature, from which challenges for new theoretical and research problems logically follow. Thus it is usually the function of a formal review of the literature to demonstrate how previous works specifically generate hypotheses and suggest variables, methodological procedures, and techniques for study of the problem at hand.

Such is the state of inquiry into the structural parameters of organizations that such a strategy cannot be particularly productive. Despite the great interest often expressed in this subject, little systematic "theory building" has been accomplished which would yield series of testable hypotheses. The purposes of this chapter, then, are not those usually expected from review of the literature.

The chapter title, "Literature, Theory, and Propositions" indicates the program to be followed. Much of this review of the literature is a critique by which it should become evident why a researcher may decide to eschew previous models and the conceptualizations they generate. For example, the three models of organization structure and change reviewed herein are not directly reflected in this research. Also, many of the empirical studies may at first appear only tangentially related to the

problem here formulated. These models and research studies have influenced the shaping of the propositions by the concerns they raise with organization structuring, although they are not directly used in specific formulation of the research propositions here analyzed.

Review of Literature

The quest for a model of organization change

The problem of achieving a consistent and coherent theory of organization has generated any number of endeavors to formulate models of change and growth. Typical of these are system, biological, and ecological models.

System models Most systems analyses postulate the organization to be an entity which consumes energy inputs, distributing them through a series of processing mechanisms to restructure them into outputs. As Talcott Parsons (1962, p. 33) has noted, these outputs can then be viewed as inputs for other systems, and thus clusters of systems comprise interacting units. Analysis of systems often involves highly sophisticated operationalizing and measurement of variables, as Charles J. Haberstroh (1965) well documents in his review of this literature.

Systems analysis of organizations involves the practice of postulating a state of equilibrium. This facilitates equations designating quantitative relationships between certain systemic elements, but has the disadvantage of emphasizing static aspects of organizations rather than their history of change. The end goal of such analysis is often description and prescription for decision making. Katz and Kahn (1968) elaborate an impressive set of terms to delineate the systemic contexts in which

such decision making can be seen to occur. P. G. Herbst's (1957) study of systemic "behavior structures by means of input-output data" is an example of the use of a system model. By such analysis, administrative size might be predictable directly from organization size, and from a few other components. But the problem is, of course, accounting for the myriad of intervening variables which seem to confound this relationship.

Biological models Another very popular approach has been to conceptualize the organization on the basis of biological models. Two exponents of this approach independently arriving at similar statements of this mode are Mason Haire and Kenneth Boulding. Both have observed that size changes of organisms are characterized by what Boulding (1953[b], p. 334) termed the "principle of nonproportional change" Haire (1961, p. 333) formalized the nature of such growth in his statement of "the square-cube law"; as the surface of a body expands by a square function, its volume expands by a cube function. If the "volume" of an organization is its administration, one can quickly see how Boulding's and Haire's formalizations lend support to the Parkinson position. Indeed, Boulding (1953[b], p. 336) notes that

> as institutions grow they have to maintain larger and larger specialized administrative structures in order to overcome the increasing difficulties of communication between the outside surface of the organization and its central executive. Eventually the cost of these administrative structures begins to outweigh any other possible benefits of large scale.

Given such a conceptualization of administrative growth, one can quickly be led to a conjecture of rather preposterous dimensions. For example, in reference to the subject of this research, Boulding muses,

"One can visualize . . . a university of 100,000 students in which the entire organization is made up of administrators" (1953[b], p. 336).

Observing that "the size of companies varies through somewhat the same limits as the size of warm-blooded animals," Haire (1961, p. 334) reasons that "the form of organization itself is an index of the kinds of forces playing on the organism, and the shape of the form is a first clue to the nature of the forces" (Haire, 1953, p. 339).

But despite the confidence which Haire expresses in the appropriateness of such biological analogies, his own research (Haire, 1959), which in essence investigates line-staff growth relationships, could easily have been conducted without the benefit of any such analogy. Certainly his findings require no such model for interpretation.

At any rate, Haire's and Boulding's works represent attempts to apply a particular type of system--the biological--to organizations as organisms. System properties such as equilibrium play an important part in the derivation of Haire's and Boulding's hypotheses. Such a general concept would seemingly provide inductive projections from their model analyses. But the specifics of their biological models descriptive of that equilibrium cannot go far beyond simply providing aids to depicting a few discrete aspects of organizations. That is, on the basis of such analogies, their models do not logically generate a series of predictive hypotheses which can then be empirically validated.

There are other serious criticisms to be made of such biological analogies. For example, in carefully reanalyzing Haire's data and subsequent replications of his methods in other contexts, McWhinney (1965,

p. 351) argues that "on the basis of Haire's longitudinal data, there appears to be no evidence to support the square-cube biological growth analogy." McWhinney's reanalysis of Haire's own data reveals that a proportional growth hypothesis fits a regression line better than does the square-cube law. McWhinney (p. 365) reckons that the basic problem in applying such models is "the inability to establish a suitable metric for organizational size," and he suggests that some "non Euclidean" operation might work better.

Penrose (1952, p. 808) required no rigorous examinations of such studies as Haire's to dismiss biological analogies applied to the growth of firms. Using much the same criticism as is leveled at behavioral psychologists who generalize from non-human behavior, she argues that the crucial element of "will," i.e., ability to manipulate environment through symbolic reasoning, is lacking in such analogies. Therefore, lacking an accounting for the essence of social nature, these analogies cannot predict behavior generated by that nature.

Ecological models Haire, Boulding, and others who sought models from biological studies have not been the only ones to turn to the natural sciences for further explication of organization phenomena. Another approach has been to focus not upon analogies to the elements of organisms, but upon the ecological relationships between organisms. Duncan and Schnore (1961, p. 318) are most persuasive in their argument that human ecologists are the logical heirs to the mantle of that sociology which conceives of social reality in a structured order

transcending the behavior of individuals. They indicate a specific relevance of ecological theory for a theory of bureaucracy, although they do not detail what the content of such a theory would be, or what program of research would contribute to that theory.

A response to Duncan and Schnore's call for research into bureaucracy conceived in the traditions of human ecology appears in the work of Walter Boland (1966, p. 5). He asserts that his hypotheses propounding a monotonic relationship between organization size and variables of "organization elaboration" represent a reaffirmation of a human ecological "equilibrium model." The hypotheses and analyses Boland employs, however, rely very little upon ecological concepts.

Summary of model analyses The search for a model of organization structure and change transferable from other disciplines is enticing; desire to find that the unknown can be interpreted in the light of what is already known is quite understandable. Yet this quest must be reckoned as one of limited payoff. Such models are elusive when applied to specific problems. More parsimonious explanation often suffices for the observations they yield, as in the case of Boland; or as McWhinney points out in his critique of Haire's study, the results of data analysis simply do not confirm relationships predicated by such theory.

Maybe the problem is not just that biological or system models mean different things in different contexts; maybe the difficulty also has been in getting the scale of the model to fit the scale of the problem. What may be required is theory less general and more modest than those

discussed thus far. These two requirements form the mandate for the research here undertaken.

Findings from previous research

Studies confirming administrative rapacity

Empirical validation for the popular notion of administrative growth surpassing that of the organization which it leads can be quickly reviewed. Parkinson (1957, pp. 7-8) offered as evidence for his "law" the growth pattern of the British Admiralty; while the size of the Royal Navy decreased 31% between the peacetime years of 1914 and 1928, the number of Admiralty officials increased by 78%. From this Parkinson suggests that "the less work to be done in an organization, the greater are the increases in its administrative staff." This would also appear to be the conclusion to be drawn from Mason Haire's (1959, pp. 292-293) observations of four firms in which only line workers were involved in nineteen cases of layoffs; in fact, in a few instances new staff personnel were hired during layoffs.

As Haire notes, such findings as his would tend to indicate a "strong resistance to negative growth" on the part of administration staff. But Parkinson's argument asserts not simply a survival motif, but a burgeoning of administration. Blau and Scott (1962, p. 226) maintain that Parkinson's conclusions based on data from the Admiralty are "misleading" as evidence of administrative rapacity, inasmuch as changes in technology associated with job roles might be highly significant in explaining such organizational change. The same might be found true in reexamining Haire's study.

Evidence demonstrating rapid administration growth is slim. Examining almost a thousand school districts of several types in three size categories, Terrien and Mills (1955, p. 11) confirm their hypothesis that the

> relationship between the size of an administrative component and the total size of its containing organization is such that the larger the size of the containing organization the greater will be the proportion given over to its administrative component.

But as Anderson and Warkov (1961, p. 27) and several others point out, Terrien and Mills did not consider the role of organization complexity, which might have been more important in explaining administration growth than sheer size. Indeed, Terrien (1963) later suggests such a likelihood.

There is an important variant to the position that administration increases out of proportion as organizations grow: e.g., that such bureaucratic growth is not necessarily the function of organization growth, but of organization age. Anthony Downs (1967, pp. 19-20) offers several reasons why bureaucracy grows with organization age:

> First, administrators tend to have more job security and stability than production workers, partly because administrators are usually more senior in rank. Therefore, whenever attrition in personnel occurs, nonadministrative officials are normally discharged first . . . . Second, the older a bureau is, the more different types of functions it is likely to carry out. As a result a higher proportion of the bureau's personnel must be engaged in co-ordination. Third, until recent developments in the technology of business machines, production jobs were historically subject to a greater mechanization than administrative jobs. The older a bureau is, the more time it has been exposed to these effects of technical change.

Some empirical evidence supports this contention that longevity breeds bureaucratic expansion. In a study of ten voluntary associations Tsouderos (1955) finds that even as membership declines over time, all

the other characteristics observed (total annual organizational income, total annual expenditures, property value, number of administrative employees) may continue to grow, but at a decreasing rate.

Furthermore, Starbuck (1965, pp. 506-511) cites work by Melman and Chester indicating the relevance of time, but also notes that hypotheses attempting to isolate size, time, output, and technology are difficult to test, because they are

> virtually impossible to disentangle empirically . . . . In typical data, the variables are all correlated with one another . . . . That the A/P ratio (number of administrators to number of production employees) is probably an increasing function of time . . . may be due to increasing "technological complexity"; it may be a consequence of changing definitions of "administrative" work; or it may be the result of new requirements imposed on and new activities undertaken by the firm.

Studies contradicting the administrative rapacity theme Most research findings do not indicate that the A/P ratio reveals a swelling of administration as the organization grows. Such studies tend to indicate that the A/P ratio is relatively constant or actually represents some diminution of the administration proportion as organizations grow. These indications appear in both longitudinal and cross-sectional studies. An examination of longitudinal studies reveals a major analysis of the A/P question undertaken by Sidney Melman (1951) in his study of all firms (aggregated by industry) appearing in the U. S. Census of Manufacturing between 1899 and 1947. Melman's summarized findings are worth quoting at length:

> Differences in magnitude of administrative overhead at one time appear to be independent of all the variables tested (corporate organization; multi-plant firms; concentration within

> an industry; profitability; pricing practices; selling effort; age of firm; employment of technicians; product type) except organization size . . . . (p. 75).
>
> Large increases in average size correspond with relatively small increases in administration overhead. [Over time] none of the other aspects of the business operation . . . appears to be selectively related to the growth of this overhead. The underlying dynamics of change in administrative overhead are apparently not related systematically with change in concentration of output; wage-earner productivity; mechanization; employment of technicians; economic age of an industry. . . . (pp. 83-84).
>
> The persistent occurrence of relatively low administrative overhead in association with large-size units since 1899 indicates that increase in size may not be held responsible for the observed trend toward greater administrative overhead. . . . (p. 90).
>
> The increase in administration personnel. . . is connected with the addition of new functions (advertising, pay-roll, accounting, etc.) carried out by the administrative personnel (p. 91).

Melman's research looms large in the citations of authors, and like many a landmark study, his work has been subjected to severe scrutiny and criticism. In examining Melman's analysis as representative of administration research, Rushing (1966, pp. 105-106) raises an important objection to Melman's counting of all salaried personnel as measurement of administration overhead. Using Melman's data sources, Rushing demonstrates that when various components within the salaried ranks (managerial, clerical, sales, etc.) are independently correlated with organization size, contradicting trends result. Rushing found an inverse relationship of managerial and sales personnel to total size, while clerical and professional staff correlated positively with size; no consistent relationship between organization size and service personnel materialized.

Starbuck's (1965, p. 502) criticism of Melman's research is even more telling:

> Regretably Melman did not make statistical tests or use multiple regression. . . . Consequently, his findings must be taken with a large grain of salt. . . . The most reasonable conclusion is that Melman found no significant correlations. A related, and more serious problem arises from his treating all manufacturing firms as one homogeneous class or organization. . . . As a result, there is a real question as to what his independent variables were.

Since he uses the same type of data as Melman employed, of course Rushing himself is guilty of this last criticism. In defending his method, elsewhere Rushing (1967, p. 277) argues that there is no logical reason to suspect that data from "industries" vis a vis data from organizations would yield substantially different results. However, if for no other reason than the absence of a binding industry-wide formal social structure, the validity of Melman's and Rushing's projections from industry to organization remains clouded. The situation presented by their approach is analogous to use of ecological correlations as representative of individual correlations. W. S. Robinson (Lipset and Smelser, 1961, pp. 145-151) has pointed out that quite different results accrue if correlations are calculated on two aggregate sets of data drawn from a given population, rather than upon specific occurrences in which each attribute is associated with the other. Thus, correlations within individual organizations may be quite different than correlations within the industries of which they are a part.

Bendix (1963, p. 221) notes in a study of German industry that during the first third of this century "a high proportion of administration employees occurred already in enterprises employing from six to fifty workers, but this proportion declined somewhat with the size of the enterprise." Bendix adds that the German data "enables us to qualify

Seymour Melman's conclusion from the American data that bureaucratization varies inversely with the size of establishment," and that "the proportion of administrators in German industry increased somewhat more than that of technicians, but the technicians increased proportionately with size while the administrators did not." As will be seen recurrently in the literature, Bendix's distinction between administrators and technicians demonstrates that so much depends upon how "administration" is construed. The significance of this point will be elaborated in the "Discussion and Conclusions" of this literature and theory section.

Mason Haire (1959, p. 296) attempted to delineate the growth of administration in four firms through time. In operationalizing his "square-cube" proposition, he studied the relative growth of line and staff. In essence, the general trend demonstrated a staff quickly expanding in growth when the firms were small in comparison to the increase of line personnel. But as the firms aged and grew, the proportionate increase in staff growth gradually tapered to meet the growth rate of the line. Of course "line" and "staff" do not necessarily separate administration from other functions. More tellingly, "the ratio of top and middle management shows an even greater decline with increasing size."

Several cross-sectional studies also add evidence contradicting the "administrative rapacity" contention. Among these, Bernard Indik (1964, p. 307) studied 126 organizations including package stations, auto sales dealerships, volunteer fire companies, industrial labor unions, and non-partisan political organization chapters. He finds "striking similarity" and "surprisingly linear" negative relationships between organization size and supervisory personnel.

The issue of administration growth has been examined by Baker and Davis, who set out to test the implications for administration of Davis's (1951, p. 232) "Law of Functional Growth," which states:

> The various functions of an organization increase in scope and complexity, as well as in the amount of work and the technical requirements for their proper performance, as the volume of business grows. The complexity of functional relationships tends to increase in geometric progression as the volume of work that the organization must handle increases in arithmetic progressions. Staff organizations tend to grow faster than the line organizations they serve. There is some evidence that the growth relation between them also involves geometric progression until we approach the optimum organization size.

Baker and Davis (1954, p. 2) reason that

> a logical concomitant to this law is the following pertinent relationship: As total line (direct) personnel increase in arithmetic progression, total staff (indirect) personnel tends to increase in geometric progression.

However, results from their sample of 211 Ohio manufacturing companies from fourteen industries contradicts this hypothesis. As the number of direct employees increases, the average number of supervisors and lower executives increases at a constant rate. As the number of direct employees increases, the number of top management executives tends to increase, but at a steadily decreasing rate. Baker and Davis conclude that their hypothesis may have been rejected because the "increase in total number of indirect workers" is not an aspect of the increase in the scope and complexity of "indirect functions" predicted by the "Law of Functional Growth" (p. 50).

Although their data on top management is certainly relevant to the proposed research, Baker and Davis' general findings are difficult to interpret in terms of the A/P ratio issue, since their use of "direct"

and "indirect" personnel may include in each category elements of both administration and production. Also, there is no measure of the possible effects upon administration size of organization complexity in Baker and Davis' work.

Bruce Despelder (1962, p. 40) has performed a study similar to that of Baker and Davis, and has produced generally similar findings. As Starbuck (1965, pp. 499-502) suggests, a number of studies indicate a pattern of marked increase in A/P in small organizations during their first growth experience, with a tapering off of administrative growth beyond some point of large organization size. Despelder's (1962, p. 40) report on "top management" ("whose duties involve the planning, organizing, and controlling of an entire enterprise or a major segment thereof") confirms such a trend within a sample of 313 "small and medium-size manufacturers of metallic automotive parts."

A recent examination of the administrative growth issue appeared as a study of administrative ratios in army hospitals by Henry Tosi and Henry Patt (1967). They too found a negative correlation between the A/P ratio and total personnel growth, when "administration" was defined as including "office work, supply, and planning personnel."

Emerging from several of the above studies is the question of the relative contribution to administration size from organization size and from organization complexity. Anderson and Warkov (1960, p. 27) also find that "other things being equal, the relative size of the administrative component decreases as organizational size increases" in their study of hospital organization. They suggest that organizational complexity, measured by number of work places and number of tasks

performed at one place, will be related to administration growth to a greater degree than will organization size.

On the other hand, in a follow-up of the Terrien and Mills study with a national sample of school districts, Frank Lindenfeld (1961, pp. 20-23) finds that regardless of the complexity of the school district (as measured by the number of schools it included) "the larger the size of the school district, as measured by total administrative and instruction staff, the smaller the proportion assigned to high level administrative work."

Haas, Hall, and Johnson (1963, p. 14) have studied thirty organizations quite disparate in function (e.g., country club, corporation sales divisions, state church headquarters, etc.) also finding that "support activity appears to decrease" as organizations increase in size. They, too, do not find the correlations suggested by Anderson and Warkov between the size of the support component and measures of complexity to be significant within their sample. As will be discussed later, there is again some difficulty in interpreting this research with an eye to the A/P ratio matter, since there is some question as to whether "support component" and "administration" are synonymous.

William Rushing (1967, p. 273) has made a very sophisticated attack upon this problem in his study of forty-one diverse industries drawn from census data. Rushing refines the "complexity" measure by introducing a "division of labor" factor measuring not simply the number of people within occupations in an industry, but also measuring the distribution of people within each occupation in each industry. His results

> showed that the effects of size and complexity are independent and opposing; size is inversely and complexity is directly associated with relative size of administration. At the same time, size and complexity interact (the positive effects of complexity decrease as size increases, and the negative effects of size increase as the division of labor increases.) The interactive effect holds only for managerial and clerical personnel, and does not hold for professional personnel. Results also indicate that with increases in the division of labor, professional and clerical personnel may increase at a faster rate than managerial personnel.

Unfortunately, the sophistication of the research poses its own problems: "since the findings are so complex, no single hypothesis can probably account for all of them." As noted above, interpretation of Rushing's data depends largely upon acceptance of his assumption that industries replicate organization patterns, and also upon the assumption that industrial occupations replicate structural roles within organizations.

The interaction of complexity and organization size in effecting development of an administration component is also noted by Hawley, Boland, and Boland (1965, p. 253) in their study of American universities. They view complexity in terms of the organizational units to be coordinated through central administration. Thus, the number of academic departments is their measure of complexity. When conceptualized in that manner, they find that

> complexity, though important, is much less influential than faculty (i.e., organization) size in determining the size of the administrative component in academic institutions. . . . In short, increase in faculty size depresses the ratio, while increases in faculty size enlarges it, though only when size of faculty is controlled.

From the resulting beta coefficients, it is apparent that "faculty size is clearly most important in accounting for the relative size of

the administrative component; the independent effects of the remaining variables--complexity, budget, and quality--are inconsequential" (p. 254).

These findings are further detailed as a portion of Walter Boland's (1966, pp. 85-86) doctoral dissertation. He distinguishes "administration, professional (heads of administrative departments, accountants, supervisors, librarians, deans, and others who have primarily administrative responsibilities)" from "administration, clerical (clerks, typists, secretaries, bookkeepers)." It is apparent that this latter category includes support staff, but it is unclear the extent to which the former category does or does not include support personnel as well as executive decision makers. At any rate, Boland finds a higher (and probably linear) correlation between organization size and professional administration size than between organization size and clerical administration size, which more nearly meet the Parkinsonian declamation of administrative expansion.

With regard to the issue of the role of "professionalism" as a determinant of administration size, Blau and associates (1966, p. 191) find more administrators in public personnel agencies with "professional staff workers" (those holding academic degrees as a job qualification) than in those agencies not so endowed with a professional staff. These researchers reason that their findings might be the result of communication factors:

> To be sure, professionals . . . make some contributions to coordination, particularly by detecting problems and proposing knowledgeable solutions for them. For these contributions to be realized in effective coordination, however, an adequate staff of managers is essential to work in close contact with the professionals and to implement their proposals as well as solicit them.

At first blush this leads one to suspect that universities would have very large administrative components, since their "production staff" (the faculty) is very highly "professionalized," by Blau's criteria. However, Hawley and his associates (1965, p. 254) find that the number of faculty holding doctoral degrees, a measure of professionalism consistent with Blau's, has practically no effect upon administration size.

Technology has been perceived both as the creator of such additional efficiency, thereby relieving the demand for increased administrative personnel (Melman, 1951, pp. 90-91), and also as the creator of greater organizational complexity, thereby accentuating the demand for increased administrative personnel (Starbuck, 1965, p. 509; Thompson and Bates, 1957, p. 325).

In her study of British industrial firms, Joan Woodward (1958) lays considerable emphasis upon the effects of technology in explaining labor costs, ratios of indirect to direct labor, professionalism, span of control, communication patterns, management specialization, and administration of production. Technology is described in terms of systems of production demanding different organization plans. Production is thus designated as either "unit," "mass," or "process."

A few studies have considered the financial resources available to organizations. Hawley and his associates (1965), and Boland (1966), include this factor in their studies of a sample of universities, and find appropriations to be more salient than complexity in partial correlations with administration and faculty size. Tsouderos (1955) finds

that income may actually continue to increase as the total organization size begins to decrease. The paucity of administration growth studies incorporating this resource variable surely cannot be due to its insignificance in organization analysis. As Barton (1961) notes, "Economic resources are generally found correlated with quality of human inputs, with activities, and with outputs." He cites several studies in which such resources were included, but in relation to variables irrelevant to this study. The absence of this variable in many a case is probably due to the inaccessibility of data, rather than to a decision to dismiss it as irrelevant.

Other studies have considered differentiating effect which various types of organizations may have upon administration size. Entwisle and Walton (1961) compare twenty colleges and fourteen business firms. As noted earlier in this chapter, Bernard Indik (1964), and Smith and Tannenbaum (1963), employ a varied sample of package stations, auto sales dealerships, volunteer fire companies, union locals, and political associations. Tsouderos (1955) studies several different types of voluntary associations, and Haas, Hall, and Johnson (1963) include a variety of organization types within their sample. In general, most of these studies do not demonstrate much differentiating significance produced by organization type upon organization characteristics. Nonetheless, this variable remains significant for further research, for the type of organization distinguishes in large measure the goals which may shape its structure. "Organizations differ in administration as they vary in goal abstractness. . . ," Thompson and Bates (1957,

p. 323) assert. Despite the absence of results confirming that proposition, the extent of research thus far is not sufficient to exclude the importance of organization type from further consideration.

Among other factors to be included in such organization analysis, Gould and Melbin (1964) cite "imperative 'policy' considerations," which may include seemingly "irrational" aspects of internal organizational politics. Additions to this array of organizational variables are environmental factors of community or regional contexts. Surprisingly few studies, however, have included such variables.

> For colleges, the importance of community and regional contexts is presumably less striking since they typically draw students, resources, and boards of control from a wider area and a more limited segment of the public. Yet these factors should be worth investigating (Barton, 1961, p. 21).

Such investigation would provide an opportunity to observe any possible effects contributed by the general social milieu of an industrial North, a rural South, or an expanding West to the organizational characteristics of universities and colleges.

Discussion and conclusions

General patterns It is no easy task when one tries to fit all the above research findings into one cogent summation of what is known about administration growth. Haas, Hall, and Johnson (1963, p. 11) understate the situation: "When viewed in toto the various studies present a rather inconclusive picture." Starbuck (1965, p. 507) more bluntly declares after completing his own thorough review of the literature that "the available evidence is sketchy and [the author] has low confidence in his ability to draw sensible conclusions at all."

Nonetheless, there is a discernible general pattern expressed within most of the organizations previously studied. Blau and Scott (1962, p. 227) succinctly summarize that pattern:

> Large organizations do not typically have disproportionately large administrative machineries; . . . however, size tends to be directly related to complexity, and complexity to a large proportion of administrative personnel; and . . . the size of an organization, particularly if complexity is held constant, may actually be inversely related to the relative size of its administrative staff.

Although Blau and Scott's summary may gloss over some glaring inconsistencies in previous findings, it is nonetheless reasonably evident that the Parkinson argument does not hold much water as a generalization about the course of administrative development.

Aside from the quasi-ideological position discussed earlier which predicts administrative rapacity, there is another approach projecting a similar outcome which is also contradicted by the pattern Blau and Scott describe. Several have argued that as an organization adds members, the number of possible interaction patterns increases dramatically. This veritable explosion of the communication burden upon the organization creates a demand, so it is maintained, that the administrative function also expand rapidly to coordinate organization activity. In pointing to this expansion of the interaction process in growing firms, Graicunas (1937) influenced the spans of control to be narrow on many an organization chart. And Davis's "law of functional growth" cited earlier, expresses a similar assumption of expanding interaction patterns.

Paul Mott (1965) notes that "the problems of coordination tend to increase at a more rapid rate than the rate of increase in the population of the organization." He explains this on the basis of a proposition

very similar to the idea expressed by Graicunas (1937) and by Davis (1951). However, he notes countervailing tendencies of managements in attempting to control the coordination problem by either transmitting "some of their functions over to independent organizations," or through the decentralization of authority.

Penrose (1959, p. 49) and Baker and Davis (1954, p. 57) conclude that an increase in relationships and a corresponding demand for more services do not inevitably necessitate an increase in personnel; existing personnel may become more efficient, perhaps through increases in labor saving technology.

Several writers have explained the apparent inverse relationship between administrative and organizational growth as the result of differential role functions of administrators in large groups as opposed to small ones. That is, although the same office exists in both large and small firms, more activities of a non-administrative nature are performed by officers in small firms than in large ones. In smaller firms, such officials are being "underused" as administrators and are probably performing a number of nonadministrative functions, as Boland, (1966, pp. 177-179) and Haas, Hall, and Johnson, (1963, p. 16) have pointed out. As Baker and Davis (1954, p. 50) note, regardless of size, a firm may have but one president, one comptroller, etc. But as the organizations grow, both Despelder (1962, pp. 40-42) and Boland (1966, p. 179-181) contend that people added take over non-administrative tasks previously performed by officials, who now simply spend an increasing amount of their time in specifically administrative duties. The point

is that the added administrative work of supervising more employees need not require additional administrators; administration simply becomes a more specialized function.

However, if new functions are added, as Melman (1951, p. 91) observes, new administrative positions will be created; and, as Boland (1966, pp. 179-181) notes in the academic setting, new hierarchies expand. It is in this instance of complexity through proliferation of new functions, which is not a process Parkinson dealt with, that Parkinson's "law" may apply.

Problems in interpreting the literature In turning to some problems of interpreting previous findings, critical ambiguities appear in definitions of "administration" which inhibit both analysis of past research and construction of a coherent theory about the growth of bureaucratic administration within organizations. Several authors, notably Rushing, and Haas, Hall, and Johnson, have given special attention to the multidimensionality of administration; e.g., "measures of heterogeneous categories are not only ambiguous; they may also produce distorting results (since their components may correlate differently with external variables)" (Rushing, 1966, p. 102).

In the same discussion, Rushing also complains that operational research definitions of administration have seldom been logically derived from a theoretical construct of administration. Of course, this is a foible often discussed by critics of American sociological research. At any rate, so long as the literature about the A/P question is based

upon research reports about so diverse a series of concepts as "staff," "support," "indirect," "nonproduction," "office, supply, and planning," etc., confusion is bound to result.

Another problem is the array of potential variables possibly intervening between organization and administration in influencing their relative growth rates. In this regard, economists have restated the A/P question from yet another perspective; does the nature of the management function itself limit the size to which various organizational components can grow? The relationship of organization as independent variable, and administration as dependent variable, are thereby reversed. Viewing the question in this way, the multiplicity of potentially intervening variables appears quite evident. Robinson (1934, p. 255) maintains that there are limitations to organization size; environmental conditions and many internal conditions qualify the nature of administrative coordination making possible large organizations.

Summing up a part of the bewildering panorama of factors possibly intervening in determining administration size is this comment from Herbst (1957, p. 341):

> . . . apart from the size of the organization, there are three factors that determine the proportion of personnel in management and administrative roles. These are complexity of organization, extent or rate at which the organization reacts to a given degree of complexity of its operations by installing extrinsic control and coordination, and the critical point with respect to size at which intrinsic regulation and transition to a complex system occurs. . . .

Obviously, Herbst's "three factors" embrace a multitude of items influencing organization and administration.

Organization analyses of colleges and universities This discussion of the literature cannot conclude without some attention to the problem of the quality and quantity of relevant material related to colleges and universities. There is a conspicuous absence of sociological literature, either essays or research reports, on institutions of higher education as formal organizations. The Hawley-Boland materials include the only empirically derived information directly pertinent to the proposed research; Boland himself found available sources quite wanting. And as noted above, the Entwisle and Walton article provides one link between the investigation of other organizations and educational institutions. There are manuals on management techniques in colleges and universities, but these lack substantive relevance to the problem posed herein.

There are also a few essays of commentary on the nature of college and university administration, but these are largely impressionistic and unsystematic. Some were written by academic administrators. Several of these studies prove relatively objective; nonetheless they tend to protest attempts to sociologically interpret the structure and dynamics of their institutions in the parlance of formal organization analysis. Such analysis, with its explicit emphasis upon hierarchical and impersonal distribution of powers, is jarring to those who prefer to perceive themselves as citizens in a "community of scholars."

For example, John Millet (1962, p. 62), writing while president of Miami University (Ohio), is one of several who argue that the fact that universities and colleges seek "to preserve, transmit, and advance

knowledge" does make them intrinsically different from other forms of complex organizations.

> Instead of being organized upon the principle of a hierarchy of authority, our colleges and universities are organized internally upon the principle of a community of authority. Power is shared by four different constituent groups in the academic entity. . .; faculty, students, alumni, and administration.

Boland (1966, pp. 22-23) has observed that even past treatises on academic organizations by sociologists have accepted the image of universities as "unique" as organizations.

Yet such claims that management in educational institutions has escaped the aggregation of power represented by rationally ordered bureaucratic administration clash with the description of universities offered by several observers.

For example Clark Kerr (1964, p. 28) describes the process by which the university adopted the administrative structure typical of such organizations.

> The general rule is that the administration everywhere becomes, by force of circumstances if not by choice, a more prominent feature of the university. As the institution becomes larger, administration becomes more formalized and separated as a distinct function; as the institution becomes more complex, the role of administration becomes more central in integrating it; as it becomes more related to the once external world, the administration assumes the burdens of these relationships. The managerial revolution has been going on also in the university.

And the institution has indeed become "more complex."

> Colleges and universities. . . run the full gamut of activities performed by both economic and social institutions. They manage investments running into billions of dollars and maintain plants of comparable value. Many universities will house and feed thousands of persons each day of the academic year. They operate large hospitals. They "promote" our largest athletic spectacles. They manage art galleries, museums, concert halls, and theatres. They are complex businesses as well as teaching and research institutions (Anderson, 1963, p. 4).

Thus the claims that universities are "unique" as organizational structures--specifically that they are not amenable to formal sociological analysis due to their structural heterogeneity--do not appear to be any more tenable than the claims that heterogeneous structure of the newly evolving giant "conglomerate" firms would render them immune from such analysis.

In the parlance of the sociology of knowledge, denial of the relevance of bureaucratic propositions and a preference for the image of the community has obvious ideological value for those desiring to defend an institution from attacks against its "bureaucratic power." It is true, as Caplow (1964, p. 61) points out, that the hierarchical structures of the contemporary university are "compound" rather than monolithic. It is also true, as Etzioni (1961, pp. 48-49) postulates, that institutional power and control such as universities possess rest primarily upon "normative" sanctions rather than the "utilitarian" motifs of the corporation, which has received the greatest attention in the literature of formal organizations. However, such variation in hierarchical ordering and sanction systems of universities does not logically exclude them from organization analysis.

Summary of literature and the scope of theory in this research

There was a period in sociological writings when writers eagerly called upon the sanctions of Merton's "middle range theories" when pressed on the one hand by vapid irrelevancies sometimes produced by "grand theory," or on the other hand by the inconsequential trivia published in many a mundane research article. Perhaps the diminished popularity

of making that invocation to middle range theory was not occasioned so much by the ultimate accomplishments of such efforts, but by the suspicion of some younger sociologists that reflexively settling upon "middle range" theories often represents an intellectual cop-out, in which the propositions which are promulgated may be relevant within the context of each other, but cannot pass the test of contributing to a larger understanding of the social order, or to amelioration of contemporary social problems.

Nonetheless, in the present instance it does make sense to invoke the propriety of the "middle range theory." In so doing, the goal is to frame the research in such a way that the relatively narrow scope of the problem will yield results which can be interpreted in a larger rubric of social change.

Such a goal was stated by an exponent of biological models, Mason Haire, (1961, p. 340):

> By tracing the history of a company or any organization through time we could see a series of changes whose regular nature would give us a clue to the kinds of forces playing on it. By comparing industries similar in size but different in process, product, resource, location, or age, we could, similarly, begin to infer from the systematic variation, the kinds of forces that are associated with these different conditions. Part of the rub here is that we don't know how to draw a picture of an industry. . . .
>
> But there doesn't seem to be any necessary reason why we can't have such a picture. It would seem to be simply an empirical matter of collecting variables and a creative job of putting them together tentatively time after time. It is a long task, but if it will lead to the evolutionary forces in the development of social organizations, it is well worth it. It could give us the first real understanding of the nature of the growth of groups.

Haire was promoting a kind of empirical program which would contribute to a middle range of theory adequately comprising large scale organization and not the entire social order.

The position of Simon and Bonini (1958) contrasts sharply with that of Haire on the issue of the substance organization theory should contain, explicitly challenging the relevance of ambitious and universal equilibrium theories. Yet in their appeal for a "stochastic" model with propositions more modest in scope they are also seeking explanations yielding greater insight into specifically organizational phenomena.

What then is the tie between the models reviewed thus far, the criticisms made of them, and the theoretical underpinnings of the research here proposed? It is in this: All these share a view of the social order which perceives the organization as a formal expression of human groups. Furthermore, it is assumed that the behavior of all such groups is the result of interaction within those groups, transcending the attitudes and behavior of their constituent members. Thus these studies and the proposed research are part of the sociological tradition of "social realism" which argues that the structure and dynamics of groups are irreducible to the individuals comprising them.

Bureaucratization has been defined by Blau and Scott (1962, p. 8) as the "amount of effort devoted to maintaining the organization rather than to directly achieving its objectives." To the extent that such activities become the function of a specialized component within an organization, developing bureaucratization may be expressed in any of a number of ways: in expansion of norms, of hierarchical statuses, or of numbers of personnel devoted to the administrative function. Thus,

dealing with the issue of the growth of this specialized component in relation to growth of an organization is one meaningful way of contributing to a theory of bureaucracy, insomuch as bureaucracy represents one facet of organizations.

Rather than adopt wholesale the perspective of any of the aforementioned models, the "middle range" approach represented by this proposed research attempts to directly reflect such a structural, holistic conceptualization of organizations. As Blau and his associates (1956, p. 179) maintained, a theory of bureaucratic structure should meet two basic requirements:

> Above all, it must be concerned with the interdependence among structural attributes of complex organizations and not take these characteristics of the structure as given and merely examine the decisions of behavior of individuals in the context of complex organizations. . . . In addition, a theory of bureaucracy should account for the connections between organizational attributes by analyzing the social processes that have produced these interconnections.

The Research Propositions

The central issue borne out throughout the above review of the literature on administrative growth deals with the direction of change in the proportion of the number of administrators to the organization size as an organization experiences growth. This issue involves not only the direction which that change may take, but also the factors which contribute to that change. Thus, the propositions which define the research goals of this study are expressed in terms of these concerns. Following a summary statement of the propositions, the variables involved are defined, and the theoretical and methodological implications underlying the propositions are discussed.

Propositions:

A. The growth direction proposition: The ratio of administrators to organization size does not increase as the organization grows; it either remains constant, or more likely, decreases as the organization grows.

B. The growth factors proposition: Administrative component size is influenced more by organization size than by complexity, budget, goals, age, or external environment.

Definition of concepts

Problems in operationalization of the research variables are presented in greater detail in Chapter III. However, some description of the terms to be employed must be offered at this point to facilitate the discussion of the propositions which follows.

Two measures of organization size will be used: total number of faculty, and total number of students. Due to its compound structure, the boundaries of the university are not self defined; indeed, they are quite vague. For examples: are the alumni a part of the organization? Are employees in some manufacturing plant distant from the campus, but wholly owned by the university, a part of its organization? It is not even easy to decide whether or not to define students as "in" or "out" of the organization. One might well argue that they are an integral component, inasmuch as they participate to one degree or another in decisions affecting personnel and curriculum policies. However, to the extent that results comparable to findings from the bulk of the literature are desired, it would be best to conceive of "the organization" as limited to "the line and staff" employees. Thus, for purposes of the research, the students would be analogous to the "product field" of the firm.

Due to the ambiguity of the university's organizational boundaries, both number of faculty and annual student enrollment on campus are included.

In counting faculty, the specific tabulating instructions were adopted from the Biennial Survey of Education (Lindsay, 1959, p. 99).

> Total number of faculty with the rank of instructor or equivalent or above, teaching and/or performing departmental research and related duties, including department heads, deans of instructional divisions (e.g., Dean of School of Education, etc.), excludes non-resident, extension, and/or non-degree faculty.

Total annual student enrollment on campus includes summer enrollment, minus names counted twice.

Rather than utilizing full time equivalents, an attempt has been made to include all part time, as well as full time, students and faculty, in the belief that administrative burdens are created by the total number of those present, rather than by the extent of their involvement with the organization. Administrative decisions regarding recruiting, promoting, and supervising of part time students and faculty probably require little less energy input than full time personnel require.

In defining administration, the primary objective was to stress the "decision making" properties which seem to be the essence of any functional definition of the term. Of course it is not always easy to determine from a position title whether or not its occupant is responsible for making decisions. Nonetheless, such determinations can usually be made, and criteria for inclusion can be employed with consistency in moving from case to case.

The specific tabulating instructions employed were also adopted from the Biennial Survey of Education (Dunham and Wright, 1966, p. 99):

> Include all professional staff, e.g., president, provost, chancellor, vice president, assistant to the president, dean of administration, dean of academic affairs, dean of summer session, director of public relations, comptroller, registrar, admissions officer, business manager, director of athletics (if considered general administration), chief accountant, college attorney, etc.--e.g., all whose administrative functions extend across departmental or divisional lines. Normally editors, heads of publications divisions, university press and alumni publications, and superintendents of buildings and grounds appear here. EXCLUDE all other custodial staff. EXCLUDE the head of an instructional unit, such as the head of the English Department, the Dean of the School of Education, the Dean of the Law School, etc. . . . Professional library staff are to be reported elsewhere. EXCLUDE clerical or nonprofessional staff in the Office of the President, the Office of the Business Manager, the Infirmary, or elsewhere. EXCLUDE professional staff for student personnel services; they should be reported elsewhere.

This definition involves aspects of both "central administration" and "top management," terms often appearing in the literature. Central administration, however, often includes clerical and other support staff responsible for pan-divisional services; such personnel are not included here. On the other hand, top management is often construed as narrower in definition than the meaning of administration used here, because top management usually does not include decision-makers below the first level of the bureaucratic hierarchy. Such personnel (e.g., assistant treasurer, etc.) are included in this study. Also, top management sometimes seems to include upper echelon officers (e.g., divisional heads) who do not have interdivisional authority. Such personnel are not included in this tabulation. In sum, the pan-divisional decision-making culling rule results in a definition of administration less inclusive than central administration, and with more organizational "depth" and less "breadth" than top management often implies.

Two measures of organizational complexity originally were employed: number of departments, and number of colleges within the university. The former proved preferable, due to the low degree of variability in number of colleges. Departments represent the lowest level of, and most numerous, homogenous units for whom administrative decisions are to be made. Hawley and his associates (1965) used similar reasoning in choosing number of departments as the measure of organization complexity in their study. In the final analysis, then, number of departments was chosen as the measure of organizational complexity in this study.

Organization budget indicates the flow of resources into the organization expressed either as total annual income or as the equivalent expenditures. The choice of either income or expenditures is dictated by accessibility of data. It was most convenient to use expenditures in the longitudinal phase, for most institutions do report a "lump sum," whereas the balancing income is often reported by source. On the other hand, income reports were directly available for the cross-sectional data. However, since expenditures equal income, the measures are equivalent. Expenditures over time must be adjusted for changing dollar value, and the appropriate calculations have been made (1958=100) for the longitudinal data.

Goals refer to the mandated purposes for which an institution was established which might in turn influence the internal structuring of the organization. This study concentrates upon the different types of state supported institutions which originated out of a need for different kinds of vocational training, but which, due to their common state

support and control, and their increasing similarity in programs and goals, offer some comparability for research purposes. A comparison of state with private institutions might spuriously introduce extraneous factors.

The question is, might an institution's origins as "the" state university, or as a land grant or normal college, affect its structure in such a way that the growth rates of its several components are differentially influenced? This study categorizes institutions in terms of goals expressed in their mandates, so that any possible influence from such variation upon rates of change between variables of organization growth can be observed. Thus, differential goals will be expressed by categorization into four mandate types: teachers colleges, state universities, land grant universities, and those institutions which combine the land grant and state university functions.

The age of the university is taken from the founding date. This variable is not at issue in the longitudinal sample, since the cases in the sample are approximately the same age. In the cross-sectional data, association between the age of the university and administration size can be measured directly.

External factors include events and conditions in the environment of the organization. The longitudinal study reflects social and economic events in the fluctuations between time periods. The different economic and social milieus presented by the geographic regions of America are not reflected in the longitudinal study, since all the institutions are within one region. The cross-sectional study, however,

does reflect these differences. In that portion of the study, institutions are categorized as Northern (from Pennsylvania east and north), Southern (the old Confederacy, Kentucky, and West Virginia), Midwestern (from Ohio to the Rocky Mountain states, and Western (west of the Rocky Mountains).

A brief discussion of the propositions The growth direction proposition maintains that, contrary to the popularly accepted Parkinsonian "law," administration does not grow at a faster rate than the organization which it coordinates. As noted above, although the empirical evidence from the literature is not entirely consistent, previous evidence tends to support the gist of this proposition.

Several explanations for this pattern have appeared in the literature reviewed above. First, technological advances in the employment of administrative personnel perhaps have resulted in increased efficiency. Organizations develop energy saving operating norms, requiring less trial and error in administrative processes.

Secondly, certain economies of size may be achieved, especially in those instances in which complexity of organizational units is kept minimal. Increases in personnel aggregated for performance of similar tasks probably would not require equal increases in administrative staff; but the increased organizational heterogeneity created by the addition of new system units may well require expansion of administration capable of coordinating the operations and personnel introduced within the added units. In other words, from the viewpoint of central administration, it is the activities of departments, and not of individuals, which create an administrative burden. Thus expansion in organization personnel

need not be accompanied by corresponding administration growth, if the organization components remain relatively few and homogenous.

But perhaps even more significant in explaining growth direction of administration is the process of administrative specialization which occurs as organizations expand. Spencer (Coser and Rosenberg, 1957, p. 513) maintained that the "coordinating agents" of organizations become increasingly specialized in function as organization numbers increase. As was observed in summarizing research reviewed for this proposal several investigators have argued that as organizations grow, their administrators devote proportionately more of their time to specifically decion-making affairs. No longer required to "double in brass," administrators may assign their clerical or technical tasks to non-administrative personnel, and concentrate upon their supervisory and coordinating duties.

The second (growth factors) proposition is contingent upon findings from investigation of the administration growth proposition regarding the rate of administration growth relative to other organization growth. If the contention of the first proposition is correct, and the proportion of administrators does not increase as the organization grows, the next and obvious question becomes one of determining what factors influence that pattern.

The expected effects of increased complexity, age, and expenditures are to increase administrative overhead, as the literature has indicated. On the other hand, as the above discussion of specialization in administrative roles maintains, the effect of increased organization size may

be to decrease the proportionate growth of administration. Therefore, it logically follows that the greatest strength of association with administration size will be contributed by the organization size, if indeed the proportionate size of administration does decrease.

The differential effects of the mandate type, the region, or of external social and economic changes initially were difficult to foresee. On the basis of previous research, it could only be suggested that these factors may have some influence, but the direction of their effects could not be predicted on the basis of either common sense logic or theoretical premise.

However, the possibilities of a principle, based on Durkheim's writings, which would logically order relationships between variables of organization structure, will be presented in the course of data analysis.

CHAPTER III

RESEARCH DESIGN AND METHODS

Introduction: The Use of Longitudinal and Cross-Sectional Data

The review of literature in Chapter II reveals that previous research has been performed utilizing either longitudinal case studies (Haire, Melman, Bendix) or cross-sectional surveys extracting data on a limited number of variables from a large sample of institutions at one given point in time (Boland, Indik, Anderson and Warkov, etc.). This study incorporates both methods, subjecting the research propositions to two distinct analyses. Thus, two separate samples and corresponding research procedures are employed for both longitudinal and cross-sectional observation of the same structural variables. The longitudinal sample includes six universities; the sample for the cross-sectional research sample includes almost all state supported four year universities and colleges (N=261).

The decision to embark upon a two pronged research strategy was stimulated in large measure by problems of method and technique revealed in review of the literature.

The cross-sectional approach has been by far the most common method found to be employed in previous research, largely due to the relative ease with which it can be performed. Yet, as Haire (1959, p. 292) comments, it generates "a spurious growth curve. It is not a curve of growth representing the dynamics within an organization, but a set of static measurements arranged by size." Nonetheless, obstacles imposed

by time and expense practically limit the feasability of historical research, which, at any rate, is not without its own limitations.

The situation is well summarized by A. F. Filley (1963, pp. 6-7), who noted in comparing the two approaches that cross-sectional analysis

> permits a sizeable sample and comforting refinement in statistical techniques, yet has some serious limitations for growth studies. Cross section studies assume that changes in size are synonymous with growth. While such an assumption may be warranted under certain conditions, it generally interferes with any true understanding of the process of growth. . . . Such studies do not show how a particular organization has grown to its present size and the changes attendant to the growth. In this sense, they provide a static rather than dynamic picture.
>
> The longitudinal method gives a true picture of growth, rather than size changes. But the longitudinal method also has weaknesses. In the first place, only a limited number of institutions may be studied at any one time. Thus the sample is small, and is statistically defensible as representative only of organizations studied rather than all firms or institutions. Secondly, the method permits a greater amount of data interpretation by the researcher than is true in the cross section analysis. Finally, where historical records are used, the researcher must assume that records are accurate and include no important changes in compilation. Availability is also a problem in many cases for records are often crude or nonexistent during early years of institutional development. In spite of these limitations, the longitudinal study seems to be the most satisfactory way to study growth.

By using both techniques it is hoped that the advantages of each, rather than their disadvantages, are summed.

There is some difference in the variables under analysis in the two portions of the study. In both instances, of course, administration size is the dependent variable. Other variables in the longitudinal study are faculty size, enrollment, number of departments, appropriations, mandate types, and effects created by external social and economic events. Variables analyzed in the cross-sectional study are faculty size, enrollment, income, mandate, and region.

The Samples

Longitudinal

The criteria for selection of the longitudinal sample involved three general considerations: (1) the definition of the sample as representative of the population of organizations, (2) requirements introduced by the research design itself, either in terms of "experimental" or "control" variables, and (3) research costs. The first of these criteria necessitated including universities which have become "large" in both faculty and student enrollment, "complex" in diversity of goals and proliferation of internal structural units to be administered, and "formal" in that norms and structures are rationally derived, specific, and codified.

Such criteria seem devoid of any quantitative values for designating cases to be included or excluded. But it must be remembered that analytical conceptualizations of the dimensions of large scale organization lack specificity. When is an organization "large," "complex," or "formal?" Given the lack of specificity in the theoretical values assigned these attributes, there is little basis for affixing quantified values.

For research purposes it can be noted that of those universities included in the longitudinal sample, all qualify as "large," with faculties of over 800 and enrollments of over 10,000 students at the terminal point of the study; they all qualify as "complex," having more than fifty departments of instruction; they all qualify as "formal"

organizations, having documented operating procedures in catalogues, bulletins, and/or manuals. But there is nothing generic to these particular numerical properties which specify organizational attributes associated with size, complexity, or codification. Thus, citing quantified absolute criteria for size and complexity would be misleading if they were construed as representing a significant theoretically derived property. Therefore, the decision to include those institutions investigated in the longitudinal study required a certain judgmental act on the part of the researcher, involving appraisal of the overall organizational structure within each university as representative of large complex, formal organizations.

The research design itself placed additional requirements upon sample selection. All cases were to be state institutions having particular sponsorship histories reflecting their initial goals. To this end, three types of university mandates were included: (1) those founded under state auspices specifically for the purpose of serving as that state's principle institution of higher education; hereafter these shall be referred to as "state" type; (2) those founded specifically as "land grant" institutions; (3) those which have served both as land grant and as the principal institution in a particular state; these are hereafter referred to as "combined" type.

Thus, the institutions of four states are studied: two states each contributed to the sample one "combined" type school. Two other states provided those cases in which the land grant and state mandate functions have developed within separate universities. Table 1 illustrates this organization of the sample.

Table 1. Longitudinal sample cases by state and mandate

Mandate type	State			
	Alpha	Beta	Gamma	Delta
Combined	Alpha U.	Beta U.		
State			Gamma U.	Delta U.
Land grant			Gamma State	Delta State

There are several factors which should be held as constant as possible in this study, and criteria for selection of the longitudinal sample reflect that requirement. Therefore it was desired that the sample schools be relatively homogenous in terms of (1) date of founding, (2) cultural milieu and geographical region, (3) power and status within their respective states, (4) faculty and student quality, and (5) research and service goals.

Thus, all six universities were founded approximately in the middle of the nineteenth century, all are located in the midwest (and are associated in several academic consortia and athletic conferences on the basis of their common regionality), all of them represent the largest universities in their respective states, all have similar academic status in terms of rankings (Cartter, 1964), and all probably recruit from the same pool of faculty and graduate students. All have shared mandates of public service which, although expressed differently in their earlier histories, have increasingly converged upon similar programs in which they have made themselves indispensable to both the technical

and the policy sciences. Each of these universities sponsors massive research projects which serve clientele from both government and private industry.

The point of these similarities is that they reflect a congruence in scholarship goals, in positions each occupies vis-a-vis their publics, and in the social composition of student bodies and faculties.

Such factors have been held relatively constant by selecting institutions of similar backgrounds so that the role of morphological characteristics, such as total and component size, are more clearly delineated. Nonetheless, it must be recognized, as noted above, that control over these factors is relative to the total population of universities; possible effects from variation in these matters must be considered in analysis of the data from these institutions.

Another important factor in selection of the sample was simply the issue of the costs of field trips to gather data. Fortunately, it was possible to select universities convenient for data collection strictly on the basis of their appropriateness in terms of the other criteria.

The cross-sectional sample

Criteria for the selection of the cross-sectional sample involved an attempt to achieve a total sampling of all four year state institutions. A list of such institutions, compiled from several private and government surveys, appears in State Colleges and Universities (Walquist and Thornton, 1964, pp. 107-114). Included in this sample were the following types of institutions:

Table 2. Distribution of institutions by mandate

Institutions	Number	Percentages
State universities	22	7.72
Land grant state universities	30	10.53
Separate land grant institutions	41	14.39
Normal schools (or teachers colleges) to state colleges and universities	192	67.37
N =	285	100.00

The classification system reflects the same sponsorship types used in the longitudinal research with the addition of normal schools. Definitions for the categories designated by Wahlquist and Thornton (1964, p. 105) follow:

> State Universities are those state-supported institutions that first bore the name of university. Often they are also the first college established within a state, especially in states formed after the original thirteen states.
> Land Grant State Universities are listed separately from state universities. These are state universities to which the grants and the responsibilities established by the Morrill Act were assigned. They are reported separately here as in other discussions so that the statistics may be joined either with state universities or with land-grant colleges, as appropriate.
> Separate Land-Grant Institutions. Forty-two institutions other than state universities were assigned Morrill Act grants and responsibilities; nearly all were established after 1862. Half of them now bear the title of university, and others have begun to discharge university functions. In several of the states, these foundations of the last 100 years now rival or surpass in quality and in prestige the originally established university of the state.
> Normal Schools to Universities. This classification is the most numerous of the institutional types, because of the practice of many states in the last half of the 19th century of establishing regional normal schools. With recent growth in demand for higher education, these institutions have expanded and lengthened their curricula so that they now combine liberal arts purposes and graduate study with their original task of preparing teachers. Their names progressed from "normal school" to "state teachers college" to "state college" and in thirteen of the 195 institutions to "state university."

Other characteristics of this sample are to be described in Chapter V.

The following institution categories (Wahlquist and Thornton, 1964, p. 114) were not included, because there was no way of determining the sponsorship dimension underlying them.

Table 3. Institution categories deleted from sample

Institution type	Number
Single purpose institutions	17
Women's colleges	5
Former women's colleges	2
Non land-grant technical colleges	22
Other state colleges and universities	7
Total	53

The relationship between the two samples

The design of this research affords unusual opportunity to compare results gained from quite different techniques, since the dependent variable is measured according to the same enumerating standards in each sample. However, at least two caveats must be noted.

First, comparisons between the longitudinal and cross-sectional data are clouded by historical transformations of organization structure. For all intents and purposes, the universities of pre-World War I existed in a quite different culture from that of 1960, the year chosen for the cross-sectional survey. And of course, the changed relationship of

higher education to contemporary technocratic society is a part of that difference in culture. Hence, the smallest college in the 1960 cross-sectional sample may be numerically similar in terms of research variables to the early twentieth century college described in the longitudinal study. Of course it is most problematic whether or not these numerical similarities reflect other similarities in organizational environment.

The second caution involves comparability of the growth line to be experienced in organizations now about to grow with the growth line of organizations across a period of previous change. Can it be said that the small colleges of today which do grow large will necessarily replicate the course followed earlier by other institutions? If there are principles of organization growth which transcend such culture-bending processes as technological development, then the past experience of the six universities reported here will aid in predicting future growth patterns of contemporary small schools.

But if, as many maintain, the technological revolution does not simply affect the instrumentality of organizations, but radically alters all relationships within a social system, then the comparisons of growth lines projected by both longitudinal and cross-sectional research may be overshadowed by the course of future technological change.

Data Collection

Longitudinal sample

Data from the longitudinal sample were drawn at five year intervals beginning in 1900 and concluding in 1960, permitting thirteen observations

in each of the six institutions. As noted above, these six decades encapsulated the years from the point when these institutions began an evolution of specialized administration within the president's personal office, to the emergence of a mature, sophisticated administrative apparatus.

The terminal year of 1960 was originally chosen simply as a matter of convenience in terms of data sources available. However, it developed that 1960 was a fortunate terminus for data collection: new processes of decentralization into branch campuses, institutes, semi-autonomous colleges, and the like, began to complicate questions of organization component dimensions in a way similar to complications in the analysis of firms posed by emergence of the conglomerate.

Data sources included annual financial reports, presidential annual reports, board of trustees minutes and annual reports, staff directories, manuals and handbooks, catalogs, bulletins and other such official publications. These source materials were drawn principally from the archives and libraries of the subject institutions. To the greatest extent possible, consistency was maintained by using the same source within a particular university for all observations. For example, if the desired information was available intermittently from several sources, but appeared in the board of trustee reports for most of the observation years, that source was relied upon as the principle reference for data. However, it was seldom the case that a series of publications ran uninterrupted through the sixty year period, thus precluding total consistency in data sources. Also, rarely was all the data for one year available from one source.

Summary enumerations of faculty seldom were available for any of the subject universities until relatively recent years, and even then such information was not available for all cases. Therefore it was often necessary to directly count the faculty as listed in directories and other such sources.

Problems of reliability and validity were inextricably bound together, particularly in the recording of data concerning numbers of administrators. Inclusion of any individual was necessarily dependent upon the title assigned to him. The problem was one of applying the enumerating instructions to specific role titles. For example, before World War I, a university might have had three officials; president, secretary, and bursar. In such an instance, the bursar might have had considerable policy making influence. But by the end of the 1920's, the same university might have had ten officials, including a bursar. There is little way of knowing whether the role designated by this title continued to carry its earlier decision making authority, or whether the role was now largely clerical in function with its former authority transferred to another role--perhaps that of registrar.

The "face logic" for inclusion of a particular title category as administrative is problematic; therefore, the extent to which reliability can be appraised is very speculative. Problems of expense and time made independent assessments of the data by other researchers an impossibility. In as many cases as possible, an attempt was made to locate officials within each university who were given the enumeration instructions and were then asked to evaluate the accuracy of the researcher's tabulations.

In three cases, it was possible to review the tabulations after a time passage of several months.

Despite ambiguities which these validity and reliability problems introduce, it is very doubtful that they distort to any appreciable degree the underlying processes at work in these institutions. In any given year, there were usually only a few cases which could not be clearly classified on the basis of the enumeration instructions. It should be noted that the universities themselves have been rather casual in their record keeping, requiring considerable cross checking of data sources.

Even enumeration of departments proved complicated. For example, Delta State simultaneously employed three distinctly different definitions of a department: payroll, curricular, and academic discipline. Upon advice of university officials, payroll data were used, this being the most administratively "structural" application of department designations in that university.

The least reliable data collected involved reports of annual expenditures. For example, according to the raw data, institutions notoriously underfinanced showed higher per student expenditures for some years than institutions known for their relative wealth. Part of the difficulty is that depending upon the circumstances, institutions adopt different accounting and reporting practices. When approached about data for more recent years one university official asked, "Which figures do you want to see? The report that went to Washington, or the one to the state legislature?"

These problems cannot be solved easily. It is assumed, however, that little systematic bias operated in the reporting of expenditures over time and between universities, and that such discrepancies vary randomly in direction and thereby cancel out each other.

Cross-sectional sample

The cross-sectional sample involved use of secondary data which introduced different problems caused by use of several different sources and the varying reliability of those sources. Data were obtained from the Bienniel Survey of Education, which provided in separate publications data on personnel (Lindsay, 1963) and enrollment (Poole and Ramsey, 1959) for all institutions of higher education in the United States in the fall of 1959. This was supplemented with budget information for 1960 reported by these institutions and published in American Universities and Colleges (Irwin, 1963). This and other sources also provided independent checks of the reliability of the enrollment reports in the Biennial Survey. The cross-sectional materials were taken from 1959-60 survey data, since that year marked the terminal point of the longitudinal study.

The chief advantage of using the government data is that all but four institutions in the nation participated in the survey. One of the problems which has plagued previous research efforts in this area has resulted from reliance upon data gathering by mailed questionnaires which yielded disappointing response rates. Among studies reviewed, for example, Baker and Davis (1954, p. 4) achieved a 12% and Boland (1966,

pp. 31-32) a 32% rate of return. In his study of university goals, Edward Gross (1968, p. 528) achieved a faculty response rate of 40% through considerable diligence and the formidable support of deans, accrediting agencies, and his own research organization.

On the debit side, although use of secondary source data eliminated researcher bias in enumerating data, there is reason to suspect the reliability of the reported counts of administrators which appear in the government survey. For example, administrators were independently enumerated for the six schools in the longitudinal sample and in several cases the figures which these institutions reported in the survey were not obtained. Also, in checking data from the 1962 survey, it is noted that one university reported a decrease from fifty to thirty administrators--a highly unlikely diminution. One explanation for these irregularities might be that different personnel are involved in submitting reports from survey to survey.

Another disadvantage of the secondary data sources available for cross-sectional study is that they do not provide an adequate measure of organization complexity. Nor has a concerted attempt to obtain such a measure from other sources, such as catalogs, proved fruitful. However, the overall quality of those data which are available, and the inclusiveness of the sample permitted by these data seem well worth the sacrifice of information on the complexity variable.

Instruments of Data Analysis

Longitudinal analysis

The longitudinal data will be subjected to several different analysis techniques, each of which permits a particular approach to the research problem.

Longitudinal analysis of the six universities represents a series of six case studies, and as such presents certain conceptual problems. As Goode and Hatt (1952, p. 331) point out, the case study

> is not a specific technique. It is a way of organizing social data so as to preserve the unity character of the social object being studied. Expressed somewhat differently, it is an approach which views any social unit as a whole. Almost always, this means of approach includes the development of that unit. . . .

In tracing out changes in organization components, the organization context itself should be retained in analysis. Hence, line graphs are presented indicating the relationship of administrators to faculty and to the other variables within each university. These relationships are further clarified by graphs indicating the rankings held by each institution on selected variables at each observation. Patterns of association between variables within the context of the organizations are thereby made more evident.

The computation and graphic presentation of percentage changes is particularly relevant for disclosing the direction of growth in attributes over time. Percentage change can be expressed as "change during some time period expressed as a percent of the original figure. . . ." (Dornbusch and Schmid, 1955, p. 32).

$$\text{Percentage change} = \frac{\text{figure for later date - original figure}}{\text{original figure}} \quad (100)$$

Dornbusch and Schmid maintain that

> The semilogarithmic chart is unsurpassed for portraying percentage change. In addition to correctly representing relative changes, it also indicates the amount of increase or decrease at the same time.

Rates of growth can be summarized on the semilogarithmic graph by computing a very simple formula to obtain a regression line (Croxton, Cowden, and Klein, 1967, pp. 231-232):

$$Y = a + bx$$

$$b = \frac{\text{figure for last observation - figure for first observation}}{\text{number of observations}}$$

$$a = \text{figure for first observation}$$

The growth in the several variables can then be compared by observing the relative degree of slope to these regression lines. Another way of comparing growth rates involves noting the number of times values for given variables have multiplied since the 1900 observation; in this research this result is termed the "growth product."

Fluctuations between variables may be compared by plotting the percentage change from observation to observation in each (Croxton, Cowden, and Klein, 1967, pp. 96-97).

Use of the semilogarithmic graph can be used not only to indicate growth processes operating in individual schools, but can be used to summarize general growth trends operating across organizational boundaries. This is done by plotting the arithmetic means of each of the variables among the six schools at a given point in time, and indicating the resulting regression line.

As an alternative technique, scattergrams are presented displaying for each case the plotting of the number of administrators and of each of the alternative independent variables. These relationships can be further specified by presentation of least squares regression lines indicating growth relationship between variables, and by coefficients of

correlation and partial and multiple correlations indicating the strength of relationship between variables. These correlations can then be cross tabulated by mandate type to introduce that control.

Also, the data from all six schools can be combined, independent of the underlying time and organizational contexts. In essence, this amounts to a cross-sectional study of seventy-eight cases of organizations, ignoring the fact that in actuality, the data were produced by six institutions observed at thirteen different points in time. The absence of these important time and organization "controls" obviously distorts the meaning of this data, but it does permit a general display of the relationship between interval scale variables.

Two techniques are used to express extent of association between research variables: coefficients of correlation, and comparison between fluctuations of variables from observation to observation.

One of the obvious advantages of employing coefficients of correlation is that they provide a quantified statement of relationships between variables under specified circumstances. Such quantification permits precision in calibrating the relative strengths of association existing between any of several alternative independent variables and a dependent variable. Also, through computation of partial correlations, it is possible to ascertain the interrelationships operating between alternative independent variables vis-a-vis the dependent variable.

Yet this device has serious limitations when applied to data from time series, since there is some question as to whether or not all the assumptions necessary for computing of correlation coefficients are operating: ". . . fluctuations of a time series are not usually

normally distributed around the trend line" (Croxton, Cowden, and Klein, 1967, p. 495). Part of the difficulty is that the temporal sequence of events and its given organizational context exert influence upon relationships operating between research variables, which may inflate the correlation coefficients purported to express those relationships. Attempts to eliminate this influence of time reflected in the overall trend by partialing out its effects (Croxton, Cowden, and Klein, 1967, pp. 491-494) appear inappropriate in this case. That procedure reduces correlations to such a great degree that any further partialing out of alternative independent variables becomes meaningless; and it was, after all, the ability to so demonstrate the interrelationship of alternative independent variables that prompted use of correlation coefficients.

However, these limitations do not detract from the capacity of correlation coefficients to illuminate general relationships between the research variables of this study. It is this descriptive attribute of correlation coefficients which is employed; having taken their limitations into account, it must be recognized that they provide one of the few means of expressing the differential relationships of the independent variables to each other as well as to the dependent variable.

The second device employed here, comparison of fluctuations <u>within</u> trends, is an alternative way of demonstrating relationships between research variables, while in effect controlling for the influence upon those relationships created within the overall trend. This is done by plotting on one graph the percentage of change in the research variables from observation to observation. One may then note the extent

to which the pattern of changes within the trend in one variable is replicated by other variables. Although this technique permits some control over bias introduced by the overall trend itself, its limitations involve the difficulty of quantifying the relationships it expresses. It is difficult to demonstrate the relative strength of relationship of each alternative independent variable with the dependent variable, or to demonstrate the degree of interrelationship between independent variables in their association with the dependent variable.

It can readily be seen that the advantages and disadvantages of analysis through comparing fluctuations and through coefficients of correlation complement each other. Employing both tools should provide a working grasp of the relationships between variables borne out by the data.

Cross-sectional analysis

The direction of administration growth in relation to the growth of faculty within institutions in the cross-sectional sample will be investigated primarily through the plotting of a scattergram demonstrating the trend generated by these two variables. The degree of slope of the resulting regression line will reveal whether or not the number of administrators is disproportionately greater in larger universities than in small colleges. If the slope of that line is less than 45^{o} such growth in administration is not occurring, a result consistent with the gist of the growth direction proposition. This finding may be confirmed by the direction of the correlation coefficient between the A/F ratio

and enrollment. If that correlation is negative, and the correlation of enrollment and faculty is high and positive, then administration is diminishing in size proportionate to the growth of faculty.

The growth factors proposition can be investigated to some extent by use of coefficients of correlation which, with the addition of partial correlations, can illustrate relationships of the alternative independent variables (faculty size, age, and income) with each other and with administration size. But relationships of these interval scale variables with the nominal scale variables (mandate type and region classification) cannot be demonstrated through correlation analysis. Correlations between the interval scale variables could be cross tabulated by nominal scale classifications. But summary interpretation of the results is made ambiguous, given the lack of specificity in determining differential association between interval scales across several nominal scale classifications.

However, there is a statistical technique which is particularly appropriate for dealing with this situation: "In analysis of covariance we combine the basic ideas of analysis of variance and correlational analysis in order to handle problems involving more than one interval scale in combination with any number of nominal scales" (Blalock, p. 359). This is precisely the kind of problem presented by the data of this research.

One additional feature required of data analysis instruments for this cross-sectional phase of research is the ability to facilitate recognition of interaction between the independent variables. Through

the Stepwise Deletion of Variables from a Least Squares Equation (Michigan State University Agricultural Experiment Station, 1968) calculated for analysis of covariance, it is possible for the researcher to use simultaneously all independent variables, both interval and nominal, in analysis.

> In stepwise deletion, an initial least squares equation is obtained using all of the independent variables. One variable is then deleted, and a new least squares equation estimated. A second variable is deleted, and the least squares equation recalculated. The procedure continues until a variable selected as a candidate for deletion meets one or more stopping criteria (MSU Ag. Exp. Sta., 1968, p. 1).

The stopping criteria in this instance will be achievement of statistical significance at the .05 level. That is,

> after a variable is deleted, the least squares equation is to be recalculated until either (1) the significance probability of the F_{bi} statistic for each of the remaining variables. . . is greater than or equal to .05 or (2) all of the variables. . . have been deleted from the least squares equation (MSU Ag. Exp. Sta., 1968, p. 4).

Thus, analysis of covariance will provide a statistical means for adjusting or "controlling" for the effect of each variable upon the other, deleting those which by statistical tests of significance fail to demonstrate influence upon the dependent variable.

The A/F ratio

The literature dealing with administration growth frequently refers to the "A/P ratio"; i.e., the proportion of administrators to production personnel at any given point in the growth of a firm. The analogous ratio in the analysis of universities is the A/F ratio; i.e., the proportion of administrators to faculty. At several points in analysis of

both cross-sectional and longitudinal data this term will be used in discussing the course of organizational growth.

In depicting the ratio of A/F to organization size, however, it is advisable to use enrollment to represent the independent variable of organization size, since faculty appears also in the ratio which comprises the dependent variable. Enrollment can, in this instance, be substituted for faculty to provide a measure of organization size which is logically independent of the measure of A/F.

CHAPTER IV

ANALYSIS OF LONGITUDINAL DATA

The program for data analysis is almost directly prescribed by the propositions themselves. However, prior to investigation of those specific issues, two other considerations are to be examined. First, the propriety of measuring organization size through either enrollment or faculty size must be determined before analysis is begun. Second, summary historical profiles of each institution's structural development reflected by the research variables are presented.

The Measurement of Organization Size

The intention to eliminate enrollment for most analytical purposes as a measure of organization size has been discussed as dependent upon the finding of a strong association between that variable and faculty size. The acceptability of that procedure can be confirmed by review of the scattergrams plotting these two variables, of their coefficients of correlation, and of semilogarithmic charts and rectilineal line graphs comparing their overall trends and fluctuations over time.

Scattergrams and correlations

The strong linear relationship between faculty and enrollment within each school is evident from scattergrams (Figure 1), and from the very high correlations between faculty and enrollment in each university

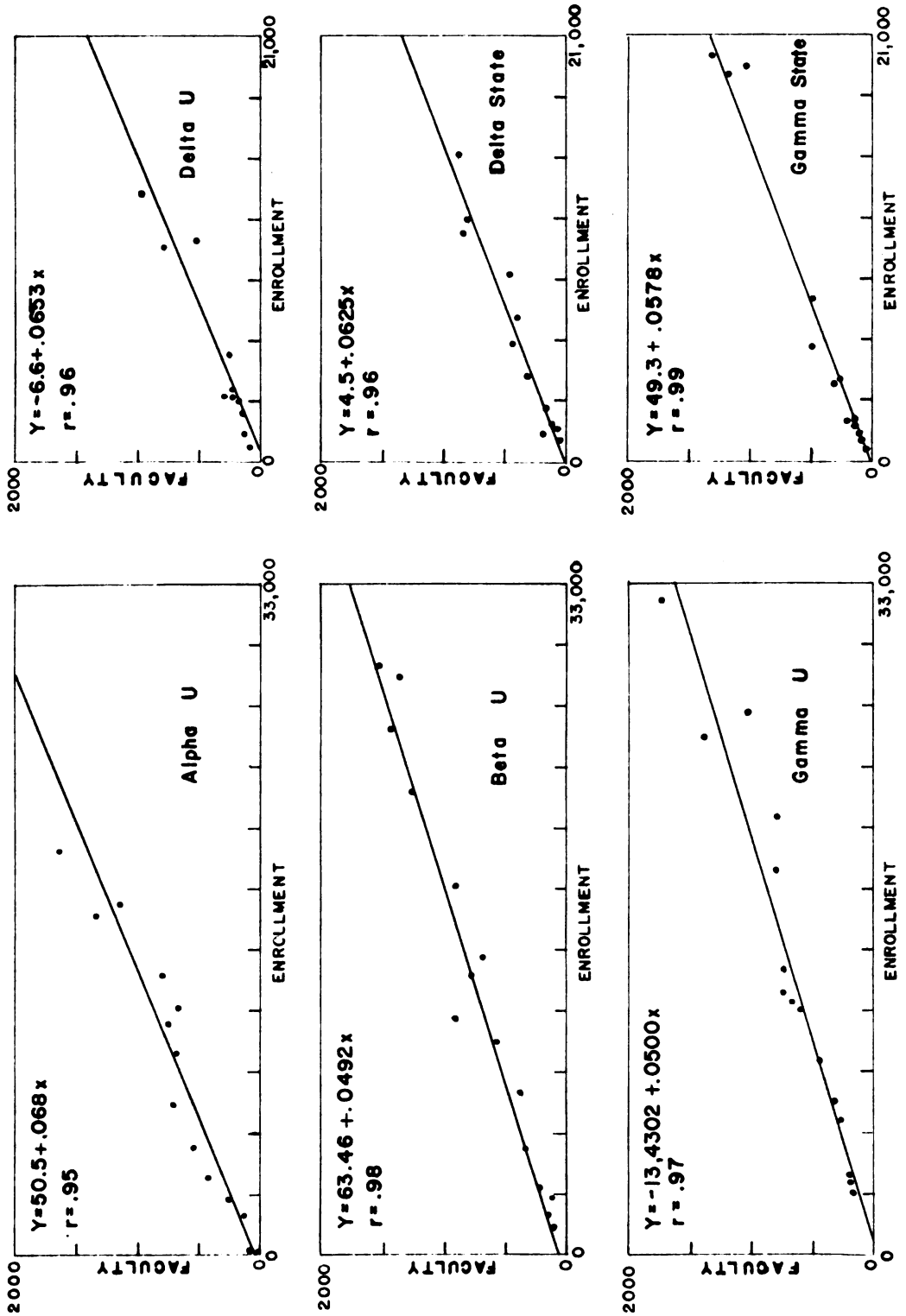


FIGURE I

FACULTY AND ENROLLMENT BY UNIVERSITY, 1900 — 1960

(Table 4). The scattergram (Figure 2) plotting faculty and enrollment for all six schools produced a marked linearity, also reflected in the correlation derived (r=.95).

Table 4. Correlations, all variables at all schools

Mandate	r_{12}*	r_{13}*	$r_{12.3}$*	$r_{13.2}$*	$r_{1.23}$*	r_{14}*	$r_{12.4}$*	$r_{14.2}$*
Combined								
Alpha University	.79	.71	.54	-.24	.81	.37	.89	-.73
Beta University	.88	.77	.66	.06	.88	.92	.32	.66
State								
Gamma University	.86	.91	.38	.68	.93	.89	.32	.54
Delta University	.99	.98	.87	.73	.99	.67	.99	.53
Land Grant								
Delta State	.95	.95	.27	.22	.96	.87	.96	.59
Gamma State	.92	.96	.01	.73	.96	.36	.93	.50
All schools	.83	.70	.62	.05	.83	.70	.64	.24

*Variables: 1=administration, 2=faculty, 3=department, 4=expenditures

Trends and fluctuations

The overall trends in growth of enrollment and faculty display a strong consistency in relationships between the two from university to university (Figure 3). The same figure reveals remarkably parallel trends between the total sample means of these two variables. As Table 5 indicates, in five cases the trend slopes for enrollment and faculty are within one degree of each other; the sixth case displays a difference of only seven degrees in slope between these variables.

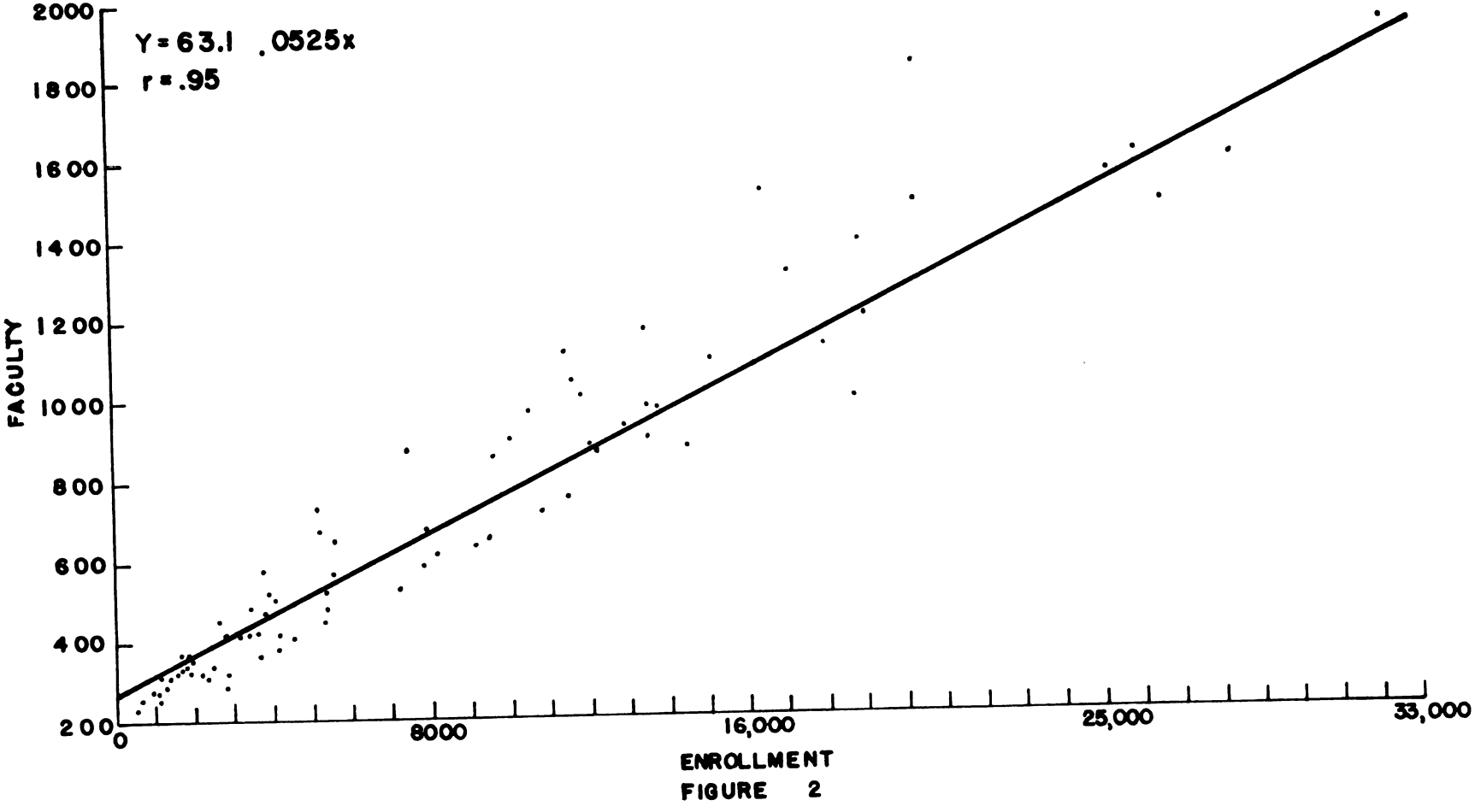


FIGURE 2

SCATTERGRAM OF ENROLLMENT AND FACULTY, ALL UNIVERSITIES
1900 – 1960

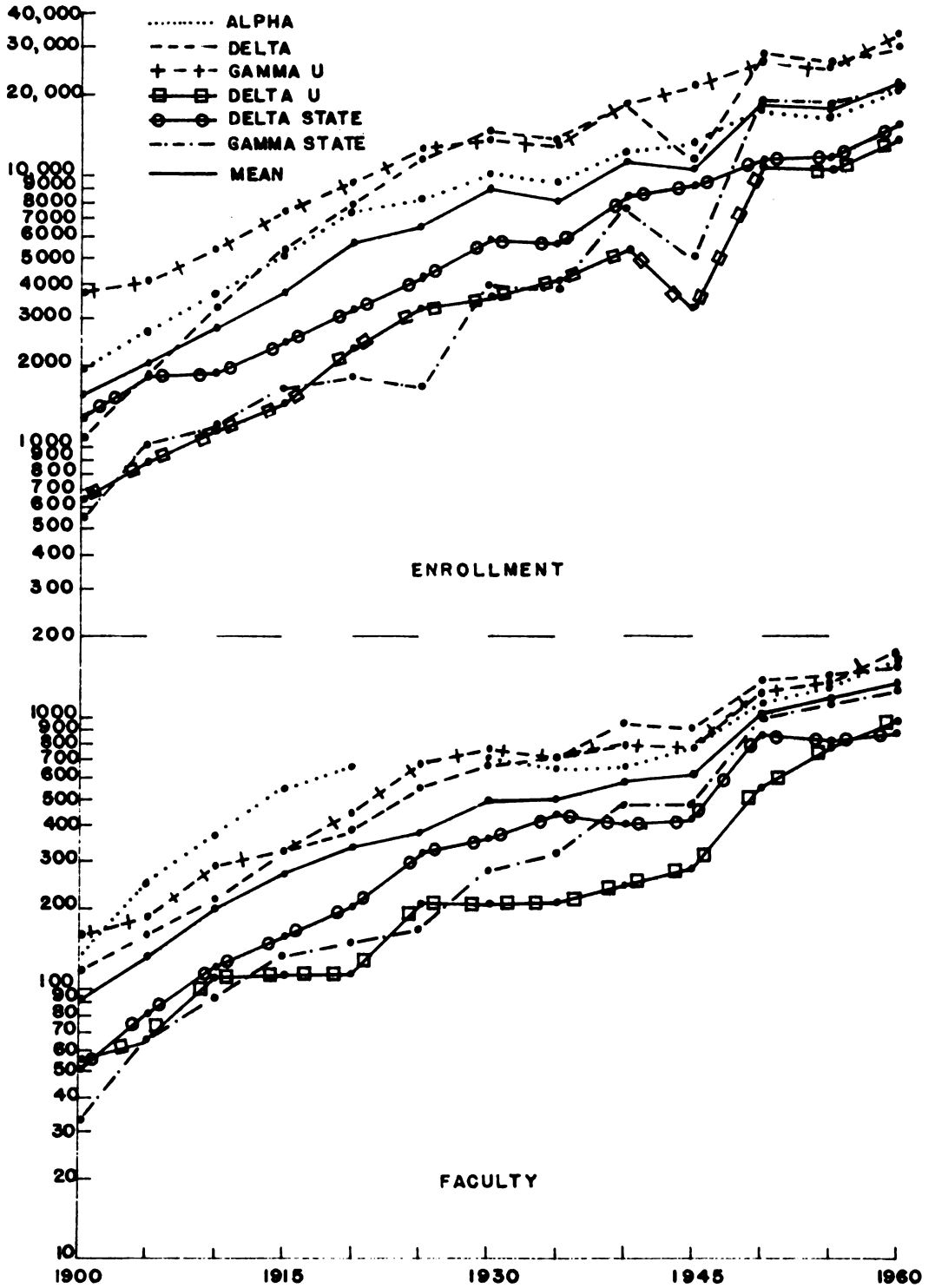


FIGURE 3

ENROLLMENT AND FACULTY TRENDS, ALL UNIVERSITIES, AND MEANS
1900 - 1960

Table 5. Growth products and slopes, all variables at all schools

Mandate	Growth products				Degree of slope			
	Ad.	Fac.	Dept.	Exp.	Ad.	Fac.	Enr.	Dept.
Combined								
Alpha University	3.2	12.6	3.8	3.8	8	20	19	10
Beta University	6.6	12.8	2.1	2.9	11	21	28	8
State								
Gamma University	8.3	11.0	1.6	5.2	18	30	18	4
Delta University	18.5	16.3	3.5	3.1	23	24	23	10
Land Grant								
Delta State	5.6	17.2	5.7	4.7	14	23	22	13
Gamma State	6.6	40.2	6.0	1.7	16	30	30	15
All schools	7.8	18.3	3.8	3.6	15	19	21	9

Not only are the trends of faculty and enrollment growth similar over time; a strong relationship appears between the fluctuations within trends of faculty and enrollment as well. When the means of such percentage changes for all six schools are plotted, there appear only two occasions when the percentage change of one of these two factors moved counter to the percentage change in the other (Figure 4).

The measurement of organization size: summary

A very strong impression of close association between changes in faculty size and enrollment size arises from examination of their trends, of the fluctuations within those trends, and of the plottings and correlations both for the individual universities and in toto. Therefore, it is entirely permissible to use either of these measures in indicating organization size. Since it is desirable to provide continuity with

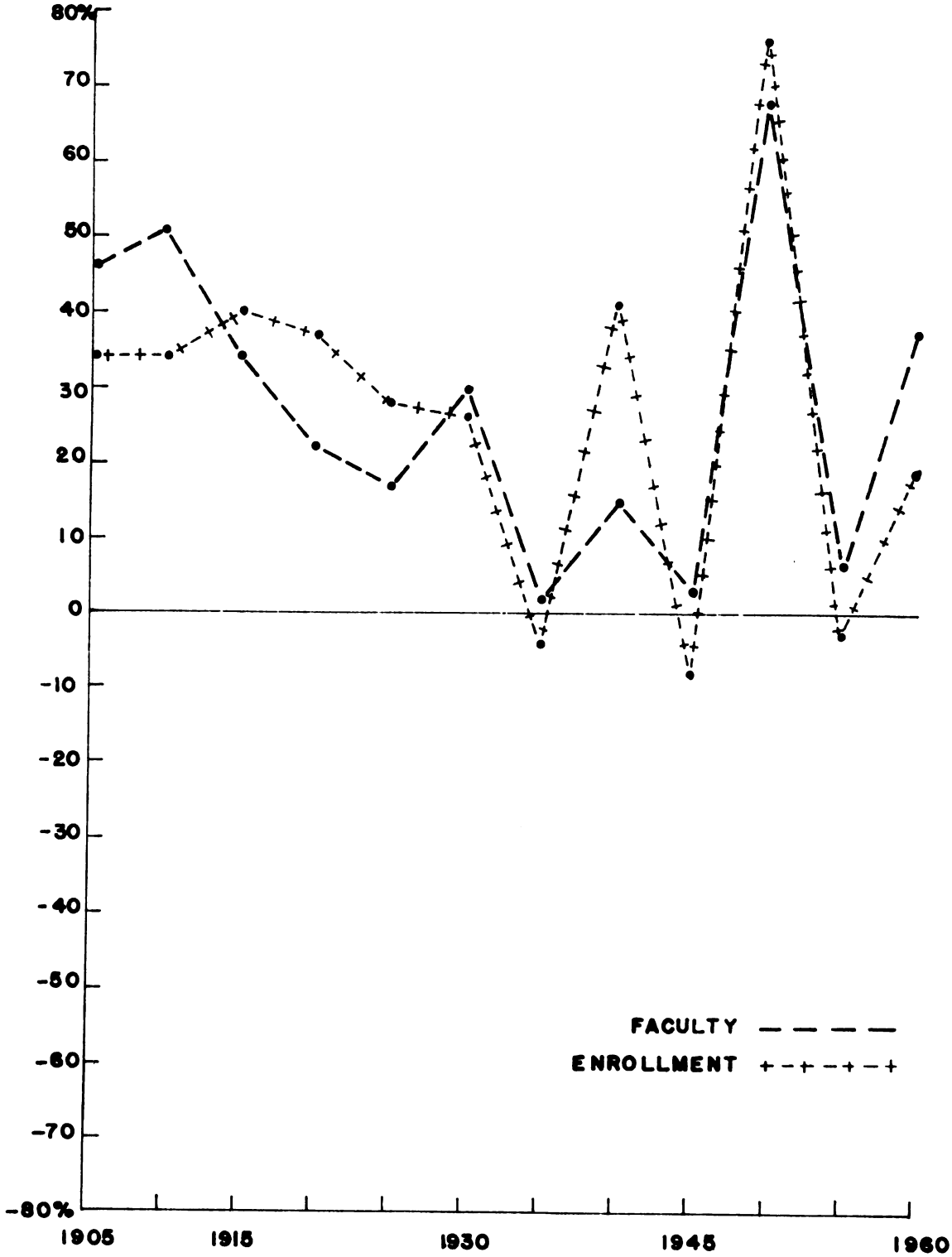


FIGURE 4

PERCENTAGE CHANGE IN MEANS OF FACULTY AND ENROLLMENT, TOTAL SAMPLE, 1905 - 1960

measurements used elsewhere in the organization literature, faculty size will be used to represent organization size in most cases of analysis of longitudinal data.

Summary Profiles of the Six Universities

Greater perspective upon the examination of the research propositions may be achieved by first reviewing general characteristics displayed by the variables within each of the six institutions.

Alpha University (Figure 5)

Alpha University is one of the largest universities in the sample, and, according to rating reports (Cartter, 1966), one of the most prestigous.

This school displayed the most marked diminution in A/F ratio of any of the universities in the sample. While administration and faculty frequently show fluctuations in the same direction from year to year, positive rate increases in faculty are, except for one occasion, greater than for administration. On the other hand, on the one occasion when both faculty and administration decreased, administration decreased much more sharply. The resulting slopes of the overall trends produced indicate that over the entire period, faculty grew by more than ten times its original size, yielding a slope of 20^{o}. During the same period administration size grew somewhat over three times its original size, producing a slope of 8^{o}.

Over the sixty year period, Alpha experienced the greatest growth in the number of departments among the six institutions. The curve

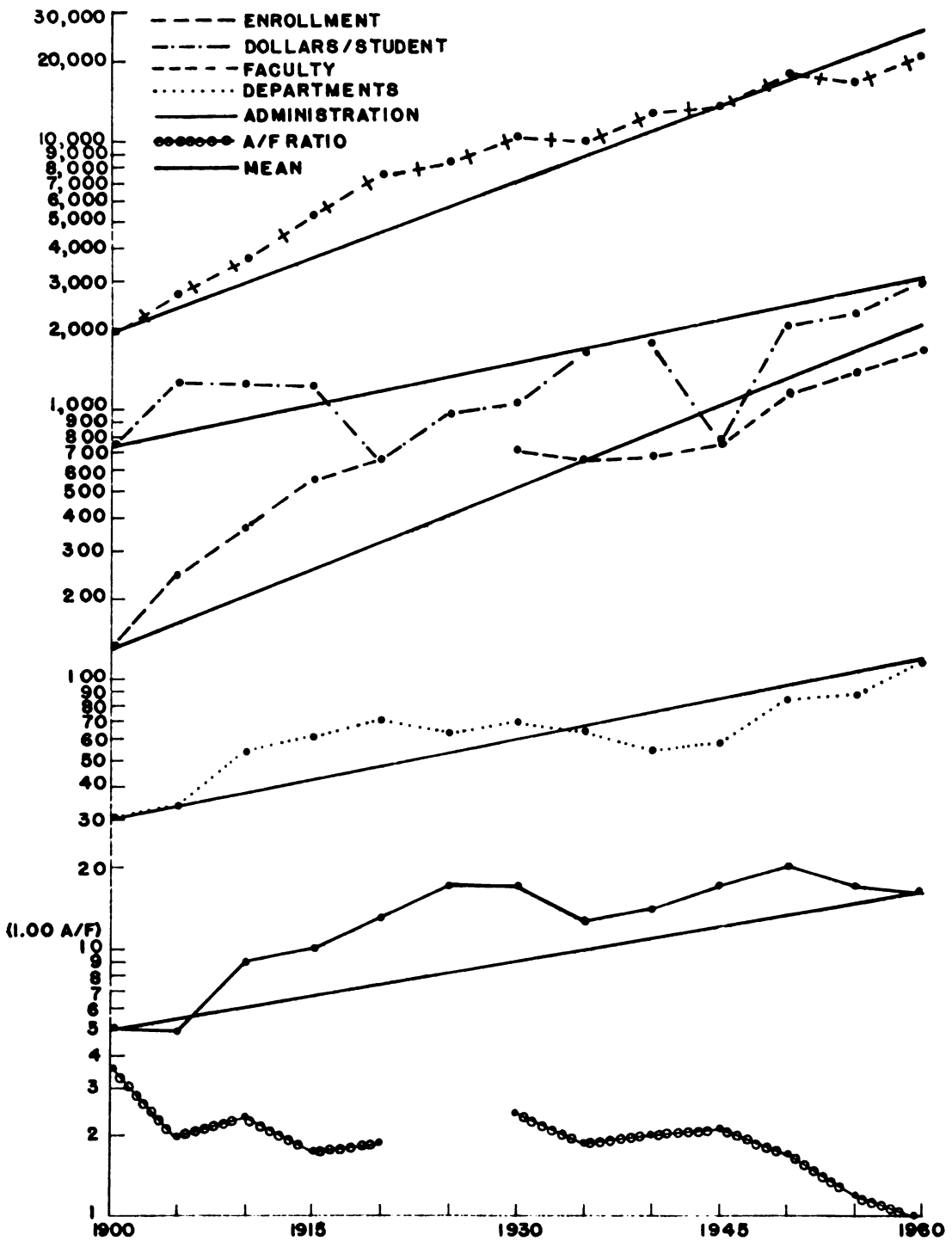


FIGURE 5

RESEARCH VARIABLES TREND PROFILE, ALPHA U

follows fairly closely the trends observed in administration and faculty size growth, yielding a slope of 10^{o} and an expansion of almost four times the original number of departments. Interestingly enough, however, and counter to the expected pattern, this unusually high rate of organization complexity proliferation appears in the context of a decreasing ratio of administrators to faculty.

The zero order and partial correlations recorded in Table 4 (p. 76) indicate that much of the apparent correlation between administration size and departments can be explained by growth in faculty. In fact, the growth of department numbers is so marked, and the growth in administration size so modest by contrast, that controlling for faculty growth produces a weak negative correlation between administration and department growth.

A rather erratic pattern characterizes the trend in expenditure expansion, manifesting no consistent relationship to administration growth or any of the other variables: the correlation between expenditures and number of administrators is .37.

The observation for 1925 is not available in the Alpha University faculty size trend. As a result, changes in faculty relative to changes in other factors during the decade 1920-1930 cannot be displayed.

In summarizing the profile produced by the data from Alpha U, several characteristics stand out. First, the A/F ratio at this university has been consistently lower than at any other of the six sample schools: the lowest A/F ratio recorded at any of the sample universities appears in the Alpha U data for 1960. Second, Alpha U ended the period under

study with by far the largest number of departments and yet, as noted above, this organizational complexity did not produce an accompanying growth in administration. Third, the role of expenditures is not strongly related to other data gathered.

Beta University (Figure 6)

Beta University is also one of the very large universities in America. Although rating reports indicate that as an institution it may not be quite so prestigous as Alpha or Gamma Universities, many of its departments rank very high in national standings, and its general reputation places it among the major public universities in the nation.

Although both administration and faculty growths exhibit similar fluctuations and overall trends, the faculty growth is characterized by a somewhat smoother course of tapering increase. Faculty size increased more than twice as much as did administration size. Administration experienced a pattern of sharp increases within one period followed by long plateaus. Therefore, the dramatic increase noted in the last decade covered by this study would be expected to be followed by such a plateau. The step-like pattern of administration growth coupled with the relatively smoother curve of faculty growth produce a moderately high correlation (r=.87).

Beta University displays comparatively little growth in number of departments: throughout the period studied, their number slightly more than doubled. From 1915 to 1960 very little expansion in number of departments occurred. There is little opportunity, therefore, for

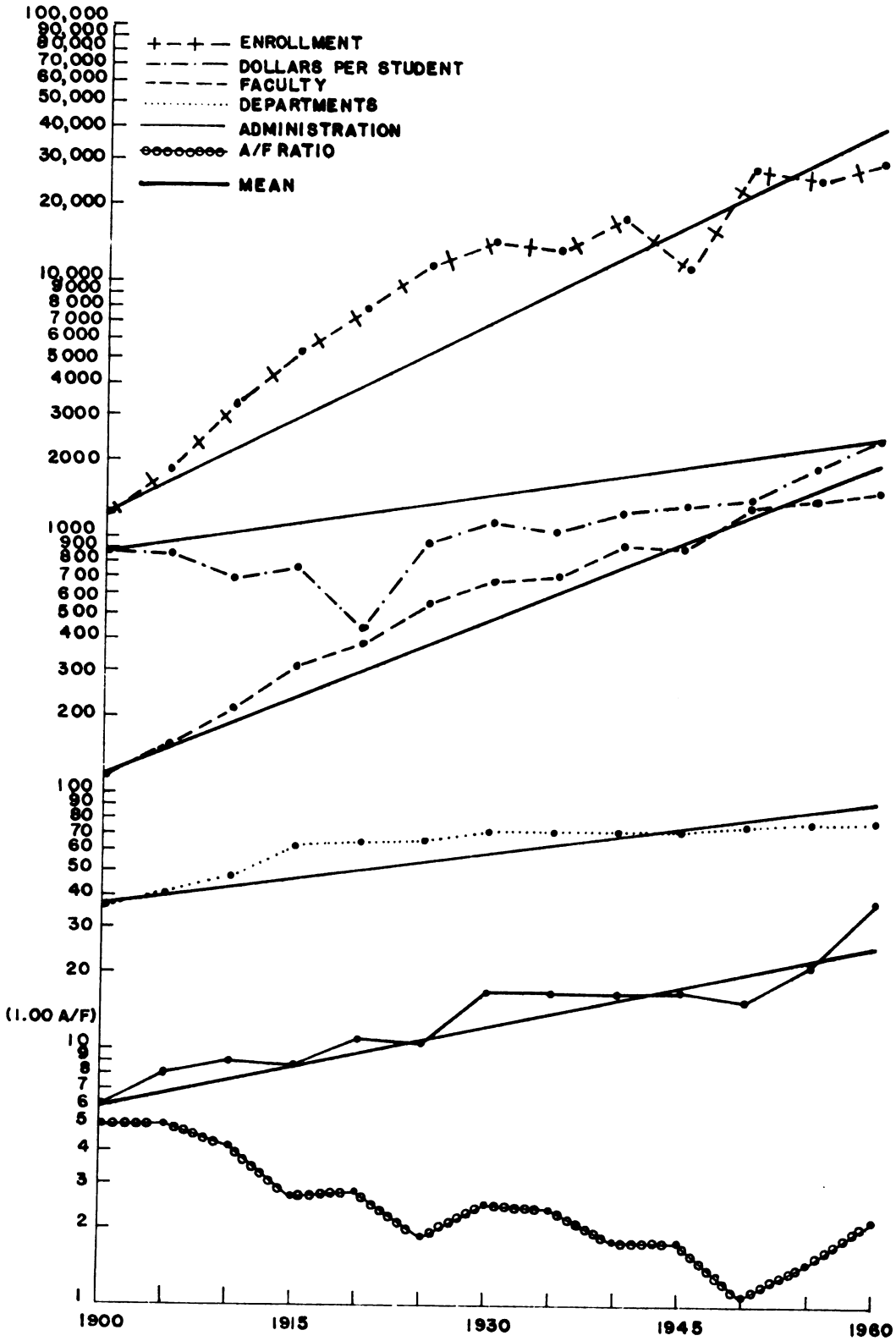


FIGURE 6

RESEARCH VARIABLES TREND PROFILE, BETA U

changes in the number of departments to influence importantly any changes in administration size. In fact, when controlled for faculty, the correlation between administration and departments drops to almost nothing (r=.06).

There is an obvious parallel between administration growth and expenditures at Beta University, especially after 1925. The correlation between these two variables is quite high (r=.92). Controlling for expenditures emphatically reduces the relationship between faculty and administration (Table 4).

An overview of the development of all variables is characterized by the markedly similar strong relationships apparent between administration and faculty and administration and expenditures, and by the relatively limited changes in the number of departments. Significant increases in the A/F ratio in the 1950-1960 decade must also be noted; however, as indicated earlier with regard to Alpha University, this may represent a "catch up" phase which may be followed by a period of little change.

Gamma University (Figure 7)

Gamma University, along with Alpha University, had achieved a reputation as one of the major universities of the Midwest and of the nation well before the period here under study. According to recent ratings it has retained this prominence to the present (Cartter, 1966).

This institution provides an illustration of divergence of fluctuations in administration and faculty growth, although the overall trends of these variables display very similar regression slopes. The growth

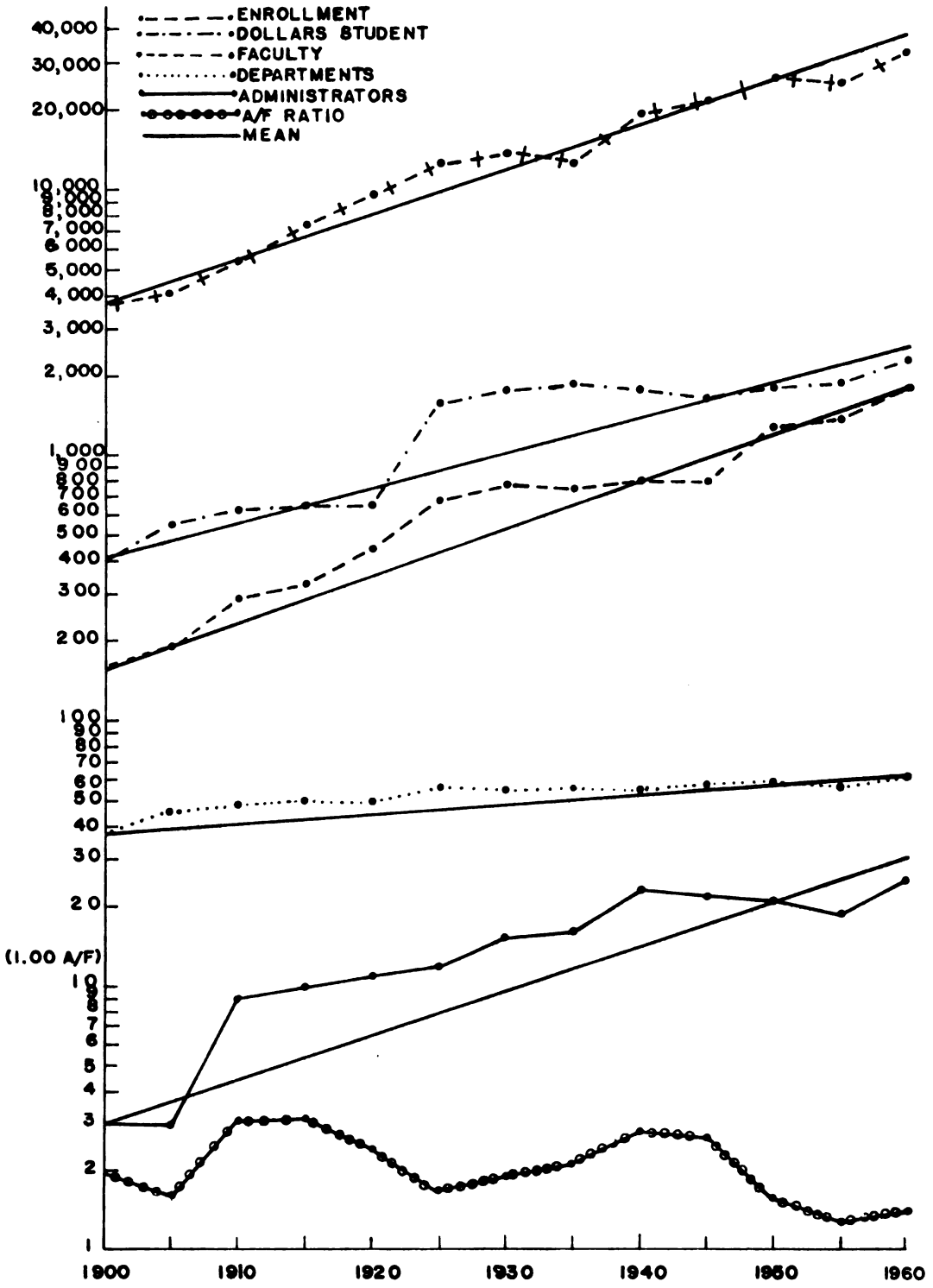


FIGURE 7

RESEARCH VARIABLES TREND PROFILE, GAMMA U

of faculty occurred at fairly consistent rates of increase from early years until 1930, when the number of faculty became relatively stable and remained so until the post World War II boom.

The development of administration growth follows a different course. The sharp increase (in terms of percentage growth) from three to nine administrators in the 1905-1910 period was followed by a long period of moderate increases in the number of administrators. This period includes the 1930's, a decade of relative stability in number of faculty. However, from 1940 to 1955 the number of administrators decreased, even while the number of students and faculty were increasing after the war. Such fluctuations, however, do not sharply reduce the correlation between faculty size and administration (r=.86).

A moderately declining A/F ratio is reflected in the fact that during the entire period studied, the number of faculty increased more than eleven fold, with a trend slope of 20^{o}, while the administration size grew somewhat more than eight times, with a trend slope of 18^{o} (Table 5, p. 71). Within the A/F trend, fluctuations indicate a sharp decline in A/F ratio during the postwar boom.

Of the six institutions, Gamma University exhibits the strongest relationship between administration size and growth in number of departments: a correlation of .91 is produced. As Table 4 (p. 76) indicates, introduction of a control for number of departments removes much of the correlation between faculty size and administration growth.

However, this apparent association of administration and number of departments may be of questionable significance. A scattergram

(Figure 22) reveals most of the cases to be very clustered due to a very limited expansion in the number of departments, which less than doubled during the sixty year study period.

In explaining the relationship between expenditures and administration, somewhat different impressions are created from correlational and graph analysis. There is only a .05 range among this correlation and those of administration with departments and with faculty. Nonetheless, the similarity in both fluctuations and overall trend slopes is greater between administration and expenditure than between administration and either departments or faculty. This is reflected in the fact that the correlation between expenditures and administration is almost as high as the multiple correlation of faculty and departments with administration.

In summarizing the experience of Gamma University in terms of the research variables, it can be noted that the trend slopes in administration, faculty size, and expenditures are similar. There was proportionately much less increase in the number of departments, but that factor correlated highly with the size of administration due to a similarity in fluctuation pattern.

Gamma State (Figure 8)

Within the period under study, Gamma State has emerged from its origins as a very small, vocationally specialized college into one of the major "multiversities" of America, a status apparent from its strong ratings in a number of diverse disciplines (Cartter, 1966).

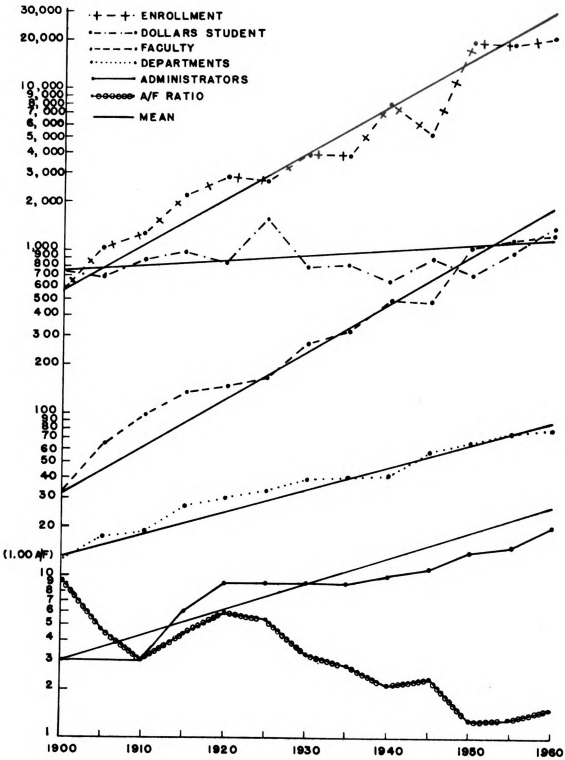


FIGURE 8

RESEARCH VARIABLES TREND PROFILE, GAMMA STATE

No other university in this sample exhibited the tremendous growth in faculty size experienced by Gamma State, which multiplied its faculty forty times during the period studied. In contrast, the number of administrators increased only six and a half times during those years. This comparison is somewhat misleading, however, since in 1900 Gamma State was a very small institution with few faculty; consequently, early small numerical increases have yielded large percentage increases. From 1925 until 1950, increases in faculty occurred at a very steady rate. Even the lack of growth during World War II and the subsequent leap in faculty size represents a reassertion of the previously established trend of faculty size growth.

On the other hand, the growth of administration displayed a tripling from 1910 to 1920, but then exhibited no further change until 1935-1940, a period which also showed a substantial increase in faculty. Interestingly enough, the period of greatest increase in the rate of administration size growth since early years was during the last five year observation period, during which no similar increase in faculty size occurred. This expansion may represent a "catch up" in administrative growth in response to earlier enrollment growth.

The number of departments at Gamma State grew at a rate of total increase similar to that of the number of administrators, and exhibited a similar though less pronounced pattern of fluctuations. The correlation of administrators with number of departments (r=.96) was a little higher than the correlation of administrators with faculty (r=.92),

yet a control for the number of departments reduced the correlation of administration with faculty to almost nothing (Table 4, p. 76).

Growth in expenditures at Gamma State showed the least increase among the six universities, actually decreasing slightly but consistently during the years from 1920 to 1935. In the ten years from 1950 to 1960, however, expenditures per student rose markedly. The overall trend represented an increase of slightly more than one and one half times the earliest recorded expenditures per student. The correlation of administration and expenditures is only .36.

Summary of Gamma State's development reveals that during the course of its growth, the administrative component never grew at a rate of expansion even approximating that of the faculty. It is largely this difference in overall trends, accentuated by a long standstill in the middle years of administration development at Gamma State, rather than a difference in fluctuations, which explains the greater association of administration with departments rather than with faculty.

Delta University (Figure 9)

Since 1905, Delta University has ranked as the smallest institution in this sample. However, it also provides testimony for the cliché that size does not necessarily relate to quality, for this school has consistently ranked comparatively high among universities in the Midwest, particularly in the areas of liberal and fine arts (Cartter, 1966).

Within the study sample, the strongest relationship over time between administration and faculty sizes appears in the Delta University

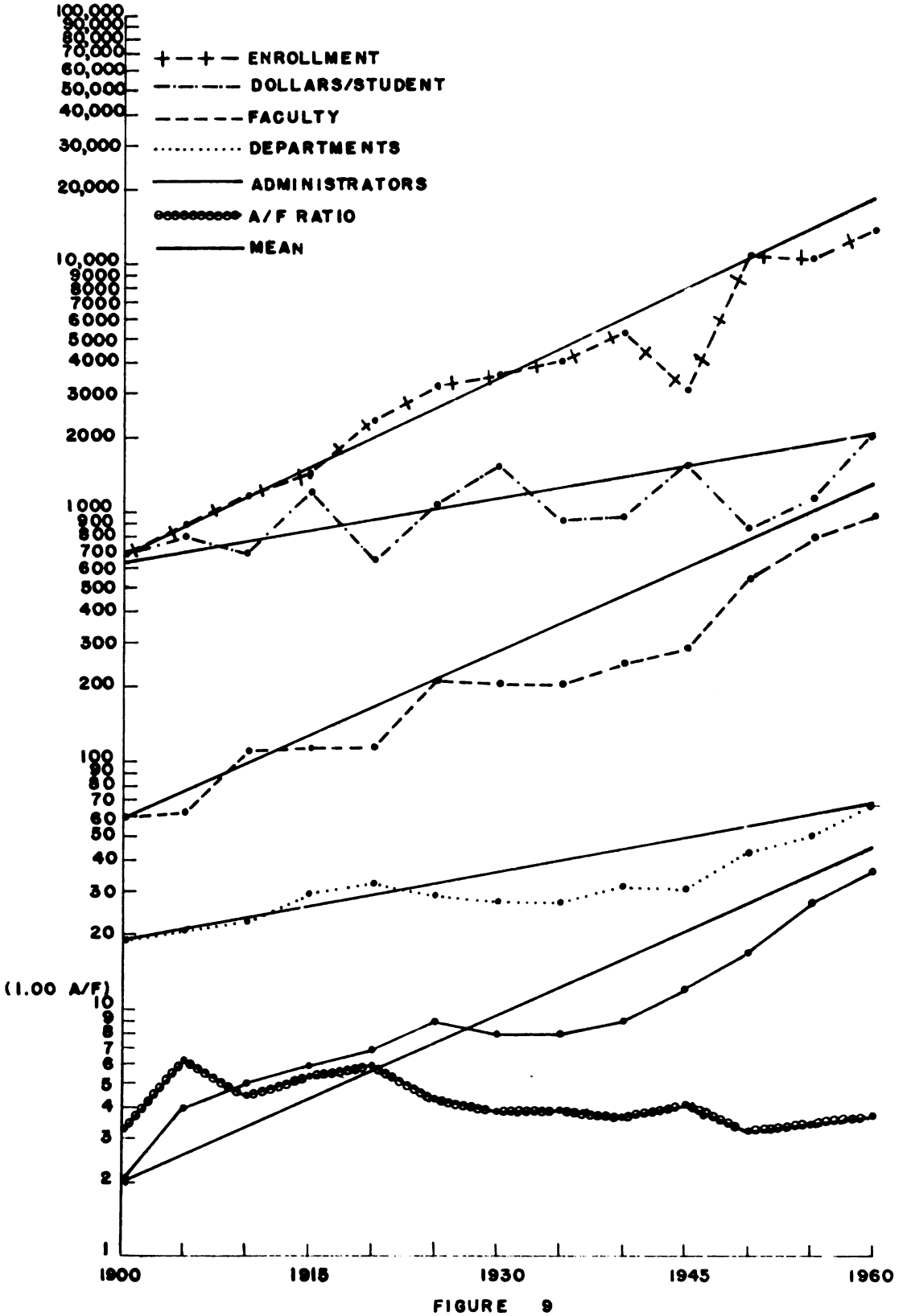


FIGURE 9

RESEARCH VARIABLES TREND PROFILE, DELTA U

data. These two factors display strikingly similar trends, and similar fluctuations within those trends. Their strength of association is well displayed by the correlation their relationship yields (r=.99).

Delta is also the only university in which the administration grew at rates greater than did faculty. During the period studied, faculty increased more than sixteen times its original size, while administration increased eighteen times.

The growth of departments at Delta University also resembles the pattern within trends displayed by both faculty and administration development; of course the changes in number of departments did not involve rates as high as in those other factors. The number of departments remained very stable from 1915 until 1945, changing by no more than 12% during any period of that span of years. Beginning in 1945, however, Delta began adding departments at higher rates of increase. Nonetheless, the number of departments increased no more than three and one half times since 1900, producing a regression slope of 13^{o}.

The correlation between administration size and number of departments is very high, within .01 of that found between administration size and number of faculty. Table 4 (p. 76) indicates, however, that partial correlations between these variables display somewhat greater salience in the relationship of administration with faculty than with departments.

Expenditures per student chart a jagged course over the sixty year span, producing four distinct cycles of expansion. Due to the irregularity of its path, the correlation of .67 with administration size does

not appear to be a meaningful guide to the role of expenditures. Use of a control for expenditures made no appreciable impact upon the correlation of administration size and number of faculty.

In summary, the profile drawn of Delta University shows dramatically accelerated parallel growth in expansion of faculty size, number of departments, and administration beginning in the mid-1930's. However, in the long term growth of the university, the A/F ratio has remained relatively stable, peaking early in the period under study, and fluctuating within a range of .15 since 1925.

Delta State (Figure 10)

Although Delta State operates programs in all areas characteristic of contemporary American universities, it continues to retain its highest reputation as an institution specializing in specific technical and vocational curricula and research (Cartter, 1966).

Administration size and faculty size changes followed generally similar paths in their development at Delta State. However, growth in administration size tended to exhibit somewhat less deviation from the regression line than did faculty changes, which grew at a decreasing rate of increase until 1940. Administration tended to experience growth fluctuations in which periods of increase alternated with periods of stability, as had been the case to a lesser degree at Beta University. As their slopes display, the rate of increase for faculty size was three times that of administration size; the faculty grew to seventeen times its original size, while the administrative component expanded to five and a half times its original size. The trends and fluctuations of these

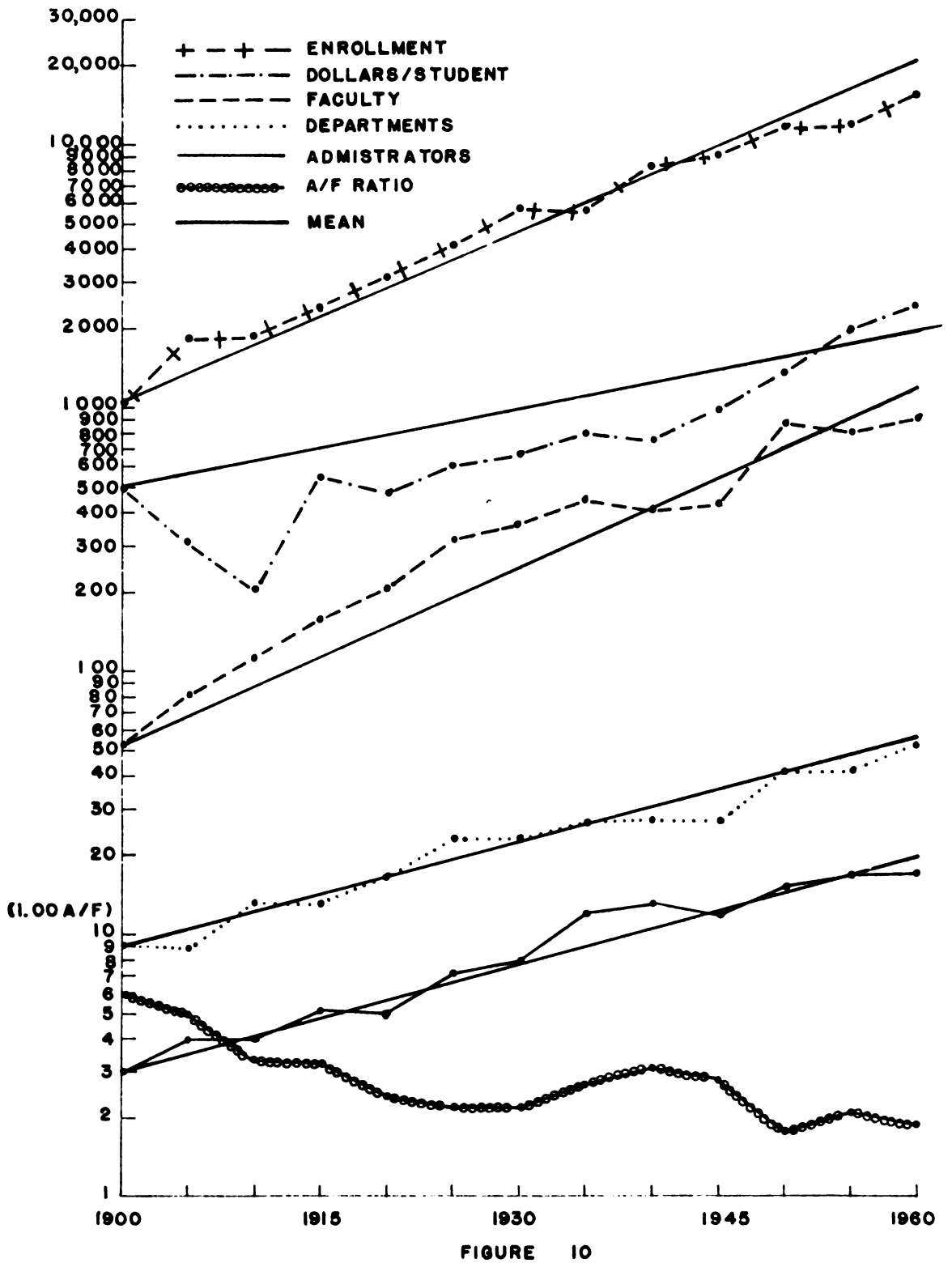


FIGURE 10

RESEARCH VARIABLES TREND PROFILE, DELTA STATE

two factors were similar enough, however, to yield a very high correlation: r=.95.

Interestingly enough, this same high correlation exists between administration and department growths over time. Although the trends of development for these variables reflect almost identical rates of expansion (Table 5, p. 79), their fluctuations display a fairly consistent pattern in which the alternating periods of stability and change in one factor were reversed in the other; i.e., while administration grew, faculty size remained unchanged, and vice versa.

The trend in expenditures per student after 1920 was similar to that of both faculty and administration, with fluctuations paralleling in large measure those of faculty changes. The correlation between expenditures and administration becomes very high when a control for faculty is introduced; on the other hand, the correlation between faculty and administration is little influenced by use of a control for expenditures (Table 4, p. 76).

In summary, review of Delta State's development depicts an unusual case in which all the growth factors exhibit very similar trends and correspondingly high correlations. Whether or not there is some other untapped variable underlying the research variables is difficult to ascertain. One possible explanation might lie in Delta State's history of greater program specialization. The resulting greater thrust in certain academic disciplines has probably meant a greater degree of planned growth in enrollment, and therefore in expansion of faculty and administration.

In presenting profiles of the sample universities, various patterns and some discontinuities have emerged. Further examination of those patterns and discontinuities can best be discussed in terms of the two research propositions posited in Chapter II.

Proposition I

The first proposition deals with the issue of the rapidity with which administrative components grow in relation to the growth of the organizations of which they are a part. It is here argued that the administration does not increase at a rate as rapid as that of faculty size.

Visual inspection of the semilogarithmic charts for each university presented in the previous section of Chapter IV indicate that in only one case was the slope of the administration trend as steep as that of faculty growth; in five of the six cases there was substantially less slope to the administration size trend. When the means for each observation are plotted for all the universities (Figure 11) the resulting trends again demonstrate the greater changes in faculty relative to administration growth.

Table 5 (p. 79) indicates the slopes and growth products for each of the six universities. In examining these computations, a consistent pattern of faculty growth more expansive than administrative growth is evident. Delta University is the lone exception; its administration grew by a slightly larger multiplier than did its faculty.

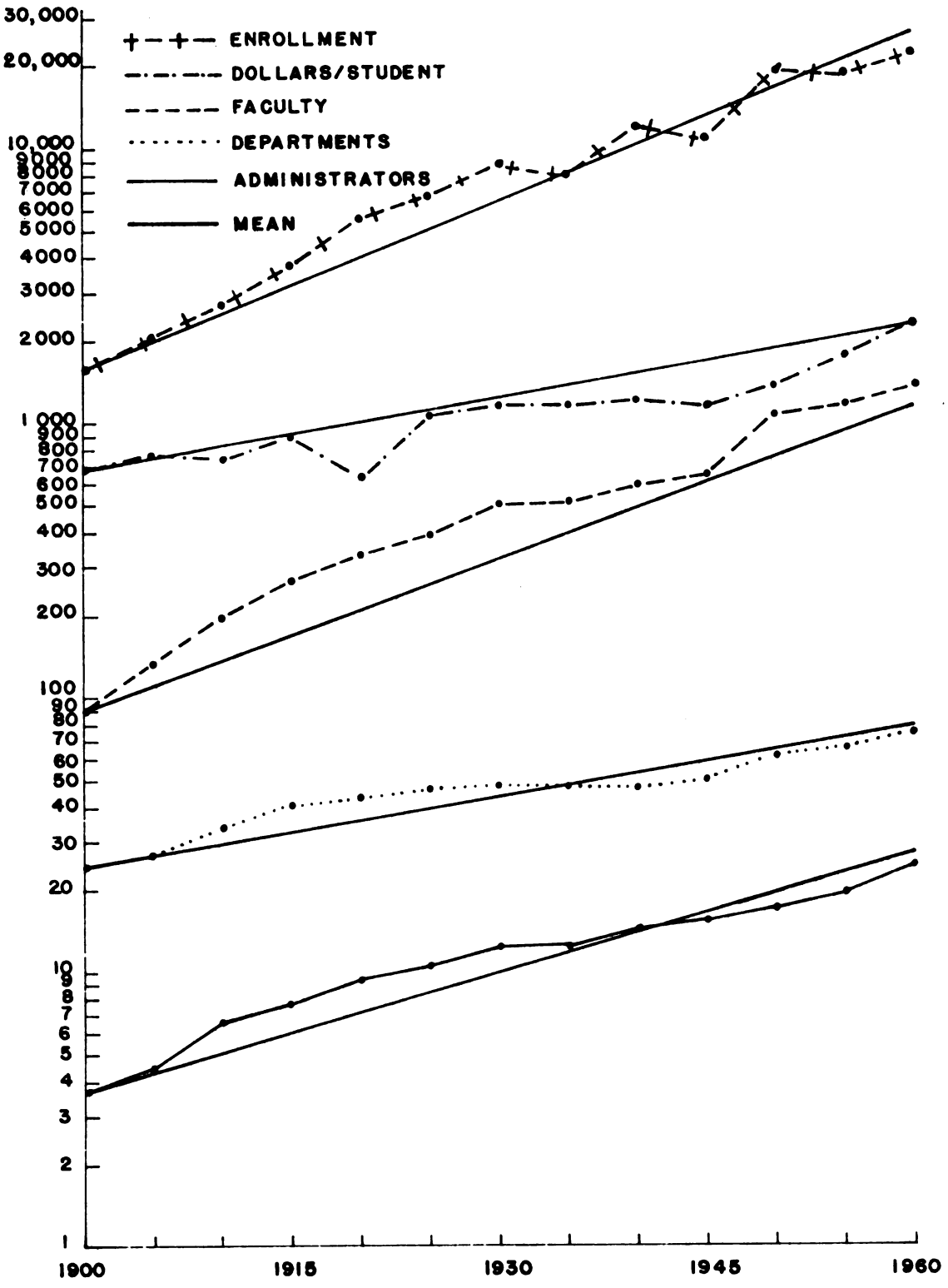


FIGURE 11

RESEARCH VARIABLES TREND PROFILE,
ALL UNIVERSITIES' MEANS

The semilogarithmic charts presented in this chapter portray A/F ratios descending through time in all of the universities. However, Delta University ended the period under study with an A/F ratio very slightly higher than that displayed in 1900. All others concluded with A/F ratios substantially lower than evidenced in the earliest years of the study. Figure 12 displays a descending A/F ratio trend over time when the means of all the institutions are plotted.

Of course the issue presented by the proposition under discussion is not the effect of time per se upon the A/F ratio so much as it is the relationship between faculty and administration size independent of a time trend. Indeed, the scattergram of the A/F ratios along the time dimension for all observations reveals a diffuse dispersion of cases, indicating little influence of time itself upon A/F ratio independent of organizational contexts (Figure 12). Thus, the trend for administration development in relation to organization size must be further displayed and discussed.

Both enrollment and faculty size exhibit the same relationship with the A/F ratio: the ratio of administrators to faculty clearly diminishes as organization size increases, as scattergrams well demonstrate (Figures 13 and 14). There is a tendency for A/F to decline precipitously until the number of faculty reaches 500 to 550; from that point A/F tapers steadily, if not so sharply.

The role of organization size in relation to the A/F ratio is most interestingly shown when the institutions are ranked in each observation year by size (Figure 15) and by A/F ratio (Figure 16). The

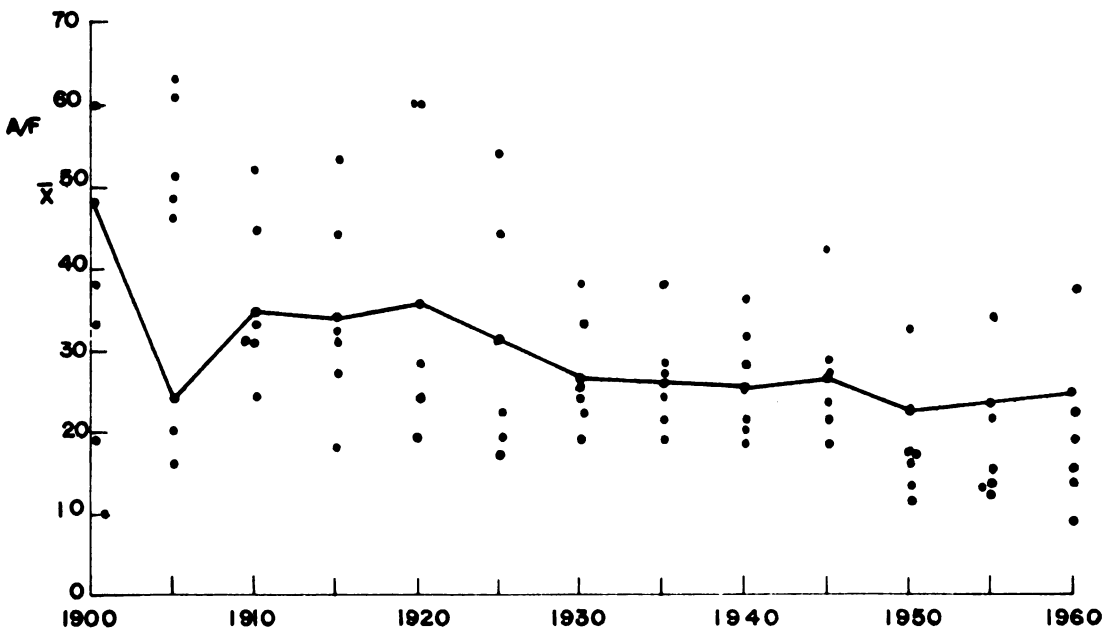


FIGURE 12

SCATTERGRAM, A F RATIOS ALL UNIVERSITIES, AND TOTAL MEAN A/F RATIO 1900— 1960

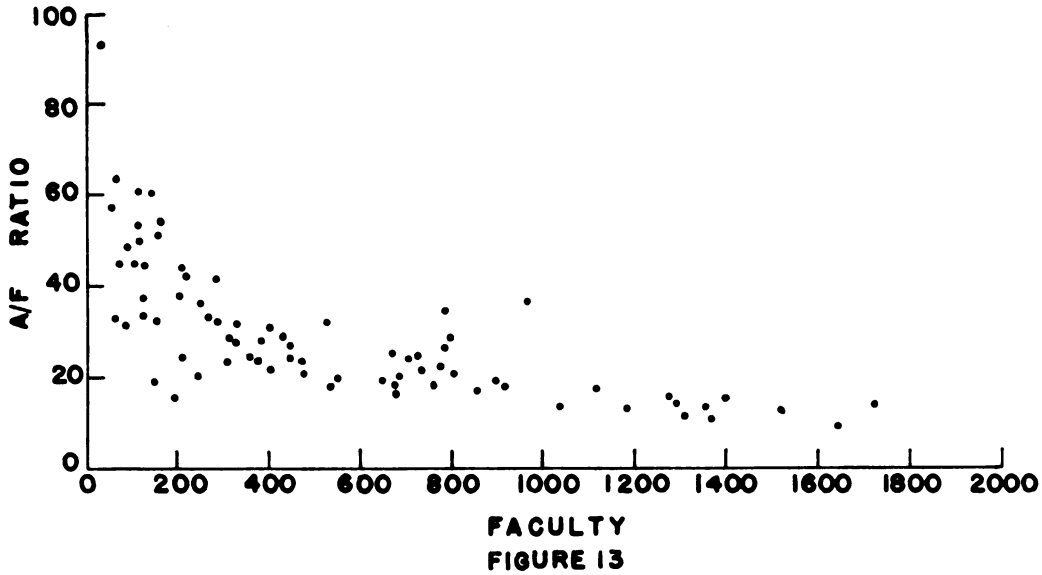


FIGURE 13

SCATTERGRAM OF A/F RATIO AND FACULTY, ALL UNIVERSITIES, 1900 - 1960

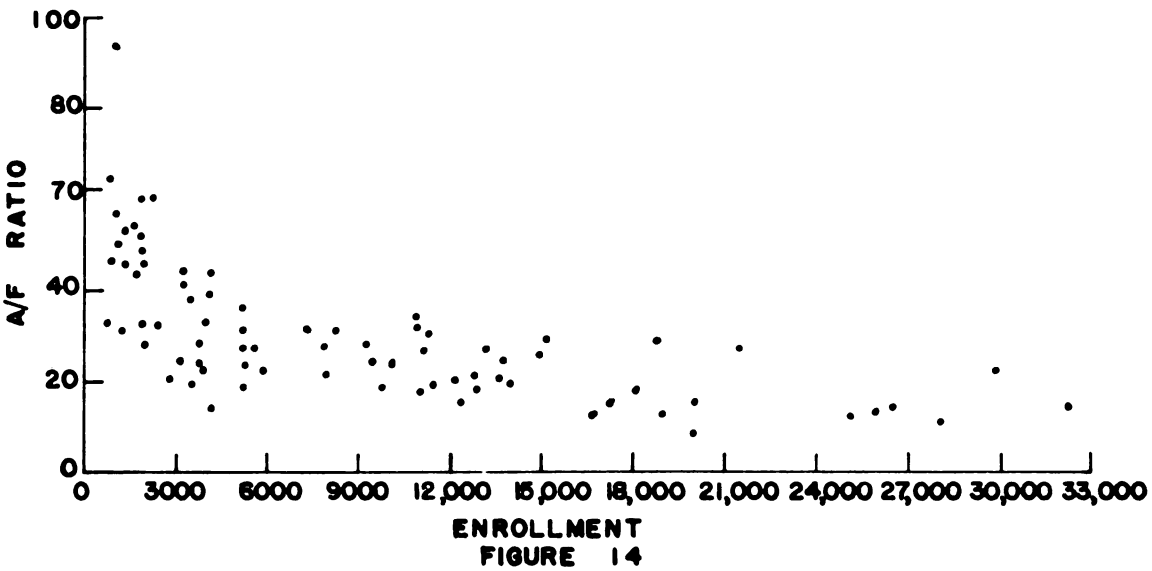


FIGURE 14

SCATTERGRAM OF A/F RATIO AND ENROLLMENT, ALL UNIVERSITIES, 1900 - 1960

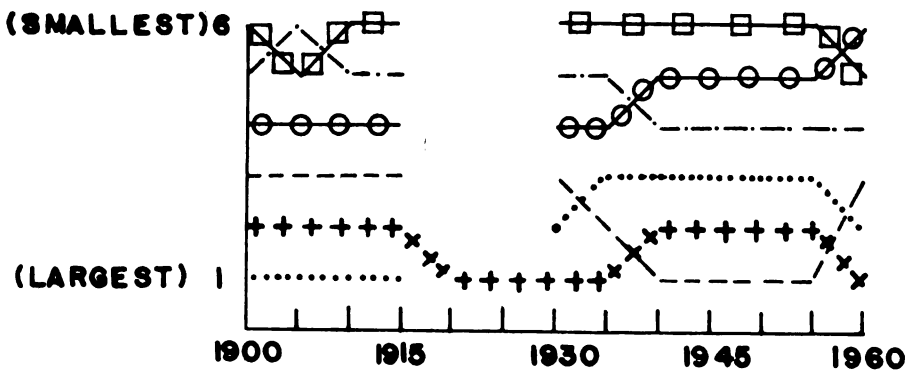


FIGURE 15

RANKINGS BY YEAR OF SIX UNIVERSITIES, FACULTY SIZE

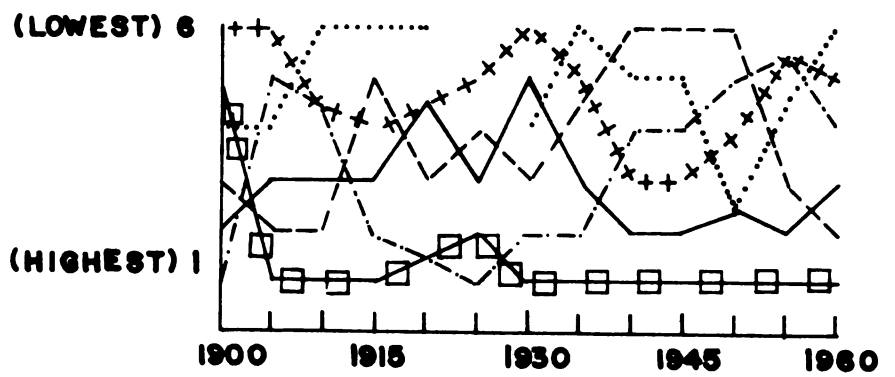


FIGURE 16

RANKINGS BY YEAR OF SIX UNIVERSITIES, A/F RATIO

ALPHA U .....
BETA U - - - - -
GAMMA U + + + +
DELTA U
DELTA STATE
GAMMA STATE

three largest universities tend to cluster in having the three lowest ranking A/F ratios in almost every observation year. Figure 17 (p. 105) indicates the extent to which the A/F ratios of these three largest universities were below the mean for the six institutions. Gamma State, the university with the most expansive size growth, moved from one of the smallest to one of the largest in ranking among the six universities. As it did so, its rank in A/F ratio moved from among the highest to among the lowest.

Thus, not only do universities tend to experience smaller A/F ratios as they grow larger; universities which are characteristically larger during the whole study period tend to have the lowest A/F ratios. For example, Gamma University, consistently one of the larger institutions, had a substantially lower A/F ratio in 1920 (.24) with 444 faculty than did Delta University, consistently one of the smallest institutions, when it attained a roughly comparable faculty size of 523 in 1950 (A/F=.32).

Summary of materials concerning Proposition I

All evidence points to the conclusion that the first proposition, which posits a slower rate of growth for administration than for the organization which it coordinates, accurately describes the experience of the six universities studied. Within five of the six, the ratio of administrators to faculty decreased over time; independent of time, larger universities had a smaller proportion of administrators to faculty than did smaller universities. In sum, as these universities grew in size, their administrative component grew proportionately smaller; if

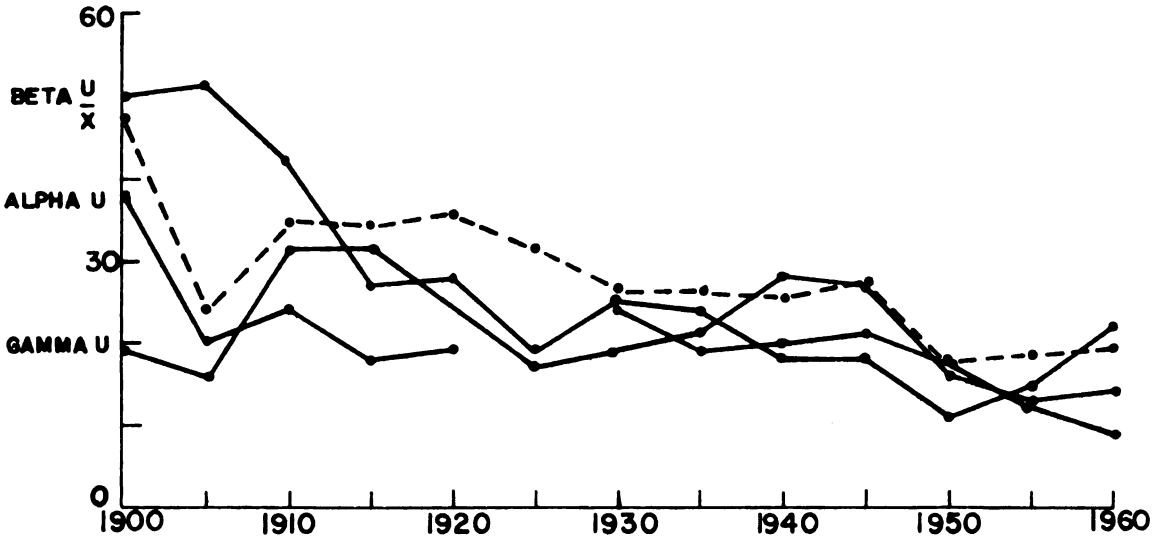


FIGURE 17

A/F RATIOS OF THREE LARGEST UNIVERSITIES AND TOTAL MEAN A/F RATIO
1900 - 1960

they were larger than others at a given point in time, their administrative component was proportionately smaller.

The three largest universities rank as having the three lowest correlations between administration and faculty (Table 4, p. 71). Scattergrams tend to indicate that one possible reason is the fact that as faculty size increases, it is more likely that administration size plottings will deviate below the linear regression line. Additional cases of growth beyond a thousand faculty may add further evidence that the relationship between organization size and administration is curvilinear, and therefore not best described in terms of correlation coefficients, which are based upon variation about a linear regression. Such curvilinearity would further illustrate the tendency for administration to increase at a slower rate than faculty size.

Proposition II

The second proposition maintains that the size of the administrative component is related to faculty size more than it is related to number of departments (organization complexity), expenditures, mandate, or external conditions (in longitudinal analysis, economic cycles, war, etc.). Explication of that theme relies primarily upon analysis of fluctuations displayed by the time series charts, scattergrams, and correlation analysis.

Administration and faculty

Fluctuations in rates of change (Figure 18) in administration tend to correspond to those in faculty size most closely in four of the six

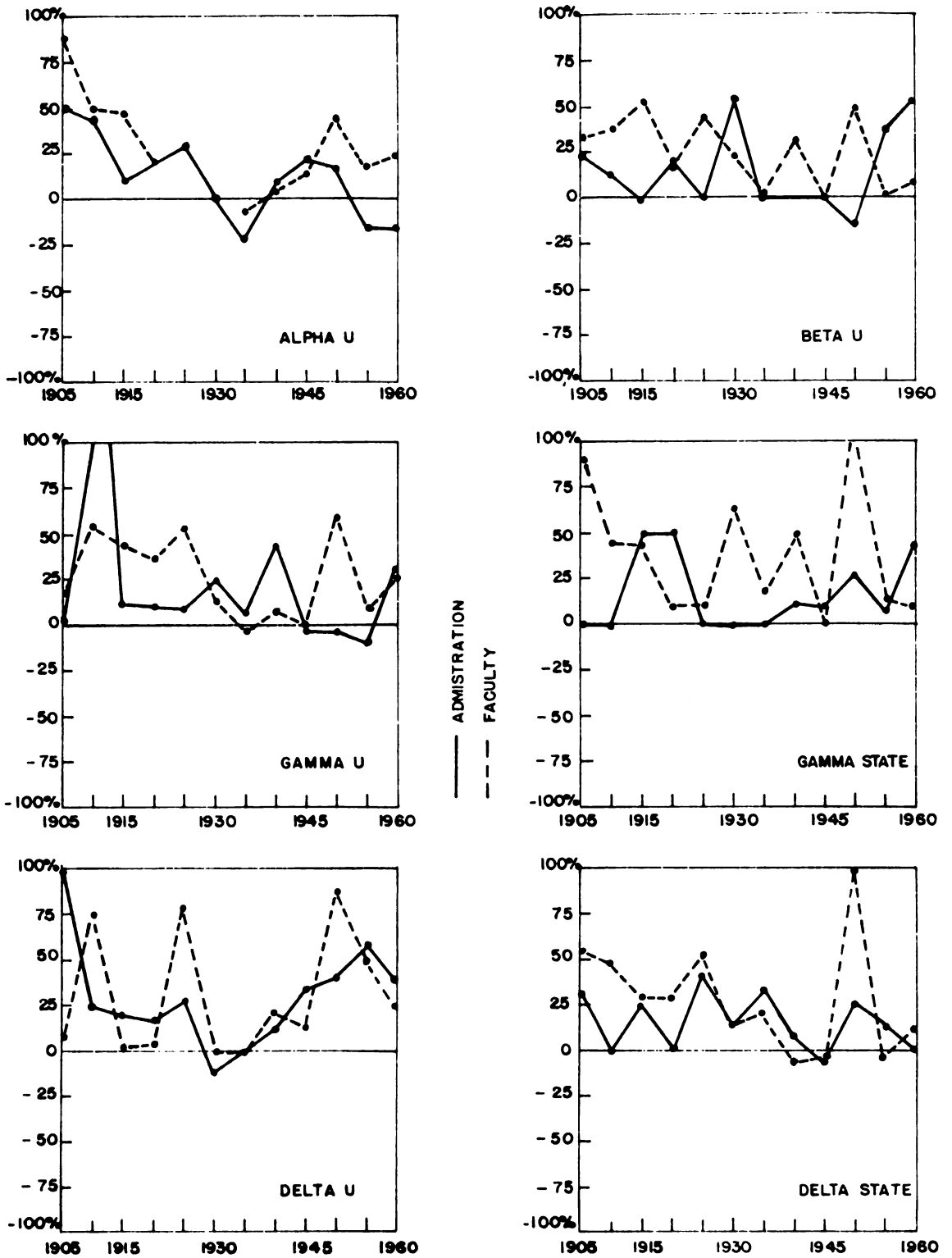


FIGURE 18

PERCENTAGE CHANGES IN ADMISTRATION AND FACULTY SIZES BY UNIVERSITY IN FIVE YEAR INTERVALS, 1905 - 1960

universities: Gamma University, Gamma State, Delta University, Delta State. In these four cases, percentages of change in administration tend to form patterns or cycles of increase and decrease coterminous with those of faculty size. There were occasions, however, when changes in administration appear to have lagged behind those in faculty growth by one five year period (e.g., at Gamma University the increase in faculty from 1920-1925 may be reflected in the percentage increase in administration in 1925-1930). The occurrence of these lags suggests that changes in number of faculty prompts changes in the number of administrators, and descending A/F ratios discount interpreting the graphs to imply the opposite: it is logically unlikely that a decline in administration is the prelude to increase in number of faculty.

The fluctuation patterns exhibited in these four schools show a tendency for the change rates of these two variables to vary in the same direction, if not in the same amount. Those deviations from that pattern which do appear are suggestive of another pattern in which changes in administration size lag behind, and respond to, changes in faculty size.

A fifth institution, Beta University, offers a variation upon this pattern in which the increases and decreases in percentage change for administration and faculty are usually moving in opposite directions. This also represents a lag in the relationship between the two factors, in that as the semilogarithmic chart indicates, administration lags behind changes in the number of departments (Figure 6, p. 85).

The sixth case, Alpha University, presents fluctuations in administration and faculty size change rates which are somewhat more difficult to interpret. The absence of data for 1925 interrupts the pattern

sufficiently to obfuscate their relationship. There is some evidence, especially in fluctuations after 1935, that at Alpha University as at four of the other institutions, changes in administration are coupled with changes in faculty.

Figure 19 indicates a strong linearity between administration size and number of faculty in all six universities. However, Table 4 (p. 76) indicates that in only two institutions, Alpha University and Beta University, were the correlations between faculty and administration appreciably higher than the correlations between faculty and departments. Delta University also shows a high correlation between administration and faculty when number of departments is partialled out.

When the scattergram plotting administration and faculty growth for all universities is examined (Figure 20), an impression of strong linearity appears. The two events which represent the most extreme deviation from linearity are the 1955 and 1960 observations at Delta University, an institution which exhibits its own strong linear regression but with a substantially steeper slope than that manifested by the other five universities.

Administration size and number of departments

Fluctuations in the number of departments appears to be less strongly related than does faculty size to number of administrators (Figure 21). Unlike faculty size, in no instance does a pattern appear in which the changes in number of departments directly parallel the direction of administration change rates. There are four cases, however, in

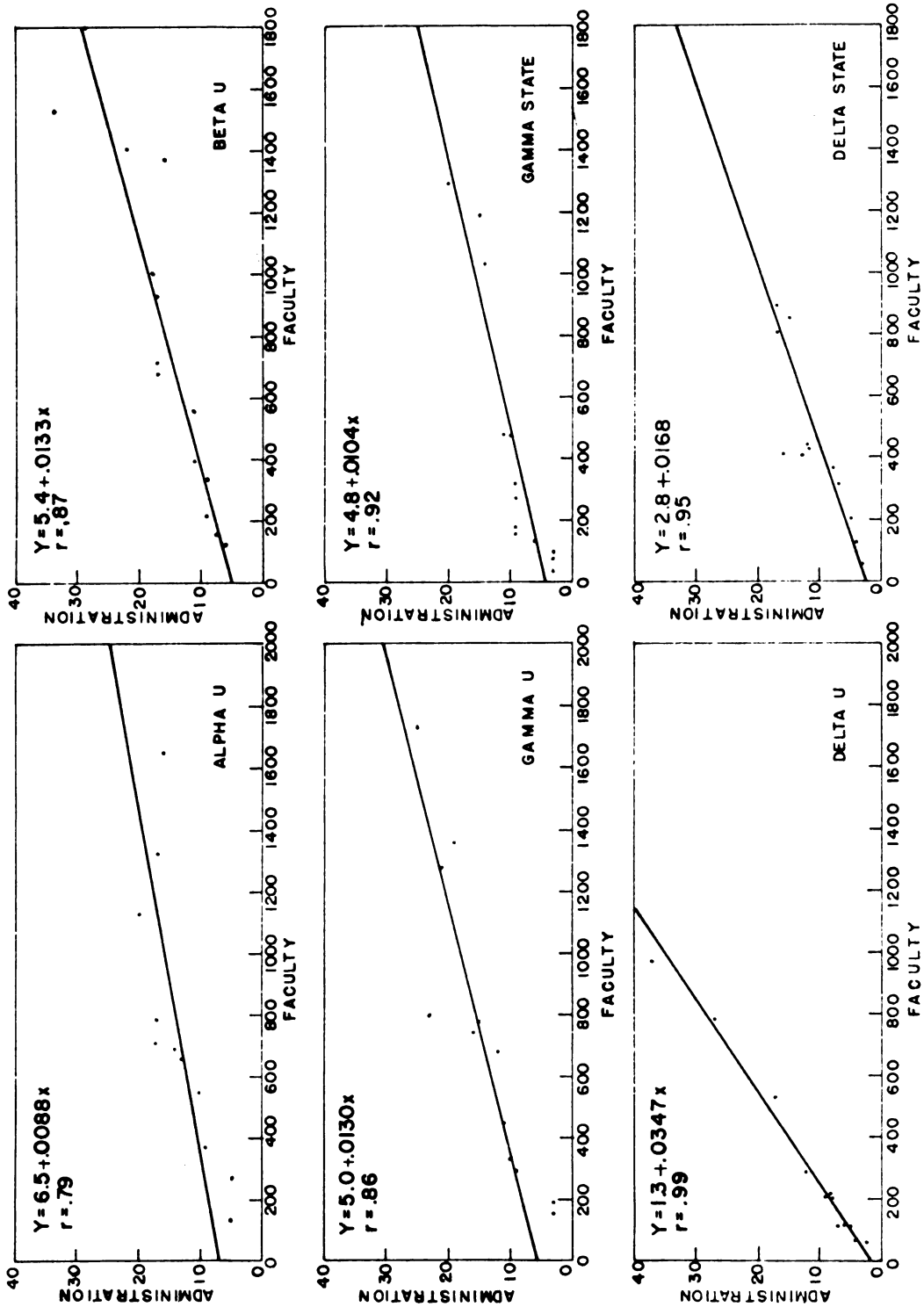


FIGURE 19

ADMINISTRATION AND FACULTY BY UNIVERSITY, 1900 - 1960

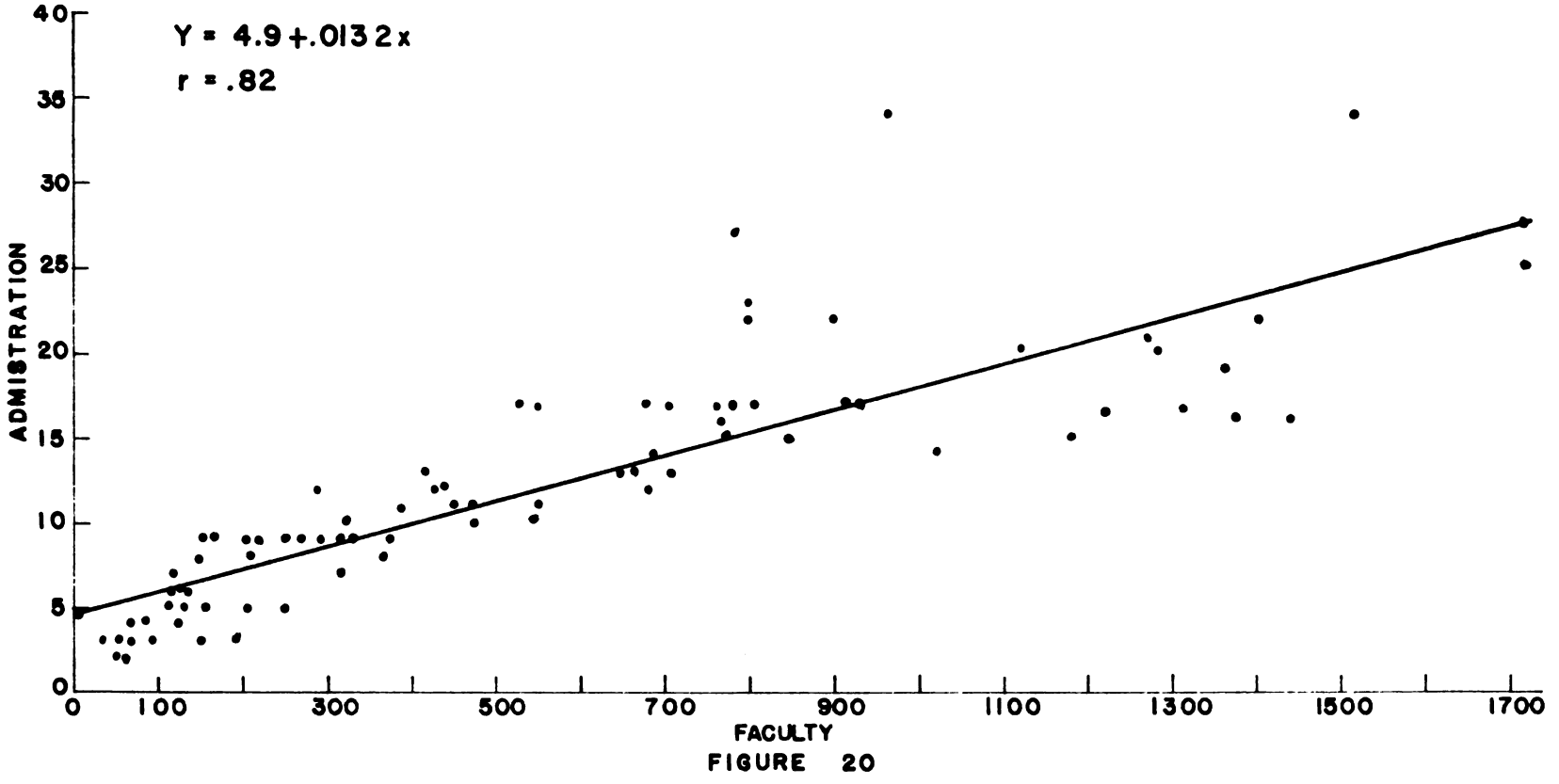


FIGURE 20

SCATTERGRAM OF ADMINISTRATION AND FACULTY, ALL UNIVERSITIES

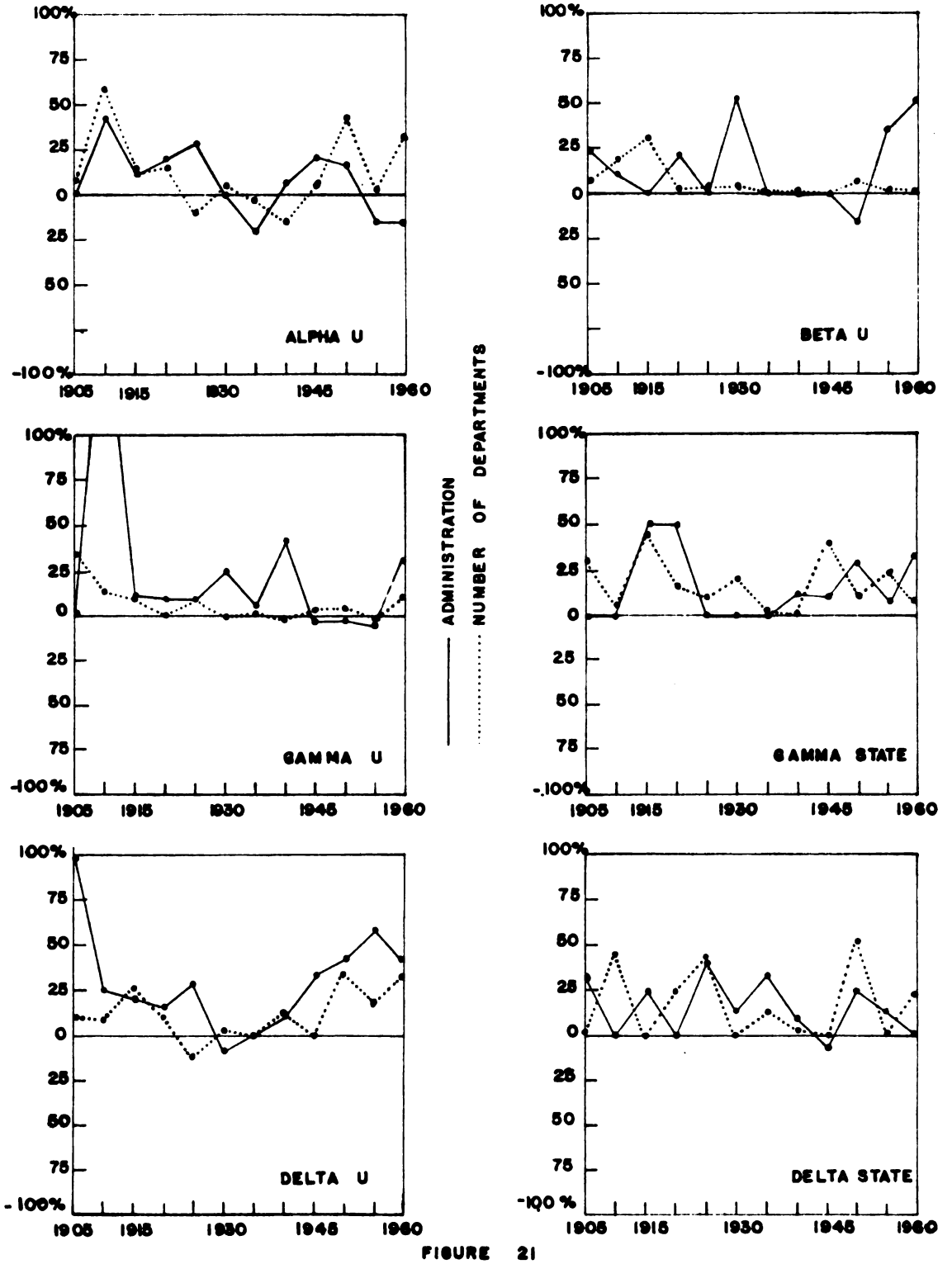


FIGURE 21

PERCENTAGE CHANGE IN ADMINISTRATION AND NUMBER OF DEPARTMENTS BY UNIVERSITIES IN FIVE YEAR INTERVALS 1905 - 1960

which a lag pattern emerges between the rates of change in administration and number of departments: Alpha University, Gamma University, Gamma State, and Delta State. A most interesting illustration appears in the case of Alpha University, in which the lag in administration increases with each cycle of rate change in number of departments. Gamma State and Delta State demonstrate a five year lag between administration and department changes. Although there is some indication of a similar lag pattern in the case of Gamma University, the low rate of change in the number of departments at this school is a source for some caution in interpreting its fluctuations. At Beta University, the lack of variation is so accentuated that no discernible relationship to administration is reflected by fluctuation patterns. Also excluded from those cases clearly exhibiting a lag pattern is Delta University, where rates of change for number of departments lead administration changes until 1930. After that point, both variables display a generally upward trend, but the fluctuations in department changes are not so clearly related to those in administration as previously.

From these fluctuation patterns it is most difficult to determine which variable, number of departments or administration size, is sequentially causal. As noted earlier, Anderson and Warkov among others maintained that increased organizational complexity led to an enlarged A/F ratio to cope with an increased burden of organizational coordination. However, as indicated in the discussion of findings related to Proposition I, the proportion of administrators does not grow larger among universities in this sample.

Among the six sample institutions, the coefficients of correlation between departments and administration size (Table 4, p. 71) are higher than those between faculty size and administration in two universities: Gamma University and Gamma State. Although the margin between the two sets of correlations is slim, introduction of appropriate controls makes the role of departments at these two universities even more decisively evident. The fact that the two universities exhibiting this characteristic are in the same state does not suggest any particular trend, since Delta University and Delta State, also within one state, exhibit no such uniformity. At Delta State, faculty and departments are equally well correlated with administration; introduction of appropriate controls does nothing to alter that relationship.

In looking at the scattergrams for each university plotting of administration size and number of departments (Figure 22), Beta University alone tends to display a third degree curvilinear relationship between these two variables. This suggests that their relationship may be stronger in this case than the correlation coefficient indicates.

On the other hand, the Gamma University scattergram suggests that the relationship between administration and number of departments is not as strong as the correlation coefficient indicates; the cases appear to be relatively clustered.

Figure 23 indicates the linearity of the relationship between administration and departments for all six cases independent of organizational contexts. This scattergram displays somewhat greater dispersion about the regression line than is evident in the plotting of administration and faculty size. These differences are reflected in the zero

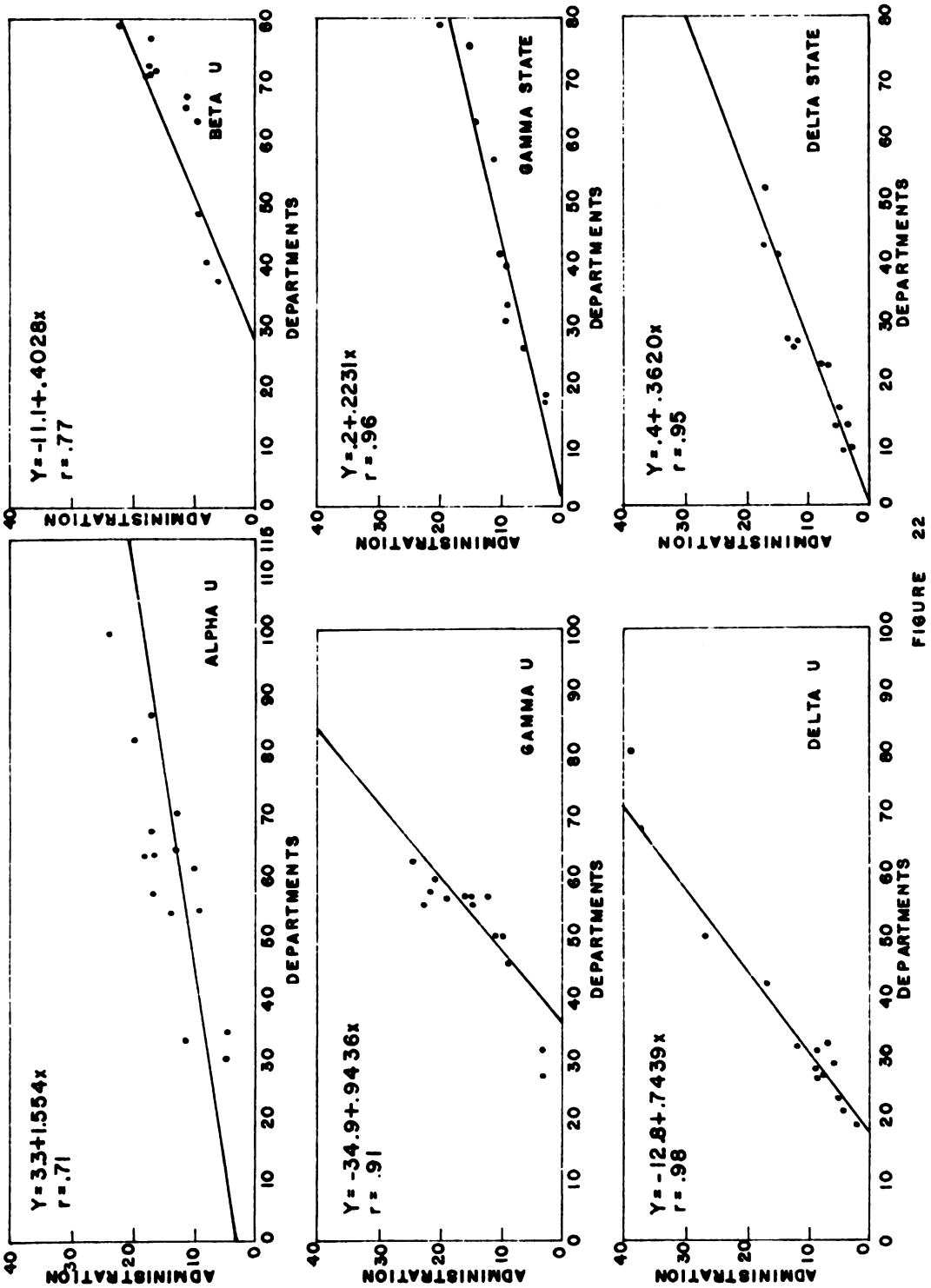


FIGURE 22

ADMINISTRATION AND DEPARTMENTS BY UNIVERSITY
1900 – 1960

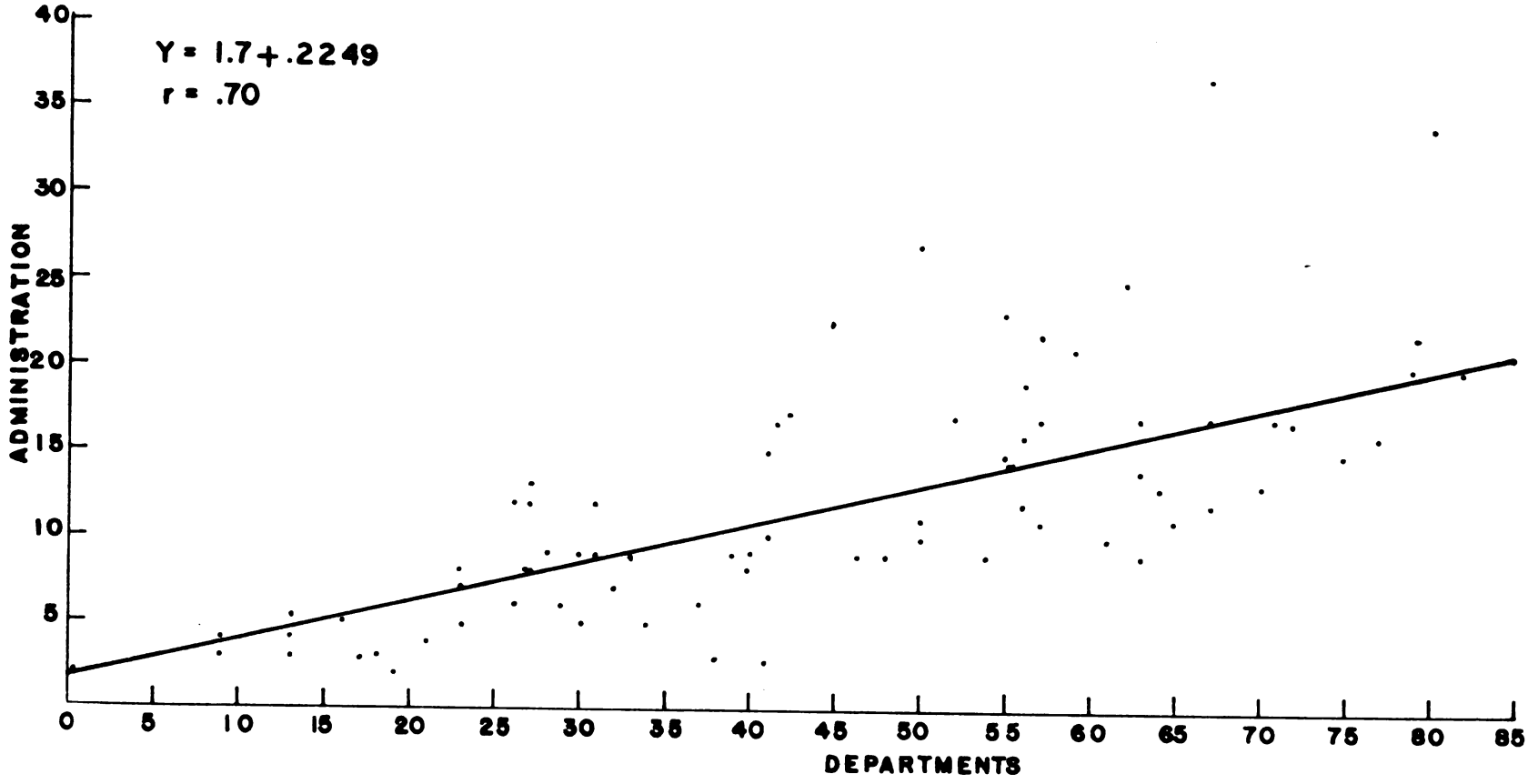


FIGURE 23

SCATTERGRAM OF ADMINISTRATION AND DEPARTMENTS,

ALL UNIVERSITIES

1900 — 1960

order and partial correlations between administration size, faculty size, and number of departments (Table 4, p. 76). Thus, if organizational contexts are ignored and all observations at all six universities are computed, the association between administration and faculty is noticeably higher than that between administration and departments. Controlling for faculty size appears to all but obliterate the correlation between administration and departments. However, this impression is misleading, given the tremendous variation in partial correlations between individual schools. As noted above, the variety of patterns in relationship between administration and complexity from university to university make summary correlations of questionable import.

Administration and expenditures

As Figure 24 illustrates, rate changes in expenditures per student vary wildly from one period to another in four of the sample universities: Alpha University, Gamma University, Gamma State, and Delta University. In only one school, Delta State, do rate changes in expenditures fluctuate in a pattern similar to administration size changes, but in that case the "fit" is quite good. As noted elsewhere, there is reason to suspect that the more specialized programs at Delta State permit more planning and control of growth factors than may be possible at the other universities. This in turn causes all the research variables to be relatively strongly associated. The sixth case, Beta University, does not exhibit extreme variations in rates of expenditure changes relative to administration size, but nonetheless no clear cut pattern emerges.

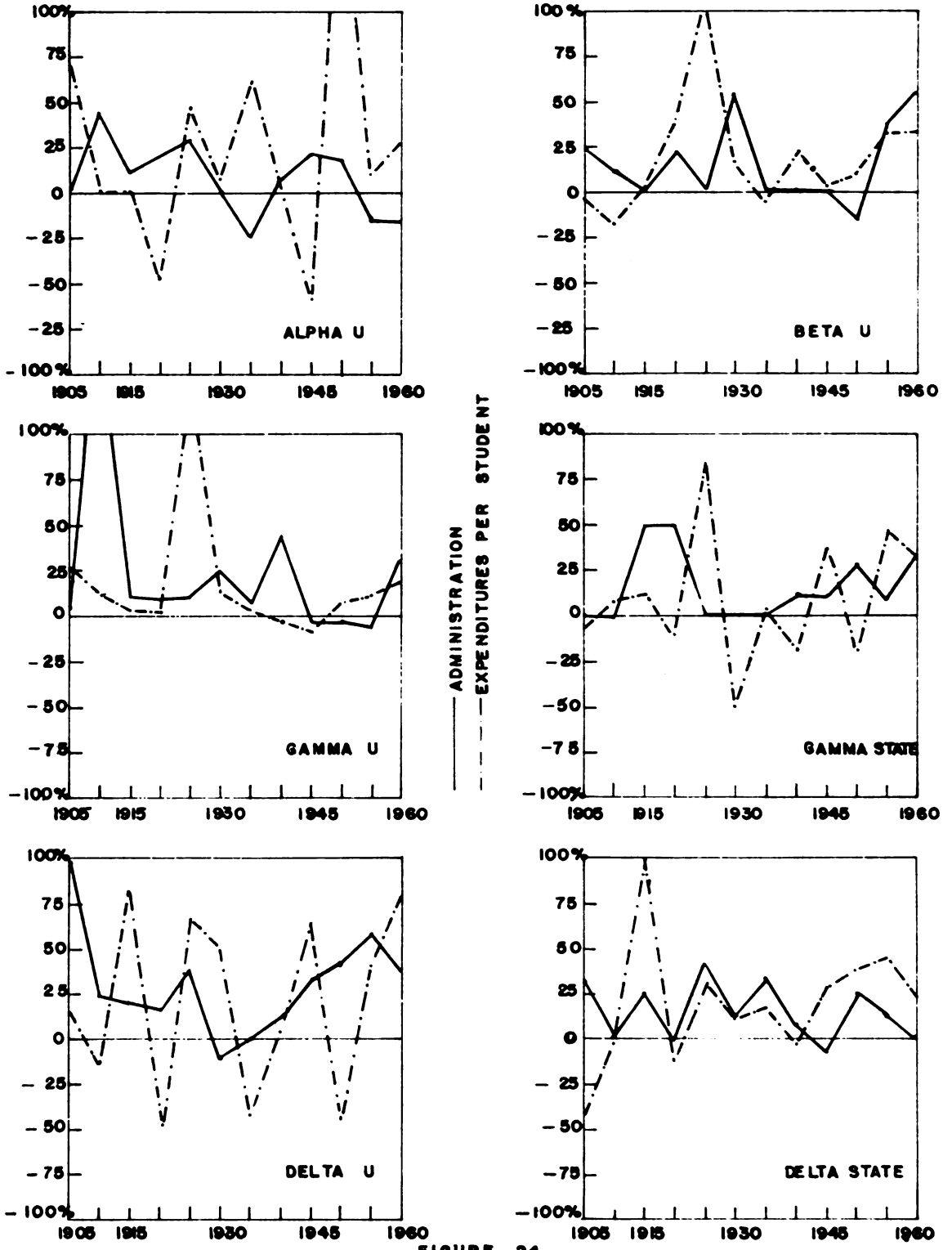


FIGURE 24

PERCENTAGE CHANGES IN ADMINISTRATION AND EXPENDITURES PER STUDENT BY UNIVERSITY IN FIVE YEAR INTERVALS

In the case of Gamma State, and perhaps also of Delta University, it might be argued that the great variations in rates of change in expenditures roughly follow rates of change in administration, in which expenditures are being constantly over or under adjusted. Interestingly enough, the swings in rate of expenditure change are equally great in both increases and decreases.

Examination of the scattergrams (Figure 25) for the plotting of administration and expenditures per student also reveals linearity, but in two cases (Alpha University and Delta State) the relationship between these variables appears quite weak compared to other findings thus far. Indeed, in four instances the correlations of administration with expenditures is lower than the zero order correlations of administration with either faculty or departments, and in three of those cases this finding is very clear cut (Table 4, p. 76). Only in the case of Beta University do expenditures appear associated with administration to a significantly greater extent than either faculty or departments. In fact, Beta University is the one instance in which the correlation of administration and expenditures is even higher than the multiple correlation of administration with both faculty size and number of departments. A tendency for expenditures to show a strong relationship to administration size appears also in the case of Gamma University, where the correlation of administration to expenditures is slightly higher than to faculty, but about the same as the administration-departments correlation.

Nonetheless, in the general case the association of administration

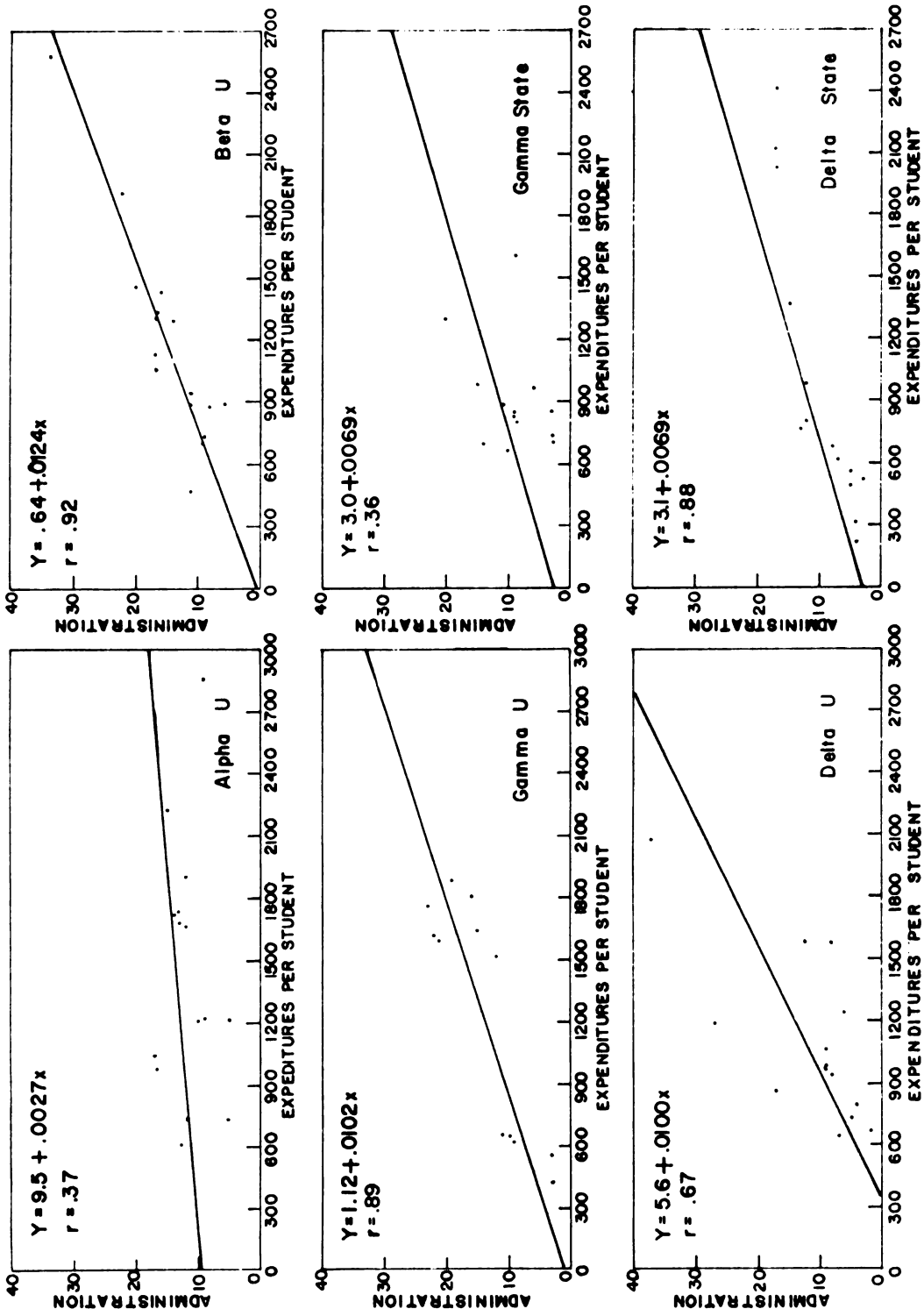


FIGURE 25

ADMINISTRATION AND EXPENDITURES PER STUDENT BY UNIVERSITY, 1900 – 1960

and expenditures does not demonstrate the strength of association which administration characteristically exhibits with faculty size, as a scattergram reveals (Figure 24). When correlations are computed across all six schools (Table 4, p. 76), the association between administration and expenditures is considerably lower than that between administration and faculty, but almost the same as between administration and departments. When a control for faculty size is imposed upon the administration-expenditures correlation it is greatly reduced, but not to the degree to which a control for faculty size decreases the administration-department correlation.

It should be remembered, however, that the measure of expenditures per student is derived from the least reliable data of all the variables, and therefore the foregoing discussion must be interpreted accordingly.

Administration size and mandate goals

The effect of the mandate under which these institutions have operated has been minimal in influencing the size of the administrative component. Tables 4 and 5 (pp. 76 and 79) show the six universities arranged according to mandate, with the combined, state university, and land grant institutions paired in that order.

In reviewing the correlations, fluctuations, and trends, no consistent pattern emerges in the relative expansion of the various growth factors when grouped by mandate type. The growth products of administration to faculty size, to number of departments, and to expenditures exhibit no commonality within mandate types.

In ordering the strength of association between variables through fluctuation analysis, it is evident that the two combined mandate schools

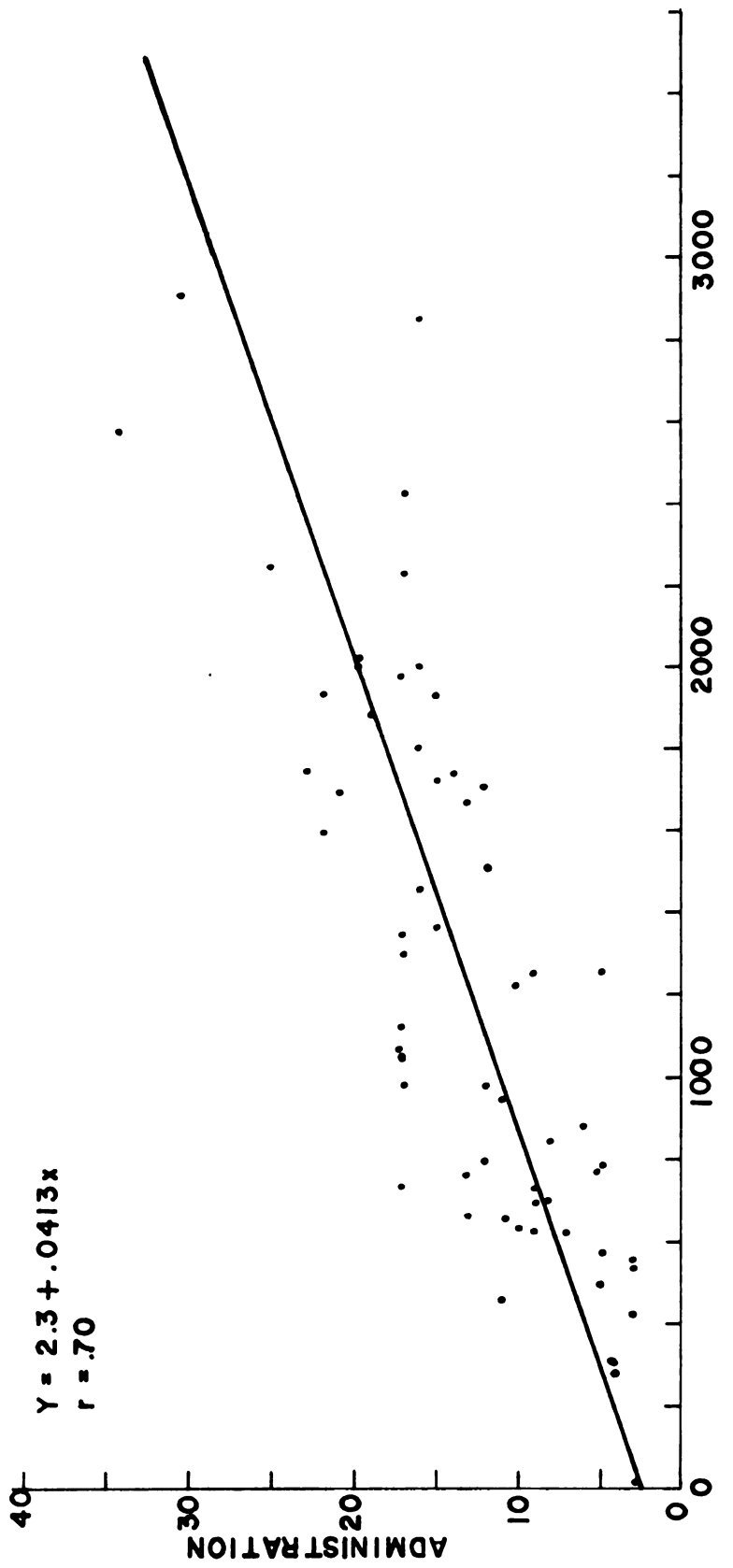


FIGURE 26

SCATTERGRAM OF ADMINISTRATION AND EXPENDITURES PER STUDENT, ALL UNIVERSITIES
1900 - 1960

do not demonstrate a strong relationship between administration and faculty size. But explanation for this requires separate analysis for each case. In one of these cases, Beta University, the pattern of association demonstrates a lag not evident in any of the other universities. In the other case, Alpha University, extent of association is blurred by an absence of data. Thus it is not necessarily the mandate type per se which explains the comparatively weak administration-faculty relationship in these two schools.

Administration size and external events

The effects of such events as depression and war appear to vary from institution to institution. But the most apparent trend is for any impact from such situations to be short term, representing aberrations from the basic trends. For example, the relative "bust and boom" of the late thirties and post World War II periods did little to influence directly the established trends.

Summary of materials concerning Proposition II

The second proposition maintains that the growth of administration is related more to organization (i.e., faculty) size than to complexity, expenditures, or mandate. Confirmation of this proposition involves the extent to which universities in this sample, individually and in concert, offer evidence to that effect in the differential association of administration with these several variables.

Analysis of fluctuations in trends indicates that in at least four of the six cases there is a tendency for changes in the rate of growth

of administration to directly parallel changes in faculty growth. In a fifth case, Beta University, there is also a clear relationship in which growth of administration lags behind that of faculty. Only Alpha eludes interpretation, due to the absence of data.

In no case do changes in number of departments parallel those in administration; in several cases a lag appears between administration and number of departments. It is difficult to understand what causal relationship may be operating here, since the purported effect of complexity increasing the A/F ratio clearly is not operating.

Fluctuations in expenditures tend to be extreme, and in only one case do fluctuations in expenditures correspond to changes in administration size with the regularity exhibited by other variables.

Correlation analysis does not create as clear a picture of the interrelation between variables as is produced by direct study of differential fluctuations between variables. The primary confusion appears in determining the relative significance of organization complexity and size. From the correlations of individual universities, no determination can be asserted with confidence. However, if the observations for all of them are combined, the results very clearly show a primacy of organization size over complexity, and complexity over expenditures.

No common pattern of association between variables emerges when they are categorized by mandate type. Also, the effect of external events is difficult to assess, since there are no criteria for their measurement or for determining their influence. Whatever influence is generated is indirect and somewhat ephemeral.

A Theoretical Context for Interpretation of Data

The problem of ordering the data from the longitudinal material disclosed the inadequacies of Proposition II in specifying what relationships might be expected, and why. The search for some logically sound theoretical statement which would aid data interpretation led to reviewing Durkheim's discussion of differential social structure in The Division of Labor (pp. 256-282). His formulations appear particularly applicable to the problem at hand, and can be paraphrased and extended to deal with the data here under study.

Durkheim argued that the division of labor within a society is primarily the consequence of certain attributes intrinsic to that society, rather than a response to various environmental characteristics, as he found Spencer to have maintained. Durkheim viewed the size, concentration, and interaction of a population to be determining elements in the degree of specialization represented by the division of labor within a society. Factors of environment, he noted, obviously leave their mark upon the differentiation of individual roles within society, but such things as "properties of the soil and climatic conditions" cannot explain the diversity of societal roles which seemingly have little relationship to simple sustenance functions. In essence, Durkheim proposed that environmental factors are necessary but not sufficient to an explanation of division of labor.

From Durkheim's theory of society-wide structure can be extrapolated principles pertinent to the order of organizations. Any specific organization can be conceptualized as analogous to a "society" in Durkheim's

discussion; the affairs of other organizations or of the larger society become analogous to events of the physical environment stressed by Spencer. To be consistent with Durkheim's proposition, it would be expected that intra-organizational characteristics are determined more by each other than by any external "environmental" factors.

To employ this perspective, the variables must first be categorized in terms of their identification either with the organization itself or with its environment. Certain factors of organization development can be categorized as largely environmental in their relationship to the institution. Spatially, the region in which the institution is located and the social milieu this manifests represent such environmental factors. Temporally, the economic cycles, war, and political fortunes present alterations of the environmental field in which an organization must operate.

on the other hand, the size of the organization itself, its longevity, the division of labor represented by the number of operating units, and the size of those units represent characteristics essentially indigenous to the organizations themselves, rather than arising directly from the external environment. And, in applying Durkheim's analysis, it would be argued that as a group, these internal organization factors will be more important in determining the nature of each other than will any external environmental factors.

There are other factors pertinent to the nature of organization, however, not so easily classified as internal or environmental. For example, the mandate under which the organization operates and the resources available to it for operating are conditions which are originally imposed

by the environment, but are internalized, shaping the goals and operating norms under which the organization functions.

At this point such factors may best be seen as "systemic linkages" between the organization and its environment. To be logically consistent with Durkheim's discussion, such factors might tentatively be seen as intermediate in their influence upon organization characteristics. They are not so influential as the internal aspects of the organization are upon each other, but they might be held to be more relevant to the internal characteristics than are those conditions categorized as environmental.

Summary: a proposed ordering of the research variables

From the above discussion of the properties of organization and environment based on Durkheim's formulation, substance is provided for revision of the growth factors proposition. Not only can expected strengths of association be ordered, but more importantly, a theoretically consistent rationale can be offered for that ordering.

It can now be argued that within a retinue of variables, organization size can be expected to be most associated with administration size not only because the literature offers empirical evidence to that effect, but because the size of an organization is very much intrinsic to its nature, offering as it does one definition of the boundaries of the organization.

The complexity of organizational structure, here represented by the number of academic departments in universities, represents at any given time the general dimensions of the division of labor given

organization size. As such, the size of administration would be expected to be more strongly associated with number of departments than with extra-organizational variables. Again this relationship can be postulated on the theoretical logic of Durkheim's statement, and not simply upon previous research which has simply recorded the tendency of complexity to be relevant to number of administrators.

In rethinking the research in terms of Durkheim's statement, it is clear that age as a research variable potentially involves two dimensions analogous to the two dimensions of age in the experience of humans: socialization and maturation. The socialization aspect is environmental, and is reflected in the longitudinal research by the social and economic events (e.g., wars, depressions, etc.) which characterize each observation period. The maturation aspect is internal to the organization; it is held constant in longitudinal research, since all six universities included began operation in the mid-nineteenth century. However, such maturation is reflected in the inclusion of founding dates as a variable for analysis of the cross-sectional sample data.

The ordering of age as an attribute internal or external to the organization depends upon which dimension--maturation or socialization--is at issue. As in humans, maturation is a constitutional factor necessary but not sufficient to the explanation of behavior; differential socialization experiences are reckoned as more significant to explanation of such behavior. Thus, although age in the maturational sense is intrinsic to the organization, its influence upon other attributes is not expected to be great. Age in terms of environmental experience

can be expected to demonstrate little effect on the basis of the ordering principle itself.

In its role as a linking factor between the organization structure and its environment, expenditures will be expected to display an association with administration size less evident than that of the latter with intra-organization factors. It would, however, play a more evident role than control variables imposed by the environment, such as the region of the country in which the institution is located (which is a part of the cross-sectional analysis) or events in time (evident from longitudinal analysis). Among control variables, the mandate of the universities would be expected to display a moderate effect upon relationships between such factors as organization size and administration, since the mandate represents another linkage factor.

In brief summary, if one accepts the paraphrasing of Durkheim's explanation of societal adaptation involving the structure of the organization itself as applicable to the above longitudinal data, the strength of association to administration size would involve the following order of variables: organization (faculty) size, number of departments, age, expenditures, mandate type, region, and social, economic, and political events.

Evidence from the longitudinal analysis tends to complement, if not confirm, the descriptive accuracy of Durkheim's statement. The two measures of organization size, number of faculty and enrollment, do tend to show a strong association with administration size; number of departments (i.e., complexity) appears somewhat less strongly associated with administration. Nonetheless, both faculty size and number of

departments, which represent intra-organizational variables, display stronger trends of association with administration size than does expenditures, a linkage variable. As noted earlier, it is unfortunate that the questionable accuracy of expenditure measurement leaves these findings far from conclusive. The significance of the other linkage factor, mandate type, and of external social changes and economic cycles, is still less evident from the data analysis.

Plainly, the ordering of factors studied in relation to administration size conforms to the explanation of societal development offered by Durkheim. Formulation of this outline occurred in the process of analyzing the longitudinal data and not as part of the proposition development prior to conduct of research. Therefore it would be inappropriate to argue that the data in any way represents a formal test of the above extrapolations from Durkheim's commentary; it is simply a matter of providing some explanation for the findings. The appropriateness of that explanation again becomes an issue in the analysis of cross-sectional data.

CHAPTER V

CROSS-SECTIONAL ANALYSIS

The Parameters of the Data

By achieving an almost total sampling of all American public four year colleges and universities, broad ranges of values were obtained among the organization variables researched. One way of describing the sample is to indicate these ranges for each variable.

Organization size

Enrollment Inclusion of two state-wide university systems with joint central administrations serving all their campuses extends the ranges for several variables. If only single campus (or main campus and branch adjunct) institutions are considered, enrollment ranges from 356 to 35,882. Inclusion of state-wide multi-campus university systems extends the upper limit to 44,816.

The sample is sharply skewed toward the lower enrollment limit. Table 6 indicates the distribution of enrollment size in three categories.

Table 6. Distribution of institutions by enrollment

Enrollment categories	Number of institutions	Percentage of total
0-4,999	244	71.6
5,000-14,999	61	21.4
15,000+	20	7.0

Faculty size The range of faculty size establishes a lower limit of 22 and an upper limit of 3689, with an upper limit for single campus institutions of 1631.

The association between faculty size and enrollment is very high, producing a correlation coefficient of .94. There is remarkable consistency in the correlation of these two variables among the two quite different samples used in this study and that used in Boland's research: all three produce this same correlation coefficient. Again it should be noted that enrollment and faculty size appear to be equivalent measures of organization size.

Incomes

The range of $306,000 to $153,700,000 among reported incomes of the sample institutions includes the state-wide university systems. When they are excluded, the upper limit is lowered to $80,299,000.

As might be expected, income data are not as readily available as some of the other data. Twenty-four institutions were dropped from the original sample of 285 because of an absence of income data. All but one of these are small teachers colleges; among these, all but four have an enrollment of less than 500. These exclusions should not bias the study results, however, since in all other respects the excluded institutions do not deviate significantly from the typical teachers colleges.

Mandate

Institutions in some phase of development from their establishment as teachers colleges form the majority of the sample, as noted in

Chapter Three (Table 2, p. 58).

Area

Institutions are fairly evenly distributed among regions of the nation, although the number of small southern colleges causes that category to be somewhat larger than the others.

Table 7. Distribution of institutions by region

Region	Number of institutions	Percentage of total
Northeast	67	23.51
South	99	34.74
Midwest	62	21.75
West	57	20.00
Totals	285	100.00

Age

The range of institution ages includes universities and colleges from two to 194 years of age. Most were founded between the Civil and the First World War.

Table 8. Distribution of institutions by period of founding

Period of founding	Number of institutions*	Percentage of total
1766 to 1864	55	19.30
1865 to 1914	201	70.53
1915 to 1945	19	6.67
1946 to 1960	9	3.16
Totals	284	99.66

*One case founded after 1960

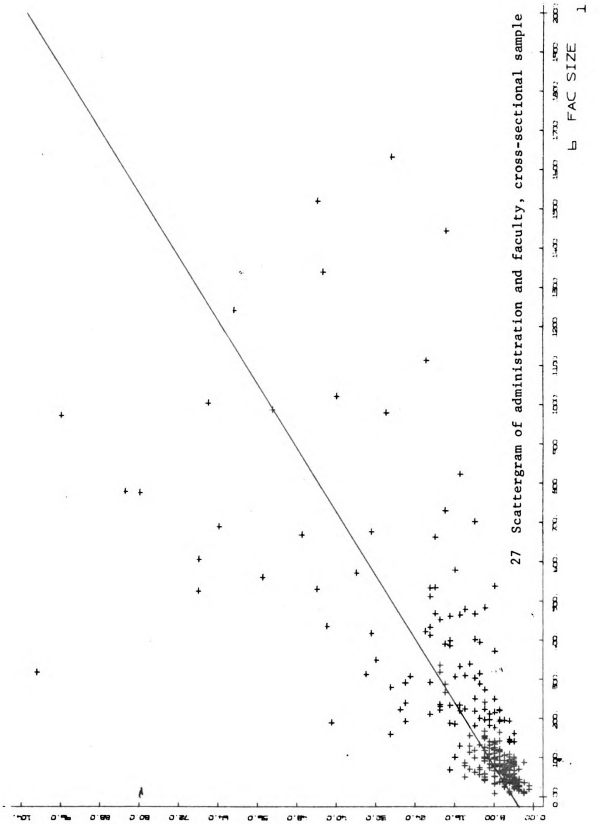
Administration size

The range in reported administration size extends from two to 254. There are several cases in which the ratio of administrators to faculty is so remarkably high that it seems reasonable to conclude that in some instances the enumerating instructions (p. 46) were interpreted quite idiosyncratically. For example, that institution which reported 254 administrators also reported 762 faculty. By contrast, another institution with 728 faculty reported 18 administrators.

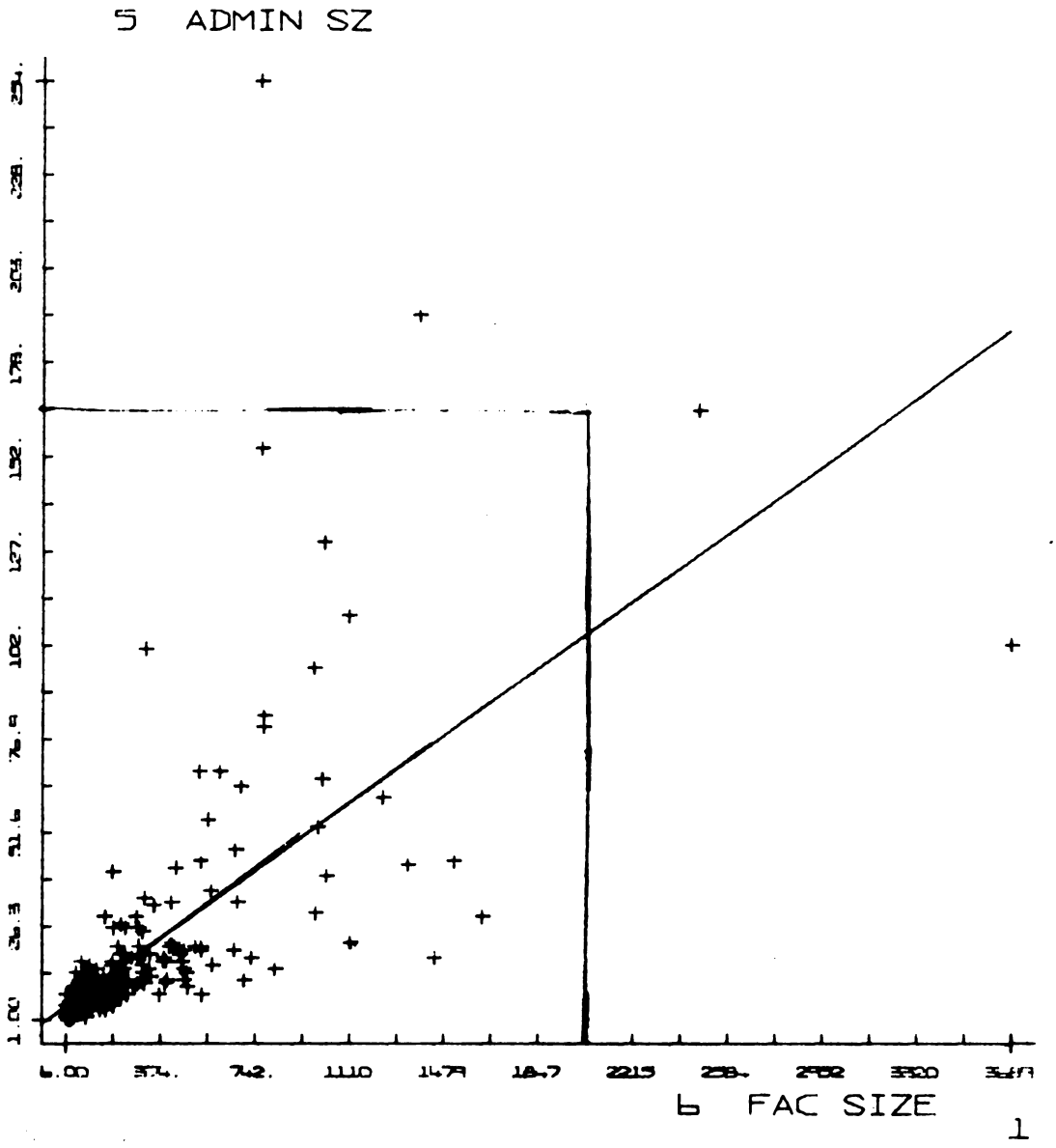
The Propositions

Proposition I: growth direction

Despite irregularities noted in the reporting of administration size, it is apparent that the trend is not for large universities to have disproportionately larger administrative components than those of small colleges. The plotting of administration and faculty indicates that the resulting slope of the regression line is less than 45 degrees, indicating less than a one-to-one expansion in the relationship of the variables. Within this sample, which includes almost all American public institutions of higher learning, administration represents a smaller proportion of the organization in large universities than in small universities and colleges. The relationship between the variables was obscured in the original scattergram (Figure 27) realized by the computer, due to the extreme clustering of cases of small institutions. To better display the plotting of administration and faculty, another scattergram was produced which deleted four extreme cases. The area included in Figure 27 is indicated on Figure 28.



27 Scattergram of administration and faculty, cross-sectional sample



28 Detail, scattergram of administration and faculty, cross-sectional sample

Another way of indicating what occurs in the proportionate relationship between administration and total organization size appears in the correlation between the A/F ratio and enrollment. That relationship is weak but negative (-.25). Thus, as enrollment increases, the proportion of administrators to faculty again is shown to be decreasing.

Proposition II: Growth factors

In addition to information regarding the direction of administrative component growth, the data reveal evidence concerning the influence of the research variables upon the administrative growth process.

Cursory examination seems to indicate that organization size and institutional income are related with similar degrees of strength to administration size. Simple Pearson correlations display correlations of administration with faculty size of .61, and with income of .59.

The age of the universities has little effect upon the size of administrative components; the correlation produced between the two is .27.

Performance of an analysis of covariance did not show any significant influence upon administration size by any of the variables except for organization size and mandate.

Table 9. Analysis of covariance

Source	SS	DF	MS	F	SIG
Total	196561.86	259			
Area	376.65	3	125.55	1	--
Mandate	5069.44	3	1689.81	3.62	.014
Faculty size	29518.89	1	29518.89	63.32	.0005
Error	117479.05	252	466.19		

The only disadvantage of the analysis of covariance for study of the research is the inability to display relative strengths of relationship. For example, there is no device by which the salience of mandate and/or faculty size in affecting administration size can be measured. It can only be said that greater confidence can be placed in the finding regarding the role of faculty size than regarding that of mandate. Such a statement can also be made in terms of the variables which did not display statistically significant relationships to administration size. The order in which they were deleted from the least squares equation was based upon the magnitude with which they failed to meet the criterion for statistical significance in relation to the dependent variable.

First to be dropped from the analysis were region and age. It may be said that these variables are least likely to be related to administration size; the probability of such relationship is not great. Last to be deleted from analysis before the .05 minimum significance criterion was achieved was income.

Summary of the cross-sectional findings

There is substantial evidence to indicate that institutions varied widely in their interpretation of instructions for enumeration of administrators, and by common sense observation, the tendency in many institutions seems to have been to enumerate as administrators personnel who were probably performing in clerical and other support functions. Nonetheless, even if such inflation of administration numbers is present, the

proposition that the ratio of administrators to organization size does not increase with organization size again appears to accurately describe the direction of relative growth between these two factors.

As originally stated, the growth factors proposition simply maintained that organization size is more important than other variables in influencing administrative component size. The cross-sectional study strongly confirms the importance of organization size as measured by number of faculty. But it also indicates a likelihood that the type of mandate under which the institution operates also contributes to determining administration size. Table 9 demonstrates a substantial range in the means of administration size within each mandate type.

Table 9. Mean administration component size by mandate type

Mandate type	Mean
State Universities	27.54
Land Grant	19.26
Combined Universities	27.61
Teachers College	13.58

At first glance it might appear that the smaller administrative components found in land grant and teachers colleges are related to their tendency to be smaller in size and to receive smaller appropriations than state universities and combined universities. However, it must be remembered that the separate effects of organization size and income are controlled in the analysis of covariance.

The presence of mandate type as well as organization size as a factor contributing to administration growth is most interesting given

the ordering principle appended to the growth factors proposition. It was suggested that the strength of relationship between administration and the several independent variables could be ordered from strong to weak by their position as internal, linking, or external to the organization structure.

Only two internal variables--age (maturation) and faculty size--appear in this phase of the study. As noted above, faculty size has been confirmed as a factor influencing administration size. However, age was quickly deleted from the analysis of covariance, and displayed a very weak correlation with administration (r=.21). But the expected direction of relationship between age and administration is positive; the older the institution, the larger the proportion of administrators. Since administration does not increase proportionately to the growth in size which accompanies aging of the institution, it is not surprising that the correlation of age and administration is almost negligible. And as noted earlier, although the maturation aspect of age tends to be positive, its influence is a constant, relatively neutral to the abiding experiences of an organization.

Inasmuch as the mandate types reflect prime organizational goals imposed by the environment, they represent a linkage factor between the organization and its environment. Thus it is not inconsistent with the ordering principle to find mandate types of some influence upon administration size.

Correspondingly, it is most instructive to note the order in which variables were deleted from the least squares equation for the analysis of covariance. The last variable deleted before the minimum significance

criterion was achieved was income, a linkage variable; among the first factors dropped were the region categories representing environment. Again a caveat is in order: the order of deletion of variables in the analysis can in no way be construed as reflecting the relative strength of relationship between these variables and administration size. What is displayed is the extent to which relationships are statistically significant.

In summary, analysis of the cross-sectional data further reasserts the counter-Parkinsonian theme which prevails in the organization literature. The importance of organization size to the size of the administration, another trend generally borne out by the literature, is also confirmed. However, a corollary is added noting that organization size may be modified in its influence by other factors. The weight of these factors is ordered according to their organizational position vis-a-vis administration. This ordering principle provides explanation for the significance of mandate type in relation to administration size, a finding of this research. Mandate type ranks among the research variables as next to organization size in theoretical proximity to administration size.

CHAPTER VI

CONCLUSIONS

Major Findings

In both longitudinal and cross-sectional phases, this study joins the ranks of those which indicate that the ratio of administrators to other organization personnel does not increase with increases in organization size. The longitudinal data displays not only such a diminution in the proportion of administrators to faculty as universities grow, but also reveals an historical propensity for smaller institutions to have relatively larger proportions of their organizations devoted to administration than is exhibited by larger universities. Size *per se*, as a structural endowment, influences administrative component development.

The cross-sectional materials also document a trend of proportionately smaller administrative components as institutions grow. As noted in the previous chapter, this pattern emerges despite apparent irregularities in the tabulation of variable values among the sample institutions.

Not only does administration demonstrate a growth rate less expansive than that of organization size; it is exactly that organization size which appears as particularly pervasive in association with changes in the number of administrators. Both the cross-sectional and longitudinal research substantiate the role of organization size in influencing the administrative component size. Moreover, they offer interesting

support for an ordering principle of organizational relationships.

Although faculty size appears as definitely related to administration growth, in each phase of the research it is accompanied by other variables in association with the dependent variable. In addition to organization size, the variables observed for association with administrative growth in the longitudinal study were number of departments, expenditures, mandate type, and changes in the larger social and economic environment. Of these, number of departments (i.e., the complexity of the organization's unit structure) accompanied faculty size as a significant contributor to administrative growth. Although the strong role of both these factors is readily apparent, the question of which exerts more influence upon administration size is difficult to answer, since the summation of findings from the six schools presents a somewhat blurred picture. In two institutions, faculty size is obviously most strong; in two others, complexity is most dominant; in yet another pair, these two factors appear equally influential. This ambiguity may arise from inaccuracies in data processing. On the other hand, this may very well reflect the intricacies of relationship between variables as noted in the literature. None of the other variables studied offer sufficient explanation for the arrangement of these pairs.

In the cross-sectional phase of research, the independent variables were faculty size, age, income, mandate type, and national region. Of these, faculty size was accompanied by mandate type as significant in association with administration size. The other variables did not appear as significant in their influence upon this relationship.

Theoretical Contributions of This Study

Review of the literature indicates a remarkable paucity of theoretical context for empirical materials. As noted in review, theory building has been devoted almost exclusively to models and analogies, with either little attention given to empirical research, or with reliance upon research of questionable relevance to the postulated theory. Almost all theory assayed and research conducted has been devoted to the direction of administration growth vis-a-vis that of the total organization. Although some factors have been discussed and researched in relation to that issue, very few attempts have been made to offer any theoretical explanation as to why particular variables might differ in their strength of association with administrative growth.

The implications of this problem did not materialize until after the propositions of this study had been formulated and research was under way. However, before any data had been analyzed, it became apparent that some theoretical constructs were mandatory before the data could be ordered. It was at that point that the relevance of Durkheim's discussion of the division of labor appeared significant: the expected salience of alternative independent variables could be ordered in terms of their immediacy to the internal structure of the organization itself. By that principle, the significance of faculty size is not only due to the mechanics of specialization, but to the intrinsic nature of size as defining organizational prerequisites.

The original growth factors proposition simply stated that faculty size alone would be associated with administration growth to a greater

degree than would any other factor. But the data from both the longitudinal and the cross-sectional portions of this study offered only partial confirmation of that original proposition: faculty size appeared as influential in both cases, but was accompanied by complexity in the one case, and mandate type in the other. These apparent aberrations from the expectations postulated by the original proposition become meaningful when the ordering principle extrapolated from Durkheim's Division of Labor is introduced.

There is an apparent inconsistency in the emergence of complexity in association with administration when, according to the literature, complexity is associated with the proliferation of administration rather than with its diminution, as appears in this research. However, the measure of complexity here employed is simply the number of academic departments within the organization. Administratively speaking, these are relatively homogeneous units, varying perhaps in degrees of autonomy, but not in the kinds of administrative burdens which they create. As such, they represent a modification upon size rather than a significant variety of structurally differentiated units to be administered. The same criticism could be leveled at the Hawley-Boland studies, which also used number of academic departments as a measure of complexity, and the Lindenfeld study which used number of schools per school district for that purpose. To tap organizational complexity, some measure reflecting different kinds of units (e.g., institutes, service components, etc.) within the organization must be employed.

In the present instance in which complexity refers to the number of undifferentiated units into which faculty are organized, it might be

expected that the direction of its influence would be the same as that of total faculty size, for such "complexity" simply represents a variation within the organization size dimension. Given the ordering principle of proximity to internal structure determining salience, it would be expected that this variable would be more closely associated with administrative size than would the other variables, which represent either linkage with the environment, or the environment itself.

In cross-sectional analysis, the two internal organization variables were faculty size and age. According to the ordering principle, these two factors might be expected to demonstrate particular effect upon administrative growth. However, as noted in Chapter 5, the failure of age to influence administrative size in this study may be due to its tendency in the general case to inflate that component. Since that is not the course of administrative growth revealed by this research, its influence is minimized. Of those factors linking the organization to its environment, mandate types are significantly related to administration size.

The point is that in each phase of the study, those factors most immediately adjacent to the administrative component were influential in association with changes in its growth. These findings suggest that organizations might be conceptualized in a manner similar to that employed by the "classical" school of human ecology propounded at the University of Chicago in the study of the urban community. Burgess and others spoke of the city as zoned in a pattern of concentric circles, each of which was characterized by specific patterns of social strata

and activities. Later, others adopted this "concentric circle theory" in plotting outward from the core of the city gradients of crime, mental illness, and other social phenomena.

An organization might also be mapped in a similar fashion, with the organization itself forming a core surrounded first by a concentric circle of systemic linkages and, in an outer circle, the larger environment. Variables could be placed within whichever of these three circles is appropriate; in some instances, it might be possible to order variables within each of the circles. For example, within the organization, factors dealing with the top executive hierarchy would be placed in the core; such attributes as productive activities would be placed closer to the rim of the circle. Within the systemic linkage zone which encircles the organization zone, the goals prescribed from the larger environment might be placed closer to the inner rim of the linkage zone, and adjacent to the inner (organization) circle. A gradient might be developed which would schematically predict the degree of relationship between variables associated not only with administrative growth, but with other factors of organization development as well.

Such an approach obviously bears similarity to some systems models which organize variables as inputs, processing factors, and outputs, positing certain relationships between the organization and its environment. It is usually the purpose of such models to describe the functions performed by the elements of such a system, often within the context of an equilibrium which requires a balancing of these elements in the accomplishment of the organizational goals. The approach suggested herein,

however, is more concerned with the strength of relationship between variables rather than with their functional interdependence. For example, one might, as Downs (1920) has done, discuss the "functions" of the organization's age in contributing to the dominance of its administration; an appreciable further contribution will be made when it can be determined just how salient such a contribution is relative to that of other factors.

The plotting of the variables as described here in order to indicate their strength of relationship to one another may superficially resemble the hierarchical arrangement of organization roles on an organization chart. The difference is in both form and purpose: the plotting suggested here is more inclusive, indicating goals, norms, succession patterns, technological development, etc.

The present study suggests the outlines for the three zones (internal organization, systemic linkage, and environment) and indicates some relationships of variables within each zone to administrative growth. Further steps would involve specification of more factors ordered within each zone, and the interaction of variables of differing saliency in other organizational phenomena than administrative development.

In describing the time period of the longitudinal analysis, it was noted that the 1960 termination date for observations provided an unanticipated advantage, since during the following decade the organizational structures of universities became extremely complex, decentralized, and diffused into a wide variety of seemingly disparate activities. It was noted at that point that such organizational proliferation, also apparent in emergence of the conglomerate business firm, poses a special

problem for analyses such as this and other research cited in the literature which ispredicated upon a unitary conceptualization of organization structure. The conglomerate is becoming an abiding form of organization: obviously some means of delineating its boundaries, as well as structures of authority, norms, goals, and personnel must be accomplished before many of the contemporary issues of organization structure and behavior can be further explicated.

Perhaps the tentative mapping of the organization described above may be modified in the case of the multiversity or the conglomerate by superimposing a "cluster" motif. Such clusters might represent the various structural facets of the organization, much as the various neighborhoods and other activity centers of the urban areas were understood to require a revision of the "concentric zone" concept.

Such a suggested mapping may seem a primitive device for analysis of complex organizations. However, it may have considerable heuristic value in setting the scene for further study. The urban mappings proposed by Burgess and others proved overly simplistic and inadequate in many other regards, and have been largely discarded for research, if not pedagogical, purposes. But it was exactly the disclosure of these inadequacies which led to a sharper sense of urban structure. Analysis of formal organizations may be furthered by following a similar course.

Methodological Contributions

One of the intended purposes of this study was the comparison of results obtained through cross-sectional vis-a-vis longitudinal research. The issue of the comparability of results from these two methods has

been raised in the past as specifically relevant to study of organization growth patterns. Haire (1959, p. 292) has maintained that cross-sectional studies posit "spurious growth curves." This research has focused upon the question raised in response to Haire's contention: spurious or not, does the cross-sectional method yield results appreciably different from those produced by a longitudinal design?

Since the results of the two portions of this research display a certain consistency, it could be argued that there is some evidence for concluding that the growth processes in question are not distorted through the cross-sectional approach. However, such evidence is hardly conclusive. For one thing, the variable lists employed in each phase were slightly different; for another, differences in processing procedures demanded by the quite unique natures of the two techniques obscure the comparability of their resulting data.

Use of the two approaches afforded an unanticipated advantage in that problems presented by the data in the first phase of the research suggested explanations which could be further investigated in the second phase, while in no way biasing the conduct of that portion of the research.

This is not to suggest that the longitudinal phase served as a "pilot study" for the cross-sectional phase. In such a procedure, the results of the first or pilot study are intentionally employed in shaping the design and methodology of the second or principle aspect of the research. To have followed that design would have eliminated the opportunity to compare results produced by each approach independent of the other.

Substantive Contributions

The review of literature noted an absence of empirical studies of universities and colleges as formal organizations, particularly with reference to the issue of administrative growth. The Hawley-Boland studies and the Entwisle and Walton article are the only predecessors touching directly on this issue. Therefore, the findings of this study serve as a contribution to basic research forming a body of literature devoted to institutions of higher education as organizations.

It must again be noted that such institutions in this study were intended to represent the larger class of formal organizations of which they are a part. Thus it is that this study should be appraised more in terms of the discussion of administration growth and its concomitants in the larger case, rather than in terms of the specific issue of university and college development.

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