COMMUNICATION PATTERNS AND ADMINISTRATIVE EVALUATION OF PROFESSIONALS WITHIN AN ACADEMIC RESEARCH ORGANIZATION

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ABSTRACT

COMMUNICATION PATTERNS AND ADMINISTRATIVE
EVALUATION OF PROFESSIONALS WITHIN
AN ACADEMIC RESEARCH ORGANIZATION

by Robert Louis Crom

This was a study of 103 researchers and their 21 department heads in an academic research organization within a major university. The intent was (1) to test hypotheses suggested in part by generalizations and a model based on scattered previous research done with scientists in a range of organizational contexts and (2) to explore and describe certain perceptions, attitudes and practices relevant to the role of departmental chairman. Variables central to the focus of both aspects of the study were frequency of communication by and between the researcher and the department head and the evaluation of the researcher.

The hypothesized positive relationship between frequency of communication between the researcher and his department head and the perceived research competence of the researcher was confirmed by data from department heads but not supported by data collected from researchers. An hypothesis positing significantly greater frequency of communication about research between a researcher and his colleagues (i.e. immediate others) located within the same department as compared to those located in different departments was not supported for the first named "immediate other" but was supported for the four "immediate others" subsequently named.

Hypotheses predicting relationships (1) between researcher-department head consensus about "significant others" and evaluation of the researcher, (2) frequency of communication by the researcher with the head and evaluation of the researcher, (3) frequency of communication with clients and peers outside of the department and frequency of publication, and (4) perceived research competence and frequency of communication with the head by the researcher were not confirmed.

In personal interviews with the department heads, thirteen general criteria for evaluating the research efforts of their staff members were identified. Productivity, number and/or quality of publications and quality of research were most often named and most heavily weighted. Contrary to generalizations in some of the current literature, the data indicated most department heads in the sample made a distinction between professional and popular publications and most consider quality of the articles and journals in the evaluation process.

Three major sources of information relevant to evaluation of the staff member were identified. However, the frequency of use of those sources varied depending on whether the research or non-research efforts (i.e. teaching and extension) were being evaluated. While the department head himself, through first-hand observations and judgements, was a most frequent source in both instances, colleagues more frequently played a role than clients in evaluating research efforts while clients more frequently played a role than

colleagues in evaluating the non-research responsibilities of the staff member.

Individual researchers were seen by department heads as being the major determiners of the research emphasis within the department. The heads perceived themselves and funding agencies as ranking next in importance as influencers of direction of the departmental research program with clients and administrative superiors ranking well down the line. Departmental staff members, particularly those perceived as most competent by the head and those of senior rank, were reported to have considerable voice and influence in making departmental policy and administrative decisions as well.

As major stimulators of productivity among researchers, department heads saw (1) a continuing challenge in the researchers' work, (2) peer recognition and (3) autonomy as being among, or perhaps, the most important. Advancements in salary, recognition by administrators, recognition by laymen, and job security were seen as being of less, if of any, importance.

COMMUNICATION PATTERNS AND ADMINISTRATIVE EVALUATION OF PROFESSIONALS WITHIN AN ACADEMIC RESEARCH ORGANIZATION

by

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CHAPTER I. INTRODUCTION

Contemporary scientific accomplishments are more and more frequently the result of coordinated and collective effort. Thus, the efficiency and effectiveness with which future scientific endeavors meet the needs of our society increasingly will depend on the conduciveness of the scientist's organizational environment, i.e. the people and the resources surrounding him. Yet, as Gordon (1963, p. 196) points out, "relatively little of factual nature is known concerning the effect of the increasingly complex personal and institutional structure within which research is conducted on the nature and quality of scientific work."

Recognition of the significance of communication processes to this area of interest is recognized. Science (Cottrell, 1962, p. 389; de Grazia, 1962, p. 34; Merton, 1957, p. 312) and complex formal organizations (Barnard, 1938; Shepard, 1954) are both social systems which could not produce, or even exist, without the coordination of activity and sharing of information through the symbolic processes. Thompson and McEwen (1958) conceptualize the integration of organizations within the larger society as essentially an interaction process based on mutual interdependence. Such a conceptualization emphasizes the significance of communication between the formal organization, as an entity, and the individuals and groups in its constituency.

Murray (1965) has comprehensively described the existing empirical evidence relating to the general area of science and communication as falling into six categories: (1) the nature of, and

conditions surrounding, scientific creativity, (2) general studies of scientists, their work and environment, some of which document the nature of the scientist role, (3) scientists' use of information sources, the adequacy and function of the existing information channels and problems of storage and retrieval, (4) computers, systems analysis and information theory, as applicable to science information, (5) diffusion of innovations, including the dissemination of scientific information to nonscientists, and (6) the scientific process in specific organizational settings.

The primary focus of this study falls within the last category. More specifically, data collected from scientists and administrators within a functioning research organization is used to test hypothesized relationships in four areas:

1. Between evaluation of the researcher and the degree of agreement between the researcher and his administrative supervisor concerning the constituency of primary importance

2. Between perceived professional research competence and the development of interpersonal communication patterns between the researcher and his administrative supervisor

3. Between frequency of publication of researchers and certain interpersonal communication patterns

4. Between patterns of interpersonal communication and organizational location, i.e. structure.

Less empirical work has been done in academic settings than in industrial and governmental ones (e.g. Barber and Hirsch, 1962, pp. 644-6). Substantial consensus supports the notion that the principles of industrial research productivity are not the same as those applicable to academic scientific productivity (Gordon,

Marquis, and Anderson, 1962; Kornhauser, 1962; Whyte, 1956). Some of those having done empirical analysis of the academic community (Caplow and McGee, 1958; Wilson, 1942, p. 7) emphasize the "astonishing" lack of systematic knowledge about institutions having intellectual activity as their primary function. Study of these institutions would appear to be of increased importance in light of the growing pressures for internal structural adjustments (Kidd, 1962) and greater emphasis on interdisciplinary research resulting from the changing social and economic demands of the constituencies of academic institutions in the United States today.

In addition to testing of hypotheses in the four areas previously mentioned, this study is intended to be of sufficient scope to furnish pilot information of use in designing further studies of science-related communication behaviors within similar academic settings. Particular attention is paid to the source-receiver aspects of the departmental chairman role.

Relevant Studies

Although empirical interest in scientific accomplishment and social organization can be traced back to 1935, over half of the relevant studies have been published since 1956 (Folger and Gordon, 1962). Many of these are surveys or relatively broad pilot studies aimed at defining fruitful areas for further research. Few have a theoretic orientation. Many of the conclusions drawn are not of the kind having a specified level of statistical significance. Nevertheless, several of these studies do make contributions to a foundation of knowledge on which to build and suggest several areas in need of further study.

General findings and conclusions

From four studies, two of which involve substantial numbers of academic or research personnel, come findings of a general nature but of basic relevance to this study.

With the aim of increasing knowledge of the functioning of a large organization devoted to scientific endeavor, Pelz, Mellinger and Davis (1953) studied approximately two and a half thousand employees of the National Institutes of Health. Among the findings in the five major focal areas are two of particular relevance within the area of interpersonal colleague relations and scientist-administrator relations as related to scientific performance: (1) interpersonal contacts were found to be regarded as more important than "hearing papers" and (2) individual autonomy of the scientist was found to be positively related to high performance.

In their study of interpersonal communication in a university setting Goetzinger and Valentine (1962) found that oral communication was easily the predominant form, constituting 80 percent of the total, with the modal conversation being dyadic in nature and brief in length.

Bernard, Shilling and Tyson (1963) studied the "informal communication practices" (i.e. face-to-face and correspondence) of 673 bioscientists in 64 laboratories of varying types. Although significance levels were not stated, an association between informal communication and productivity was reported. They also found a positive association between age and productivity to a point, i.e. the average number of papers given by those who wrote papers rose through age 40 and then leveled off. In their

comparison of communication networks by sex they reported no major differences.

In a subsequent study of the same data Bernard et al (1964) grouped the 64 laboratories into (1) subject matter disciplines and (2) types of labs, i.e. industrial, private, university, public university, government and private research institutes. They found more differences between types than between disciplines with the latter proving not to differentiate the labs with respect to interpersonal communication behavior, productivity, or communication efficiency. However, they did find that certain administrative policies, e.g. unrestricted use of long distance calls and reimbursement for travel expenses to meetings regardless of whether scientists presented papers, were positively associated with both productivity and efficiency. Also reported, at an unspecified level of significance, was a positive correlation between research discussion group participation and three indices of publication productivity when comparing organizational unit productivity on the basis of communicative behavior of unit members. The finding of a negative correlation between participation in a group project and all measures of publication and efficiency led Bernard et al (1964, p. 62) to conclude a lone worker is generally a better producer of publications than the group project worker.

Menzel (1958) studied, and reported in detail, the information exchanging behaviors of 77 biochemists, chemists, and zoologists as a step toward identifying all channels through which scientists share information. In elaborating on his conclusion that

person-to-person communication of an informal sort was of great importance among scientists he concludes:

> What is desirable is . . . the wise and discriminating promotion of personal communication between scientists in certain positions, on the occasions which are most suitable to the fulfillment of those communication functions which most urgently require face-to-face contact. What those positions, occasions, and functions are is not known. The only recommendation possible at present is to undertake empirical inquiries to find out. (Menzel, 1958, p. 172)

Administrative evaluation of the researcher

The literature reveals a disproportionately small number of studies on many aspects of academic institutions (Gustad, 1962) of which the evaluation of professional academic personnel is one. Caplow and McGee (1958, p. 83) maintain the evaluation of academic performance is based "almost exclusively" on scholarly publication as evidence of research activity. Lampan (1956, p. 70), Morse (1959) and Wilson (1942, p. 190) furnish some support for this notion. Wilson (1942, p. 103) suggests that the main burden of staff evaluation, whatever the basis, rests upon administrative officers almost exclusively. Glaser (1963, p. 253) appears to reinforce both the conclusions concerning (1) the importance of the immediate supervisor and (2) the primary role of publications in the evaluation process.

Building on Turner's (1956) theoretical notion that an actor (e.g. a scientist) may "play to" or attend to various audiences (i.e. significant others) according to the relative importance of the evaluation of that audience to him, Couch and Murray (1964) studied the relationship of evaluation by administrators and the

kinds of significant others reported by agricultural extension workers, county extension agents, and elementary school teachers. Contrary to the common assumption that actors "playing to" their evaluators (i.e. administrators) would be highly evaluated, Couch and Murray found this was not the case for either the teachers or the extension specialists. The assumption was concluded to be only partially true for the agents, i.e. agents who indicated both clients and administrators as their significant others tended to have higher salary increments. In fact, specialists who selected department heads as their highly significant "audience" tended to receive low evaluations. On the basis of these findings, Couch and Murray suggest the hypothesis that "under conditions of low surveillance and high flexibility of role, evaluation of the actor will depend on the degree of correspondence between the actor's orientation to others and his evaluator's expectations." The essence of this hypothesis, applied to researchers, is proposed for test in this study.

Murray (1965), in a subsequent study of scientists found a significant negative association between age, time from doctoral degree, and length of time at the university and high evaluation by administrators as measured by percentage of salary increments. However, the relationship between a significant-other peer-orientation, of scientists, and administrative evaluation was not significant.

Scientist-supervisor interdependence

The relationship between the scientist and his supervisor has been concluded to be strategic to the success of both (Glaser, 1964).

The supervisor, e.g. department chairman, is seen as important to the researcher's career because of the supervisor's involvement in evaluation, facilities procurement, protection, support and sponsorship. Reciprocally the researcher and his successes are important to the supervisor's professional achievement. Glaser performed secondary analysis on data collected from 332 medical researchers employed in a large government research organization described as being similar in environment to that of a university. From that analysis, he suggests, but does not actually test, the hypothesis that socially recognized research competence is a key variable which influences the patterns and frequency of interpersonal communication between the scientist and his supervisor when both are engaged in basic research. Using crude indices from the existing data, he was able to demonstrate some support for the validity of his model. He found that more scientists with recognition were influenced with respect to work-related activities (18 percent) and that it was those scientists who exerted greatest influence on supervisors. Glaser (1964) concluded there is a causal relationship between, at least, an average degree of recognition and high performance as judged by the researchers' close professional colleagues.

Certain other studies of organization would appear to lend support to the notion of "reciprocity" in the scientist-supervisor relationship as proposed by Glaser. Pelz (1951) and Blau (1954) drew similar conclusions about the positive relationships between (1) acceptance and "help toward goal achievement" and (2) perceived competence and interaction. Jackson (1959), who studied

organizational communication in business offices and a social welfare agency using a reference group approach, also drew conclusions compatible with Glaser's reciprocity hypothesis.

Effects of organizational structure on communication patterns

Of concern in this study is further understanding of the influences exerted on scientists' interpersonal communication patterns by the formal structure of the complex organization in which he works. A few studies and much theorizing have been focused on the academic department. Millet (1962, pp. 82-89), for example, views it as the primary unit with which the faculty member identifies. Storer (1964, p. 4) has interpreted his findings, and those of others, to suggest that departmental lines exert relatively little influence on social interaction and that "patterns of communications among scientists do not ordinarily coincide with the boundaries of these organizations, but cross them almost as freely as if they do not exist."

Stogdill (1955), although not studying scientists, concluded that "interactions in an operating organization are very complex in structure. . . (and) are affected by many factors. . . (including) the formal structure of the organization."

Communication patterns and productivity

The relationship of various patterns of interpersonal communication to productivity has been of major interest in several studies done within the last ten years. Of particular interest are those which have included in their focus the publication dimension of scientific productivity.

Of continuing interest in several subsequent studies was an early finding reported by Pelz (1956) that medical scientists working in a government research context similar to that of a university tended to perform most productively when they could have frequent contact with one individual of similar orientation to their own but otherwise to be associated with colleagues having a variety of values, experiences, and disciplines and working under supervisors who provided frequent stimulation along with autonomy of action.

Pelz and Andrews (1961, p. 178) studied the kinds of "dissimilarities" among interacting university doctorals which were associated with the output of papers, reports and patents. They found a negative relationship between such output by individual scientists and dissimilarity of experience among his colleagues, e.g. industrial, government, university.

Further study by these researchers also revealed that mean frequency of interpersonal contact reflected more consistent productivity effects than amount of interaction. They also found that certain kinds of publication productivity, e.g. output of papers, related positively to frequency of communication for doctorals but not for non-doctorals and that output of certain kinds, e.g. reports, showed a positive but erratic relationship to interpersonal communicative behavior.

Although they found associations between frequency of face-to-face communication and publication productivity within organizational units, Bernard et al (1964) found the percentage of individuals within the unit indulging in this type of exchange did not regularly

correlate with productivity. Concerning the positive correlation found they suggest:

> It would not be legitimate to infer that there is a causal relationship between informal (person-to-person) communication and productivity, despite the general correlation between them. Scientific productivity is far too complex a phenomenon to be explained in terms of any one set of variables. Both productivity and informal communication undoubtedly reflect the operation of many other forces converging to produce (these) results... (p. 26)

Murray (1965) found that researchers with a peer-orientation, i.e. those reporting a majority of fellow scientists among the five persons most frequently talked to about research, published less frequently than researchers with nonpeer-orientations. It is of further interest to note, with this relationship to publication output, that this same peer-orientation was positively related to percentage of salary increment.

Building on the work of Pelz and Glaser, Hawkins (1964) developed an "index of diversity" of face-to-face contact on the basis of nine categories of professional interests and background, e.g. administrators, commercial researchers, extension men, etc. He found scientists having high frequency of contact with individuals from several of the nine categories produced significantly more publications for lay audiences than did scientists with low frequency contact with individuals from fewer of the nine categories. However, "diversity of contact" appeared to have no appreciable influence on professional publications. In light of this evidence and his findings that appeared to support Glaser's (1963) notion that both local and cosmopolitan dimensions may be found within a single personality, Hawkins concluded that "the productivity of

each (i.e. lay and professional) publication may be activated at the appropriate time and place as determined by the organizational structure within which he works." In addition to reporting evidence that appears to further support Glaser's notion, Murray (1965) suggests his findings provide evidence that scientific effort does not occur in a social vacuum but in a social setting which effects the individual's behavioral expression.

Theoretical Context

A growing number of contemporary theorists suggest the need to implement interdisciplinary approaches to the study of complex formal organizations. Blau (1957), Etzioni (1961b), Golembiewski (1962) and March and Simon (1958) are among those taking the position that any appreciable advancement in our understanding of this type of social system is heavily dependent on the integration of theory and what we have learned about individual and social behavior from the several disciplines and theoretical "schools"--sociology, psychology, social psychology, anthropology, political science, economics, etc.

In keeping with this position, a somewhat eclectic theoretical framework has been chosen for this study.

The various theoretic traditions which can be traced to the work of George Herbert Mead (Kuhn, 1964) incorporate the notion that man is a social being--the product of his interactions with other social beings. Blumer (1962) suggests that structural features--"social systems"--shape situations in which people act. Gross, Mason and McEachern (1958, p. 38) describe the development

of this theoretic vein and suggest implications for its applicability for studies dealing with both individual and organizational variables:

> That human behavior is in part a function of the actions and reactions of other members of the multiple social systems, in which the individual lives and behaves, and that it is influenced by normative or evaluative standards, are basic notions of sociology and anthropology. The diffusion of these ideas found in the writings of such men as Cooley, Mead, Thomas and Znaniecki, Sapir and Linton into psychology was greatly facilitated by the research and writings of such psychologists as Lewin, Piaget, Sherif and Newcomb. The formulations they proposed for examining the phenomena of personality and individual behavior included explicity or implicitly the ideas of social structure and culture. They recognized that extra-personal influences had to be taken into account. These psychologists were influential in pointing out the importance for many problems of treating the actions of an individual as <u>interactions</u>, that the 'social self' was largely derivative of the history of interactions of the individual, and that human behavior is influenced by the 'norms' of the society and the groups of which the individual is a member.

Therefore, as participants in a complex formal organization scientists are, in part, products of their interactions with the (relevant) others with which this academic social system puts them in contact through its structure of social positions (Berlo, 1960, pp. 133-167), its recruitment and organizational policies (Etzioni, 1961a, pp. 151-160), departmental norms, etc. Blau (1960, p. 190) emphasizes the relationship of the effectiveness of communication networks within the organization and the enforcement of such norms.

Thus, an orientation emphasizing the centrality of social interaction appears to be most appropriate and useful for the study

of the patterns of exchange of information among scientists and among scientists and administrators as organizational participants.

Environment and awareness

The ecological considerations of social behavior are central to the work of Mead and those who have further developed his theoretical position (Coutu, 1949; Hickman and Kuhn, 1956). The individual is in a setting and the setting is constituted by a whole variety of objects. Although Mead's position is that the environment is partially constituted by what the individual selects out of it and becomes aware of, we can logically conclude that the probability of selection by the individual at any given time is, in part, a function of organizational influences or activities within that physical environment. Thus a scientist's opportunity to engage, for example, "intellectual greats" in his day-to-day social environment may depend to a considerable degree on organizational variables.

Social system and role

The social system, i.e. the agricultural experiment station, can be viewed as suggested by Waisanen (1963) as a "collectivity in organized pursuit of consensually held goals." Within that system is a matrix of interrelated positions or social locations (Gross et al, 1958). These positions are filled by actors who perform roles.

The concept of role is seen as a set of evaluative standards applied to an incumbent of a particular position. In other words, it's a set of behaviors expected of the holder of a particular

position within the social system--regardless who that individual might be (Newcomb, 1951). These behaviors can only be defined in terms of a reciprocal role--the holder of which would be a relevant other (Turner, 1962).

Levinson (1959) advances the notion that the concept of role is appropriate for study of formal organizations in that it takes into account the thoughts and actions of the individuals and, at the same time, recognizes the influences upon the individual of "socially patterned demands and standardizing forces."

Role, then, is the normative element of social behavior with individuals influenced in varying degrees by the expectations of those with whom they interact or perceive as important and as having surveillance or potential surveillance of their behavior. Parsons (1951, p. 40) suggests the degree of influence may be a function of at least two variables: (1) the extent of agreement between the actor and a given "other" on what the role is about and (2) how important it is to the actor to be perceived as doing a good job in the particular role in relation to other roles which he plays.

Self, "immediate" and "significant" others

Sarbin (1954) deals with this "repertoire of roles" which the individual can play, or has played, in the concept of the self. The relative salience of the respective roles and stability of this repertoire, allowing for the notion of process, vary through time and with situations. How one conceives self in a particular role, i.e. his own expectations, exerts an important influence on his performance of a particular role.

A closely related factor, which may determine how greatly the individual is influenced by the expectations of those with whom he frequently interacts (i.e. immediate others), is the audience to which he is playing, so to speak. Turner (1956) introduces the notion that the actor's perception of who's watching and the importance of their evaluation to him accounts for differences in his role performance. Those regarded as important, and whose expectations are most influential on the actor, are called "significant others." Some of these may be others with whom he does not share a role relationship, i.e. some, but not necessarily all, of the significant others will be relevant others.

Sanctions

An actor's deviation or conformity to expectations to relevant others may stimulate sanctions, i.e. either disapproval or approval. These sanctions in symbolic forms, as well as economic, constitute cues for the actor. If he feels the sanctions, or threats of sanctions, are important enough, due to the significance of the other or the saliency of the role or both, they may cause him to adjust his role performance. Through extended interaction and cues from relevant others, performers increasingly get a more accurate perception of the role behaviors expected by the relevant others involved. These cues may also cause him to alter his self-concept and role expectations.

Homans (1950) suggests that the more frequently individuals interact with each other the more nearly alike they become in the norms and expectations they hold. However, Newcomb (1953) would

make such a prediction only when prior personal orientation between the interactors was positive.

Significant others and evaluation

When role performers, i.e. scientists, within a hierarchically structured social system select the audience to which they will play, their significant others, among their alternatives are (1) peers, (2) superiors, (3) subordinates, or (4) some combination of two or more. Because complete congruence of expectations seldom, if ever, exists for the holder of a focal position (Parsons, 1951, p. 39), whose expectations he elects to be influenced by may make a difference in the way he's evaluated within the organization (Couch and Murray, 1964).

Hypotheses and Rationale

The role of an administrator within a given social system involves his assuming responsibility for using the material and human resources under his supervision to accomplish certain organizational goals. His perception of those goals becomes a primary determinant of the kind of role behavior expectations, i.e. the evaluative criteria, he develops for those reporting to him. Among the most observable behaviors of the academic scientist is his selection of problems on which to work and the primary "audiences" served by the results of that work.

From the perspective of the scientist, who by tradition within the social system of science has a high degree of autonomy in his role, the persons or groups (i.e. audiences) seen as "watching" and as important (i.e. significant others) exert a primary influence

on his selection of problems on which to work as well as his selection of audiences to which to communicate his results.

Hypothesis 1: Department heads evaluate most highly those researchers who hold as "significant others" those persons or groups which the department head believes should influence the researcher most.

Our theoretic orientation, as earlier described, embraces the assumption that the social system (i.e. the experiment station) being studied is devoted to the pursuit of some consensually held goals. We would further assume that evaluation of the scientist by his peers and colleagues within the system would, in general, be made on the basis of the peers' or colleagues' perceptions of those goals. Given that an individual's high research competence is consensually recognized by his peers and colleagues within the organization and so perceived by the department head, it would seem logical that the frequency of his communication with the head would be higher than that of a department member of less recognized competence. Basic to this hypothesized relationship is the concept of mutual benefit and reciprocity between the scientist and his administrative supervisor as discussed by Glaser (1963-4). Some empirical support has been found for the notion that organizational participants tend to communicate with those whom they perceive as being able to help accomplish goals of importance to the initiator.

The scientist's professional success is to some degree dependent upon the social and economic support of his department head. Assuming that perception of his competence by peers is to some degree a function of actual professional performance, our theory would lead us to conclude that greater frequency of communication

is desirable from the scientist's perspective in that it should result in greater agreement within the dyad concerning the scientist's needs, problems, etc. Out of this agreement should come greater success in competing for resources on the part of the researcher.

The department head's success in his professional role is largely dependent upon accomplishment of certain organizational objectives or goals as was suggested earlier. If for no other reason, the scientist recognized as an outstanding researcher by colleagues in the organization becomes a desirable person to communicate with because (1) his recognition gives him added power or influence within the structure of the system and (2) whatever experience and successful performance underly the recognition granted him represents a higher potential for valuable counsel to the department head than the scientist with less recognized success in his research endeavors.

Hypothesis 2: Department heads and those researchers recognized as highly competent by organizational peers develop more frequently used communication linkages than are developed between those department heads and scientists of less recognized competence.

Among the concomitants of more frequent communication between a researcher and his department head are implications relevant to evaluation of the scientist in his professional role. Recognizing that the evaluative process is a highly complex one involving many variables, it is not the intent to suggest a primary causal relationship. Instead, a possible rationale is suggested for frequency of communication by the researcher with his department head being positively associated with and partially a function of his evaluation.

Jackson (1959b) suggests (1) people communicate or avoid communication in order to achieve goals, satisfy needs, and/or to improve their situation and (2) that they tend to communicate with those they perceive as being able to help them and avoid communicating with those who may retard them. If accepted, these premises provide a basis for drawing the inference that researchers who report communicating frequently with department heads probably perceive them positively, i.e. as having the potential to help achieve professional goals. Although this report says nothing directly about how the department head perceives the researcher, it seems reasonable to infer that over an extended period of time, in an organization such as we're studying, the fact that the department head was accessible for such communication provides some justification for drawing the inference that his orientation toward that particular researcher was more likely to be positive than negative. Given the validity of these inferences, Newcomb's theory would suggest that frequent communication within this dyad should result in greater accuracy of perception of (1) expectations about role behavior, (2) symbolic sanctions, and (3) work related values. Accompanying these, we would expect to find increased understanding by the department head of the work and results of the scientist. These in turn should be accompanied by a positive influence on evaluation of the researcher:

Hypothesis 3: Researchers who frequently communicate with their department head are more highly evaluated than those who communicate with him less frequently.

The Meadian orientation suggests that the psychological environment of the individual and his resultant behavior is in large part a function of those with whom he interacts. Thus, the scientist who most frequently communicates about his research with colleagues within his own department might be expected to display different publication behavior than one who communicates most frequently with academic colleagues and clients outside of his department in the organization. The latter might be expected to encounter and become aware of problems of greater diversity, including more of those of an applied nature, and having interest to a greater number of audiences. The former might become aware of an equal number of problems but of a more specialized nature and of concern to audiences more limited in number and more homogeneous in nature. Thus, we would expect the frequency of publication to be related to these patterns.

Hypothesis 4: Frequency of publication by scientists is highest for those having a high frequency of interpersonal communication with clients and peers outside of their department and lowest for those reporting a low frequency of such communication.

Assertions concerning the influence, or lack of influence, of organizational structure on the flow of communication in academic and research institutions are not uncommon. However, as is evident in the review of relevant studies empirical data on which to base judgments of the validity of these assertions have not been found.

Traditionally, American colleges and universities have established departments on the basis of similarity, if not singularity, of disciplines. Thus, similarity of previous educational socialization usually provides greater commonality of concepts,

professional vocabulary, and perhaps certain shared values within departments than between departments in general. Regardless of whether these conditions of commonality exist, when persons are recruited or shifted into a position within an academic department certain expectations about their self-definition and their role behavior, in relation to others in the department, are implicit. It is generally assumed that departmental norms are more binding than those at any other level in the academic structure. These theoretical considerations, plus the recognition that geographical proximity frequently prevails among the members of a given department, provide the basis for hypothesizing a greater frequency of communication between "immediate others" within the same department as compared to those in other departments.

Hypothesis 5: Frequency of interpersonal communication about research among scientists tends to be higher with colleagues (i.e. immediate others) within the same department than with colleagues across departmental lines.

Some data relevant to the hypotheses already stated were available in the study of scientists within an Agricultural Experiment Station conducted by Murray (1965). Data used from that study were collected by personal interviews, self-administered questionnaires and organizational records.

Additional data were collected for this study from 21 department heads within the same Station by personal interviews and self-administered questionnaires.

The Sample

Murray's original sample consisted of 126 non-administrative scientists employed by the Michigan State University College of Agriculture who (1) held a Ph.D. degree or its equivalent, (2) received at least 50 percent of their salary from the agricultural experiment station (research funds) and (3) were hired before July 1961.

The 21 department heads studied were (1) those individuals assigned the primary administrative responsibility for the respective departments employing one or more of the 104 scientists on whom Murray collected usable data and (2) who had been head or acting head of that department for three years or more as of July 1, 1965.

In the absence of comparable descriptive data, the author has no basis for knowing in what respects, if any, these two samples differ from the general population of their counterparts in Experiment Stations elsewhere in the United States.

Operationalization of Variables

The variables of primary interest in this study are:

1. Significant others
2. Expected significant others
3. Perceived research competence
4. Frequency of interpersonal communication
5. Evaluation of the scientist
6. Frequency of publication
7. Organizational location

Significant others

To elicit this information Murray asked scientists: "Whose opinion of you as a researcher is most important to you?" He probed to get five names from each respondent and asked them to weight the significant others by distributing 15 points among them. Using these weightings to classify the orientation of the scientist toward (1) peers, (2) clients, and (3) administrators, i.e. in terms of the total number of points assigned to persons or groups falling into the three respective categories, it was possible to compute an absolute difference score when compared to the weightings given "expected significant others" by the scientist's department head.

Expected significant others

Department heads were asked to indicate weightings totaling 15 points on the relative importance opinions of (1) "fellow scientists," i.e. peers (2) "administrators with whom they work", and (3) "appliers of research such as farmers" should have for researchers.

Perceived research competence

Each respondent in the scientist sample was provided with a list of names of persons in the sample and was asked:

> "--who are some that, in your opinion, most deserve the reputation of outstanding researcher?"

Five nominations were requested. The number of nominations received by each scientist on the list was used as an index of perceived research competence.

Frequency of interpersonal communication

Each of the respondents in both samples was to identify five persons he "talked to most frequently" about research. Also elicited was an estimate of the approximate frequency of communication, at specified alternative levels, with these five individuals. The distribution of these responses was used as a basis for ordinal measurement of this variable.

Evaluation of the scientist

The average salary increment for the preceding three fiscal years was used as the basis for an ordinal index of administrative evaluation of the scientist.

Frequency of publication

Each scientist in the sample provided a list of his publications for the period September 1, 1961, through September 1, 1964. A simple count of publications was used to rank scientists within their department on frequency of publication. Inadequacies in this procedure are acknowledged in that it does not reflect differences in length or quality or differentiate between single and multiple

authorship. However, as Murray (1965, p. 44) concluded, consensus seems to prevail among those having tried to develop indices to reflect these differences, that attempts to go beyond frequency counts merely introduce different kinds of distortion rather than improve the measure of individual output.

Organizational location

The departmental affiliation as confirmed by the scientist and his department head was considered to be the organizational location within the structure of the University. In those instances where colleagues, administrators, and clients outside the two samples were involved, the report of the respondent was accepted as valid.

Data Collection

A personal letter was written by the author to each of the department heads informing them of an interest in studying communication among scientists and asking their cooperation. Subsequently an appointment for a personal interview was arranged by phone with each except for two heads who were on extended foreign assignments at the time. At the outset of the interview each respondent was assured that neither superiors or subordinates within the Station would have access to raw or individual data. All interviews were conducted in a setting where no other office personnel were present. The author conducted all but one of the department head interviews. That interview was conducted by another graduate student with similar academic interests and experience. All interviews were conducted according to the schedule attached (Appendix A).

The two department heads who were out of the United States on extended foreign assignments were contacted by the author via mail. Both agreed to, and expressed no major difficulty in, self-administering the schedule according to the instructions.

Data on the scientist sample were collected by Murray in personal interviews utilizing the schedule of questions and self-administered instruments attached (Appendix B). Data concerning percentage of salary increments were acquired from administrative records.

CHAPTER III. FINDINGS

Description of the Samples

The sample of scientists consisted of the 103 of the 104 employees of Michigan State University on whom Murray (1965) collected usable data. Each held a Ph.D. degree, obtained at least 50 percent of his or her salary from the Agricultural Experiment Station and had been on the staff for at least three years. One scientist who received no salary from the station was included by Murray because he was often named as an outstanding researcher and met the other two requirements. Because no salary data were available on the latter individual he could not be included in aspects of this study involving administrative evaluation.

Each of the 103 scientists held a position in one of 22 academic departments within the University. Of the heads of these 22 departments, 21 fulfilled the tenure requirement of three years or more as head or acting head. All 21 were willing to respond to at least a major portion of the interview schedule thus permitting the collection of counter-position data for 103 of the 104 scientists in Murray's sample.

Personal and professional characteristics of department heads

The heads in the sample had a median age of 53.7 and a median tenure as department head of 11.2 years. All held the rank of full-professor. Three out of four (76.2%) had been promoted from "within the ranks" at the University. Slightly over 1/2 (52.4%) held earned doctorates from a land-grant university other than Michigan State

while slightly more than 1/4 (28.6%) received their doctoral degrees from Michigan State.

Table 1 summarizes in more detail the characteristics of age, tenure as department head, nature of employment immediately before becoming department head, institution granting the doctoral degree, and the proportion of time spent by heads in non-administrative activities.

In addition to their administrative responsibilities, almost 1/4 (23.8%) said teaching was their only non-administrative activity. Nearly 1/5 (19.1%) reported doing teaching, research and extension work in addition to performing administrative duties while another 28.6 percent reported doing a combination of research and teaching. No department head reported doing only research or only extension work in addition to his administrative functions. The median time devoted to these activities was 20.2 percent.

Characteristics of department heads as compared to researchers

Department heads differ from researchers in age, as might be expected, with the heads being significantly older[1]. While almost one-tenth (9.7%) of the researchers were 35 years or less, none of the heads were. Only 12.6 percent of the researchers were 55 or older but 45 percent of the department heads were.

Inspection of the data pertaining to the institutions from which members of the two samples were granted doctoral degrees reveals a high similarity in distribution with 63 percent of the

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[1] $x^2 = 13.71$; 3 d.f.; p less than .05, two alternative test.

Table 1. Summary of personal and professional characteristics of department heads

Variable	Range	Median	Categories	%
Age[a]	35-65	53.7	Under 40	10.0
			40 - 49	35.0
			50 - 59	35.0
			Over 59	20.0
				100.0
Proportion of time devoted to non-administrative work	0-90	20.2	1/10 or less	47.6
			More than 1/10 but less than 1/4	9.5
			1/4 or more but less than 1/2	19.0
			1/2 or more but less than 3/4	19.0
			3/4 or more	4.8
				99.9[b]
Alma mater (Ph.D.)	--	--	MSU	28.6
			Other land-grant university	52.4
			Non-land-grant	14.3
			No doctorate	4.8
				100.1[b]
Tenure as department head	3-19	11.2	5 yrs. or less	14.3
			6 - 10 yrs.	33.3
			11 - 15 yrs.	38.1
			16 - 20 yrs.	14.3
				100.0
Employment prior to becoming head	--	--	Professional staff at MSU	76.2
			Professional staff other campus	19.0
			Employed in industry	4.8
				100.0

[a] N = 20 for this variable, elsewhere N = 21.

[b] Rounding error.

scientists having received their degrees from a land-grant university other than Michigan State and 25 percent holding degrees from Michigan State[2]. Twelve percent of the scientists held degrees from non-land-grant universities as compared to 14.3 percent of the department heads.

The Samples in Terms of the Theoretic Variables

In this section, the respective samples are described in terms of the seven theoretic variables of primary interest in this study.

Significant others

In response to the question, "Whose opinion of you as a researcher is important to you?" 101 of the 103 researchers in the sample named one or more individuals or groups or a combination thereof. They were requested to list five names and subsequently to distribute 15 points among these according to their relative importance to the researcher. For this study the individuals or groups named were placed according to major work role into one of four categories, i.e. (1) fellow scientist, (2) client or applier of research, (3) administrator or (4) "others" which included "self" and family-member responses of which there were five (5%). The total number of points assigned to persons falling into each of the first three categories listed were used in this study as an index of the relative importance of these three types of significant others. The distribution of difference scores resulting from the use of this

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[2] $x^2 = .20$; 2 d.f.; p greater than .05, two alternative test.

index together with the "expected significant other" index, computed for department heads, is discussed in the following section.

The greatest mean number of points was assigned to "fellow scientists" (9.5) with "administrators" ranking next (3.6 points). Seventeen researchers (16.8%) assigned all points to persons or groups in the "fellow scientist" category while only one researcher (1.0%) assigned all 15 points to the "administrator" and "client" categories respectively. Four (4.0%) of the researchers assigned no points to the "fellow scientist" category, 29 researchers (28.7%) assigned no points to persons or groups in the administrator category, and 66 researchers (65.3%) assigned no points to persons in the "client or appliers of research" category.

Expected significant others

The 21 department heads were asked to distribute a total of 15 points among three specified groups, i.e. "fellow scientists", "appliers of research such as farmers", and "administrators with whom they (researchers) work", to indicate the relative influence their opinions should have "on a researcher in your department". All responded. Table 2 summarizes their distribution of the 15 points.

Although the question was not used to operationalize the variable, prior to being asked about the three specified "significant other" groups department heads were asked:

> "In general, whose opinions of your research staff should be important to them? Putting it another way, whose opinions should carry the most weight with them?"

In response, 19 (90.5%) specified fellow scientists or peers. One

Table 2. Relative weightings assigned to expected "significant other" groups

S. O. group	Range of weightings	Mean points	Mode
Fellow scientists	5 - 12	8.7	10
Appliers of research	0 - 5	2.5	3
Administrators	1 - 7	3.8	5
		15.0	

(4.76%) said administrators' opinions and another (4.76%) said the researcher's own opinions should carry the most weight. None suggested that opinions of clients or appliers should be the most important. Responses to the item in general would appear to provide some validation of the specified categories used.

Using the department heads' responses to the structured question and the researchers' weightings of significant others, dyadic difference scores were computed as an index of consensus of agreement about relative importance of significant others between each researcher and his department head. The range of difference scores was from 0 (1%) to 30 (2%). The mean score was 9.6 and the median 8. Of the 100 dyads for which difference scores could be computed about one-fourth (24%) had difference scores of five or less while approximately one-fourth (27%) had scores of 12 through 30.

Perceived research competence

When presented with a list of names of those persons who constituted Murray's original sample, 98 of the 103 scientists in the

sample being used for this study responded to the request to list five "who deserved the reputation of outstanding researcher", two nominated two, and three made no nominations. For the purpose of this study the number of nominations received by a given scientist was used as an index of his research competence as perceived by his peers within the Experiment Station.

The number of nominations received ranged from 0 to 39. The distribution had a mean of 3.8 and median of 2.0 with 31.1 percent of the 103 scientists receiving no nominations. Only 20.4 percent received five or more nominations.

Frequency of interpersonal communication

Respondents were asked to list five, in the case of the researchers, and 15, in the interviews with department heads, persons with whom they communicate frequently, i.e. "immediate others", and indicate the approximate frequency of communication with them.

When researchers were asked for five names of "some of the people talk(ed) to frequently about your research", 97 named only individuals, 2 named only groups, and 5 named some combination of groups and individuals. Of the 103, 99 gave five responses. The six alternative levels from which they were asked to select the one that most appropriately described the frequency of their communication (spoken or written) with each of the individuals or groups named were (1) more than daily, (2) daily, (3) every other day, (4) twice a week, (5) weekly, and (6) less than weekly. The distribution of responses relevant to the hypotheses of this study are summarized in Table 3.

Table 3. Distribution of scientist respondents by levels of frequency of communication reported

A. With the head of their department

More than daily	2.9%
Daily	9.8
Every other day	2.0
Twice a week	11.8
Weekly	6.9
Less than weekly	4.9
None reported (i.e. head not named immediate other)	61.8
	100.1%[a]
	(102)[b]

B. With peers and clients outside their own department

None reported among five persons named	29.8%
Some, but less than one-sixth of contacts	37.2
One-sixth or more of contacts	33.0
	100.0%
	(94)[b]

C. With peers within the university (i.e. five named as immediate others)[c]

	1st	2nd	3rd	4th	5th
More than twice per week	72.3%	43.0%	37.8%	35.8%	34.7%
Twice per week	17.4	27.9	22.0	14.8	26.7
Weekly or less	10.4	29.1	40.2	49.4	38.7
	100.1%[a]	100.0%	100.0%	100.0%	100.1%[a]
	(86)	(86)	(82)	(81)	(75)

[a] Rounding error.

[b] Difference between N and 103 results from no responses or respondents having failed to name five Immediate Others or specify frequency.

[c] Difference between N and 103 results from respondents naming Immediate Others outside of the University, elimination of those naming less than five immediate others, respondents naming non-peers within the University and incomplete frequency data on four respondents.

The 21 department heads were asked to list from 5 to 15 individuals they "talk(ed) to most frequently about (their) department's research and related administrative problems." Nineteen responded by naming individuals and one named a group within the department. One elected not to respond. The 20 were asked to indicate the five communicated with most frequently and indicate one of seven specified levels that most accurately described that frequency. Alternative levels were the same used with the scientists with one addition, i.e. "less than monthly." Nineteen heads responded with frequencies on all individuals and one with a group frequency. The distribution is summarized in Table 4.

Table 4. Levels of frequency of communication with respondent scientists in their departments as reported by heads

Frequency	% of sample
More than daily	4.2
Daily	8.4
Every other day	4.2
Twice a week	3.2
Weekly	9.5
Less than weekly	1.1
Less than monthly	1.1
Mentioned as talked to frequently but not among five most frequent	14.7
None (i.e. researcher not named as immediate other or one talked to frequently)	53.7
	100.1%[a]
	(95)[b]

[a] Rounding error.

[b] Difference between 95 and 103 accounted for by the inability to collect data on eight scientists.

Evaluation of the scientist

Percentage of salary increases given over three fiscal years was used to measure organizational evaluation of the scientist. To control for varying absolute salary level the following formula was used to compute percentages:

$$\frac{\text{Annual salary 8/'64 - Annual salary 6/'61}}{\text{Annual salary 6/'61}} \times 100$$

Range of these increments was from 1.1 percent (1%) to 18.9 (1%). The median increment was 7.1 percent. From these data departmental medians, summarized in Table 5, were computed to permit the use of median tests (Siegel, 1956, p. 111-116) to control for departmental differences.

Table 5. Distribution of departmental increment medians and scientist respondents by intervals

Increment interval	Departments	Respondents
4.1 - 5.0	5.9%	2.1%
5.1 - 6.0	5.9	10.4
6.1 - 7.0	23.5	38.5
7.1 - 8.0	35.3	27.1
8.1 - 9.0	0.0	0.0
9.1 - 10.0	23.5	18.7
10.1 - 11.0	5.9	3.1
	100.0%	99.9%[a]
	(17)	(96)[b]

[a] Rounding error.

[b] Difference between 96 and 103 results from exclusion of departments having only a single respondent and having no access to salary information for three respondents.

Frequency of publication

The number of publications reported as being authored or co-authored by the respondent during the period between September 1, 1961 and September 1, 1964 ranged from none (1%) to 56 (1%). The median number of publications from the 103 researchers was 10.5. Departmental medians were computed to permit use of median tests and control for departmental and possible disciplinary differences in publication output. The distribution of those medians and respondents by levels is summarized in Table 6.

Table 6. Distribution of departmental publication medians and scientist respondents by levels of publication

Publication levels	Departments	Respondents
2.5 - 7.4	23.5%	15.2%
7.5 - 12.4	41.2	46.5
12.5 - 17.4	17.6	29.3
17.5 - 22.4	0.0	0.0
22.5 - 27.4	11.8	7.1
27.5 - 32.4	5.9	2.0
	100.0%	100.1%[a]
	(17)	(99)[b]

[a] Rounding error.

[b] Difference between 99 and 103 results from not computing medians for four additional departments having only a single respondent in the sample.

Organizational location

One or more of the respondents in the scientist sample and a department head was organizationally affiliated with each of the twenty-one departments studied. The subject matter disciplines involved were animal husbandry, biochemistry, botany, dairy, agricultural engineering, entomology, crop science, fisheries and wildlife, foods and nutrition, food science, forest products, home management, horticulture, institutional administration, microbiology and public health, pathology, physiology, poultry science, sociology and soil science. The number of scientists from a single department ranged from 1 (3.9%) to 16 (15.5%). The mean number was 4.9 and the median number was 3.0. The distribution of scientist respondents by department size is summarized in Table 7.

Table 7. Distribution of scientist sample by department size

Respondents per department	Departments	Scientists
1 - 4	57.1%	25.2%
5 - 8	23.8	30.1
9 - 12	14.3	29.1
13 - 16	4.8	15.5
	100.0%	99.9%[a]
	(21)	(103)

[a]Rounding error.

Tests of Hypotheses

Of the five hypotheses posited one was supported by four of five sets of data against which it was tested; another was supported by one of the two sets of data proposed for testing. The remaining three hypotheses were not supported.

The first hypothesis stated that when the difference between the types of significant others held to be most important by the researcher and those expected by his department head were small, salary increments would be larger than when these differences were great. Analysis of the data summarized in Table 8 did not reveal this relationship to be statistically significant although in the predicted direction. Hypothesis 1 was not confirmed.

Table 8. Relationship between researcher-department head consensus about types of significant others and researcher evaluation[a]

% Salary increment	S. O. consensus (diff. score) High (0-6)	Medium (7-10)	Low (11-30)
High (9.2 - 18.9)	40.0	33.3	29.7
Medium (6.3 - 9.1)	30.0	46.7	25.9
Low (1.1 - 6.2)	30.0	20.0	44.4
	100.0%	100.0%	100.0%
	(40)	(30)	(27)

[a] $x^2 = 5.33$; 4 d.f.; p greater than .05, two alternative test.

The second hypothesis predicted that a department head and those researchers recognized for high competence would develop more frequently used communication linkages than would be developed between the head and scientists of less recognized competence. This hypothesis was proposed for test by analysis of two sets of data, i.e. frequency of communication as reported by (a) the department head and (b) the researchers. The department head data, presented in Table 9, supported the hypothesis but the data collected from the researchers, also presented in Table 9, did not.

Analysis of the data reported by the department heads, which supported the hypothesis, reveals that over one-fourth of the resulting significant x^2 can be attributed to two of the nine cells. In the "high frequency of communication" cell falls a greater proportion than expected of the researchers of high perceived competence while in the "low frequency of communication" cell falls a smaller than expected proportion of the researchers of high perceived competence. These findings fit the hypothesized relationship and would thus support that part of the theoretic rationale, elaborated in Chapter one, which suggests the department head tends to communicate more frequently with those on his research staff perceived as most competent--perhaps (1) because they hold higher potential for valuable counsel to the head or (2) because the scientist who is perceived as highly competent by his colleagues exerts more influence and enjoys greater credibility within the organization than does the researcher of lesser repute.

The data collected from the researchers about their frequency of communication with their department heads fails to support the

Table 9. Relationship between frequency of communication and perceived competence of the researcher

Frequency of communication with researcher[a]	Frequency of communication with department head[c]	Perceived research competence		
		High	Medium	Low
High (at least every other day)		28.6	16.7	3.3
Medium (some, but not oftener than twice weekly		28.6	16.7	43.3
Low (not mentioned)		42.9	66.7	53.3
		100.1%[b] (35)	100.1%[b] (30)	99.9%[b] (30)
	High (at least every other day)	17.5	10.0	15.6
	Medium (weekly or twice a week)	17.5	30.0	25.0
	Low (not mentioned)	65.0	60.0	59.4
		100.0% (40)	100.0% (30)	100.0% (32)

[a]Reported by department heads. $x^2 = 11.70$; 4 d.f.; p less than .05, two alternative test.

[b]Rounding error.

[c]Reported by researchers. $x^2 = 1.94$; 4 d.f.; p greater than .05, two alternative test.

rationale that suggests the researcher of high perceived competence may find communication with his head relatively more beneficial or rewarding than do his peers of lesser perceived competence. Conclusions concerning these findings will be further discussed in the final chapter.

The third hypothesis predicted a significant positive and direct relationship between the researcher's frequency of communication with the department head and evaluation of that researcher. Analysis of the data, presented in Table 10, failed to reveal a significant relationship. Thus, Hypothesis 3 was not confirmed.

Table 10. Relationship between researcher's frequency of communication with his department head and evaluation of that researcher[a]

Frequency of communication with department head reported by researcher	Percentage of salary increment		
	High (9.2-18.9)	Medium (6.3-9.1)	Low (1.1-6.2)
High (at least every other day)	17.6	15.6	6.1
Medium (weekly, twice/week, or less than weekly)	14.8	21.8	39.4
Low (not mentioned)	67.6	62.5	54.4
	100.0%	99.9%[b]	99.9%[b]
	(34)	(32)	(33)

[a] $x^2 = 6.44$; 4 d.f.; p greater than .05, two alternative test.

[b] Rounding error.

The fourth hypothesis stated that frequency of publication by a researcher is positively and directly related to his frequency of communication with peers and clients outside of his own department. In order to control for apparent differences in frequency of publication levels among the 16 departments, a departmental median split was used for both variables and a median test administered. The relationship was not statistically significant. Hypothesis 4 was not confirmed. The basic data, which were split at departmental medians for test, appear in Table 11.

Table 11. Relationship between frequency of publication and the researcher's frequency of communication with clients and peers outside of his department[a]

Frequency of communication with extra-departmental peers and clients	Publication frequency		
	High (15 or more)	Medium (8-14)	Low (0-7)
High (1/6 or more)	32.1	35.1	32.0
Medium (some, up to 1/6)	42.9	29.7	40.0
Low (none reported)	25.0	35.1	28.0
	100.0%	99.9%[b]	100.0%
	(28)	(37)	(25)

[a]Median test used. $x^2 = .40$; 1 d.f.; p greater than .05, two alternative test.

[b]Rounding error.

Table 12. Relationship of organizational location of interpersonal communication linkages and frequency of use of those linkages

Frequency of communication with first named "immediate other"[a]	Organizational location	
	Within dept.	Between depts.
High (more than twice/week)	72.0	75.0
Medium (twice/week)	17.7	25.0
Low (weekly or less)	10.3	0.0
	100.0%	100.0%
	(82)	(4)
Frequency of communication with second "immediate other"[b]		
High (more than twice/week)	50.7	0.0
Medium (twice/week)	28.8	23.1
Low (weekly or less)	20.5	76.9
	100.0%	100.0%
	(73)	(13)
Frequency of communication with third "immediate other"[c]		
High (more than twice/week)	46.2	5.9
Medium (twice/week)	23.1	17.6
Low (weekly or less)	30.8	76.5
	100.1%[d]	100.0%
	(65)	(17)

[a] $x^2 = .0186$; 1 d.f.; p greater than .05 two alternative test. Medium and low frequency cells were collapsed to eliminate expected frequency of less than one in one cell.

[b] $x^2 = 8.08$; 1 d.f.; p less than .05, two alternative test. Medium and low frequency cells collapsed to eliminate expected frequencies of less than five in two cells. Corrected for continuity (Siegel, 1956, p. 107).

[c] $x^2 = 12.94$; 2 d.f.; p less than .05, two alternative test.

[d] Rounding error.

Table 12. (Continued)

Frequency of communication with fourth "immediate other"[e]	Organizational location: Within dept.	Organizational location: Between depts.
High (more than twice/week)	45.9	5.0
Medium (twice/week)	18.0	5.0
Low (weekly or less)	36.1	90.0
	100.0%	100.0%
	(61)	(20)
Frequency of communication with fifth "immediate other"[f]		
High (more than twice/week)	43.9	5.6
Medium (twice/week)	29.8	16.7
Low (weekly or less)	26.3	77.7
	100.0%	100.0%
	(57)	(18)

[e] $x^2 = 17.62$; 2 d.f.; p less than .05, two alternative test.

[f] $x^2 = 15.65$; 2 d.f.; p less than .05, two alternative test.

The fifth hypothesis posited that interpersonal communications linkages, used to discuss research and research related problems, are more frequently used when between individuals in the same department than when those linkages are between individuals in different departments.

Data collected from those researchers naming five "immediate others" and specifying the frequency of communication with each of those five were used to test this hypothesis. Inspection of that data, in Table 3, suggests two apparent relationships: (1) a consistent inverse relationship between high frequency of

communication and order of naming of the respective "immediate others" and (2) a similar relationship between order of naming and the number of "immediate others" that are located outside of the university. Controlling for the order of naming of "immediate others", the five respective sets of data were used to test the fifth hypothesis. Analysis of those data, presented in Table 12, revealed that the data pertaining to the first named "immediate other" did not support the hypothesis. The relationship between frequency of communication and the organizational location of the other four named as "immediate others" was statistically significant well beyond the specified level. In the four analyses revealing significance, the preponderance of the significant x^2 consistently stemmed from a disproportionately large number of "between department" linkages falling in the low frequency category and a disproportionately small number of "between department" linkages falling in the high frequency category.

However, the hypothesis as stated cannot be considered confirmed in light of these findings. It would appear that factors not related to departmental location may be more directly associated with a researcher's frequency of communication with his first named "immediate other." On the positive side the data analyzed do provide some support for the notion that, for other than the first named "immediate other" of five named, a researcher's departmental location is associated with the relative frequency with which he communicates with a given "immediate other." The data and design of this study do not provide empirical grounds for inferring what specific forces or variables account for this association.

Other Findings

In addition to testing of specific hypotheses relating to evaluation of researchers and to frequency of communication by or between (1) researchers, (2) department heads and (3) peers and clients, part of the stated intent of this study was to explore and describe certain other perceptions, attitudes, and practices relevant to the role of the department head as related to communication with and evaluation of the researcher. This section is devoted to such description.

Perceived importance of research

As a measure of the department heads' perceptions of the relative importance of the basic functions of their departments, as related to the overall effectiveness of the University, each was asked to distribute 100 points among the three commonly accepted "land-grant" functions: teaching, extension and research. The average (mean) number of points assigned by the 21 heads was 45.9 to teaching, 33.6 to research, and 20.2 to extension. Several assigned no points to extension because, they explained, it was a form of teaching. Of the 21, 61.9 percent gave teaching the most points, 4.8 percent gave research the greatest number, and 33.3 percent said they saw teaching and research, or teaching, research and extension, as equally important. Thus, consensually research was seen as having at least equal importance with other functions by about three-eights of the heads, and being of less importance than teaching by about five-eighths of them.

Perceptions of the "ideal researcher"

Using Murray's (1965) nine-item modified Q sort instrument (Q 9, Appendix A), each department head was asked to "sort", according to "most" and "least" importance, nine phrases describing characteristics of a researcher. Table 13 presents the phrases and the average (mean) number of points resulting from the five-position "sort". Greatest consensus among the heads was on the

Table 13. Characteristics of the "ideal researcher" as rated by department heads

Characteristic	Average (mean) points
...is dedicated to the search for knowledge	4.5
...uses sound methodology, is accurate and precise in data collection and analysis	3.8
...is analytical in that he is able to sort out relevant relationships	3.5
...has ability to choose important questions	3.4
...keeps up to date on the literature	2.7
...writes up findings with clarity, and with sufficient but not too much detail	2.6
...willingly accepts long hours and hard work	2.5
...is fair in exchanging ideas and criticism from others	2.3
...sees the other fellow's point of view, is easy to work with	1.8

importance of a researcher being "dedicated to the search for knowledge; 71.4 percent placed it in the "most important" position. The

"least important" characteristic was agreed upon by 52.4 percent of the heads.

The order of ranking by the heads was identical to that of the researcher sample.

Criteria for researcher evaluation

Department heads' responses concerning the criteria on which they evaluated researchers within their respective departments, for either promotion or salary increments or both, are summarized in the thirteen categories presented in Table 14. Weightings were derived from 20 department heads distributing 100 points each among the criteria subsequent to their having completed the listing of

Table 14. Relative importance of criteria used by department

Criterion	% Citing[a]	Range	Mean points assigned
Number and/or quality of publications	60%	0-100	20.8
Productivity (e.g. engagement in solving an important problem, helping others identify what's important, adding new knowledge, ability to complete a job, attracting competent people to the field)	40	0-100	20.7
Quality of research	45	0-65	14.6
Personality characteristics (e.g. enthusiasm, creativity, problem solving ability, ability to stimulate colleagues, originality of thought)	25	0-85	10.7
Reputation in his profession and recognition by his peers	30	0-50	7.4

Table 14. (Continued)

Criterion	% Citing[a]	Range	Mean points assigned
Ability to teach and stimulate graduate students	35	0-30	6.6
Cooperativeness, ability to collaborate, attitude toward associates	35	0-25	3.6
Service (i.e. on departmental committees and service in the field)	10	0-50	2.6
Contribution in relation to his talents	5	0-40	1.9
Contributions to college and total university	5	0-40	1.9
Quantity of research	15	0-20	1.4
Participation in professional meetings and societies	10	0-10	.5
Evaluation by industry and funding agencies	5	0-10	.4

[a]N = 20. One respondent found it too difficult to assign points on a general basis.

criteria used. While these categories are not claimed to be mutually exclusive, efforts were made to keep them as much so as possible and still construct meaningful groupings which would not distort the data collected in the interviews.

The most frequently named criteria, number and/or quality of publications (60%), was one of two that showed the broadest range of weightings and the heaviest average (mean) weightings (20.8). Productivity, cited by 40 percent had as broad a range and average

(mean) weighting almost as great (20.7). Quality of research was cited by more heads (45%) but had less variation in range and a smaller average (mean) weighting.

Publications and evaluation

When asked early in the interview to indicate how important (i.e. one of five degrees) it was for a "good researcher" to publish, all 21 department heads ranked it as either "very important" (38.1%) or "extremely important" (61.9%). However, 9.5 percent later said they did not consider publications in evaluating researchers in their department. The remaining 90.5 percent included it either as a separate criterion of evaluation (57.1%), a part of productivity (23.8%), a personality characteristic (4.8%) or a function of quantity and quality of research (4.8%).

Of the 21 heads, 71.4 percent said they made a distinction between popular and professional publications while 28.6 percent said they did not. However, the rationale for their responses was widely varied. Several, particularly heads of departments working in production and applied subject matter areas, pointed out that while they drew a distinction between kinds of articles both had a place. The crucial consideration was not just whether they were popular or professional but whether they "did a job" or were "solid". Roughly one-third said they definitely gave heavier weight to the professional article. Some suggested ratios ranging from 4/1 to 10/1.

Sources of information used in evaluating the researcher on his research

Having named and given relative weightings to the criteria on which they evaluated researchers in their departments, the 21 department heads were asked "how do you get information relevant to these (criteria)--what are the major sources of this information?" Responses fell into one or more of three major categories. All 21 (100%) cited personal contact and observations (i.e. themselves as a source), four-fifths (80.9%) said they also relied on information from colleagues and peers of the researcher, and a little over one-fourth (28.6%) indicated they received and used information from clients in the evaluation process.

Within the personal contact and observation category, two general sources were by far the most frequent: (1) his own day-to-day face-to-face contact (76.2%) and (2) a systematic access to the individual's work usually centering around an annual report, terminal evaluation of research projects, the flow of journal articles across the chairman's desk or post-publication observation of those articles in the journals (71.4%). Two other, much less frequently cited, sources of information were named in this general category: (1) travel authorized to give papers or to serve on technical committees and job offers (9.5%) and (2) the number of graduate students they attract (4.8%).[3]

Within the colleague and peer category the most frequently named sources were individuals or groups within the department

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[3]In some instances percentages add to more than 100% because respondents cited more than a single source or a single kind of information.

(38.1%). One-third of the department heads cited individuals or groups of the researcher's peers on campus but outside of the department while the same proportion of the department head sample indicated they attended to information from colleagues and peers in general. An additional 14.3 percent reported attending to off-campus researchers as a source of evaluative information. Some representative comments were:

> ...I hear comments from peers on the papers my staff members give.
>
> ...I try to arrive at a consensus with the full professors in the department concerning advancements for those below that rank.
>
> ...Feedback from those who have contact with him (the researcher) is helpful.
>
> ...Opinions expressed to me by peers both in and out of the department give me some basis for judging research productivity.
>
> ...I use outside consultants to evaluate a staffer's research. For instance, the off-campus seminar speakers we have in--I really get a lot of mileage out of them.
>
> ...I call in colleagues with no axe to grind to see if their opinions agree with mine.
>
> ...I listen and read what professional colleagues say about their (researchers') work.

Within the third category of sources of evaluative information, clients, four groups were cited: (1) graduate students (9.5%), (2) the public in general including the community (9.5%), (3) undergraduate students (4.8% and (4) farmers and growers (4.8%).

Additional information and sources used in evaluating researchers who taught

All department heads completing that section of the interview (N = 20) indicated that some, or all, of the researchers on their staffs not only did research but also teaching, either in the campus classroom or extension-type teaching. Also all indicated that in evaluating these individuals they used some additional kinds of information over and above that pertaining to the research evaluation criteria. The kinds of information used could be classified in four major categories: (1) general reactions of others to the individual (cited by 85%), (2) appraisals of general performance (80%), (3) information about specific abilities of the individual (55%), and (4) specific attitudes perceived (25%). The sources of this information fell into three major categories; (1) clients (named by 90%), (2) the chairman himself through personal contact and observation (90%), and (3) colleagues (60%).

The "reactions of others" category could be viewed as having four components. Most often mentioned was popularity among, and evaluation by, students (60%). Professional status among the staff or staff reactions (40%), complaints and comments of satisfaction among clients or the public in general (not including students) (30%), and reactions of the staff evaluation group or committee (10%) constituted the other three.

Information on "performance" included appraisals of performance in the classroom or field (80%), on committees on (20%), and the individuals response to inquiries and requests (10%).

Within the category of information on "specific abilities" the most frequently mentioned by the 20 department heads was information on the individual's ability to teach.

The information category relevant to "specific abilities" included mention by the heads of their consideration of information about the individual's ability to teach and be comprehended (20%), to stimulate his clientele (10%), to meet and work with people (10%), to get graduate students finished (5%), to organize conferences (5%), to innovate (5%), and to speak in public (5%).

One-fourth of the heads indicated that in the evaluation process they considered information about one or more perceived attitudes including (1) the individual's attitude toward academic functions other than research, e.g. about teaching or extension work (15%), (2) toward change (5%), and (3) his general enthusiasm (5%).

In addition to the kinds of information already mentioned, the department heads suggested other kinds of observations useful in the evaluation of the non-research functions of a staff member. What he writes (20%), his professional activities (10%), the performance of his students after graduation (5%), accomplishments in terms of adoption (5%), where he travels and what kind of teaching substitutes he selects (5%) were all mentioned by one or more heads as relevant.

As sources of information, clients were found to play a much more prominent role in evaluating the non-research, as opposed to the research, responsibilities of staff members. Students as sources of informal voluntary information (66.7%) and formal

information via evaluation sheets (30%) were the most frequently mentioned client source. Clients in general (20%) and farmers and processors in particular (15%) also were cited as providing information on which evaluations were based. Alumni (10%) and employers of alumni (5%) were mentioned as well.

With equal frequency to clients, department heads themselves (90%) served as a source of information via first-hand observations about performance based on classroom visits (40%), attendance at Extension meetings (15%), surveillance of the number of students enrolling in a teacher's section or requests for appearances directed to a staff member (15%), and through general personal observation and evaluation through day-to-day contacts (25%). Examination of the teachers' course outlines (10%) and individual conferences with the staff member (5%) were also cited as providing a basis for drawing first-hand inferences about non-research activities of the member.

Among the colleague sources, which were mentioned by 60 percent of the heads, was a wide range of categories including county agents and field staff (25%), faculty advisory committees (10%), other staff in the department (10%), state Extension leaders (5%), Extension staff and colleagues in general (5%), staff outside the department (5%) and specified individuals (5%).

Two other sources were mentioned: the staff member himself through self-evaluation (10%) and miscellaneous unsolicited comments from anyone who cares to make them to the department head (20%).

Influences on departmental research and publication

Implied in the criteria specified for evaluation of a researcher's work is the notion of direction or at least the existence of general priorities of need for solutions of "important problems" within the areas of concern to the various departments. The department heads were asked about their role and "how much voice" they had in determining that direction (i.e. the kind of research done) in their departments. About one-third (35%) said they felt they had more "voice" than any other individual and another one-third (35%) indicated they had as much as any other person but not necessarily more. The remainder of the 20 department heads responding felt they had (1) some, but less than certain others (20%), (2) very little (5%) or (3) none at all (5%).

In an attempt to get a composite picture and a more detailed assessment of the individuals and groups that department heads saw as playing a role in shaping their departments' research program, each was asked to list these and distribute 100 points among them to indicate the relative magnitude of the influence each exerted on his department's research output. Nineteen of the heads responded. The results are presented in Table 15. Over and above being consensually seen as having the greatest voice individually (38.6), researchers collectively were seen as having substantial influence (13.4) thus constituting a, if not the, major determiner of the kind of research undertaken within the department.

In exploration of the means used by the department head to exert influence on the kind of research done in his department, three major ways were most frequently mentioned. Sixteen of the heads (80%)

Table 15. Ranking of individuals and groups influencing research within their departments as perceived by department heads

Individual or group	% Citing[a]	Range	Mean points
Individual researcher	68.4	0-83	38.6
Department chairman	78.9	0-60	16.3
Funding agencies and sponsors outside of the University	52.6	0-90	16.1
Colleagues or dept'l members as a group	47.4	0-80	13.4
Clients (through means other than funding)	47.4	0-60	8.2
Administrative superiors	57.9	0-15	5.3
Others (i.e. graduate students, certain colleagues within or outside of department)	15.8	0-20	2.1
			100.0

[a] N = 19.

suggested personal counsel with the researcher was a primary means. Such counsel included directing the researcher's attention to problems that needed study, encouraging him to interact with commodity people, suggesting other researchers for him to talk to, and discussing his problems and attempting to help him avoid pitfalls. Budget adjustment was cited by one-half of the heads as a means used. This included addition of personnel in the form of graduate students, personal aid in getting grants to support what the head regarded as research of merit, or adjustment of the operating budget. The

third major way they influenced the direction of research, cited by 45 percent of the heads, was through the hiring process. Several expressed the conviction that "hiring the right man" was the main influence a head could exert because from that point on the interests and competencies of the researcher would be the major determining influence on what was researched and published.

Several other means were mentioned by smaller percentages of the heads. Adjustment of the non-research load (10%), personal expression of appreciation and encouragement (5%), salary and promotion (5%), and encouragement to attend certain professional meetings (5%) were among these.

As mentioned previously, all department heads indicated they felt it was either "very" or "extremely" important for a researcher to publish his results. Questioning aimed at determining whether the head made a conscious attempt to stimulate publication within his department revealed that the majority (90%) did make such attempts, some (10%) did not. Some volunteered, "the good researchers don't need stimulation." For those heads attempting to stimulate publication, the means used were similar to the means used to influence research output of their departments as previously reported. At least one-fourth of the heads mentioned, as a stimulation technique, keeping researchers aware of the relationship of publication to promotion, salary increases and, in some cases, operational budget. Publication as "the best means for getting recognition" is another awareness which some department heads reported trying to create as stimulation. Granting of leaves, development of a departmental research library, recognition of publication in intra-office

communication media, expression of personal encouragement and appreciation to those who publish, and suggesting that "they go home and write or lock their office door" were all mentioned as means or attempts to stimulate publication. Department heads also pointed out that in some cases they see their role as discouraging publication--either because it is perceived as pre-mature or because the quality or content is not up to their standards.

Departmental policy on making professional journals available to the research staff was also checked. Predominantly (71.4%) the heads said most of the relevant journals were made available either within the department or in interdepartmental libraries. In the other departments an equal percentage (14.3%) made "some" available as compared to those which made "none" available.

Productivity and perceived stimulators

Productivity was suggested by 40 percent of the department heads as one of the criteria on which they evaluated the research work of their staff. It was one of the two criteria assigned the most (mean) points. In elaborating on their responses heads using the term made such statements about what constituted productivity as follows:

> ...it's not publications, it's being actively engaged in solving an important problem, helping others see what's important and attracting competent people into the field.
>
> ...it includes the ability to get a job done and quality too--I can't separate them.
>
> ...it's not limited to the number of titles. I mean creativeness, adding new knowledge to the field, pushing back frontiers--many variables.
>
> ...I mean the ability to complete and finish research.

> ...it involves gaining new knowledge, writing papers, using imagination in his research.

Department heads were also asked to indicate, based on their experience as department heads, which, if any, of seven factors were of major importance as stimulators of productivity among researchers and to suggest other factors in addition to those listed. The seven listed were: a continuing challenge in their (the researchers') work, job security, autonomy, advancements in salary, recognition by peers, recognition by laymen, and recognition by administrators other than dollars. Fifteen (75%) rank ordered some or all of these and five (25%) indicated one or more that were of major importance but did not rank order them. One other factor was suggested by each of three heads, i.e. organization of self, advancements in operating budgets, and avoiding overloading researchers with other duties.

Of the seven factors suggested "continuing challenge in their work" was distinctly the leading stimulator as seen by the department heads. Eighty-five percent agreed that it merited a first or second place among all named. Autonomy and recognition by peers ranked next, in a virtual tie. More than three-fifths of the heads agreed that these should rank among the top three. Salary advancements fell, with about equal consensus, into fourth importance but distinctly below those above it. Recognition by administrators, and recognition by laymen ranked next, in that order, with job security being ranked as the least important stimulator. It was not suggested by any head as belonging among the top five.

Others consulted by the department head on major decision

On the assumption that decision making within the academic department is, at least to some extent, the result of a process of interaction, department heads were asked to whom they most frequently talked about significant or major decisions concerning such problems as major equipment purchases or a change in the department's research emphasis. Of the 19 heads responding almost one-half (47.4%) named only groups within the departmental staff or, in some cases, the whole staff; about one-third (31.6%) named only individuals; and the balance (21.1%) named a combination of individuals and groups within the department. Some representative responses to the query as to whom within the department was most frequently talked with were:

> ...initially, a small group of three or four of what I consider our best men. Then the matter is taken to the entire department. If two or more sides develop a small committee is appointed to look further into the matter.
>
> ...a sort of executive committee within the department composed of five men that represents all areas.
>
> ...to the staff involved on changes in research emphasis. Equipment purchases are taken up at the general staff meeting.
>
> ...to three or four persons in the department whose judgement is respected most.
>
> ...to a committee on equipment in the department.
>
> ...to a four man program planning committee.
>
> ...to those concerned with the particular area or problem.
>
> ...to the staff as a committee of the whole.

As for those talked to elsewhere on the campus, department heads predominantly named administrators only (73.7%) or in some

cases (21.1%) a combination of administrators and faculty outside of their own departments. The balance (5.3%) talked with no one on campus outside of the department about such decisions.

About four out of every five of the department heads (78.9%) reported talking to someone off-campus about such decisions. Of the total group, those heads that did talk with off-campus groups or individuals most frequently named client groups or leaders of those groups (26.4%), off-campus colleagues (21.1%) and funding agencies (21.1%). Equipment suppliers (5.3%) and members of the family (5.3%) were also mentioned.

CHAPTER IV. CONCLUSIONS

Summary

This was a study of 103 researchers and their 21 department heads in an academic research organization within a major university. The intent was (1) to test hypotheses suggested in part by generalizations and a model based on scattered previous research done with scientists in a range of organizational contexts and (2) to explore and describe certain perceptions, attitudes and practices relevant to the role of departmental chairman. Variables central to the focus of both aspects of the study were frequency of communication by and between the researcher and the department head and the evaluation of the researcher.

The hypothesized positive relationship between frequency of communication between the researcher and his department head and the perceived research competence of the researcher was confirmed by data from department heads but not supported by data collected from researchers. An hypothesis positing significantly greater frequency of communication about research between a researcher and his colleagues (i.e. immediate others) located within the same department as compared to those located in different departments was not supported for the first named "immediate other" but was supported for the four "immediate others" subsequently named.

Hypotheses predicting relationships (1) between researcher-department head consensus about "significant others" and evaluation of the researcher, (2) frequency of communication by the researcher with the head and evaluation of the researcher, (3) frequency of

communication with clients and peers outside of the department and frequency of publication, and (4) perceived research competence and frequency of communication with the head by the researcher were not confirmed.

In personal interviews with the department heads, thirteen general criteria for evaluating the research efforts of their staff members were identified. Productivity, number and/or quality of publications and quality of research were most often named and most heavily weighted. Contrary to generalizations in some of the current literature, the data indicated most department heads in the sample made a distinction between professional and popular publications and most consider quality of the articles and journals in the evaluation process.

Three major sources of information relevant to evaluation of the staff member were identified. However, the frequency of use of those sources varied depending on whether the research or non-research efforts (i.e. teaching and extension) were being evaluated. While the department head himself, through first-hand observations and judgements, was a most frequent source in both instances, colleagues more frequently played a role than clients in evaluating research efforts while clients more frequently played a role than colleagues in evaluating the non-research responsibilities of the staff member.

Individual researchers were seen by department heads as being the major determiners of the research emphasis within the department. The heads perceived themselves and funding agencies as ranking next in importance as influencers of direction of the

departmental research program with clients and administrative superiors ranking well down the line. Departmental staff members, particularly those perceived as most competent by the head and those of senior rank, were reported to have considerable voice and influence in making departmental policy and administrative decisions as well.

As major stimulators of productivity among researchers, department heads saw (1) a continuing challenge in the researchers work, (2) peer recognition and (3) autonomy as being among, or perhaps, the most important. Advancements in salary, recognition by administrators, recognition by laymen, and job security were seen as being of less, if of any, importance.

Interpretation of Findings

Looking at the data of this study with a rather broad descriptive intent, they would appear to justify the conclusion that social interaction within the academic organization is surprisingly limited from several perspectives. The fact that two-thirds of the researchers in this study reported no communication with the department head, of a frequency of at least once a week, is somewhat surprising. However, it appears to be supported not only by the data collected from the researchers but also the findings based on department head reports which mentioned no interpersonal communication with fifty-three percent of their researchers in the sample at a weekly, or an even lower, frequency.

As reported in the previous chapter, eighty percent of the department heads indicated a major means of influencing the nature of

the research done in their departments involved structuring the perception of their researchers via interpersonal communication, i.e. helping them see problems that needed study, problems to avoid, recommending meetings to attend, suggesting clients and researchers with whom to interact, etc. Similarly, ninety percent of the heads indicated they attempted to stimulate publication and productivity through means highly similar to those used to influence and stimulate research.

Realizing that frequency is only one of several dimensions of interpersonal communication and is not necessarily a measure of the relative influence of communication from the total array of sources on a given receiver, these findings, nevertheless, give rise to some interesting questions concerning the amount of reciprocal influence which is exerted on and by this major segment of researchers with whom the frequency of interpersonal communication is apparently so low.

Basing judgement on the "immediate other" data reported by the researchers, only about one-third of them go outside of their own department for as much as one-sixth or more of their research related interpersonal contacts. Three out of ten reported these contacts were totally confined to their own department. Thus, interdepartmental communication would appear to be relatively low among the research personnel studied. This was found to be the situation in spite of the fact that several of the departments in the sample were what might be considered to be problem and production centered departments which, traditionally, employ scientists of disciplinary

backgrounds similar to those in one or more other departments at the university, e.g. chemists, zoologists, pathologists, etc. However, it is recognized the data of this study did not permit complete mapping of departmental networks because the sample only included departmental members holding doctoral degrees and meeting certain other criteria and permitted study of only the five persons most frequently talked to about research and research related problems.

Examination of the data collected from both the department heads and the researchers concerning their judgements of the relative importance of nine specified characteristics of an "ideal" researcher revealed a complete consensus between the two groups on the order in which these characteristics should be ranked. That order, presented in Table 13, gives top priority to those characteristics which would be seen as basic to competency and effectiveness in the laboratory, e.g. the ideal is dedicated to the search for knowledge, is sound methodologically, is analytical, and able to choose important questions. Among the four ranked lowest of the nine were three which could be interpreted as characteristics directly related to communication with and relation to other scientists, i.e. writing up findings, exchanging ideas and criticisms, being easy to work with and seeing the other fellow's point of view. Recognizing that this data was collected with a structured instrument which forced the subject to rank order, the findings would still seem to justify the conclusion that both researchers and department heads place slightly less importance or value on the sharing of findings and ability of the scientist to work as a member of a collective effort than they place

on the so-called basic skills and attitudes appropriate to the laboratory.

In addition to the already mentioned consensus between department heads and researchers, as collectives, concerning their perceptions of the "ideal" researcher, other similarities in perceptions and attitudes were apparent from the data collected. The two also agreed on the relative importance of three general "significant other" groups for researchers, i.e. peers, administrators and clients. Inspection of the data reveals their respective perceptions of individuals with high research competence among the scientist sample were highly similar. Perhaps these congruencies are not surprising in light of the similar backgrounds of heads and researchers in terms of academic degrees, alma maters, professional employment patterns, and the fact that three-fourths of the department heads had come up from the ranks within the university, i.e. many had played the researcher role before they assumed that of department head. The one significant difference found between the two groups was that of age; the department heads were significantly older. The implications of agreements and similarities such as these, as suggested by the theoretic framework of this study, is that communication would be facilitated and, some theoreticians--Etzioni (1961a) for one would suggest, that such similarities in "socialization" would lessen the amount of communication needed between the role players to accomplish organizational objectives.

In another area of concern, evaluation of the researcher, the findings of this study would seem to indicate the evaluation process is not as simple as some of the literature cited in Chapter 1 would

imply. Although department heads ranked number and quality of publication high among criteria for evaluation, they also cited numerous other considerations on which their judgements about promotion and salary increments were often equally or even more heavily dependent. As can be noted in Table 14, department heads defined many of these high priority considerations as falling under the rubric of "productivity" and "quality of research." Of some interest and relevance is the fact that many of these criteria are basically social in nature. This is interpreted to reflect some concern on the part of the department heads for the presence of those qualities which would enhance the departmental output through some kind of interaction, e.g. helping others identify important problems, attracting competent people, possessing the ability to stimulate colleagues, having the ability to collaborate, etc.

The inventory of sources of information used by the head suggests the assertion that evaluation of the researcher rests mainly on the administrator (Wilson, 1942, p. 103) must be tempered with recognition that in most cases the administrator takes into account both objective information and subjective evaluations beyond the realm of his own opinions. The findings would indicate that the so-called informal channels introduce a surprising amount of "mediated" information and judgements from peers into the process, particularly for evaluation of research activity, and from clients, in the evaluation of teaching performance.

Findings based on the department head interviews also provide some basis for questioning the generalizability of the Caplow and McGee assertion that academic performance in general is based

"almost exclusively" on evidence of research activity. Department heads in the sample for this study without exception cited criteria and sources of information unique to the evaluation of staff members who also taught, as well as conducted research. Logically, the finding that 60 percent of the heads saw teaching as being the most important function of their university and another 33 percent said it was at least of equal importance with research would imply a value system conducive to considerations of teaching performance per se in the evaluation process.

As suggested in the previous chapter concerning the second stated hypothesis, the failure of the data collected from researchers to support the hypothesis is interpreted to mean that the scientist of high perceived research competence finds frequent interpersonal communication with his department head relatively no more beneficial or rewarding, in terms of goal achievement, than do his peers of lesser repute. This finding, when considered in the light of Murray's (1965) findings, leads to an interpretation which implies a more complex relationship than the simple "mutual benefit" or so-called reciprocity hypothesis.

Murray found significant positive relationships between (1) an immediate other orientation toward peers and peer evaluation, i.e. perceived research competence; (2) immediate other orientation toward peers and salary increment; and (3) immediate other orientation toward peers and publication rate. Given these findings, logic suggests that a researcher perceived as highly competent may have achieved this reputation through visibility growing out of high publication and/or maximizing his interpersonal communication with

peers, not administrators. It further suggests that as long as the system is rewarding him with peer recognition, which department heads rated in this study as one of the top three stimulators of productivity, and administrators are already rewarding him with high salary increments, the researcher of high perceived competence has little cause to change his communicative behavior pattern. This more complex relationship among (1) researchers of high repute, (2) their peers and (3) the department head appears also to be compatible with the finding, reported in the previous chapter, that researchers saw "fellow scientists" as substantially more important, as significant others, than administrators. Furthermore, when we take into account the fact that over ninety percent of the department heads indicated that is the way they thought it ought to be, it would seem logical that such patterns might well be reinforced by administrators rather than discouraged.

Turning to the findings on the fifth hypothesis, they provide evidence of a significant relationship between departmental location of a researcher and the frequency with which he talks to certain of his immediate others, i.e. the second, third, fourth and fifth named. Further, although an appropriate and meaningful statistical test of the data is not apparent, the fact that ninety-five percent of the first-named immediate others within the university were in the same department as the researcher is interpreted as some evidence that who is named as an immediate other is associated, in part, with departmental assignment or organizational location. In none of the other four instances were less than seventy-five percent of the university colleagues, named as immediate others, located in

departments other than that of the researcher. Thus, on the basis of these findings, given the departmental locus of a group of researchers one could predict with better than seventy-five percent accuracy the organizational location of each of their immediate others.

Implications for Research

Two of the most obvious implications of the findings of this study involve the need for further research aimed at testing and further developing and refining the theoretic base on which hypotheses two and five were posited.

As has been suggested earlier in this chapter, the complexity of the relationship of perceived research competence and interpersonal communication patterns is concluded to be greater than suggested by the theoretic rationale of this study. However, the understanding of that relationship is still seen as basic and contributory to our ultimate understanding of the interaction effects within the academic department as a research unit. The notion of relative credibility of those playing various roles within that unit would appear to be central to the further research implied. Although no measure of interpersonal trust was incorporated into this study, the implications of its relevance are strong and, in the opinion of the writer, should be included in any further study undertaken.

The inclusion of this measure might also be found to be helpful in further understanding the phenomena surrounding the area of interest relevant to the fifth hypothesis. The data would seem to

support the notion that almost every researcher has, at least, one "high-frequency confidant" with whom he discusses research related matters--some have more. Both the variables that influence who he selects and with how many he communicates at a high frequency level would appear to merit further study. The interpretation of findings of this study suggests that, in part, who is selected is a function of organizational location. The findings relevant to the first-named immediate other suggest the need to consider variables in addition to those included in this study and the need to measure the level of frequency below the level measured in this study. By inference, the data provide basis for concluding that interpersonal communication between substantial numbers within a given department takes place at a frequency below the "weekly" level.

Closely related to the above implication is the conclusion that collection of data which would make possible the complete mapping of linkages within and between departments might be highly beneficial. The nature of the sample and data collected in this study did not permit such mapping. In particular, that approach would allow for identification of "chains" or "networks" that might, in part, account for infrequent interpersonal encounters between, for example, a department head and certain of his faculty who are a linkage or two removed from him due to factors such as organizational structuring within the department.

This study had as one of its intents the exploration of the means used by the department head to exert influence on the direction of his department in two specific areas, i.e. on the nature of research done in his department and in stimulating publication

productivity. The findings appear to justify the conclusion that interpersonal communication was, as seen by department heads, centrally involved in such means and influence. Further study of the evidences and perceptions of such influence, for example, from the researchers perspective, would seem to be a meaningful next step toward an evaluation of the effectiveness of those means and further determination of the relative importance of interpersonal communication as a variable in the study of complex academic organizations.

Another of the exploratory areas of this study involved the evaluative process as it pertained to the criteria and the respective sources of information relied upon by the department heads. The findings of that exploration, coupled with the findings in the testing of hypotheses one and three and with those of Murray (1965), suggest that our understanding of the evaluative and reward processes is meager at best. Further, that our ability to identify and measure some of the key variables, e.g. research productivity, publication output, etc., is dependent upon further study and development and refinement of appropriate instruments. Responses of the department heads support the belief that all acts of publication are not equivalent. Thus, instruments are needed to take into account a greater complexity of variables than number alone.

One of the apparent related needs, operationally, is an improved index of evaluation. Salary increments alone are of questionable utility and validity. In addition to Murray's (1965) finding of a significant negative relationship between length of institutional service and salary increment, study of the contemporary practices

in institutional budgetmaking and increment determination reveals frequent use of formulas and policies governing increment ranges which logically would tend to veil appraisals of merit or exert a "ceiling" effect on some individuals meriting the maximum increment allowable in a given year. In a state institution, such as was being studied here, the relative adequacy of legislative appropriations in a given year or series of years is, of course, related to the above.

Implications for Practice in an Academic Research Organization

Given acceptance of the premise, as stated at the outset, that scientific accomplishment is increasingly dependent on coordinated and collective efforts, findings in this study have implications that would appear to contribute to the increase of such accomplishment. Basically these implications relate to the "socialization" process to which future scientists could be exposed during their undergraduate and graduate programs and, possibly, even in-service periods of their professional careers.

Findings of this study, as interpreted in earlier sections, indicate that (1) consensual values among both researchers and department heads appear to relegate communication related capacities and characteristics of the ideal researcher to a lesser importance than certain other basic scientific capacities and skills and (2) department head responses provide evidence of their awareness of and concern for the social influences and interaction within their departments. The awareness and concern is evidenced both in their evaluation criteria, Table 14, and in their responses which clearly defined

their belief that productivity of researchers was more directly the function of such factors within the immediate social environment as peer recognition, autonomy, and challenge than of salary increments or promotion in rank. Then, of course, the selection and hiring process, named as one of the three major means of influencing the nature of research within the department, also has implications for affecting the social environment of the unit.

Admitting that evidence on which to base recommendations in this area of social science is still in the stage where "truth" is highly tentative, a seemingly low-risk investment in increased emphasis on formal education aimed at (1) increasing the relative value placed on the communication related skills and capacities by scientists and administrators and (2) a reinforcement of awareness and greater understanding of the significance of the social environment to scientific output would seem to be in order. On the assumption that such values and understandings can be taught, implementation of such an emphasis might take the form of course work with an objective of increasing the understanding of the future scientist of the role of communication within the scientific process, as suggested in Chapter 1, and his professional and ethical obligation to participate. Similarly, such course work might cultivate his understanding of the basic theory of interpersonal as well as other forms of communication including publication for various audiences. The resultant appreciations, e.g. for the need of a source and receiver to share meaning for concepts and vocabulary, effects of social systems on communication etc., logically should benefit both research and teaching efforts--the latter of which was seen by most department heads as being the

primary function of a university. Greater understanding of these processes has obvious implications for those scientists moving into administrative roles, as most of the heads in this study were found to have done. It should enable them to evaluate researchers and teachers more effectively and, hopefully, make more effective use of their number one tool for influencing the nature of research and publication productivity within their departments, i.e. interpersonal communication.

Still another area of course work that might logically be included would be aimed at improving the mastery of skills, i.e. particularly writing, on the assumption that one writes more willingly when he perceives himself competent to do it. Department heads were unanimously agreed on the great importance of a "good researcher" publishing. Although publication output was only one of more than a dozen criteria on which researchers were evaluated, it was one of major importance. Furthermore, as Murray (1965) found, researchers who published, perhaps because they published, enjoyed high evaluation as researchers among their peers and, as already discussed, other rewards appear to accompany such evaluation.

Thus, from both the standpoint of the future advancement of the individual and in the interest of increasing his value to his department, his discipline and to the scientific enterprise, such curricular emphasis in the preparation of future scientists would seem to be a logical and prudent investment.

REFERENCES

Andrews, Frank. The scientist and his administrative chief: communication, autonomy, influence, and scientific performance. Analysis Memo #14. Study of Scientific Personnel, Survey Research Center, University of Michigan, 1962 (mimeo.).

Argyris, Chris. The fusion of an individual with the organization. American Sociological Review, 19 (1954), 267-272.

Barber, Bernard, and Hirsch, Walter. The Sociology of Science, New York: Free Press, 1962.

Berlo, David K. The Process of Communication. New York: Holt, Rinehart and Winston, 1960.

Bernard, Jessie, Schilling, Charles W., and Tyson, Joe W. Informal Communication Among Bioscientists. Washington, D. C.: George Washington University, Volume 1, 1963; Volume 2, 1964.

Blau, P. M. Patterns of interaction among a group of officials in a government agency. Human Relations, 7 (1954), 337-348.

Blau, P. M. Formal organization: dimensions of analysis. American Journal of Sociology, 63 (1957), 58-69.

Blau, P. M. Structural effects. American Sociological Review, 25 (1960), 178-193.

Blumer, Herbert. Society as symbolic interaction. In Arnold M. Rose (Ed.), Human Behavior and Social Processes, Boston: Houghton Mifflin, 1962, 179-192.

Caplow, Theodore, and McGee, Reece J. The Academic Marketplace. New York: John Wiley and Sons, 1961.

Cottrell, A. H. Scientists: solo or concerted? In B. Barber and W. Hirsch (Eds.), The Sociology of Science, New York: Free Press, 1962, 388-393.

Couch, Carl J., and Miller, Mason E., and Murray, John S. Communicative Behavior of Agricultural Scientists. Institute for Extension Personnel Development, Michigan State University, East Lansing, Michigan, 1964, (mimeo).

Couch, Carl J., and Murray, John S. Significant others and evaluation. Sociometry, 27 (1964), 502-509.

Coutu, Walter. Emergent Human Nature. New York: Alfred A. Knopf, 1949.

de Grazia, Alfred. A concept of scientists and their organizations. The American Behavioral Scientist, 6 (1962), 31-34.

Doyle, Edward A. The Status and Functions of the Departmental Chairman. Washington: Catholic University of America Press, 1953.

Etzioni, Amitai. A Comparative Analysis of Complex Organizations. New York: Free Press, 1961. (a)

Etzioni, Amitai. Methods for the study of organization. Complex Organizations: A Sociological Reader. New York: Holt, Rinehart and Winston, 1961, 419-421. (b)

Folger, Anne, and Gordon, Gerald. Scientific accomplishment and social organization: a review of the literature. The American Behavioral Scientist, 6 (1962), 51-58.

Glaser, Barney G. Attraction, autonomy and reciprocity in the scientist-supervisor relationship. Administrative Science Quarterly, 8 (1964), 379-398.

Glaser, Barney G. Comparative failure in science. Science, 143 (1964), 1012-1014.

Glaser, Barney G. The local-cosmopolitan scientist. American Journal of Sociology, 69 (1963), 249-59.

Goetzinger, Charles, and Valentine, Milton. Communication channels, media, directional flow and attitudes in an academic community. Journal of Communication, 12 (1962), 23-26.

Golembiewski, Robert. Behavior and Organization, New York: Rand McNally, 1962.

Gordon, Gerald, and Marquis, Sue, and Anderson, O. W. Freedom and control in four types of scientific settings. The American Behavioral Scientist, 6 (1962), 39-43.

Gordon, Gerald. The problem of assessing scientific accomplishment: a potential solution. IEEE Transactions of the Professional Technical Group on Engineering Management, EM-10 (December, 1963), 192-196.

Gross, Neal, and Mason, Ward, and McEachern, Alexander. Explorations In Role Analysis: Studies of the School Superintendency Role, New York: John Wiley and Sons, Inc., 1957.

Gustad, John W. Communication failures in higher education. Journal of Communication, 12 (1962), 11-22.

Hawkins, H. Stuart. Influence of role commitments, perceived role-conflict, and gregariousness on the publication behavior of

agricultural scientists. Unpublished Master's thesis, Michigan State University, 1964.

Hickman, C. Addison, and Kuhn, Manford H. Individuals, Groups and Economic Behavior. New York: Dryden Press, 1956.

Homans, George C. The Human Group. New York: Harcourt, Brace and Co., 1950.

Jackson, Jay M. Reference group processes in a formal organization. Sociometry, 22 (1959), 307-327. (a)

Jackson, Jay M. The organization and its communication problems. Journal of Communication, 9 (1959), 158-167, 189. (b)

Kidd, Charles V. American universities and federal research. In B. Barber and W. Hirsch (Eds.), The Sociology of Science. New York: Free Press, 1962, 394-416.

Kornhauser, William. Scientists in Industry. Berkeley and Los Angeles: University of California Press, 1962.

Kuhn, Manford H. Major trends in symbolic interaction theory in the past twenty-five years. The Sociological Quarterly, 5 (1964), 5-22.

Lampan, Robert J., and Buechel, Henry T. The pressure to teach. Journal of Higher Education, 27 (1956), 68-72, 114.

Levinson, D. J. Role, personality and social structure in the organizational setting. Journal of Abnormal and Social Psychology, 58 (1959), 170-180.

Lindesmith, Alfred R., and Strauss, Anselm L. Social Psychology. New York: Dryden Press, 1949.

March, J. G., and Simon, H. Organizations. New York: Wiley, 1958.

McEwen, W. J. Position conflict and professional orientation in a research organization. Administrative Science Quarterly, 1 (1956), 208-224.

Menzel, Herbert. The Flow of Information Among Scientists. New York: Columbia University Bureau of Applied Social Research, May, 1958, (mimeo).

Menzel, Herbert. Review of Studies in the Flow of Information Among Scientists. New York: Columbia University Bureau of Applied Social Research, 2 Vols., January, 1960, (mimeo.).

Merton, R. K. Social Theory and Social Structure. Glencoe, Ill.: Free Press, 1957.

Millet, John. The Academic Community. New York: McGraw-Hill, 1962.

Morse, Taylor H. Improving instruction in the college classroom. Mimeo of address (extracted) given before the Annual Meeting of the American Association of Colleges for Teacher Education, Chicago, Ill., February 13, 1959.

Murray, John S. Influence of self concepts, significant others and interactive patterns on the publication activity of agricultural scientists. Unpublished Ph.D. thesis, Michigan State University, 1965.

Newcomb, Theodore M. Social Psychology. New York: Dryden Press, 1951.

Newcomb, Theodore M. An approach to the study of communicative acts. Psychological Review, 60 (1953), 393-404.

Parsons, Talcott. The Social System. Glencoe, Ill.: Free Press, 1951.

Pelz, Donald C. Leadership within a hierarchical organization. Journal of Social Issues, 7 (1951), 49-55.

Pelz, Donald C. Some social factors related to performance in a research organization. Administrative Science Quarterly, 1 (1956), 310-325.

Pelz, Donald C. and Andrews, Frank M. Similarity to five colleagues and role of communication with them, as related to output. Analysis Memo #12, Study of Scientific Personnel, Survey Research Center, University of Michigan, (1961), (mimeo.).

Pelz, Donald C, Mellinger, Glen D., and Davis, Robert C. Human Relations in a Research Organization. Ann Arbor: Institute for Social Research, University of Michigan, 2 vol., 1953.

Sarbin, Theodore R. Role Theory. In Gardner Lindzey (Ed.). Handbook of Social Psychology, Vol. I. Cambridge: Addison-Wesley, 1954, 223-258.

Shepard, Herbert A. Superiors and subordinates in research. The Journal of Business, 29 (1956), 261-267.

Siegel, Sidney. Nonparametric Statistics for the Behavioral Sciences. New York: McGraw-Hill, 1956.

Stogdill, Ralph M. Interaction among superiors and subordinates. Sociometry, 18(1955), 552-557.

Storer, Norman. Science and scientists in an agricultural research organization: a sociological study. Unpublished thesis, Cornell University, 1961.

Storer, Norman. Institutional Norms and Personal Motives in Science. Harvard University, March, 1963, (ditto).

Storer, Norman. Paradigms and collegia in the biological sciences: a study of the structure and functioning of research specialty groups in science. A proposal submitted to the National Science Foundation, 1964, (ditto).

Thompson, James D. and McEwen, William J. Organizational goals and environment: goal setting as an interaction process. American Sociological Review, 23 (1958), 23-31.

Turner, Ralph H. Role taking, role standpoint, and reference groups' behavior. American Journal of Sociology, 61 (1956), 316-328.

Turner, Ralph H. Role taking: process versus conformity. In Arnold M. Rose (Ed.), Human Behavior and Social Processes. Boston: Houghton Mifflin, 1962, 20-40.

Waisanen, F. B. Stability, alienation, and change. The Sociological Quarterly, 4 (1963), 18-31.

Whyte, William H., Jr. The Organization Man. New York: Doubleday, 1956.

Wilson, L. The Academic Man. New York: Oxford University Press, 1942.

APPENDIX A

SCIENTIST COMMUNICATION STUDY
(Dept. Head Interview Schedule)

Project Number (1-3)

Phase Number

Department and Subject Number

Locale: Building _____ Room _____

Time: Hour _____ Date _____

*****

Could we get some of the vital statistics first?

Q 1. How long have you been head (or acting head) of the department here at MSU? _____

Q 2. How old are you?

1 - under 30	6 - 50-54
2 - 30-34	7 - 55-59
3 - 35-39	8 - 60-64
4 - 40-44	9 - 65 and over
5 - 45-49	0 - _____

Q 3. What is your subject matter specialty? ..that is... when you introduce yourself to persons in your discipline, how do you define your field?

_____

_____

Q 4. When did you obtain your doctorate? _____

Q 5. Where did you obtain your doctorate?
1. M.S.U. _____
2. Other Land Grant _____
3. Other _____
4. _____

Q 6. Were you employed on the professional staff here at MSU before becoming head of the department?
1. Yes 2. No

IF YES SKIP TO Q 8 IF NO, ASK Q 7

Q 7. What was the nature of the position you held immediately prior to coming to MSU? _____

_____

Q 8. Approximately what proportion of your time do you spend on:

1. Conduct of research _____
2. Classroom teaching _____
3. Extension work _____
4. Administration _____

*****

Now I'd like to talk about your views on research and the job of a researcher.

HAND INTERVIEWEE THE I - R FORM

Q 9. Would you use this sheet in indicating which of these characteristics are most and least important in an ideal researcher?

TAKE THE FORM WHEN COMPLETED

*****

Now let's consider for a moment the set of persons with whom you communicate most frequently in your work as a department head.

Q 10. Who are the individuals you talk to most frequently about your department's research and related administrative problems? I'd appreciate getting from five to fifteen names.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

11. _____

12. _____

13. _____

14. _____

15. _____

*****

Q 11. From the names listed above, which five do you talk to most frequently about departmental research and related problems?

CHECK (✓) AND LIST THOSE FIVE AT THE TOP OF "IMMEDIATE OTHER" SHEETS, AND SOLICIT THE REMAINING INFORMATION ON THEM.

*****

Some people's opinions of us are important to us while the opinions that certain other people have about us are not. I'd like to get your ideas as to whose opinions a researcher should care about.

Q 12. In general, whose opinions of your research staff should be important to them? Putting it another way, whose opinions should carry the most weight with them?

_____

_____

_____

Q 13. Looking at just three groups that are often mentioned by researchers as being important to them, would you rank the following three by assigning a total of 15 points among them to indicate the relative influence their opinions should have on a researcher in your department?

1. _____ Fellow scientists

2. _____ Appliers of research such as farmers, etc.

3. _____ Administrators with whom they work

*****

Now, a couple of questions about your opinions concerning publication by scientists.

Q 14. To meet your standards of a "good researcher," how important is it for a member of your professional staff to publish?

5. _____ extremely important
4. _____ very important
3. _____ fairly important
2. _____ not very important
1. _____ not at all important

Comments: _____

Now using 100 points, would you indicate relative importance on the following question?

Q 15. When it comes to communicating his findings, what, in your opinion, is the relative importance a researcher should give to making his results known to the following:

1. _____ Professional journals (i.e. others in his specialty)

2. _____ Other researchers in his department

3. _____ Other researchers on campus but outside the department

4. _____ Teachers and/or students

5. _____ Those who can immediately apply the results (e.g. farmers, processors, etc.)

The next questions concern your opinions about the work of your department.

Q 16. How much voice do you feel you have in determining the kind of research your department does?

5. _____ more than any other person
4. _____ as much as any other person
3. _____ some, but less than certain others
2. _____ very little
1. _____ none

IF ANSWER ABOVE IS ALTERNATIVE 3, 2, or 1 ASK Q 17; IF NOT SKIP TO Q 18.

Q 17. What groups or individuals have "more voice" than you have in determining the nature of that research?

1. _____
2. _____
3. _____
4. _____
5. _____

Q 18. Who (i.e. individuals or groups including any listed in item 17) has a voice in determining the kind of research your department does?

		Relative Importance
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Q 19. Of those you have just named (immediately above), what's the relative magnitude of the influence they exert? (RECORD ABOVE USING 100 POINT SYSTEM.)

IF ANSWER TO Q 16 WAS OTHER THAN "NONE" ASK Q 20; IF ANSWER TO Q 16 WAS "NONE" SKIP TO Q 21.

Q 20. You have indicated that as department head you exert some influence on research activities of your researchers; what means do you use to do this?

1. _____
2. _____
3. _____
4. _____
5. _____

Q 21. In particular, do you make a conscious attempt to stimulate your professional staff to publish?

2. No 1. Yes (PROBE FOR HOW)

Q 22. Which professional journals, if any, does the department make available to the research staff?

1. _____

2. _____

3. _____

4. _____

5. _____

Q 23. Does your department sponsor or participate in regularly scheduled seminars, colloquia, or other routine means of keeping others in or outside of your department up-to-date on what's being studied by your department researchers?

2. No 1. Yes (PROBE - WHAT ARE THOSE MEANS?)

IF THE DEPARTMENT SPONSORS OR PARTICIPATES IN SEMINARS OR COLLOQUIA, HAND THE INTERVIEWEE THE LIST OF HIS DEPARTMENT MEMBERS IN THE RESEARCHER SAMPLE AND ASK Q 24. IF "NO" IN Q 23, HAND HIM THE LIST AND ASK Q 25.

Q 24. Looking at this list of some of your departmental members, would you indicate the approximate frequency of their attendance at these seminars by entering one of three letters in the blanks in from of their names. Please write "R" in front of those who attend regularly, "O" for those who attend occasionally, and "S" for those who seldom attend.

WHILE INTERVIEWEE HAS THE LIST BEFORE HIM, ASK Q 25

Q 25. If you feel it appropriate, would you circle the names of one or two on that list who you would say contributed "as much or more than any other" toward the significant research accomplishments of this department during the past three years?

Q 26. In all organizations some gain a reputation for superior performance. Without regard for department, would you indicate some of those listed on those two pages who, in your opinion, most deserve the reputation of "outstanding researcher"? Just place a check mark behind the names of one to five persons. You may check more than five if that number is too limiting.

ASK FOR, AND RETRIEVE, THE LIST

Q 27. As department head, how well informed do you feel about the progress of research underway in your department?

5. _____ extremely well informed
4. _____ very well informed
3. _____ fairly well informed
2. _____ not very well informed
1. _____ not at all informed

Q 28. Based on your experience as a department head, which of the following are of major importance as stimulators of productivity among researchers:

1. _____ continuing challenge in their work
2. _____ job security
3. _____ autonomy (e.g. freedom in choosing research problems)
4. _____ advancements in salary
5. _____ recognition by their peers
6. _____ recognition by laymen
7. _____ recognition by administrators (other than $)
8. _____ other _____

Q 29. What are the criteria on which you evaluate the researchers in your department for promotion and/or salary increments?

		Relative Importance
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Q 30. Using a total of 100 points, what's the relative importance of these? (RECORD ABOVE)

IF HE DID NOT MENTION PUBLICATIONS, ASK Q 31, OTHERWISE SKIP TO Q 32.

Q 31. Do you consider the number of publications authored by your researchers under any of the above? If so, which one?

_____

Q 32. In considering publications, do you make any distinction between popular and professional articles or publications?

2. No 1. Yes (PROBE FOR CRITERIA) _____

_____

Q 33. You mentioned some criteria on which you evaluated researchers, how do you get information relevant to these--what are the major sources of this information?

1. _____
2. _____
3. _____
4. _____
5. _____

Q 34. Do some of the researchers in your department also teach and/or do Extension work?

2. No 1. Yes (SPECIFY) _____

_____

IF ANSWER TO Q 34 IS NO, SKIP TO Q 37

Q 35. What kinds of information, over and above the pertaining to the research criteria, do you consider in evaluating them as teachers (or Extension workers)?

		Sources
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Q 36. How or where do you get this kind of information? (RECORD ABOVE)

Q 37. Thinking now in terms of the overall effectiveness of Michigan State University in fulfilling its mandate, and your department within the University, what is the relative importance of the three basic functions? Could you assign a total of 100 points to give me an idea of the relative importance of these three?

1. _____ Teaching

2. _____ Extension

3. _____ Research

Now, two final questions that relate to your department.

Q 38. When you are faced with significant or major decisions (e.g. substantial expenditures for equipment, changes in emphasis on research) who are the people you most frequently talk them over with?

Within your own department?

_____

_____

_____

Elsewhere on the campus?

_____

_____

_____

Off Campus?

_____

_____

_____

Q 39. In every organization, some members almost always "abide by the rules" while others more often question, challenge or attempt to modify them. Who on that list of researchers from your department would most often fall into the latter category?

1. _____

- END -

FOR USE WITH Q 9

L. R.

Subj. No. _____

Here are some characteristics that have been attributed to good researchers. Read over the list. Then, select that characteristic which, in your opinion, is most important for a ideal researcher to have. Enter the corresponding number in the uppermost box. Then indicate the next two most important characteristics by entering the appropriate numbers in the second row of boxes. Then reverse your perspective, and select the least important characteristic for an ideal researcher and enter the number in the lowest box. Fill in the two remaining rows by selecting the next two least important characteristics from the remaining five and entering these numbers the second bottom row of boxes, and then enter the remaining three numbers in the middle row. It may help to strike out each statement after it has been used.

The Ideal Researcher:

1. keeps up to date in the literature.
2. is dedicated to the search for knowledge.
3. sees the other fellows point of view, is easy to work with.
4. willingly accepts long hours and hard work
5. has an ability to choose the important questions.
6. is fair in exchanging ideas and criticism with others.
7. is analytical in that he is able to sort out relevant relationships.
8. uses sound methodology, is accurate and precise in data collection and analysis.
9. writes up findings with clarity, and with sufficient but not too much detail.

most important to an ideal researcher

least important to an ideal researcher

Note: Identical instrument used in collection of "ideal researcher" data from researchers.

I. O. S.

Subject Number _____

Other Named: _____(as Sig. too: Y__ N__)

What does he do? (elicit primary work role)

Research _____ Administration _____
Teaching _____ Other _____
Extension _____ _____

Where does he work?

This Dept. _____ U.S.D.A. _____
This Campus _____ Other Campus _____
Other _____

That is the basis of your relationship with this person? How come you talk to him more than to others?

Immediate superior _____ Administrator (not
Fellow department head _____ immediate superior)
Outstanding researcher _____ _____
Member of my department _____
Other _____
_____

What aspects of research and related problems do you talk about with this person?

_____

_____

How frequently do you communicate with this person? (talk to, phone, write)

More than daily _____ Twice a week _____
Daily _____ Weekly _____
Every other day _____ Less than weekly _____
Less than monthly _____

Note: Similar instrument used in collection of "immediate other" data from researchers.

APPENDIX B

SCIENTIST COMMUNICATION STUDY
(Researcher Interview Schedule)

Project Number (1-3)

Phase Number (4)

Department and Subject Number _____(5-8)

Locale: Building _____ Room _____

Time: Hour _____ Date _____ (9-11)

*****

First of all, a few vital statistics....

Q 12. How old are you?

1 - under 30
2 - 30-34
3 - 35-39
4 - 40-44
5 - 45-49
6 - 50-54
7 - 55-59
8 - 60-64
9 - 65 and over
0 - _____

Q 13. What is your academic rank?

1. Assistant Professor
2. Associate Professor
3. Professor
4. _____

Q 14. What is your subject matter speciality? ...that is...when you introduce yourself to persons in your discipline, how do you define yourself?

_____

_____

Q 15. When did you obtain your doctorate? _____

Q 16. Where did you obtain your doctorate?

1. M.S.U.
2. Other Land-Grant _____
3. Other _____
4. _____

Q 17. Did you have professional employment before coming to this station?

1. Yes 2. No

IF YES, ASK: Q 18 IF NO, SKIP TO: Q 27

Q 18. What kind of work did you have before coming to this station?

1. Research
2. Teaching
3. Research-Teaching
4. (Other) _____

Q 19. With what type of agency were you employed?

1. Other Experiment Station _____
2. Industry _____
3. U.S.D.A. _____
4. College of Agriculture _____
5. (Other) _____

Q 20. How long did you work there? _____

1. less than 2 years
2. more than 2 years, less than 5 years
3. more than 5 years, less than 10 years
4. more than 10 years

Q 21. Did you have other professional employment prior to the position just discussed?

1. Yes 2. No

IF YES, ASK Q 23 IF NO, SKIP TO Q 37

Q 22. What kind of work was it?

1. Research
2. Teaching
3. Research-Teaching
4. Other _____

Q 23. With what type of agency were you employed?

1. Other Experiment Station
2. Industry _____
3. U.S.D.A. _____
4. College of Agriculture _____
5. Other _____

Q 24. How long did you work there? _____

1. less than 2 years
2. more than 2 years, less than 5 years
3. more than 5 years, less than 10 years
4. more than 10 years

Q 25. Did you have other professional employment prior to the position just discussed?

1. Yes 2. No

IF YES, ASK Q 26 IF NO, SKIP TO Q 27

Q 26. How many other professional jobs have you held? _____

*****

Now I'm going to read some statements that Agricultural Experiment Station Researchers have made about themselves and their research.

PROVIDE CARD A

For each statement I'd like you to indicate how you feel about it, that is, how true it is in your own particular case. When I read each statement, first, tell me whether...in general...you agree or disagree with it...and then tell me a number...one, two, or three...to indicate how much you agree or disagree.

Q 27. _____ _____ I try to do research which will make an original contribution to the storehouse of knowledge.

Q 28. _____ _____ The research I do may directly affect a large number of people in a way important to their welfare.

Q 29. _____ _____ It would bother me to have other scientists in my field (specialty) regard my research as insignificant or inconsequential.

Q 30. _____ _____ My research deals with fundamental scientific questions.

Q 31. _____ _____ I try to do research which will provide practical solutions to "real" problems that people have.

Q 32. _____ _____ The research I do is regarded as important by other scientists in my field (specialty).

Q 33. _____ _____ It would bother me to have nonscientists regard my research as inpractical or ivory towerish.

Q 34. _____ _____ My research deals with immediate problems of Michigan producers-processors-consumers.

Note: Card A listed three alternative degrees of disagreement and three alternative degrees of agreement.

*****

The next questions concern those persons who are important to you as a researcher. I would like you to tell me who some of these persons are..., and then a little bit about them.

*****

Q 35. Whose opinion of you as a researcher is important to you? (request 5 names)

1. _____ _____

2. _____ _____

3. _____ _____

4. _____ _____

5. _____ _____

Now consider that the amount of importance of these persons to you as a researcher is equivalent to 15 points. Distribute or assign the 15 points among these persons according to their relative importance.

*****

(The names provided are now written at the top of "Significant Other" sheets, and the remaining information solicited for each.)

*****

Q 36. Now, considering all the researchers you know in your discipline....

PROVIDE CARD B

How do you rate yourself on competence as a researcher? What number? Where 1 means among the few least competent and 9 means among the few most competent?

_____

*****

Now a few questions about the writing you do as a researcher.

*****

_____

Note: Card B listed nine alternative levels of competence.

Q 37. First, considering all the things you do as a researcher, how do you feel about writing research reports?

Dislike most of all _____
Dislike somewhat _____
Not different from other activities _____
Like somewhat _____
Like most of all _____

Q 38. Again, considering all the things you do as a researcher, how difficult do you find the writing of reports?

Most difficult activity of all _____
Somewhat difficult _____
Not different from other activities _____
Somewhat easy _____
Easiest activity of all _____

*****

Now let's consider for a moment the set of persons you deal with most frequently in your work as a researcher.

*****

Q 39. Who are some of the people you talk to most frequently about your research? (elicit five names)

1. _____
2. _____
3. _____
4. _____
5. _____

*****

(The names provided are now written at the top of "Immediate Other" [I. O. S.] sheets, and the remaining information solicited for each.)

Q 40. How frequently do you give talks or lectures to groups of non-scientists (non-students)?

No. _____ per year

Q 41. Which professional journals do you subscribe to?

1. _____

2. _____

3. _____

4. _____

5. _____

If more than 5, give total number _____.

Q 42. Which non-professional periodicals (farm magazines, trade magazines, popular magazines) do you read regularly (read more than two-thirds of the issues).

1. _____

2. _____

3. _____

4. _____

5. _____

If more than 5, give total number _____.

Q 43. In all groups of people, some gain a reputation for superior performance. Here is a partial list of the researchers at this Experiment Station; who are some, that in your opinion, most deserve the reputation of outstanding researcher? (list _____)

1. _____

2. _____

3. _____

4. _____

5. _____

S. O. S.

Subject Number: _____

Other Named: _____ Wt. _____

What does he do? (elicit primary work role)

Research _____	Administration _____
Teaching _____	Other _____
Extension _____	_____

If a scientist, is he of your ----

discipline Y _____ N _____; specialization Y _____ N _____

Where does he work?

This Dept. _____	U.S.D.A. _____
This Campus _____	Other Campus _____
Other _____	

What is the basis of your relationship with this person? How did he come to be important to you?

Doctoral Advisor	_____	P. Supervisor	_____
Ex-Supervisor	_____	P. Colleague	_____
Ex-Colleague (work)	_____	Related Research	_____
Ex-Colleague (grad school)	____	P. Administrator	_____

Other _____

_____

Do you exchange with this person,

Reprints	Y_____	N_____
Unpublished mimeo material	Y_____	N_____

Do you share other interests with this person besides your research?

Y_____ N_____

How frequently do you now communicate with this person? (talk to, phone, write)

More than 1/day	_____	Less 1/wk, More 1/mon.	_____
Daily	_____	Less 1/mon., More 2/yr.	_____
Less 1/day, more 1/wk.	_____	Less 2/yr.	_____