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A CONSIDERATION OF THE PLANETARIUM AND THE
LECTURER AS AGENTS TO EFFECT CHANGE IN
ADMINISTRATORS REGARDING SOCIAL ATTITUDES IN
THE SCHOOL AND COMMUNITY.

University of Illinois at Urbana-Champaign,
Ph.D., 1972
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A CONSIDERATION OF THE PLANETARIUM AND THE LECTURER AS AGENTS TO EFFECT CHANGE IN ADMINISTRATORS REGARDING SOCIAL ATTITUDES IN THE SCHOOL AND COMMUNITY

BY

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THESIS

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Education in the Graduate College of the University of Illinois at Urbana-Champaign, 1972

Urbana, Illinois
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

THE GRADUATE COLLEGE

June, 1972

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY SUPERVISION BY MARION MERLE JAMISON

ENTITLED A CONSIDERATION OF THE PLANETARIUM AND THE LECTURER AS AGENTS TO EFFECT CHANGE IN ADMINISTRATORS REGARDING SOCIAL ATTITUDES IN THE SCHOOL AND COMMUNITY

BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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PREFACE

Within the seventy years of this twentieth century, the field of education has witnessed many trends in emphasis and an even greater number of monumental changes. These situations have been paralleled by educational philosophies, concepts, theories, and practices; some were causal in nature, some were results, and some were simply concurrent related happenings. To many, the relationship of educational theory to educational practice has been of most concern. Nowhere in the field of education has this relationship been of more concern than in educational administration and supervision. At present, the debate continues -- how practical should we be, how theoretical should we be and how do we determine what attitude to take under the circumstances. This question is especially critical for education because of its traditional, unique role in bringing recent research to people and at the same time being a liaison enabling people to reach the educational process (the people's needs and/or practical perspective).

No doubt the debate will go on. However, this may help the reader to understand why this dissertation was developed, ordered, and written as it is found here. There is some concern about the usual approach to graduate study research in administration and supervision.
which selects several practical variables, sets up a comparison study, then reaches for the appropriate literature and research which will support it. This study is an attempt to put research in proper order to convey to the reader the need to make theory relevant and practical, that is: literature, theory, question and then the study or comparison.

In using this approach, the thesis loses none of its objectivity, reliability, or validity. In fact, it is my expectation and desire the reader will see evidence of much concern for objectivity, reliability, and validity.

Some of the concepts such as "attitudes," "leadership," "administration," "social system," which pervade this thesis are not easy to comprehend. They are even more difficult to explain. Hopefully, some clarity has been put into the manuscript.

There is a need to clarify the major concepts on which the research is based. Chapter one deals expressly with our educational purposes for this time. Chapter two deals with the objectives, limitations, and the rationale of the research study. Chapter three is an attempt to profile the relationship and identify the characteristics of the school and community. Chapter four deals with leadership and the administrator role since a decision-making process is involved in this study. Chapter five comes to grips with attitudes and attitude changes and the concept of this somewhat nebulous term
(attitude). Chapter six deals with the agent of change, namely a teaching device called the Planetarium, the reader will find of interest. The problem then, the research methods regarding the problem, concurrent procedures, results, conclusions, and implications for further study are found in the remaining chapters.

Regarding simplicity and clarity, the use of a quick reference glossary, to be found in the appendix, will enable the reader to follow the discussion with more meaning.

If the reader is only interested in certain sections of the dissertation, he can turn to page viii for the table of contents; to page 67 for a statement of the research problem; to page 73 for the experimental procedures; to page 69 for the questions of significance. A quick review of the major findings are found on pages 80-106; the conclusions and implications for further study are found on pages 108-114.

In conclusion, the five volumes of print-out from the computer as well as the transcription tape for this research is found in the library at Olivet Nazarene College, Kankakee, Illinois.
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CHAPTER I

EDUCATION FOR THE 70's

"If a nation expects to be ignorant and free, in state of civilization, it expects what never was and never will be." (Thomas Jefferson)

Since education is considered so important for the development of the nation, it is logical that people should be concerned vitally with purposes and policies. Differences of opinion should be expected. These differences present problems, but they also provide challenges and stimulate further studies and thinking on the part of many people.

The economic development of the nation has been impressive. The relatively abundant natural resources, but perhaps even more importantly, the rapidly improving educational level of the entire population, has made it possible for the people to achieve the highest level of income found in any nation. The high level of personal income attained by a large proportion of the population has made it possible to expand and improve the educational program, although many would question whether the resources devoted to the support of education have been adequate to meet the needs of the day. The points of view and values held by most citizens have gradually evolved with considerable controversy among people with widely different traditions and origins. Many of

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the early differences in outlook and opinion have been resolved, but some have not; and new issues arise periodically for serious consideration. These developments have much significance for the educational program and the determination of educational aims.

If the goal of school public relations is to have an effect on attributes of the public - on knowledge, attitudes, or behavior - it is of more than passing interest to understand the conditions and forces that make these attributes what they are. In spite of the large number of public opinion and attitude surveys conducted in education over the years, greater illumination of the forces determining public inclinations appears to be emerging from the recent investigations of school elections and voter behavior.

It is necessary to call attention to the importance of understanding relatively stable and enduring orientations of citizens toward the schools rather than transient opinions or information about issues of the moment. Never before has so much attention been given to educational change and to educational planning for the future as during the present decade. Education is simply one among many social institutions concerned with the extrapolations of present trends, the construction of hypothetical alternative futures, the preparation for emerging conditions, and, insofar as practical, with the deliberate shaping of what is to come in the years ahead.
Near range concerns for the future have been invested with more than usual tension by the educational revolution in which we are engaged - a revolution that is part of a broad social revolution that is taking place in most parts of the world. Out of the turmoil of the 70's will continue to come many changes in the governance of education, in educational decision-making processes, the instructional programs of the schools and colleges, and in the roles of those associated with educational institutions.

The "explosion of knowledge," though a tired phrase, is still the easiest way to describe the exponential growth in knowledge which seems destined to continue. Curricular stresses are sharpened: Is the knowledge of processes such as planning, decision-making, and problem solving, information storage and retrieval, economic control, and socialization more important than the traditional content of disciplines? Are processes and content that separable? How should knowledge be organized for more efficient learning? Will the schools soon develop and adopt effective uses of the computer and other educational mediums in aiding instruction and facilitating a management information system as a basis for better decision-making?

The question facing our society, and particularly our educational profession, is whether the professions as we have known them can survive the transition in their
members' values, from the sacred-moral-stoic to the secular-calcultative and epicurean. At least one answer may come from another issue in the evolution of the educational profession: whether it can shore up the quality of its professionalism by giving more rigorous attention to the need for more systematic organization of both the theory and practice contained in its sustaining body of knowledge. This issue, of course, leads to a prime implication of societal changes for the preparation of those involved in education.

Particularly since World War II, education appears to have become of focal concern to our entire society. Increasing public interest is reflected in legislation, in court decisions, and in the attention paid to education by political candidates and office holders. In many of these activities, schools have been conceived not only as centers of instruction but as instruments of social policy - agencies to foster integration, job opportunities, and proper civic behavior.

One factor which makes education of major concern to the entire society is the belief that education has a bearing on national security. In the period immediately after sputnik, education for defense was seen chiefly in terms of improving instruction in science and mathematics. Now, many citizens support the view that to prepare to deal with ends as well as means, the overall instructional program should be strengthened.
In education for economic growth, as in education for national security, we find again that policy making for schools has transcended school government and has been thrust into the arena of general government.

Many people are also convinced that education fosters social mobility. Robert Havighurst and Bernice Neugarten, after many studies, conclude that education is less a cause than means and that where schooling is readily available, as it is in most places in this country, young people with intelligence and ambition find it a ready means for self-improvement.

Americans expect much from schools to insure national security, economic growth, social mobility, and improved citizenship in the democratic way of life. Expectations which tend to thrust education into a prominent position and require policy decisions for education at the hands of general government not simply educational government. In all this, there is clearly the danger of expecting more than our schools can deliver under the present system.

Formal education alone cannot solve all of society's pressing problems. The schools are very much the instrument of society, and can do little unless they find support in its milieu. On the other hand, schools have been known to provide the kind of leadership that has changed in some degree the environment within which they exist.
More realistic understanding of the interaction between school and society is needed, to permit us to focus more clearly on what the schools can and should do. Schools need to join in collaborative efforts. Improvement of the human condition is the objective of the health services, the welfare services, and the law enforcement agencies. Only in this kind of collaboration does the likelihood exist that severe problems of our society can be alleviated. In a very real sense, then, policy making for any of these public functions also affects policy making for education.

Educators in the 70's will necessarily come to terms with the essential humanity of people. The educator must realize that his own individual humanity is threatened only when he, himself, is insensitive to the needs and the fears, pains and joys, which students and adults alike experience as they learn. The contentual objectives of the 70's will be expressed specifically in a to-the-point fashion, reflecting the skills of educators who apply objective criteria in their search for relevance. The curriculum research, the national curriculum projects, and the major development task forces of the 70's all are providing, slowly, foundations for meaningful goals for individuals--goals that simultaneously contribute to the achievement of national goals. The complexities of our nuclear age will require closer correlation of goals by curriculum developers at all levels to insure
a democratic ideal among the freedom-loving nations of the world.

If giant steps are taken, schools of the 70's will reject normative teaching in practice as they have already done in theory. The individual will no longer receive better grades, and grade levels, too, will no doubt be abolished. These will be replaced by a continuous diagnostic program that is appropriate to each individual. Computers will assist in record keeping, reporting to the parents, diagnostic evaluation, and the teaching process itself. The teacher will devote time to teaching relevant processes, the scientific inquiry, while the computer, planetarium, and language laboratories will provide for repetitive type of learning through individually tailored programs of practice and response.

National and international television by satellites will be available to every school and home, revolutionizing communications of societal roles, and destroying permanently the myth of isolationalism. The complexities of interdependencies will create new problems unimaginably complex, and the concept of the school as an institution set apart from society at large will grow increasingly obsolescent. The "Giant Step" schools will become part of the immediate community and will affect it as much as a fresh water spring affects a pond making large ripples in the immediate vicinity, and smaller ones at more remote points which merge with, and affect, the
influences of other currents in the pond.

Viewing the total community as a potential and actual classroom, schools will utilize community centers of learning, museums, parks, libraries, planetaria theaters, industrial complexes, and other sites for the provision of experiences geared to the unique goals and interests of students. With basic skills being taught by carefully programmed instructional devices, such as retrieval systems, planetaria, video taped lectures, and language laboratories, teachers will be free to engage in adult-child discourses on topics relevant to the "here and now".

Administrators will assume the role of instructional leaders in the schools. Working closely with the teacher educational institutions and using the resources of research centers and regional laboratories, the principal will find that his primary task is to insure the ongoing education of his staff.

If giant steps are taken in the 70's, the educator will be a scientist-professional. Such persons will not cease to be concerned for individuals—quite the opposite, for their concern will not be expressed in a "hit or miss" fashion. Instead, educators will learn to analyze data of behavior, then to couple this behavioral analysis with a keen understanding of human development in order to plan precise, effective intervention with the objective of change toward a prede-
termined goal. This has always been the scheme for the educational encounters of individuals; the teacher of reading has understood the value of the printed word, and his program has sometimes been called "diagnostic"; but the effectiveness of many such programs has been questionable because the programs have not been formulated in a scientific frame of reference. Such unrewarding approaches will be abandoned as education discovers its power and comes to terms with that power to make certain that it is applied in a relevant and humane manner.

Our times demand more than a minimum education program. Quality is necessary. Needed are project grants to encourage innovation, grants to assist in covering additional costs of restructuring outmoded school systems, and increased funds for educational personnel training at the graduate level. The school that provides the best education would, of course, have a higher percentage of students passing the national examinations and would thereby receive recognition. Schools would then be encouraged to improve the education they offer, and parents would demand better quality from their schools.

In response to the question, "What lies ahead for education in the 70's?", it must be said that change lies ahead. The direction of that change depends entirely on whether we purposefully change in order to meet our needs or let change occur without direction.
If we are to have quality education in this country in the next decade, then those responsible for education at all levels must act decisively. A high level of public understanding and public support will be required to override the narrow and selfish interests that tend to control public policy.
CHAPTER II

OBJECTIVES, LIMITATIONS AND RATIONALE

An objective is an intent communicated by a statement describing a proposed change in a learner—a statement of what the learner is to be like when he has successfully completed a learning experience.

Objectives identified for this project have far reaching implications for most communities.

Objectives

1. To identify positive community attitudes toward some social issues.

2. To identify questionable attitudes and determine which segments of the community administrators held them.

3. To use individual and small-group contact to effect a favorable change in community attitudes toward these social issues.

4. To determine the amount of gross attitude change for each individual on all items on the questionnaire.

5. To determine the average from the pre-test and post-test for the group as a whole.

6. To determine the amount of net attitude change on all items on the questionnaire for each individual from the pre- to post-test.

7. To determine the amount of net attitude change on all items of the questionnaire for the group as a whole from pre- and post-test.

8. To determine on what items, there are significant differences in the pre- and post-test gross attitude changes on the total sampling.

9. To determine on what items, there are significant
differences in the pre- and post-test gross attitude changes for each of the five subgroups.

10. To determine on what items, there are significant differences in the pre- and post-test net attitude changes on the total sampling.

11. To determine on what items, there are significant differences in the pre- and post-test net attitude changes for each of the five groups.

12. To stimulate the administrator to a greater awareness of the majesty and order in the universe of which the earth is a part through the introduction of some of the basic methods of observation and research.

13. To provide dramatic stimulus to the leadership of the community and surrounding area and encourage them to be curious about the universe and to seek a better understanding of the earth-sky phenomena through observation and consideration.
Limitations

The area of study regarding the Planetarium and school community attitudes is new. Studies of many types are needed to help direct its development. This investigator could only scrutinize one aspect of its complex nature, therefore, the study was limited in the following ways:

1. The sample population was chosen from members who had already made a name for themselves and who had, by virtue of their own efforts, occupied responsible positions in the community.

2. The community in question will be isolated; however, it represents a community which might be found anywhere. Most types of managers, supervisors, authorities, and figures of influence in this study are representative of a community, but the sample may be biased toward industry.

3. Elements regarding sex, political affiliation, religious allegiances will prevail. The environments will be a closed system and a comparable socio-economic level might be difficult to identify.

4. It is limited to those administrators of community institutions that have responded to the questionnaire.

5. It is limited to a particular community and restricted by the issues, believed by the writer to be, significant to that community.

6. It is limited to questions which were relatively less threatening and designed to evoke favorable responses from the available answers.

7. It is limited to the comparability of the pre- and post-testing techniques.

8. It is limited to the selection of variables differing only on socio-economic or socio-psychological dimension (e.g. membership in organization), not on other characteristics.
9. No attempt has been made to determine the effect of the lecturer with respect to the total procedure.

10. This study utilized data collected at one point in time without the benefit of serious cause - effect considerations.

11. This study concerns itself with a relationship toward attitudes but no attempt is made to predict behavioral intentions as a result of cognitive attitudinal postures.
Rationale

Rationale is a logical explanation devised to explain and justify the existence of the statements and the subsequent planetarium program.

All statements found in the Administrator Attitudes Questionnaire are significant in that they represent some of the major issues involved in the Kankakee study. The statements were categorized into two areas of the school and community, namely, social concerns to administrators in the Kankakee area and the Planetarium which is symbolic of the schools' value as a social agent of change.

The 28 statements represent six general topics, and they are:

1. Learning Theory
2. Attitudes, social and personal
3. Developments, Innovations and Change
4. Community participation
5. Finance
6. The Planetarium as an agent of change

1. Statements 13, 20, 21, 22, 23, 26, 30, 31, 34, 35, 36, 38, 40 represent a tenuous connection with the theory of learning.

2. Statements 14, 15, 24, 28, 29, 31, 34, 39, 40 were involved directly with Attitudes, both private and corporate.

3. Statements 17, 19, 22, 24, 34, 36, 37 were grouped in the general theme of Innovations, developments and change.

4. Statements 18, 19, 27, 28, 33, 35, 37 were significant to the principle of community participation.

5. Statements 19, 21, 22, 32, 35, 36, 37 were appropriate in an indirect way to the major considerations of Finance.
6. Statements 16, 19, 20, 24, 25, 27, 31, 34, 37, 38, 39 were directed toward the Planetarium itself as an agent to influence the respondent.

It is essential the reader understand that this research technique is not designed to appeal to the cognitive aspects of the experiment. In very few instances in the teaching treatment are direct references made to specific statements on the questionnaire. The control in the experiment is designed to evoke a series of responses as a result of the entire experience. It can be explained in symbolic fashion in the following way:

\[
\begin{align*}
Q & \rightarrow 35 \\
A \rightarrow & V_1 \\
\text{less tenuous} & \quad \text{more tenuous} \\
\therefore & = \text{Total response to all statements (13-40)}
\end{align*}
\]

Where Q represents a statement, A and V symbolize the Audio and Visual effect upon the respondent during the Planetarium program. The tenuousness of a particular statement is significant to the amount of influence exerted by the stimulation within the closed and controlled environment.
CHAPTER III

THE SCHOOL AND COMMUNITY

"The nature of the Community largely determines what goes on in the school. Therefore to attempt to divorce the school from the community is to engage in unrealistic thinking, which might lead to policies that could wreak havoc with the school and the lives of children. The community and the school are inseparable." (James Conant)

As American culture, society and our various communities find themselves faced with new problems, we can have two reasons for a feeling of assurance about the future. First, the United States is a dynamic, not static, country - we cannot and will not stand still - and the presence of problems is a sign of healthy growth. Second, we have built in American a school system which, with all of its many faults, thrives on problems and difficulties; it is the kind of flexible and adaptable enterprise that grows as it faces new challenges. As our culture and our communities change, the school that is sensitive to its obligations to the community, that gives it life and meaning as an educational institution will change too - and both school and community will become stronger in the growth process.

The school which seeks to develop good working relations with all of the members of the community must not
concentrate on the parents alone. Every adult in the community may have a better opportunity to become informed about the schools if every possible effort is made to secure adequate coverage of school affairs and problems in the local newspapers, over radio and television. Through wide distribution of interestingly written school reports and newspapers, presentation of programs and displays will be seen by the "downtown" folk. Best of all, there will develop a natural and effective inter­communication between school and community if the former is doing an effective job of serving the total educational needs of the community. The community-minded school already has a head start on the road to good public relations just because of the kind of school it is and the richness of the program it offers the community. The school as a formal education agency has perhaps never had complete identity of interest and purpose with all the other agencies and institutions of the community it serves, but schools of an earlier age were in many ways closer to their community than they are today. As the function of education became more formalized, special teachers, curriculum, and buildings came to be set apart for the carrying out of this important social function; the preservation of the cultural heritage, the group way of life and indoctrination and training of the young. Gradually, education became synonymous with schooling, and the school grew apart from the community it served.
Sometimes education became sharply and consciously divorced from the life of the community. There is evidence now that a rift is developing between school and community that did not generally exist over a hundred years ago.

The urbanization of our population has brought millions of people together into our great metropolitan centers, and tens of thousands into our cities and towns; the older concept of "neighborhood" has in many places virtually disappeared. The children are strangers to each other, their families are not acquainted, the teacher is in many cases just another hard professional devoted to her work, perhaps here today and gone tomorrow—a local resident who went away to the normal school "for a couple of years" and returned home to teach. Rural schools have been abandoned or consolidated; schools are more centralized, generally much larger; they serve not a community or a neighborhood in the older sense of the term, but a geographic area circumscribed only by the distance which a school bus can travel. The school district may be very large, covering perhaps a whole county or parts of several counties; the school board members see each other at board meetings and never see many of their constituents at all. Both the school and community of course have changed, and sometimes it seems they are perversely changed in opposite directions, moving further and further away from each other every
year.

The religious tie between school and community formally a very strong one in many areas has all but been completely severed. There have been other cultural patterns of change, too. Shifting populations, the decline of the old semi-feudal agrarian patterns of life, the immigration of foreign born persons or those from other sections of the country, the decline of the family as an independent economic unit, the questioning of firmly established moral and social values - these are but a few of the changes that have effected the closeness of the school-community relations.

What if the community does not want its schools to be adaptable, to take an active part in community life, to alter in any way the academic traditionalism that isolated them from the real life of the community? In short, what if the needs of the community and its children and youth are not recognized by the community itself and any proposed alteration in the school programs opposed by the parents and denied administrative or financial support by the board of education? Should not the professional educators - teachers, principals, and superintendents - insist on a good program and go ahead with it anyway? The answer to this question is a somewhat reluctant but otherwise unqualified "No!"

It is a responsibility for professional educators to work honestly and courageously and intelligently for
the kind of education they believe to be best, but the final decisions on plan and program must rest with the **community** - the public that supports and controls the school. The educator has the same citizenship rights but are only accorded or loaned to him as the general public sees fit. As Willard Goslin (himself a teacher and **administrator** who has pioneered in developing community acceptance of many new educational ideas) has said, in discussing the rights of teachers, "The teaching profession may develop the core curriculum, for instance, but the people have the right to throw it out on its ear or on any part of its academic anatomy." The close relationship of school and community will be felt directly in a better educational program. This closer relationship contributes also to the community as a whole for good schools make better communities. An alert, informed body of citizens can work together to create a lively, interesting, satisfying community life. The higher the level of educational opportunity, the higher the economic level of the group. Well-educated and appropriately educated people make the best citizens; they study and understand community issues and problems; they are politically active; they read more intelligently and more widely; they fight more courageously and more consistently; they support such community programs as movements for better civic government, better roads, improved soil conservation practices, and community health.
services. In every way, the community that has good schools is a better community.

It is not at all unusual today to find the community-minded school serving as a community center and meeting place to a far greater degree than was usual even in the 'good old days' when life seemed to center around the little red schoolhouse. It doesn't have to be a fancy, modern school with lots of meeting rooms and good equipment.

Whatever the physical facilities available, the community school can serve the adult population in many ways. In rural areas, villages, towns, or cities, it can become a place of meetings of all kinds, the center of the entertainment and "cultural" life of the community (through school-sponsored musical, athletic, dramatic, and recreational programs, or such activities conducted by the adults themselves); if properly equipped, it can be a general activity center as well. Many schools today use the home-economics facilities for serving banquets and dinners for nonschool agencies and groups; a small charge for use of the building must be made, of course, but the results in terms of community service and community interest are well worth the effort.

If the thesis of this chapter is correct— that the good school is an integral part of the community it serves — then one of the major tasks of the school is to engage in a program of effective communications. Now,
the term "public relations" has a somewhat unfortunate and unsavory connotation in the minds of many people; it suggests "selling the public" on their schools, "putting over" a new idea or a new program, or "influencing favorable opinion", or even "putting your best foot forward", and (by implication) concealing from the public the limitations, failures, or mistakes of the school system they patronize and support.

Really, school public relations - often abbreviated simply to "PR" - means establishing better working relations with the public; it means working together with the general public for better schools and a better educational program.

The recent wave of attacks and criticism of modern public education have made many schools more conscious of a job they have sometimes neglected: finding out what the public expects of its schools, keeping the public informed about what is happening or is about to happen in their educational system, and soliciting public help in joint planning for ways to improve the schools.

Public relations deals with one side of the school-community relationship - the school's effort to influence the community. Such efforts must be carried on within the context of the social and political control exercised by the community and the society at large over the school, and to ignore this larger context is to
render public relations an exercise in futility. The
topic is a large one, beyond the scope of the present
review, but several lines of contemporary research
should be noted that have begun to clarify the dimensions
of the problems and may eventually lead to a redefini-
tion of the public relations task itself.

It is plain that the public schools in the United
States are subject to many powerful influences emanating
from beyond the boundaries of the local district (R.
Campbell & others, 1965) - influences that may far out-
weigh those originating from within the immediate environ-
mental setting. Schools are becoming relatively less
dependent upon the "goodwill" of the local public.
Even among the localized influences, a distinction must
be drawn between those that reflect impersonal circum-
stances of the district, such as economic conditions and
demographic forces, and hence incapable of alteration
through communication and persuasion, and those that
represent interests and attitudes of the local populace.
Mort and his students, in studying the adaptability of
school systems, separated a "public understanding" or
"goodwill" factor from such factors as size and wealth
of the district in an effort to estimate their inde-
dependent contributions to district variance in adapta-
bility (Ross 1958). Pierce (1947) referred to the
former as "controllable community characteristics".

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implying that they could be affected through public relations programs. Recent investigations, to be reviewed more fully later, raised doubts regarding the amenability of the attitudinal processes underlying "public understanding" to persuasion attempts. One remarkable study conducted in a Detroit suburb (Smith & others, 1964) suggests that the changes in citizen support for the schools resulting from public relations efforts ("contrived changes") were small in comparison with "natural changes" associated with the immigration of new residents. Carter and Suttoff (1960) have argued that the issue is not one of the general public's "understanding" but rather the level of "understanding" among community leaders plus the existence of effective mediating agencies between leaders and the rank-and-file citizens.

James (1964) and Jenson and Staub (1961) review studies that center directly on the processes of political and social control over school policies. The research on community power structure (Bloomberg & Sunshine, 1963: Kimbrough, 1964) raises the question, but by no means settles it, regarding the conditions under which it is worthwhile at all for the school to deal with the general public as opposed to small coteries of local power wielders. The growing body of research on the political linkages of the school board (Cronin, 1966; Lutz, 1962; Minar, 1966), as well as on the
internal dynamics of board decision making (Cunningham, 1959) raises the same question. The superintendents' role in mediating cross-pressures arising within the community (Gross, 1958; Gross & others, 1958) draws attention to other, potentially countervailing factors in the community's control of the school, including progressional associations of teachers and of administrators and the bureaucratic character of the school organization itself (Corwin, 1965).

The principle lesson from the foregoing research is that we must not expect vast improvements in the attitudes and interests of the general public.
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CHAPTER IV

LEADERSHIP AND THE ADMINISTRATOR

"... The acquisition of knowledge opens up the most terrifying prospects of controlling what people do and how they think and how they behave and how they feel." (F.S. Jewell)

The concept of leadership is one of the most hazy and perplexing notions of the behavioral sciences. The argument as to the complexity of research related to administrative theory is not without cause. Scholars interested in administration have attempted to answer some of the most fundamental questions about human organizations: Why do people subordinate themselves to leaders? Why do leaders arise? What is their source of influence and what is the process by which they exercise it? What difference does it make to an organization that leadership exists?

Katz and Kahn (1966)¹ see no difference between leadership and the administrator. For them, leadership will take place at any place and at any point in the organizational hierarchy. However, leadership at these distinct levels requires different personalities, traits, intellectual skills and demands different behaviors by the leader. According to Katz and Kahn, leadership consists of "all acts of influence which effect matters of organizational relevance", with special emphasis on

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the increment of influence which goes beyond that which formally accrues to a role incumbent, that is, a school principal who simply implements a school policy would not be considered, normally, to be performing a leadership act. However, a principal who supplements an existing policy or who imaginatively interprets such a policy might be thought to be exercising leadership.

The obvious dilemma occasioned by the existence of many definitions of leadership is that a leader is never confident that research finding based on different definitions are comparable. The discussion, then, of research findings about leadership and the administrator, as they appear in the literature, must be implicitly bound by the admission that the researchers may not have been examining the same phenomena.

In addition to difficulties arising from conceptual definitions of leadership, there are those that arise from methodological considerations. Perhaps the basic question to be raised is, "how does the researcher know he has observed leadership?" If one adopts the reinforcement strategy which seems the most tenable and is surely the most useful one, the administrator's value can be described in fairly specific terms. The administrator's major contribution is as an interpreter of the logical demands of his parent organization. He is the one who translates the requirements into operational terms which reinforce rather than interfere with professional attitudes.
and behaviors. Looked at in this way, the role of the administrator is a dynamic one in that he must take the given requirements and operationalize them for the professional staff members in his charge. He becomes, as is so often the case of the administrator, a special kind of middle man between the abstract organizational goals of which he is a part and the real world of professional behavior. The strategy which the administrator adopts and from which his tactical behavior will flow will reflect the day to day kind of assumption he makes about his position and place in the community construct. He may not even be aware of the potential which he possesses. To some extent his behavior will be based on his own analysis of the various factors present to him. In the course of the investigation having to do with this research study, the sample population chosen was respondents who were by several definitions in positions of the leadership role or in positions of management. All of them in one way or another were involved in the decision-making process and were responsible for the work of at least one other person and had formal authority over that person. It was not the purpose of this study to identify completely the causes that place these persons in positions of authority but only to recognize they had a particular type of earned or delegated influence.

An administrator in this study was seen as a person
occupying a position in a formal organization and as a person responsible for the output of at least one other person. A person whose work he is responsible for becomes a subordinate and the persons that he works with and who he is responsible to becomes his superior. There were five categories of administrators in this study that were identified as being that type of person.²

1. Self-employed.
2. The executive - that person who integrates and develops programs.
3. The supervisor - one who determines and interprets those programs.
4. The manager - that person who coordinates the activities of those programs.
5. The specialist - one who reports and carries out prescribed actions.

So, the difference between these types of leaders is essentially based on where the power lies and who has the responsibility and degrees of authority. Obviously, most administrators having this authority will perhaps fall into all five categories at one time or another.

For centuries effective management has been described and sometimes measured in terms of a list of personal qualities or traits - the all effective leaders who were thought to possess traits such as judgement, integrity and energy appeared often on such lists and the appeal of this particular type of approach is that it is easy to understand, appears sensible, and is widely used. It is often found useful in describing the
qualities required for particular positions of authority. The weakness of this type of approach to the identification to administrators and leadership is - there is no agreement on the best traits that fit all situations - there is no evidence that one group of traits predict effectiveness generally and there are now well over a thousand different traits to deal with. For this reason the trait approach to the identification of administrators is becoming less popular.

Administrators are involved in the exercise of authority and the bearing of responsibility. If group decisions about the purposes of education and the nature of social issues in the community are to be carried out, some responsible person or persons must have and accept the authority to enforce group decisions and to attend to the specific details. These same leaders or administrators are involved in a variety of communication situations. Each is different from the others. Probably, except in the case of formal written reports or speeches, this communication is always a mixture of both formal and the informal types. Small group communication may relax the status differential between people and give opportunity to express to groups and to members of the groups the leading opportunity for questions, for clarification of meaning, and for expressions of support or criticism. Thus, the administrator sees his role as that of a communicator to each from all.
If authority resides in leadership and administrator relationships, and if agreement and conviction are the soundest basis for such authority, it is essential that all individuals involved in the situation come to understand the facts and participate in the decision-making process. It has been much repeated as a dictum of democracy that all who are affected by decision should participate in making it. A rational basis of authority is the undergirding of a democratic system of bureaucracy and administration that insists authority be derived from analysis of the situation to be met and dealt with accordingly.

Another dictum of democracy and of organization alike is that authority must be commensurate with responsibility. This can be turned around to say that a person must be held responsible for as much authority as he commands or exercises. When authority residing in the administrator is organized in terms of common emphasis or of mutually compatible purposes, there is evidence that people are flexible rather than fixed. Given a common goal and understanding of self-circumstances there is prospect that membership including leader will be willing to make modifications either temporarily or permanently to meet the needs of the various situations identified in the community. This is sounder than to repeat the same unsatisfactory experiences year after year by changing the administrator leadership or persons
in positions of leadership.

Acknowledgable participation of hundreds of people is required if the school is to make adequate use of the talents and the abilities of those who serve in the community. Only through the studied, thoughtful, and informed participation of the community can the schools achieve their full potential as a social institution and become integral part of the community. John Stuart Mills Said,

"Great economic and social forces flow like a tide over half-conscious people. The wise are those who foresee the coming events and seek to shake their institutions and mold the thinking of the people in accordance with the most constructive change. The un-wise are those who add nothing constructive to the process, either because of ignorance on the one hand or ignorant opposition on the other."

This, then, is the primary consideration and the reason for having community leadership become an active part of this research study, for by in large those administrators and leaders in the community are the ones who determine the direction the community will take and have the most to say about the kind of community it will be.

It is hoped by using these intellectual forces they in turn will be able to recognize and provide for educational needs and the answers for the social issues prevalent in the community. It is further hoped that a relationship would exist that would not be a superficial
one - rather a deep and meaningful relationship. One that is not occasional or temporary but continuous and lasting and come to yield tremendous benefits to all members of the community.
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CHAPTER V
ATTITUDE AND ATTITUDE CHANGE

The topic of Attitudes, Attitudinal theory, and Attitude change is nearly as broad as the field of education itself. This chapter will deal with the various aspects of the problem as it concerns the role of education.

It must have been somewhere in 1953 that Gordon Allport reviewed the general area of attitude, theory, and research. After considering more than one hundred different definitions of attitude, he concluded that most investigators basically agree that an attitude is a learned predisposition to respond to an object or class of objects in a consistently favorable way. Furthermore, he pointed out that this bipolarity in the direction of an attitude is often regarded as the most distinctive feature of the concept, thus attitude was conceptualized as a simple unidimensional concept.

Research based on this conception of attitude and attitude change has not resulted in behavioral prediction and it appeared to Gordon Allport that perhaps this inter-dimensional view was somewhat oversimplified. Is it not true that two people could be equally favorable toward an object and yet feel differently about components or characteristics of that object?
People can be equally in favor of change but disagree on the method of operation of a reform movement. So according to Allport, although too few people may have the same degree of affect toward an object they may differ qualitatively in their attitude toward it. Obviously, one reason why behavior cannot be predicted from attitude is that our measure of attitudes are unidimensional and do not take this qualitative nature of attitude into account. To quote Gordon Allport, "the concept of attitudes is probably the most distinctive and indispensible concept in contemporary American social psychology."  

In order to provide answers to questions about the most effective techniques of attitude change it would be nice to know the kind of problem areas to which the techniques of attitude and behavior change are applicable.

Attitudes have generally been regarded as either mental readiness or implicit predispositions which exerts some general and consistent influence on a fairly large class of evaluative responses. These responses are usually directed toward some object, person, or group. In addition, attitudes are seen as enduring previous dispositions, but ones which are learned rather than innate, thus, even though attitudes are not momentarily transient they are susceptible to change.

The field of social psychology currently is investing much of its research energies in experimental
studies of persuasion, conformity, social influence, and generally in attitude change. Two recent reviews give a picture of the extent of this activity and the kinds of theoretical issues under debate (McGuire, 1966; Muscovici, 1963)^2, while Daniel Katz (1965)^3 offers a modest report of some fruits of the research in the course of a school-community relations seminar. Some of the impetus for research grew out of the experimental studies of Carl Hovland during World War II and continued by Hovland at Yale University in subsequent years (Hovland, 1963)^4. His early discovery that measurable changes in option could be produced in experimental settings by movies, lectures, pamphlets, and the like, enabled him and his co-workers to vary systematically a wide variety of experimental conditions in order to examine their relative effects.

Of special importance to public relations practitioners are the studies that indicate the significance in persuasion of audience perceptions of the source of communication—perceptions as the communicator's credibility, trustworthiness, and impartiality. Hovland (1959)^5 examined the question of disparity between results of laboratory studies of persuasion, where opinion change regularly was achieved, and findings of field studies, where change was rarely observed. He developed a theory of attitude change featuring, as a central
component, the amount of discrepancy perceived by the audience member between his own attitudinal position and the position advocated by the communicator (Hovland & others, 1957; Sherif & Hovland, 1961).

Competing theories of attitude change have developed in association with such terms as balance theory, symmetry, cognitive dissonance, and so on, well summarized by Cohen (1964), which postulate change in attitude as one of several possible consequences ensuing from a psychological inconsistency between an attitude toward an object and information about it, behavior with respect to it, or attraction to other people who have opposite attitudes toward it. Some writers have marked these theoretical and experimental developments as the "breakthrough" of social psychology. One cardinal implication of the research is the contradiction of a standard dictum in educational circles: "In order to change a person's behavior, his attitudes must first be changed." Investigation shows, on the contrary, that attitude change will follow a change in behavior under appropriate conditions. Besides the references cited above, the reader can gain entree to the area of attitude change through the Summer 1960 issue of the Public Opinion Quarterly, devoted exclusively to the topic (D. Katz, 1965).

In constructing an attitude scale it is important that the initial list of statements contain several practical criteria:
(1) Statement should be as brief as possible so as not to fatigue the subject you have asked to read the list.

(2) The statement should be such that they can be endorsed or rejected in accordance with their agreement or disagreement with the attitude of the reader.

(3) Every statement should be such that acceptance or rejection of the statement indicates something regarding the reader's attitude about the issue.

(4) Double barrel statements should be avoided except possibly as examples of neutrality when better neutral statements do not seem to be readily available.

(5) One must insure that at least a fair majority of the statements really belong on the attitude variable that is to be measured.

The essential characteristic of this measurement method is a scale of evenly graduated opinions so arranged that equal steps or intervals on the scale seem to most people to represent equally noticeable shifts in attitude. Ease and simplicity with these attitude scales can be checked for internal consistency seem to make it desirable to determine the reliability and examine the internal consistency of each attitude scale for each group upon which it is used.

The concept of attitude and the meaning of the word us used to denote the sum total of a man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specified topic. Thus, a man's attitude about pacifism means here all that he feels and thinks about peace and war. It is admittedly an objective and personal affair. With the above comments the concept of "opinion" will
here perhaps mean a verbal expression of attitude. Obviously, this is a matter for interpretation and as far as possible uses various words on a linear continuum which will have some scholastic validity. For instance, more or less, good or bad, rich or poor, etc. and this enables us to have some type of a relative comparison even if the pairs used have little, if anything, in common. For the linear continuum implies a conceptual construction giving us the physical existence of a yardstick.

The method of summated ratings calls for a collection of various statements of opinion which are then edited in accordance with informal criteria similar to those used in the Thurstone method. Usually a one to five scale of response is used. Subjects are checked whether they strongly agree, agree, are undecided, disagree, or strongly disagree with each statement. A score is given with each item depending upon the response made. The five possible responses may be weighted 1, 2, 3, 4, 5, or 5, 4, 3, 2, 1. Either 1 or 5 is consistently favorable or unfavorable, although the continuum is reversed in about half the statements. That is, about half the statements are worded so that a strongly agree response indicates a favorable reaction to the issue in question, while the other half of the statements are worded to that a strongly agree response indicates an unfavorable reaction.
Investigators who have used the Likert method seem to be in agreement that it is simpler. In the construction of the Minnesota survey of opinions scales, most agree that it is "less laborious than the scale developed by Thurstone."\textsuperscript{10} After investigation, experience in constructing both Likert and Thurstone scales indicates they agree with other investigators that scales can be constructed by the method of summated ratings more quickly and with less labor than by the equal appearing interval method.

The present approaches indicate that traditional measures of attitude toward a given object, person, or class of people are not likely to be related to behavior in any consistent fashion. Indeed the main purpose of this study is to consider seriously the question of an individual's attitude toward an object. Consistent to this a theory of behavioral prediction has been suggested. In contrast to previous attempts to resolve the attitude-behavior problem by expanding the definition of attitude (over 100)... The proposed behavior today attempts to understand the attitude-behavior relationship by:

1. considering a limited set of variables that function as primary determinants of behavior.
2. analyzing the relations between these variables and traditional methods of attitude.

This brings into focus a summary of much of the evidence that research has provided on the general
topics of attitude, change, and social influence. In a sense, this skims the surface regarding the progress made toward a scientific analysis of rhetoric to the investigation of basic psychological processes. Most of the research presented applied precise, controlled experimentation to the study of the principle areas in the field of persuasion, analyzing the effectiveness of arguments and appeals, the personality factors, the acceptance of influence, the effects of social roles and interactions, and similar issues, in terms of principles of learning, perception, motivation, and cognition. Many of the investigators whose research was examined differed considerably in their theoretical bents and in the specific problems that were chosen for study. They are all, however, concerned with the understanding of attitudes and beliefs through communication and social interaction.

Progress in research is guided by and benefits from being based on some theory. The development of a theoretical base makes it increasingly likely that the experimenter can select beforehand the appropriate variables that effect the acceptance of a communication. "Any theory is better than no theory at all."
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CHAPTER VI

THE PLANETARIUM

"In the middle of the garden, between two waterfalls, there stood a large room, three hundred feet in diameter, whose sky-blue dome, filled with golden stars, reproduced all the constellations and planets in their correct positions; and this dome revolved like the heavens, driven by a mechanism as silent and invisible as that which directs the real celestial motions." (Voltaire)

Although written almost two hundred years ago by Voltaire in "The Princess of Babylon" this would be a fitting description for many of the planetaria in operation today. Planetaria today have large inner rooms, most between 30 and 85 feet in diameter, where the celestial objects and their motions are reproduced in periods of time appropriate for the occasion.

This has not always been true. Although man, since the earliest of recorded time, has been interested in and studied the universe about him, the knowledge and technology has only in this century been advanced enough to make his dreams of an artificial sky possible.

The planetarium is still a comparatively new and rare phenomenon in our national life, and the tools and techniques needed to improve its educational services are still in the process of development. While the planetarium projector was invented more than 40 years
ago, it has only recently been used to any great extent as an educational learning medium.

Most of the world's population today is centered about great metropolitan areas, which during even the clearest of nights present a poorly discernable sky at its best. While we have the knowledge to comprehend the various motions of innumerable celestial objects, only a relatively few are afforded the luxury and opportunity of viewing this splendor at its best.

We may well ask the question, "What is a planetarium?" and, "What specific purpose and advantage does it possess?". Webster defines a planetarium as a model using projectors to display the movements of celestial objects on an hemispherical ceiling (see appendix page 155) and a "room or building containing such a model (see appendix page 156)." A planetarium serves as a fine potential teaching and entertainment device for large numbers of persons can be accommodated and exposed to a consideration of the primary concepts of mankind. Phenomena of the heavens and the earth, both social and physical can be witnessed regardless of the time or weather conditions.

The modern planetarium presents an alternative to traveling out into the country away from the glare of city lights on a clear night. In both instances one would behold a sight that most ancient people probably regarded as an inherent part of their surroundings. The sight awed and overwhelmed them by the mysteries they
represented - mysteries formed by the different motions of the stars, planets, sun and moon.

The stars in the sky remained stationary with respect to one another but altered their position in the sky with the change in seasons and with the daily rotation of the earth upon its axis. The planets appeared of varying brightnesses and not only moved with the rotation of the sky but shifted their positions with respect to the background stars with an erratic but somewhat predictable motion. The sun, climbing high in the summer and dropping low in the winter, created the change in the constellations and announced the coming changes in the seasons. Even the moon going through its phases moved from west to east as it moved around the earth each month and from east to west as the earth rotated each day.

This is what ancient man saw in the sky. This was the chaos from which he attempted to establish order. While attempts were made to bring order to the universe and its motions, it was not until the 17th century and the advent of the telescope that true progress was made. With the telescope, theories which had been proposed could finally be tested, verified and accepted, or proven false and discarded.

Celestial globes were known centuries before the turn of the Christian era. Anaximander, who lived in the first half of the sixth century B.C., is credited with
inventing the celestial globe on which the constellations known at that time were depicted. The Farnese Atlas, dating from the first century B.C., represents the best preserved example of this art. It is also generally believed that a celestial globe was made, or at least possessed, by Eudoxus of Cnidus around 350 B.C.

Other globes of more advanced form followed, but the celestial globe, although a useful tool in the study of astronomy, is not a planetarium. Only the rotation of the celestial globe can simulate the daily motion of the stars. It is simply a representation of the sky without reference to motions of any of the bodies in the sky. Also, the globes give the reversed representation of the sky. The observer is in the position of being outside the universe looking in.

At that time the center of the earth was considered the center of the universe and all motions were viewed as being motions around the earth. But a true model for portraying celestial motions could not be built based on a geocentric universe, and there was not as yet enough understanding to build an accurate model. Even with this lack of understanding, Archimedes is credited with having constructed in 250 B.C. the first planetarium based on the geocentric system. It reputedly demonstrated the motions of the planets, sun and moon.

From the beginning of the Christian era until after the heliocentric system of Copernicus, new efforts
were urged in the study of the universe, astronomy, along
with other semblances of learning during this time.
Once the details of the motions of the heavenly bodies
had been resolved, then ingenious men of many lands began
serious work in the portraying of these motions.

This departure was a large copper sphere almost
twelve feet in diameter, weighing over three tons. It
was large enough to permit ten people to be housed inside
to see the stars and constellations painted on the inner
surface. On the outside was a map of the world which
could be examined in detail by spectators walking around
the globe. The stars painted on the inside were illum-
inated by small oil lamps near the center of the globe.
The globe rotated, by the turning of an Archimedian
screw to simulate the motion of the earth. In 1715 it
was sent to St. Petersburg as a present to Peter the
Great and as late as 1901 was still in existence there.

About 1670, Erhardt Weigel of Jena made a similar
globe ten feet in diameter. Inside it there were many
accessories, with the assistance of which it was possible
to reproduce the phenomena of meteors, rain, hail,
lightning, thunder and volcanoes.

"It contained working models of Aetna
and Vesuvius. 'They give out steam, flames,
and pleasant odours,' writes
Cornelli, 'which pleases spectators.'
Meteors, rain, hail, wind, thunder and
lightning could also be reproduced with-
in the globe. If spectators experienced
all these in succession they must have
emerged with a greatly heightened sense
of appreciation of the world outside." 1
Other globes of similar design were constructed. The last was the fifteen foot Atwood globe dedicated in June 1913. Thousands of visitors viewed its splendors before it was destined to near oblivion by the opening of Adler Planetarium on the shores of Lake Michigan in Chicago.

A mechanical model which showed the motions and positions of the planets in their paths around the sun was constructed at the beginning of the 18th century. It was named an orrery, for John Rowley's first model was constructed for Charles Boyle, the fourth Earl of Orrery.

Mechanical orreries became commonplace during the 19th century, and in many museums throughout the world are still to be found mechanical models depicting the positions of the planets and their motions.

At about the time the Atwood globe was built, Professor Max Wolf, of Heidelberg proposed another method of realistically representing the heavens. His proposal included a great rotary mental dome in which the observer was placed upon a platform. The planets were to be moved upon the inner surface in accordance with their actual apparent motions. A great deal of experimental work was carried out on this idea, but no satisfactory solution could be found. The Zeiss works then began the task of creating a planetarium similar to the Atwood globe, but World War I intervened and no work could be done until the war had ended.
"Reversing the plan of a mechanically rotatable hollow sphere with illuminated images of the stars, he transferred the entire mechanism for the movements to a collection of projectors which would project luminous images of the stars on to a stationary white hemispherical dome of much larger dimensions than those originally conceived. Within the dome, the center of which would be occupied by the projectors, all would be in darkness. By means of suitable mechanisms the projectors would be moved and guided so that their illuminated images of the heavenly bodies would conform on the dome to the motions which actually occur in nature. The projector movements would be effected by electric motors, which, like the various lamps within the projectors, would be controlled from a switchboard." (Max Wolf)²

Thus, instead of creating a rotating sphere with holes to represent the stars, the startling new concept was to project the stars, sun, moon and planets on the inside of a giant sphere. In August of 1923, the first planetarium show was given in a small dome erected on a factory roof of the Zeiss Company in Jena, Germany. After many tests and modifications, this instrument was turned over to the Deutsches Museum in 1925.

The first model was capable of showing the stars and members of the solar system from the latitude of 48 degrees north. Later, another axis was added, along with additional stars, to allow the nighttime sky to be seen from any latitude on earth. The instrument could also provide three other important motions, the diurnal, annual and precessional movements.

Following World War II, Spitz Laboratories of
Yorklyn, Delaware, and the Goto Optical Works in Tokyo entered the planetarium field. Through the efforts of Armand Spitz, new and different designs of planetaria have come into use. Companies such as Viewlex, Minolta, and Harmonic Reed now produce planetaria which are suitable for use in high schools and small colleges. The cost of a major planetarium instrument alone is somewhere in the neighborhood of $250,000. Smaller planetaria including dome and associated equipment, while providing essentially the same performances cost much less. Thus, the cost of smaller planetaria can be within the budgetary limits of communities that provide adequate educational materials.

Of the hundreds of small planetaria that have been established, many are used to supplement astronomy education in the schools and may be utilized regularly for scheduled classes. Others are used much in the manner of the larger units, but on a smaller scale. Some have been so well planned and so expertly administered that their value within their home communities may be said to rival that of the major installations.

Man's great interest in the universe, dating back to prehistoric times, has been the basis for the contention that astronomy is the oldest of sciences. Going back into time, the step-by-step development of astronomy as a science can be followed by looking at the tools developed and used by man in its study.
First came the static model of the world, the celestial globe. This was made more versatile by making it rotatable and by the addition of reference lines. The invention of the telescope allowed a tremendous leap forward in the knowledge and understanding of the universe. This knowledge, along with a more advanced technology, allowed highly complex forms representing the universe to be constructed. These forms were the orreries, even yet extensively used, and the Gottorp globes, the forerunner of the modern planetarium.

The idea of representing the heavens by projecting light upon the inner surface of a fixed dome and making the projector movable has provided mankind with a fascinating as well as flexible and highly valuable tool for the study of his world. It is a tool that can be used to tell the story of astronomy dramatically and scientifically. It is a tool that makes possible the understanding of cosmic events that otherwise could never be seen. The planetarium makes possible the teaching of space sciences in a controlled environment, creating a night sky at any time. The sky can be presented as it appears at any time of the day or night, present or past, and from any point on earth or in the Solar System. Celestial motions can be shown in seconds that would take nature days, years or centuries to produce. It is a tool which can be used successfully with any age group or any level of sophistication. It offers an unparalleled
experience which aids clear understanding, promotes faster learning and stimulates longer retention.

The modern planetarium, whether large or small, is not limited to instruction on astronomy alone. With proper planning and programming, most allied sciences and many areas of education can benefit in its use. Physical science, aeronautics, navigation, geography, surveying, mathematics, physics and meteorology are sciences which adapt readily to planetarium usage. With ingenuity, student interest and attention might also be intensified in such other subjects as history, sociology, music, art, education, English, Latin, and other languages.

This is but a partial list in which the planetarium can be used to good advantage. The possible ways in which a planetarium can be used are limited only by the imagination and ingenuity of the users. The proper use of the planetarium requires many talents and skills but which, with careful planning and production, produce programs well worth the time and effort involved. The planetarium, indeed, is a highly useful and versatile tool.

The heavens and their motions have always been, and still are, an inherent part of man's life. Primitive man, set in a hostile environment and unpredictable terrestrial climate, found solace in the warming sun, pleasant moon and varied stars as certainties on which he could at all times depend. He learned to use the
celestial bodies and their motions to regulate his life. For those events he could not understand, he invented explanations. He built myths and superstitions about them which, in many cases still persist.

With the gradual growth in knowledge and understanding of the motions of the sky, much of the fear and mystery were dispelled, at least in the minds of the learned. The populace in general remained more or less ignorant of these advances, and the "beep-beep" of the Russian sputnik in 1957 found a public totally unprepared to evaluate the importance and great advance in technology and philosophy it denoted.

Man-made crafts have circled the earth, passed Mars and Venus on fly-by missions and made landings on Mars and our Moon. Man has proven that he can venture for long periods of time into space unharmed. New accomplishments in space are being made almost daily and new barriers will be overcome, opening new doors to the understanding of the universe.

This is a period in which the greatest relative increase in scientific knowledge of all times is in progress. It is an era in which the promise of startling advances makes it more than ever imperative that the public be kept informed and that the new information be placed in proper perspective. A backlog of ignorance of yesterday's achievements is always with us, and this, too, must be diminished before we can properly prepare
for the events of the future. The past decade has seen advances in scientific knowledge that have almost no way of becoming known to the public or even to the average student in school or college. The professional literature is so voluminous that it taxes the reading time of any teacher.

Formal educational institutions, because of their avowed purposes and established techniques, can not always disseminate current events in science nor always separate the valid from the invalid. Modern science often makes such rapid advances that the teacher is hard put to extract the essence for presentation to the pupils, even should he be able to find the time or extra energy. Often, too, new equipment is required for proper presentation, and the budget or ingenuity demanded is not available. We are finding, also, that far too few teachers are well enough prepared to be able to either teach well or to interest pupils in science, at the time when we have a need for scientists.

It is important that the citizen be informed and kept up-to-date in science so he can intelligently play his part in the future, not only indirectly but also as a potential direct participant in decisions to conduct future programs. It is necessary to the progress of science that there be a favorable atmosphere among the nonscientists, and an understanding of the aims, methods and accomplishments of science. Not only the other
sciences, but the fields of art, music and literature have been strongly touched by astronomy. There are many pleasures and spiritual satisfactions to be gained from a knowledge of the universe.

Man today are more conscious of everything astronomical because so much of it is found in their daily lives. The average citizen has stored away in his mind many questions about the heavens and his universe, with seldom anyone available to give him the answers in terms he can understand. He can consult books and periodicals but many, difficult to decipher, have the answers he seeks buried in a mass of material. There are societies and clubs which are but a partial answer and then only if associated with reliable authorities.

With its ability to present lectures and demonstrations in an informative and interesting context, the planetarium is extremely well suited to inform the public and the schools in knowledge, both current and old. The planetarium should be a continually developing medium of information to satisfy the interested citizen's curiosity and keep him informed on scientific events.

Not only should the planetarium use its facilities to disseminate information to those already interested but should seize upon every means and opportunity available to create interest in astronomy and its services to mankind. By good examples and exceptional services, a planetarium should seek to raise the level of under-
standing throughout the entire formal educational system.

The planetarium does have a unique and vital role to serve as a center for the stimulation of the mind (in all disciplines) and as an effective interpretive science center. We must try to communicate all that we know (and do not know) to as many individuals as possible to assist them in living in the age of space, the age of protest, the age of pesticides. One of the most distressing aspects of today's technological society is the ever increasing gap between the common man and the intelligentsia. There seems to be an increasing gap between what we can do and what we ought to do. "Know-how continues to leave know-what and know-whether further and further behind." . . . as Joseph Wood Krutch has succinctly stated. 3

Many of us decry the academician that has become such a specialist that he can no longer address himself to public questions except as an expert. We must do our part to reverse this trend. To do so requires that we not just cater to an "elite" portion of the population that truly wants and seeks what we have to offer. It is important that we be concerned with that portion of the population that has only a slight curiosity about what is going on inside our walls. Who is to say which group of individuals will ultimately be of greatest value to the technological and educational environment? What better place exists for placing man in proper
perspective regarding space and time than the planetarium? It is insufficient for us to simply relate trite facts about the universe -- we must relate the achievements of man and his cultural heritage in relation to it.

Even the most modest of our facilities can be effectively used to portray the drama of the heavens. Even though we must compete with other media, we must remember how awe-inspiring the simulated sky is to the first-time visitor (the one who wants to see the telescope or the one who eagerly awaits the opening of the dome). The comment made by Isaac Asimov at Rochester is most relevant: "I can't think of anything which is so immediately visual and so immediately marvelous as the planetarium." Each of us has our little "Wonder of Jena" -- let us use it to the fullest possible extent (within budget, time, and matrimonial harmony), to communicate meaningfully with as many members of our communities as possible. For example, to frequently take some elderly citizens, on a journey through the universe would be most appropriate. These people contributed, each in his or her own way, to our technological world -- should they not enjoy some of its fruits?

Let us examine our priorities. Let us be more active in our attempts to communicate more meaningfully with more of our citizens. Let us look beyond the moon, beyond the solar system, and beyond the universe to man's relationship to all of creation. And when we
do this, we will again be thinking in geocentric terms (which might not be totally regressive). If we do produce a program with some of the value orientations mentioned, we might conclude the program with the lines heard at the Strasenburgh Planetarium: "Twinkle, twinkle, little earth -- How I wonder what you're worth." What are we worth, and who do we serve?

The planetarium offers us an artificial sky on which we can actually perform experiments. By means of time lapse we demonstrate events which cannot otherwise be shown. In this age of space travel, the interest of the public in astronomy is extremely broad. The planetarium has the unique capability of meeting this interest -- and of educating adults on a broad basis. And the ethical and cultural aspects of the operation of a planetarium should not be forgotten. Observation of the starry sky makes man think about his significance -- or insignificance -- in the eternal realm of creation.
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In this second half of the twentieth century, people are more keenly aware than ever before of the differing beliefs, assumptions, values, and ways of life upheld by various human groups. Man's mastery of his physical environment has created a new world, foreshortening time and space in exchanging words, goods, people, and missiles. People differing drastically in outlook and aspiration find themselves in contact—whether they like it or not and whether for good or ill. At the same time, man's changing environment and society strain his traditional assumptions and viewpoints, demanding new modes of adaptation. All of these developments have brought the problems of attitude and attitude change out of the textbooks and into the negotiating hall, the legislature, the marketplace, the schoolroom, the neighborhood, and in the home.

Without a doubt, the accumulated literature on attitudes in socialization, attitudes as factors in psychological activity, attitude measurement, and attempts at attitude change through communication or other social process is more extensive than ever before. This is as it should be. The products of social interaction are revealed, psychologically, as sets of attitudes formed
by the individual. Socialization of the human child consists in large degree of the individual's internalization or learning of the values, norms, roles, and way of life in his family and that part of society in which his family lives.

No matter where we may be living in the world of the 1970's, whether under capitalism or socialism, ours is an age of social change to the point of no return. The alienation problems associated with a widening generation gap, and the fantastically rapid rate of technological change are reflected in problems that by their nature are of concern to our society. Such social actualities pose for social psychology the issue of the validity of its findings and conclusions on the topics it purports to study. The aim of any scientific endeavor is prediction; the fulfillment of such an aim poses one of the problems of the study.

The educational process as an enterprising facet of the community can be brought to bear on the leadership of the community by the use of singular elements in that process to effect some change in attitudes and behavior. The administrators, managers, supervisors, or other persons of authority will be part of a committee or social group and will possess the characteristics of leadership, responsibility, and power. They will also have the most to say about the direction that a particular community or other environment will take.
The planetarium has become an essential part of the educational process in many of the communities with populations above 2,500 people. This is understood, of course, to be in a formal educational situation. Sadly, we find from the literature that little or nothing is known about the effect that such a educational medium has when used on the community participants outside of the realm of this formal educational environment. Thousands, perhaps millions of individuals come from the community to the educational institutions of the United States every year and participate in all types and kinds of activities, such as, athletic events, the performing arts, and educational conferences. Millions of dollars are spent every year on testing programs to validate the existence of the educational system and the effect it has upon the lives of its most active participants, namely, the student. There is no longer any justification for learning being abstract or compartmentalized. It is possible for all individuals regardless of age and station in a social environment to recognize the beautiful order and harmony that exists in our physical world. The planetarium is a technological machine brought to the forefront of educational attention by the twentieth century space age and the achievements of science. This in itself represents the cardinal essence of the rational mind—innate curiosity. There are at least 1,100 planetaria installed and operational in educational
systems in this country and the western world. They are, primarily, teaching devices costing approximately a quarter of a million dollars each. This comes at a time when the community of voters in the democratic society are rebelling at increased taxes and questioning the validity of the expenditure in money, time and effort for the value of the end product from our educational system. As an agent of change, the planetarium has great potential, for it is easily adapted to teaching sophisticated concepts and is well known as an interest stimulator. The planetarium is used in some communities as a device primarily for entertainment purposes. It is suggested at this point that the planetarium can be used to build a bridge of communication between the community and the school. The planetarium can make education relevant to the social problems within the community and justify the importance of education as a dynamic force in society.

The Problem

The purpose of this study is in essence what the title of the proposal implies—to use the planetarium as an influential device and to examine the effect of this device and the lecturer upon a broad spectrum of administrative personnel where social issues are concerned.

The problem was to identify appropriate issues, bring a significant number of administrators into the
controlled environment of the planetarium where most of the variables can be regulated, and measure significant changes in attitude which result from the planetarium program through pre- and post-testing procedures.

Theoretical Frame of Reference

Theoretically, serious attempts should have been made to analyze the relationships between administrative leadership, social issues, and the planetarium to determine attitudinal posture. However, according to research investigation, documented studies have not appeared in the literature.

As a teaching tool, the planetarium has great potential for many allied subjects, such as mathematics, earth-space sciences, history, and language arts, as well as courses in social studies and the humanities. Large planetariums in some of the major cities have contributed significantly in this respect, but they are few in number, high in construction and maintenance costs, and may not have the program flexibility required by individual school classes. Here is where the small "community size" planetarium is most valuable. It exists for the community, is a product of the community, and has the ability to reach every level of interest within the community.

Widespread adoption of a facility of this type in many communities has been long in coming, generally
because of the lack of educational leadership, administration, and adequate building and equipment facilities.

The community has to grapple seriously with problems of social change, a concern that arches over the coverage of almost every topic existent in modern society today. It is necessary to consider the problems of social change as those being greatly expanded, especially materials dealing with the formation change of individuals within groups, the generation gap, and with social groups shaping and shaped by newly emerging self-images of participants in the community. In this study these participants and these groups were identified solely as administrators and persons in positions of authority and power which is, for the most part, legitimate.

In the course of this investigation several salient questions needed to be answered:

(1) What justification is there in the purchase of such expensive equipment to be used expressly by those enrolled in the school?

(2) If we can measure attitudinal changes in students, then should it not be possible for us to do the same with those in positions of leadership in the community?

(3) If teaching devices exist to bring about change, then can we not expect changes to be brought about in those adults who are giving guidance and direction in the community to the educational processes?

The familiar referendums and bond issues around the nation testify to the attitude people have regarding issues in the community that directly affect them, therefore, additional questions might be:
(4) Can we determine the attitude of administrators regarding issues in the social, economic, philosophical, and educational realms with the use of the planetarium?

(5) Is there a difference in the attitude of administrative leadership regarding generalized social issues and the attitudes they have regarding issues in the community that directly affect them?

To use the concept of attitude in understanding and predicting action, we need **reliable and valid measures**. The measurement of attitudes, like the measurement of all psychological determinants, is necessarily indirect. Attitudes can be measured only on the basis of inferences drawn from the responses of the individual toward the object—his overt actions and his verbal statements of belief, feeling, and the disposition to act with respect to the object.

**Attitude Scales:**

Of all methods for the measurements of attitudes, by far the most widely used and the most carefully designed and tested is the so-called **attitude scale**. Actually, most attitude scales have been concerned only with the measurement of valence. Recently, however, some attempts to develop scales to measure the multiplexity of the cognitive component of an attitude have been reported.

An attitude scale consists of a set of statements of items to which the person responds. The pattern of his responses provides a way of inferring something about his attitude. Scales differ markedly in type and in method of construction, but in every case their objective
is identical: to assign an individual a numerical position on a continuum, a position which indicates, for example, the valence of his attitude toward a particular object.

Criteria for the selection of scale items:

In determining which items shall be included in a scale, and how many items are required, the following four criteria are relevant:

(1) Discriminating function. An item must actually discriminate. People of different attitude complexion must respond to the item in systematically different ways.

(2) Sharpness of discrimination. Items should also discriminate as sharply as possible.

(3) Discriminate along the entire scale. Not only is it necessary to be able to separate the sheep from the goats, the friends from the foes, those for and those against; it is also desirable to be able to make much finer differentiations. We need to be able to separate the more extreme sheep from the less extreme sheep, and the less extreme goats from the more extreme goats.

(4) Minimal number of items for reliability. The greater the number of items in a scale, the higher the reliability. This is because irrelevant "errors of measurement" tend to cancel out. Though an individual may ascribe unique meanings to various items in a way that distorts measurement, it is not likely that the distortions will always be in the same direction. The larger the number of items, the less the danger of net distortion in one direction or the other. However, considerations of efficiency and practicality in testing sharply limits the total number of items that can be comfortably accommodated in attitude scales.

This attitude scale involves the following procedures:

(1) The collection of a number of appropriate statements.
(2) The administering of these statements to a group of subjects.

(3) The determination of individual scores to the responses.

(4) The carrying out of an item analysis to select the most discriminating items and to make the significant correlations.

The greatest value of statistical research methodology lies in the fact that it allows us to generalize. It is the purpose of this study to select specific groups for observation and experimentation and hopefully, to find some relationships which will apply to much larger groups in general. It is the further purpose of research to develop general theories based upon studies and experimentation of sample populations under the most stringently controlled conditions.
CHAPTER VIII
EXPERIMENTAL PROCEDURES

All of the preceding chapters contain the essential concepts which are so vital to the complete understanding of the value of the experiment. These previous sections were carefully developed on a very broad generalized base in order for the reader to more clearly understand the emerging concepts which will come, specifically, as the result of a localized situation which is not so broad in its approach. The research was accomplished in a suburban setting and is quite restricted in its testing and measurement procedures.

A total of 470 administrators in the community were contacted and invited to participate in the research effort. Of these, approximately fifty percent (228) of those were involved in the experiment directly.

The questionnaire consisted of two parts:

(1) Twelve questions designed to gather biographical and demographical information about administrative personnel involved in the study.

(2) Twenty eight questions designed to gather a variety of attitudinal information from some statements regarding social issues within the community construct.

Certain questions are of specific interest, and a random sample of responses was selected from all the responses in such a way that each social class, sex, and
classification of administrator are represented in proportion to its incidence in the total administrative population. This procedure is being used so that the sub-samples can be combined in any way desired to calculate descriptive measures, such as means, without weighing these measures to reflect differences in proportionate representation of the sub-samples.

The scores on each scale were analyzed individually and collectively and ascertained if and how they were different. One-way analysis of variance was used and the data were analyzed by the computer.

The administrators met at the planetarium during their regularly scheduled meeting times, at a noon luncheon, or for an evening session. The length of time required for a particular group of administrators was approximately twenty minutes to complete the pre-test. The Planetarium presentation in the chamber was forty minutes in length with the lecturer-demonstrator presenting a pre-recorded program in virtual darkness with only one-way communication present in this controlled system under closed environmental conditions. The post-testing using the initial twenty eight statements as found on the social issues questionnaire were presented to the administrators present immediately after the conclusion of the program and the turning up of the chamber lights. The time required for this exercise was approximately fifteen minutes. The IBM punch cards and the printed questionnaire were retained...
in order to verify the accuracy of the administrators' choice of responses and to control the variable of communication outside the controlled setting.

Response Mode. The observers were asked to circle 1, 2, 3, 4, or 5 on the computer card directly beneath the number of the statement to which they responded.

The Test-Retest Method. The attitude scale questionnaire was administered to the same group of persons at two different times, and the correlation between the two sets of scores was computed.

The Pre- and Post-Test method has an advantage of holding constant the items used, thus eliminating unreliability due to differences between items, which often occurs when the equivalent-forms method is used.

This method of evaluation has some disadvantages—the most obvious being the subject has been tested on one occasion and this may influence his attitude score on subsequent measurements. The most likely effect is that the subject may remember specific items and simply respond accordingly.

Validity. Concurrent Validity is called for in this research because the criterion measure and the attitude scale are administered at approximately the same point in time. There is a recognized danger that one data collection operation will influence the other, thus yielding a rather high estimate of validity.

Reliability. A scale yields consistently reliable...
scores when an attitude is measured a number of times. At minimum then, a useful scale must be reliable and valid. Characteristics that make it reliable and desirable are the equality of measuring units, and unidimensionality. Some social psychologists suggest that for a test to have a zero point means there cannot exist an attitude at all. (Krech and Crutchfield, 1962)¹

Immediately upon completion of the experiment using the five groups totalling 228 observers, the cards were programmed for the IBM 360 Computer at the Computer Services Department of the University of Illinois. SOUPAC (Statistically Oriented Users Programming and Consulting) originated at the University in the late 1950's. It is being maintained and improved by the statistical consultants of the Department of Computer Science. This SOUPAC program corresponds to the February 1, 1972 description manual.

In order for this research to be meaningful and to achieve the stated objectives in the fullest sense, it is essential that the following tables of data be forthcoming from the program of research:

1. A complete analysis of the biographical and demographic information given by the respondents in the first twelve questions of this instrument, individually, by sub-groups and the total group.

2. A complete print out of total, sub-group and individual responses on statements 13-40 in the Pre-test and Post-test exercise.

3. It is important that the total gross sums of

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differences and total gross differences of the sums on the pre- and post-test be available for individuals, sub-groups and total observers responses on statements 13-40.

4. A complete analysis of the correlation between the biographical information and statements 13-40 utilizing the pre- and post-test responses for the individuals, five sub-groups, as well as the entire group of 228 administrators.

5. It is essential to have a one way analysis of variance for statements appearing in the six topical rationale categories for individuals, sub-groups and total observers. They are:
   1. Learning Theory
   2. Attitudes, social and personal
   3. Developments, innovation and change
   4. Community participation
   5. Finance
   6. The Planetarium

6. Means and standard deviations for individual, five sub-groups and the total sample will be necessary for analysis and the interpretation of significant results.

7. To analyze and conclude what net significant changes there were on the positive elements of responses as shown by the relationships between the observer profile, social issues responses and the rationale categories.

Of the infinite array of stimuli which a variety of subjects could perceive and respond to at many levels in numerous dimensions, the subjects, the stimulus, and the response mode have been selected. An experiment is then conceived graphically as a set of these three overlapping circles representing the population of all responses which are relevant to the general problem under investigation. What the investigator studies then is a very small area or point of their interconnection. A correlation study
such as this can never yield unequivocal conclusions about the nature of the causes of the relationships involved.

While the above studied objectives will hopefully be significant, the full range and intensity of psychological variables can only be approximated in the laboratory setting. This is because there is only a relatively brief exposure to the stimulus in an experiment. The task is often of limited relevance to the respondents in other life experiences and has minimal implications for his future functioning. In addition, the nature and intensity of the experimental manipulations are limited by ethical, moral, and social consideration.

The gains achieved by the superior control of an experiment may be off-set by its trivial content. As a result of purifying, standardizing, controlling, and selecting within the procedures of the experiment, it is hoped that the research will not be distant or diluted from the problem that we have set up to study.

Under these conditions, the results, which will be forthcoming from this investigation, hopefully, will have practical significance, since in some degree it may be possible to extrapolate from the research a direct correlation to action-oriented problems of social significance in a community and the community attitudes toward the school.
REFERENCES


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CHAPTER IX
RESULTS, ANALYSIS AND FINDINGS

Probably the most important step in any undertaking in scientific research is to analyze, interpret, and report the findings of research in result form. Obviously, there is nothing to be gained by hiding or concealing the outcome of significant statistics in the experiment. It must be pointed out here that this chapter deals with the raw data which has been collected from the research methods and experimental procedures and now must be properly organized in order for it to be meaningful and useful to the readers.

Analyzing the results of this investigation, it is necessary to determine the relationship between two series of events or between two sets of measurement. Such a relationship if it does exist is known as a correlation.

There are several ways of determining a correlation between two sets of data and two of the most commonly used methods of finding the coefficient of correlation are:

A. Spearman's "rank-difference" method, in which the relative ranks of the two sets of measurement are compared.

B. Pearson's "product-moment" method, in which the deviation from the average of each series is considered.
Of the two methods, Pearson's is the one used most commonly in scientific research. The fact that a high statistical correlation exists between two things does not necessarily mean that the two items are actually related. The coefficient of correlation is only a number and indicates a degree of statistical relationship which may or may not indicate any actual relationship. Certainly it never demonstrates that one event is the cause of another.

In statistical terms the correlation between two sets of data is expressed numerically as a coefficient of correlation, which lies somewhere along the scale as is shown in the following.

<table>
<thead>
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<th>-1</th>
<th>-.75</th>
<th>-.50</th>
<th>-.25</th>
<th>0</th>
<th>+.25</th>
<th>+.50</th>
<th>+.75</th>
<th>+1</th>
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</table>

Perfect Negative Correlation

No Correlation

Positive Correlation

Perfect Positive Correlation

Williams (1968)² and Hays (1963)³ both argue that statistical significance only puts the researcher in the position to interpret relationships and their magnitude. The question then is--what is an acceptable correlation level? Guilford (1956, p. 145)⁴ provides one guide. He suggests that correlations of:

.20 are slight, almost negligible; that
.20 - .40 are low, definite but small; that
.40 - .70 are moderate, but substantial and significant; and that correlations higher than a correlation above .70 are very high and very dependable.

Fiedler (1967, p. 146)\(^5\) seemed to accept correlations of .20 or higher in the development of his Contingency Model of leadership. Devereux (1960)\(^6\) used correlations of .24 to .50 in support of his arguments. Thus, anything lower than .20 has not been acceptable in previous studies.

In interpreting experimental results, bear in mind that all samples are subject to sampling error, that is, the extent to which the results may differ from what would be obtained if an entire population had been interviewed. The size of such sampling errors depends largely on the number of the respondents.

The following table may be used in estimating the sampling error of any percentage in this study. The computed allowances have taken into account the effect of the sample design upon sampling error. They may be interpreted as indicating the range (plus or minus the figure shown) within which the results of the repeated tests in the same time period could be expected to vary 95% of the time, assuming the same sampling procedure, the same change agent experience, and the same research instrument.

The table shows how much allowance then should be
TABLE
Recommended Allowance for Sampling Error of a Percentage

<table>
<thead>
<tr>
<th>Percentages near 10</th>
<th>200</th>
<th>100</th>
</tr>
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<tbody>
<tr>
<td>Percentages near 20</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Percentages near 30</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Percentages near 40</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Percentages near 50</td>
<td>8</td>
<td>11</td>
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<tr>
<td>Percentages near 60</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Percentages near 70</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Percentages near 80</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Percentages near 90</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

made for the sampling error of a percentage.

The table would be used in the following manner.

We may have a reported percentage of 33 for a group which includes 100 respondents. Going to the row "percentages near 30" in the table and across the column headed "100", the number at this point is 10 which means that the 33% obtained in the sample is subject to a sampling error of plus or minus 5 points. Another way of saying it is that very probably (95 chances out of a hundred) the average of repeated samplings would be somewhere between 28 and 38, with the most likely figure 33 obtained.

The purpose of this study was to determine the degree of positive, linear association or relationship between the independent variables and the attitude intensities. With that in mind the two types of techniques suggested

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for determining this association, those dealing with
covariation were seen as most appropriate for the purposes
and types of data dealt with in this study. Of the
various alternatives, the Pearson product-moment is most
appropriate. It is a powerful statistical tool for
quantitative, interval data to be tested for linear
relationships. As Bartz (1963) states, it is "to be
preferred for greater accuracy".  

Another factor determining the statistics used was
that this was a descriptive study of a "statistical pop­
ulation" or universe. There was no larger population to
infer to from the data. Thus non-inferential statistical
procedures were used. The techniques used were only to
describe data through the use of central tendencies
(means, medians, and modes) and measures of spread (stan­
dard deviation), and to describe the existing inter­
relationships between the variables in the data
accumulated. This procedure by definition rules out
statistical significance testing, uses of the inference
probability tables, and the generalization of the results
through the statistical route.

The descriptive approach has several advantages. For
one, it reports the actual relationship, not the prob­
ability of what could have been expected in a population
as inferred from a random sample. As a result, it is
far less complex. The Pearson is the main statistic used
for accepting or rejecting the research, and other tech­
niques, of course, were relied on as they seem appropriate. The Pearson statistic bases its analysis not on linear regression line but on column means of the independent variable.

If this study had used random sampling and inferential statistics the common practice of reporting "significant levels" might have been included. As it was, there was no need for this practice, for by using the population for data there was no probability of having errors. What is, is what was observed and reported.

In this endeavor, Mueller Schuessler (1961)\textsuperscript{8} concludes that "absolute terms are not very meaningful . . . familiarity with the scientific norms prevailing in given situations offer the only guide for useful judgements: in determining acceptable correlation levels. Hence, this discussion establishes the "scientific norms" for a study of this sort. This was done by using other studies and data from the current study.

In summary, this study tested the linear relationship of phenomena within a theory. This was done using data from what was considered a population, not a random sample. That being the case, descriptive, not inferential statistics were used. The basic statistic was Pearson's product-moment \( r \), with additional supplementary statistics also used.

The avowed purpose of this study was to accumulate a voluminous amount of statistical data that would thoroughly
examine biographically the persons involved in the re-
search and associate the social issues with the administra-
tors' attitudinal intensities.

The results were quite comprehensive, covering a wide
array of positions. The SOUPAC program from the computer
revealed 7,671 tables collated in five volumes of 3,918
pages containing 86,311 lines of statistical information.

470 persons met the criteria for administrators. Of
this group, 228 (50%) were actually a part of the experi-
ment. 209 were men with 19 women. 84% of the men have
lived in the community from five to ten years, while only
15% of the women lived in the area that length of time.
57% of the respondents had children living at home and 177
(77%) of the total group pay property taxes in Kankakee
County.

Other interesting biographical information revealed
a predominance of Protestants (72%) in what was believed
to be a Catholic oriented community. It was no surprise to
the investigator to find that 158 (69%) of the administra-
tors indicated a republican preference politically.

Selected demographic data which was felt to be sig-
nificant to the social issue attitudes response are shown
in the following table:
Table

Biographical Variables of Total Sample

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total Response Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Age</td>
<td>58</td>
</tr>
<tr>
<td>Education</td>
<td>7</td>
</tr>
<tr>
<td>Annual Income</td>
<td>15</td>
</tr>
<tr>
<td>Community Participation</td>
<td>17</td>
</tr>
<tr>
<td>Administrative Category</td>
<td>76</td>
</tr>
</tbody>
</table>

The response index indicates that the total sampling of respondents were spread out along the age continuum with ranges all the way from 21 to over 60 years of age. As one might have predicted the group was for the most part, well educated with over 69% of them having had some college training or more advanced preparation.

Information about the question regarding annual income is interesting in that the greater number (85%) of respondents fall into the category of $10,000 or more.

- 75 or 33% of the participants ... $10,000 - $15,000
- 54 or 24% of the participants ... $15,000 - $19,000
- 65 or 28% of the participants ... $19,000 - and more

Other characteristics of interest reveal that of the 228 administrators who participated in the research experiment, 76 were self-employed, 55 regarded themselves as the executive type, 17 were supervisors, who determine and interpret programs, 33 considered themselves managers.

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and 47 were specialists.

Of the 228 leaders, 17 did not participate in any community meeting over the past six months while 45 indicated they were in attendance at least 1 - 3 meetings during that time. 55 individuals participated in formal organizational meetings from 4 - 7 times over the past six months, while 33 were involved at least 8 - 12 times. 76 members of the total group of respondents indicated formal meeting participation 13 or more times during the previous six months.

To further understand the phenomena existing in this study, it is necessary to describe some of the issues and some of the attitudes expressed toward them. Further clarification is particularly advisable at this point because of the infinite number of possible correlations in the research itself. Several things were considered in developing the internal elements existent in the social issue statements and in the biographical questionnaire. The most significant group of statistics concerns itself with the six general topics in the Rationale, namely: learning theory - statements regarding attitudes - statements having to do with innovations and change, community participation, financial considerations, and the planetarium as an agent to affect or influence.

One group or type of administrators may well have responded in a particular way to a particular question regarding any of these six topics; however, when clustered together, the validity of such a statement may fade in
The general attitude intensity was reinforced by the responses made by the group collectively on the sum total of statements falling within each of the six categories in both the Pre-test and the Post-test instrument.

The critical information necessary to the justification of the experiment is found in the results of the 78 variables from the 66 tables on pages 131 to 144 found in the appendix. These variables represent the cluster of statements found in the six topics of the rationale. The values, frequencies, and percentages indicate the amount of net favorable and unfavorable change for the entire sample of 228 administrators from the Pre- and Post-testing experience.

Variable 13, table 1, page 132 (questions 13, 20, 21, 22, 23, 26, 30, 31, 34, 35, 36, 38, 40) purports to show some indication as to the net change brought about by the change agent regarding the theory of learning. In this case, the total percent of regression was 32.2% and the percent of favorable change was approximately 63%. The net change for this cluster of statements was therefore 30.8% favorable for the 228 respondents. 11 (4.8%) of the participants indicated no change at all.

Variable 14, table 2, page 132 are the difference of sums, from Pre- and Post-testing, and net change for questions 14, 15, 24, 28, 29, 31, 34, 39, 40 involving attitude and attitude intensity statements. The table
shows 32.8% of the participants indicated unfavorable attitudes, 21 (9.2%) individuals indicated no change and a 58% favorable change in attitudes from the Pre-test to the Post-test experience.

Variable 15, table 3, page 132 concerns itself with the total net responses for the 7 statements which were grouped into topic #3 of the rationale. These statements were designed to investigate the general attitude toward innovations and change. There is indicated a 30.9% regression rate and 23 (10%) persons took a neutral position. 135 (59.1%) individuals made favorable changes in the total attitude toward this cluster of statements.

Variable 16, table 4, page 132 represents 7 statements (18, 19, 27, 28, 33, 35, and 37) from the questionnaire in the cluster of Rationale #4. These statements were among the most important because of the nature and state of school and community relations. It was hoped there would be a proportionately larger percent of change toward the favorable end of the continuum. Results show 33 (14.5%) of the respondents indicated no net change (zero attitude intensity). 25.4% had a regression of up to 7 points on scale value with the remaining two-thirds (60.1%) showing a favorable net change between the Pre- and Post-test of as much as 14 points on the scale.

Variable 17, table 5, page 133 contains 7 state-
ments which seem appropriate in an indirect way to participants' attitude toward money. An infinite variety of financial problems exist and there is an infinite variety of ideas as to how best to deal with them. No two local situations are alike. This part of the study of personnel in administrative positions of responsibility responded in the following manner:

36.2% of the participants had unfavorable net responses in their attitudes after the planetarium program with 48.5% of the participants having a net favorable change in attitude. 15.3% of the sampling apparently maintained a neutral or undecided attitude. In no case was the attitude intensity drastic—for the cluster was centered around -3 to +2 on the scale value in terms of net change on all of the pertinent items in this category.

Variable 18, table 6, page 133, contains the attitude toward the change agent itself, -- the planetarium as a communication device. Questions 16, 19, 20, 24, 25, 27, 31, 34, 37 were intended to evoke some response toward the general topic #6 in the rationale. Since this is the first documented study remotely connected with the correlation between people and social attitudes using a planetarium, this category is of extreme importance to Planetarium directors everywhere involved in the community planetarium as a resource instrument.

Only 19 (8%) people indicated "no change" but the range of net responses varied from -11 points to a
+22. 45 (21.9%) participants produced a net change in attitude intensity which was unfavorable but an overwhelming 70.1% were influenced in the 9 questions to respond favorably. An analysis of individual statements will reveal the statements that were the most influential ones in producing this evidence.

Variables 25 - 37, table 13 - 25, page 135 - 137 are item by item analysis of the 13 statements which comprise the cluster in the theory of learning. As an example, according to the net results shown in variable 27 (statement 21 on the instrument) response of a negative nature tended to reinforce the positiveness of the scale values. The statement reads: "It is undesirable to reduce the number of teachers by increasing the size of classes."

The Pre-test results indicated a 25.3% agreement with the statement but on the net results the percentage rose to 34.5%. One observation could be the administrators recognized the ability to learn effectively in a large group which teaching devices such as language laboratories, retrieval systems and a planetarium can easily accommodate.

Variables 38 - 46, tables 26 - 34, page 137, are item by item analysis of the 9 statements which appeared in the questionnaire and were clustered in category #2 directly appropriate to the consideration of attitudes both individually and corporately. Statement 14, for example, on the Pre- and Post-test differences show a positive correlation with the statement as it appears in the cluster.
of rationale category on attitudes.

31% of the group responded unfavorably to this reverse scale statement and on the net response to this statement clustered in the rationale the percent rose only 4% to 35%. Generally speaking, it would appear to indicate the statement was reliable and is further reinforced by the fact that persons of authority in the Kankakee Community are specialist oriented and living in a predominately industrialized setting.

On item 28 in the questionnaire (variable 41) there is some uncertainty in the initial testing responses with 94 (41%) of the participants. The statement is: "The school as a social agency is not as vital as others to influence the direction of change in our community." Upon the completion of the Pre-test analysis and placing this statement in the rationale cluster, the number of "no change" responses falls to 92 (40%), while the unfavorable sums remained fairly constant (21% and 23%). It would seem the planetarium being used as an educational vehicle had little effect upon the attitude intensities of the total sampling regarding the school and this particular statement.

Variables 47 - 53, table 35 - 41, page 139, are statements 17, 19, 22, 24, 34, 35, and 37 of the administrators questionnaire. By combining these statements, the investigator was attempting to identify some consensus of positive attitude regarding the concept of progress (innovations, developments, and change). On the differences
of sums from Pre- to Post-test results some 83 participants expressed negative scale value scores (1-9) while on the net responses for the questions found in the rationale cluster, there were 60 administrators with a net value of -4 points. At the same time 110 persons (44%) had favorable attitudes while the net results to the questions found in the rationale rose to 168 (73%). It is difficult to know how valid these figures are for it would seem some questions were somewhat ambiguous in meaning.

Variables 54 - 60, tables 42 - 48, page 140 - 141, are concerned with the general attitude intensities of administrators to the principle of the community. Several statements were in the questionnaire and designed to identify feelings toward community responsibility. Statements 18, 19, 27, 28, 33, 35, 37, were of significance.

"Parents should be required to attend school in order to keep informed of what the schools are doing." -- This statement received strong disapproval on the initial response with negative values ranging to -11 points. On the Pre- and Post-test results for statement 18, . . . 159 (65.3%) registered disapproval. On the net rationale results the unfavorable attitude by the respondent had fallen to -4 with 23.6% of the participants expressing some disapproval to the statement.

Statement 19, variable 55, table 43, is closely associated with the statements regarding the parents (18). This is a positively scaled question and reads:
"The community should offer classes and activities during the late afternoon and evening hours that would be appropriate for every member of the community."
This statement could well imply the adult education program, extension classes, extramural programs as well as professionally conducted workshops or public programming utilizing current educational facilities. The results of the Pre and Post-test differences reveal a wide array of attitude intensities ranging from -13 points to +18 on the continuum. 75 (33%) participants expressed unfavorable attitudes on the initial Pre- and Post-test trials. On the statement as it relates to the cluster within the rationale, the values had a -2 points on the scale with 47 (20.5%) of the participants registering unfavorable responses.

Of the administrators, the best measure of the attitudes toward the school in the community is their readiness to support programs financially. Several statements in the administrators questionnaire were designed to measure, in some degree, attitudes toward finance. Variables 61 - 67, tables 49 - 55, page 141, contain statements 19, 21, 22, 32, 35, 36, 37, which were felt to be appropriate, indirectly, concerning the problem of Finance.

All of the statements had at least one element in common, that is, in every case a wide range of values were indicated on the attitude intensity scale, for example, statement 35 contains two words "however expensive" which
perhaps should have been deleted from the statement. In the Pre-test response 148 (65%) were undecided about the strength of the statement; in the Post-test 153 (67%) of the respondents were undecided, fortunately there was a small number (5) responding toward the favorable end of the scale. On the total net responses of statement 35 (variable 63) when associated with the cluster of statements in the rationale, the "no change" responses dropped to 115 (50.4%) and a 26% increase in favorable attitude was shown. It seems the change agent had some influence on some of the respondents.

The fundamental reason for this entire research study was to utilize an educational medium known as a planetarium to effect change among the leadership in a community. It seems therefore, that statements 16, 19, 20, 24, 25, 27, 31, 34, 37, 38, and 39 which appear as variables 68 - 78 in the rationale topic #6 are particularly appropriate. It is well to repeat that this research technique was not designed to determine cognitive aspects regarding the school and community, but the tenuousness of the experience was designed to bring to the surface a series of attitude intensities which could justify a large expenditure of money called for when a planetarium is established in a school or as a community facility.

The statements in the questionnaire were direct in that the word "planetarium" appeared, but, in each of the statements a different aspect of the educational process
and the attitudes of administrators in the community could be analyzed with some degree of reliability. Many of the respondents had never visited a planetarium before while there were those who had been exposed to the beauty of the universe several times and under varying circumstances.

Statement 16. "The Planetarium gives opportunity for realistic learning experiences which are not possible with other forms of educational mediums."

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Response (%)</td>
<td>-40.2</td>
<td>42.9</td>
<td>+16.9</td>
</tr>
</tbody>
</table>

The researcher could have possibly predicted the results as shown. The statement was biased in that "which are not possible" is a portion of the statement which made it too strong in meaning. There are many forms of educational mediums such as television and an entire host of others which no doubt are being used to influence large groups of the populace.

Statement 19. "The community should offer classes and activities during the late afternoon and evening hours that would be appropriate for every member of the community."

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Response (%)</td>
<td>-20.5</td>
<td>53.0</td>
<td>+26.5</td>
</tr>
</tbody>
</table>

When considering the local situation surrounding Kankakee and the problems associated with finance it is not surprising the administrators indicated some indecision when responding to the statement. Local school systems are operating at a deficit and recent suggestions calling for changes to be made for the use of facilities.
at times other than the normal school day would jeopardize the various extension, extramural and workshop programs.

Statement 20. "The Planetarium has a unique and vital role to serve as a center for the stimulation of the mind in all disciplines."

<table>
<thead>
<tr>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>-14.4</td>
<td>(12.3)</td>
<td>+73.3</td>
</tr>
</tbody>
</table>

The overwhelming net change in attitude intensity by the total sample of administrators indicates a major improvement in attitudes toward the planetarium. It may be that a correlation between the educational achievements of the administrators and the program presented exists and probably serves as a reminder of the responsibility educators have in the school as a social institution.

Statement 24. "Spiritual and moral values should also be taught directly at some time in the formal educational process."

<table>
<thead>
<tr>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test (N=228)</td>
<td>-27</td>
<td>14 (0)</td>
</tr>
<tr>
<td>Post-test (N=228)</td>
<td>-3</td>
<td>92 (0)</td>
</tr>
</tbody>
</table>

Net Response (%)

<table>
<thead>
<tr>
<th>Pre-test</th>
<th>Post-test</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>-26.6%</td>
<td>37.7%</td>
<td>+35.7%</td>
</tr>
</tbody>
</table>

This statement was the most significant one in the entire research. Both the variations from the pre-test to the post-test responses and the net change in the sum of the differences for the total sampling were radical. On the pre-test totals, the attitude intensity ranged from a negative one (-1) value to a negative twenty seven (-27). The greatest frequency and value was 16 and (-8). On the
post-test totals for statement 24 (items 52) the range shifted dramatically toward the positive end of the continuum. The smallest negative number became -3 and the largest positive value was a 3. The greatest frequency on the post-test responses was 92 at zero (0) value out of the total 228 participants. On the pre-test statement, 32 participants expressed 11 favorable changes while on the pre-test statement, 162 participants expressed 4 positive attitude intensities.

A controversial aspect of the educational process is "what do we teach and how". Certainly this question focuses in on the contested problems between the constitutional separation of church and state. The statistics shown probably means that those with negative attitudes in other areas maintained some negative position in this areas. More important the number of negative attitude responses was reduced significantly in comparison to the responses of the total sample. The word "also" was not explained and could perhaps have diluted the responses because of it.

Statement 25. "The Planetarium relates the achievements of man and his cultural heritage in relation to it."

<table>
<thead>
<tr>
<th>Net Response (%)</th>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-16.1</td>
<td>(27.6)</td>
<td>+56.3</td>
</tr>
</tbody>
</table>

The net change in attitude intensity response of 56.3% can be attributed to a portion of the planetarium program highlighting the various avenues of progress.
made during the past 20 years. Particular emphasis was given to the lunar expeditions and the cost of this national priority.

Statement 27. "The Planetarium is an educational medium being used to increase the gap between the common man and the intelligentsia."

Net Response

<table>
<thead>
<tr>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>-59.8</td>
<td>(20.2)</td>
<td>+20.0</td>
</tr>
</tbody>
</table>

No doubt the reader will take particular notice of the tremendous change in attitude intensity. A regression of 59.8% indicates, possibly, several items particularly noteworthy:

1. A semantic differential exists
2. Too much factual material put into a 40-minute program
3. Visual events seen with audio explanation were presented too rapidly in the time permitted.
4. A possible "second time" experience for the administrator with some opportunity to respond critically.

Statement 31. "Learning can be meaningful and stimulating when it is constructively realistic and lifelike."

Net Response

<table>
<thead>
<tr>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>-11.7</td>
<td>(25.8)</td>
<td>+62.5</td>
</tr>
</tbody>
</table>

In using the planetarium as an agent to effect change and reproduce the environment of the earth-sky relationship, one of the guides for effective communication is
to begin where man is and not some artificial point in understanding. These statistics indicate a very strong change in attitude intensity as a result of the experiment. Two thirds of the participants were effected in a very positive way—obviously, information can be available from the present record that behavior is modified by the Planetarium, at least, for purposes of the experiment.

Statement 34. "The Planetarium offers an unparalleled experience which aids clear understanding, promotes faster learning, and stimulates longer retention."

<table>
<thead>
<tr>
<th></th>
<th>SD</th>
<th>D</th>
<th>U</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>2</td>
<td>19</td>
<td>84</td>
<td>105</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>(.9%)</td>
<td>(8.3%)</td>
<td>(36.8%)</td>
<td>(46.0%)</td>
<td>(7.9%)</td>
</tr>
<tr>
<td>Post-test</td>
<td>0</td>
<td>22</td>
<td>33</td>
<td>116</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>(9.6%)</td>
<td>(14.5%)</td>
<td>(50.8%)</td>
<td>(25.0%)</td>
<td></td>
</tr>
</tbody>
</table>

In simple terms of analysis, these scores from 228 administrators clearly shows the tendency of change toward the favorable end of the scale. Of great interest also is that this particular statement contains the word "unparalleled" which is quite strong in semantic overtones. This tends to further reinforce the results. It does not say, however, how long the understanding, learning and degree of retention of the attitude would be.

Statement 37. "Every community should have a Planetarium to meet the needs of people as an entertainment and educational medium."

<table>
<thead>
<tr>
<th></th>
<th>No (%)</th>
<th>Undecided (%)</th>
<th>Yes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Response</td>
<td>-20.1</td>
<td>(51.3)</td>
<td>+28.6</td>
</tr>
</tbody>
</table>

Planetaria have, for at least 15 years immediately after Sputnik, been purchased many times for the sake
of prestige. The majority of these facilities existent in this country today are not operated on the average of more than 15 hours per week. Even if community leadership provided adequate facilities (planetarium), competent and enthusiastic operators are rare indeed. In addition, small planetaria can reproduce the sky and various motions as the large installation still the average investment in funds alone can exceed $20,000. At a time when money is tight for educational purposes, planetarium personnel have not wooed and won the public or created a need for such expensive equipment. Perhaps this is the reason for the uncertainty of responses by the participants. However, a net change toward the favorable is encouraging.

Statement 38. "The time spent in a planetarium presentation is likely to be as well spent as other forms of entertainment and educational activity."

<table>
<thead>
<tr>
<th>Net Response (%)</th>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>(65.6)</td>
<td>+44.4</td>
</tr>
</tbody>
</table>

There are encouraging statistics in most areas of education and Gallop poll results attest to the fact that education is vital to national survival. Time, money, and effort become critical with the general public desirous of the institutions of learning to be that center of activity it can be.

Entertainment that is real and life-like and that which produces application and accountability merely adds
positive elements to the general welfare. No net unfavorable response accumulations lead us to believe that man has time for activities that contribute to helping him become a better informed citizen.

Statement 39. "The planetarium encourages worthwhile ideals, values, and beliefs regarding society."

<table>
<thead>
<tr>
<th>No</th>
<th>Undecided</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>-11.4</td>
<td>(43.4)</td>
<td>+45.2</td>
</tr>
</tbody>
</table>

Had some of the ideals, values and beliefs been well identified specifically, the investigator felt the net percentages would have been much more meaningful. A 45.2% increase in favorable attitudinal responses is significant when this statement is considered in light of the remaining statements in the rationale cluster. These affective principles are "caught" not "taught" and are perceived when the total picture of man's environment is considered. Change in attitude responses apparently did take place, however, that identification would go far beyond the scope of this study.

Table 57, variable 69 represents the sum of the differences in total group responses to all statements. The range of positive values was 63 thru 108 on the pre-test while on the post-test totals, the range was little changed to 71 thru 113. The significant part of this lies in the fact that there was a 54% attitude response in positive values:

<table>
<thead>
<tr>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test (N=69)</td>
</tr>
<tr>
<td>Post-test (N=37)</td>
</tr>
</tbody>
</table>

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The intensity of sums from the unfavorable end of the continuum changed significantly as shown in variables 70. This is the representation of the sum of frequency responses on all items of the pre-test statements for the 228 participants. On the pre-test 168 administrators had values from 0 - (-2) while 60 administrators had favorable values of 4. On the post-test with the values remaining constant, the frequency dropped to 52 with 176 respondents indicating favorable values.

Variable 71, table 60 is the net sum of frequency responses on both test items for all statements by the total sampling. The net results show 73 participants with values of up to 20 points; 148 had a change in values of up to 40 points while only 7 had net total values of zero (no change).

In summary, this chapter had several purposes. The population was described on the basis of several variables and demographic traits. Additional data was explored in order to further interpret a small fraction of the findings. These procedures were attempted so that some profile can be obtained regarding community leadership, the public attitude toward the school, the schools' attitude toward the community and what effect a change agent, such as the planetarium, can have on attitudes and attitude formation. Studies show that strengths of attitude are based on the amount and kind of experiences administrators have had within their social system. Persons tend to balance their
attitudes with their behaviors, beliefs, and values. It may be that certain sub-groups in the community would better reflect relationships on individual issues. Results from the study show economic values, social commitments, and personal perceptions toward the issues. The quantity of intensity toward an issue was a predictor of the quality of attitude intensity and commitment. The fact is that important variables were determined in relationship to six specific categories or topics and not to generalizations. The important perceptions obtained were possible underlying justifications for the reasons that attitudinal intensities existed as they did.
REFERENCES


CHAPTER X

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

The social issues which were considered in this study were those that emanated out of discussions with community leaders. The issues, were, for the most part, locally oriented and did not necessarily reflect items of national concern.

The profile, of the administrators in the community who projected those concerns, indicated a broad contribution of age, income, educational attainment, and position. The leaders were well informed about events, taking place locally, and participated actively in formalized social organizations.

The planetarium was the device used to bring about some favorable change in attitudes by administrators toward the issues of local importance. It is evident from the results, the attitudes of 228 administrators were generally changed in a favorable way. This favorable change in attitudes was predominate in enough areas to conclude the planetarium was effective in influencing the leaders in this study.

Because of the tenuous nature of the statements, the 28 statements of social significance were categorized into six general topics. This was done in order to reinforce
the responses to the individual statements and to produce a greater degree of freedom. These six general topics are:

1. Learning Theory
2. Attitudes, social and personal
3. Developments, Innovations and Change
4. Community participation
5. Finance
6. The Planetarium as an agent of change

Learning Theory. Thirteen statements in the instrument regarding the process of learning possessed some strong interrelationships and could well account for the two-thirds (63%) net favorable change in attitude from those tested. The general change in favorable attitude was the most pronounced in the areas of curiosity, integration of knowledge, mental activity, and curriculum. In the remaining areas, the planetarium did have success in bringing about significant, but not substantial favorable changes in attitudes.

Attitudes, social and personal. Nine statements in the research study had indirect reference to the scientific study of attitudes. Ideals, values, and priorities, social influence, and parental concerns for the welfare of children, were considered important by the initial group of administrators who drafted the statements. The narrow range of favorable net responses indicates small changes, but, the significance of change in attitudes lies in the shift toward the favorable end of the scale by such a large number of respondents on the post-test exercise. Some favorable change in attitude was slight in the area of social influence.

Developments, Innovations and Change. The results of responses on seven statements in the instrument were note-
worthy regarding developments, innovations, and change. While the statements shared the concept of progress in common, the administrators were apparently divided in their attitudes toward how to achieve progress. Consensus was evident in the need to "change" in order to keep up with developments in our time, but very divergent in the attitude toward the establishment of new programs in the community such as drug abuse, crime prevention, civil defense and recreational facilities. By combining the responses from the seven statements and calculating the net amount of attitude change for all participants, we must conclude that a very favorable net change in attitudes toward the issues represented by these statements was produced in using the planetarium as an agent of change. The planetarium facility used as an instrument to produce innovative programs received little encouragement from the leaders. The need to promote this facility through the various arms of the community will, perhaps, cause a favorable shift in attitude about innovations from the present predominately "no change" attitude as expressed.

Community participation. Results from this study indicate the administrators desire to be well informed about local problems and accomplishments. They further indicated a willingness to make available community resources in order for the populace to be better informed about their problems and accomplishments for administrators participating in this study did not feel the school was the social agency to provide this communication. Community participation
by the parents, mediums of information, need for more entertainment facilities to deal with delinquencies, greater utilization of local resources to combat ignorance and the reduction of the communications gap were issues in the local areas symbolized by the seven statements in the cluster regarding **community participation**. There were notable exceptions in the results from the study. Generally, little change in attitude was reflected as a result of the planetarium experience. The planetarium being used as an educational and entertainment medium to communicate with the administrators regarding social responsibility, social participation, and social need was not particularly effective. This is shown by the great number of respondents who disagreed consistently with statements on the pre- and post-test results. Improved ways must be found to respond to local needs of social origin if the planetarium as a "bridge" is to be justified as a community change agent.

**Finance.** Kankakeeland is predominately an industrialized suburb of Chicago. Most of the money in circulation originated from outside local sources. The administrator participating in the research study may have, in effect, two allegiances — that owed to the parent company in local operation and the leader responsibility to the community of which he is a part. What is good for the community may not necessarily be good for the economic components comprising the community. The seven statements tenuously referring to the concept of finance were designed to reveal administrator attitudes as to how some local issues could be financed if monies are called for.
The post-test responses of the entire group revealed an "undecided" attitude, for the most part, toward the individual seven questions concerned with finance. While statements on activities to confront issues received strong support, they were offset by general rejection of programs which would require funds not available through outside sources. The Federal and State programs for highways, housing, Mental State hospitals, welfare recipients and educational construction make possible the solving of issues in the community with aid from the larger community. Even drug abuse, law enforcement, on-the-job training, and work-study programs enable a more objective view to be taken of local problems. A wide range of favorable/unfavorable attitudes was still indicated, however, the degree to which they responded is significant. The net results show a shift toward the favorable end of the scale even though the average for the total group remained about as before, "Undecided". If this be true, the conclusion might be that those with some unfavorable dispositions on the pre-test moved toward an uncertain position while some with "Undecided" tendencies on the post-test shifted to a more favorable position on the scale. This movement in attitude position on the part of 228 administrators would tend to promote a desire on the part of the researcher to investigate in an isolated way the implications of this condition through another study.

The Planetarium as an agent of change. The planetarium is an expensive enterprise. The fact is that large sums

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of money are expended for which, up to this point, there is doubt about both the financial remuneration and qualitative return. Eleven statements were inserted appropriately into the test instrument. All but one of the statements in this group received a favorable net change in response. The conclusion can be made at this point that the question was good in content but far too dogmatic in word value to be acceptable to the entire group of administrators. The degree of acceptability varied and it can be assumed the planetarium experience could have been so overwhelming in affect that it could have been rejected completely. It is possible another experience in the planetarium could well reveal a better and more favorable attitude response. In any event, attitudes as shown by the net resultant responses were changed but varied in degree of favorableness.

One of the main objectives of this study was to identify the degree of favorable attitude responses by the administrator toward some social issues. This was done. It is significant there was a thorough appraisal of the total sampling in order to determine the extent of validity of this research.

The findings of this study, and the previous literature cited, are in support of the stated conclusions.

The relationships of favorable/unfavorable attitude responses between six sets of variables in the rationale were not consistently above the minimum level of significance. The correlations between the totals were, however, above the .250 level. In other words, when the
attitude responses were summed into a total attitude score, and the total attitude was correlated with the independent variables, higher correlations resulted.

Based on these findings, the relationships held true more where the focus was on the total attitude intensity which came close to reflecting the total community social system.

**Implications**

As a result of this study, certain recommendations, including the suggestions and opinions of experts, are considered appropriate.

1. School systems or communities desiring to initiate a program involving change-agents may find the various proposals, procedures, methods of experimentation, results, findings, and conclusions of this study helpful as a reference in forming the structure of a program development.

2. The results of this study which seem to indicate further research should be placed on the list of competencies needed by personnel in the planetarium field to do an efficient job of conducting such a program.

3. An in-depth study of an item-by-item analysis within the biographical questions correlated with the statements appearing on the test instrument would reveal the extent of attitudes that particular kinds of administrators possessed toward particular statements of interest to them.

4. No analysis of the five sub-groups contained in the total sampling was made. A comparison of the results between group-to-group relationships should be
made available. This might reveal a segment of the community administration that is significant in making particular kinds of decisions which directly affect them.

5. The same study could be repeated using a random sampling of non-administrative participants and compare the attitude value responses item by item.

6. A comparable study in another community should be conducted to determine whether or not the results obtained in this research are significant in other communities.

There are no doubt many more questions needing some additional research. The intent here was to present only those seeming to be the most pressing in terms of this present study. In the meantime, educators should press ahead in their educational efforts using some of the implications contained herein, in conjunction with their past knowledge of social change and community development.
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Appendix A

Operational Definitions
OPERATIONAL DEFINITIONS

1. Administrator: a person occupying a position in a formal organization who is responsible for work of at least one person and who is formal authority over that person

2. Attitude: an enduring system of positive or negative evaluations, emotional feelings, and pro or con action tendencies with respect to a social object

3. Attitude cluster: a set of two or more attitudes which are relatively highly interrelated and relatively isolated from other attitude clusters

4. Behavior: refers to any visible activity displayed by a learner (student)

5. Chi Square: a statistic designed to categorize actual measurements and place them in a significant number such that all observations will fall into each position arbitrarily; for example, if there are ten categories, one would have nine degrees of freedom ($\chi^2 - 1$)

6. Cognitive system: an interrelated complex of separate cognitions about objects and persons, the determinants of which cognitions become organized into a single system seeming to be of two kinds—stimulus determinants and experience

7. Community: a formal or informal social organization bound together by close interrelationships and sharing at least one commonality of purpose

8. Correlation: the joint variation of two measurements, neither of which is restricted by the experimenter

9. Criterion: a standard or test by which terminal behavior is evaluated

10. Decision-making: the acts necessary to put the decision into operation and so actually affect the course of action of an enterprise

11. Democratic leadership: a type of leadership in which the leader plays a "permissive" role, sharing the functions of leadership with the members of the group by encouraging their
12. Education: the science of deliberate thinking

13. Equal-appearing-interval scaling method: a scaling method adapted by Thurstone for the measurement of attitudes. In this method, judges sort a large and representative pool of evaluative statements about an object into groups separated by equal steps or intervals.

14. Executive: an administrator who uses high tact and relationship orientation on situations where such behavior is appropriate, and who is therefore effective and perceived as a good motivating force treating everyone somewhat differently and in equal parts of team management.

15. F-ratio: F-scores in the analysis of the variance are found by dividing the mean of the square among means by the mean square within groups. There is a significance if at the five per cent level for differences.

16. Feeling component of attitude: the feelings, positive or negative, toward an object which are incorporated in an individual's attitude toward that object.

17. Frame of reference: the standard or framework which serves as a reference against which the properties of a particular object are judged; for example, the perception of the weight of a single object in a series of objects is partly determined by the weights of all the objects making up the series.

18. Frequency distribution: data tabulated at different intervals in proportion to the place of actual frequencies.

19. Item analysis: a way of determining the degree to which attitude items discriminate among individuals who differ in their attitudes toward an object. The discriminatory power of an item is measured by computing the correlation between item scores and total scores. Items which correlate most highly with the total score are retained as the most discrimination items.

20. Influence: an act or power of producing an effect without producing the apparent exertion of force or direct exercise of commands.
21. Leader: a member of a group or organization who outstandingly influences the activities of the members of a group and who plays a central role in defining group goals and in determining the ideology of the group

22. Limitations: the act or condition that restrains or confines and reduces freedom of action or process

23. Manager: a term applied to employees who direct supervisory personnel to obtain operational goals of an organization or department as established by top management

24. Mean: the sum of all observations divided by the number of observations

25. Net attitude change: the mean amount of positive change produced by a persuasive communication minus the amount of negative change produced. Net change may also be calculated by subtracting the percentage of persons showing negative change from the percentage showing positive change.

26. Neutral region: the region on the favorability continuum which lies between the zone of negativity and the zone of positivity of an attitude. The neutral region is the region of transition from negative to positive attitudes. If an individual's score on a unidimensional scale falls in the neutral region and therefore indicates neither a negative nor a positive evaluation of an object, the individual cannot be said to have an attitude toward the object.

27. Participatory leadership: a style of leadership in which the leader plays an active consulting and advising role but gives subordinates a considerable amount of independence in making final decisions

28. Regression: a manifestation of earlier and less mature behavior after having learned more mature forms, as a consequence of frustration

29. Reliability: the consistency with which the test or the examination yields its intended results

30. Significant number: the value to be chosen by the experimenter at his choice to determine the acceptance or rejection of the hypothesis fixed before the experiment is begun. The
critical region is usually .05 or 5%.

31. Society: an organized collectivity of persons, made up of a network of interconnected groups and organizations, which constitutes the structure of the society

32. Specialist: one who directs and coordinates activities of a specialized nature and area of good or services

33. Standard Deviation: perhaps the most important of all measures of variation or dispersion. It may be described as the square root of the mean of the squares of the deviations from the mean of the distribution, or, briefly, the root-mean-square deviation.

34. Summated-rating scaling method: a method of constructing attitude scales developed by Likert. Subjects are asked to indicate on a five-step scale the degree of their agreement or disagreement with each of a large and representative set of items. The total score of each subject is computed by summing his item scores. The items are then subjected to item analysis, and the most discriminating items are retained for inclusion in the final scale.

35. Supervisor: a person who coordinates activities of a group of workers engaged chiefly in a particular type of function, and who determines work procedures, assigns duties, and examines work for exactness and neatness

36. Terminal behavior: refers to the behavior you would like your learner to be able to demonstrate at the time your influence over him ends

37. Valence of attitude component: the degree of positivity or negativity of the cognitive, feeling, or action tendency components of an attitude system. Valence may vary from extreme positivity, through a neutral valence region (corresponding to the absence of an attitude), to extreme negativity.
Appendix B

Geographic Location Map of Kankakee, Illinois
Appendix C

Conceptual Tables of Total Gross and Net Attitude Change
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# 11.04.05 JOB 717 END EXECUTION.

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//SYIN DD *
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SAMPLE SIZE = 228

EXECUTE TIME FOR FREQUENCY COUNTING PROGRAM IS 8.41 SECONDS.

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Appendix D
Research Instruments
Dear Administrator:

Thank you for agreeing to be a part of this Research Project.

Your task consists of completing two form questionnaires and being a witness to a planned Planetarium Program.

(1) The activity consists of a set of 40 questions and statements. Today, you are asked to respond to these questions and statements. (Approximate time consumed - 15 minutes)

(2) You will have the opportunity to see and hear a planned Planetarium demonstration. (Approximate - 40 min.)

(3) You will be asked to again respond frankly to some statements. (Approximate - 10 minutes)

(4) The instruction page gives specific directions to be followed in giving you responses to the instrument. In each item mark the option under the number, which in your best judgement, describes how you honestly feel about the statement.

(5) Note that the larger the number, the more positive the weight of your attitude. Please mark each and every item of the IBM 360 card which is provided. Please feel free to ask assistance if these instructions are not clear.

(6) All of the questionnaires are anonymous, and your identity will be protected.

The results of this study may have national significance and will be made available to any participant in the study who wishes to see them. A list of participants and their occupational roles will be found in the appendix.

Please accept my sincere appreciation for your participation and help in this research.

Marion Jamison
Candidate Doctor of Philosophy
University of Illinois
March 1972
ADMINISTRATOR ATTITUDES QUESTIONNAIRE

INSTRUCTIONS:

You are asked to indicate a response to each question and you have been given a computer card which has a series of numbers both vertically and horizontally. The numbers vertically refer to the options which you may choose under each of the question numbers.

When you make a decision regarding a particular question circle your option under that question number on the computer card.

Some of these questions are rather comprehensive in their range of subjects and it is not expected you will have particular attitudes on any one question. There are no right or wrong answers. Therefore complete the responses to the attached statements, with the options on the card which you feel best fits the attitude you possess. Please mark every item with a circle.

1. Strongly disagree
2. Disagree
3. Undecided
4. Agree
5. Strongly agree
ADMINISTRATOR ATTITUDES QUESTIONNAIRE

(BIOGRAPHIC INFORMATION)

1. Your sex (1) Male (2) Female
2. Race of respondent (1) White (2) Black (3) Other
3. How long have you lived in the area?
   (1) Less than 1 year (2) 1-4 years (3) 5-10 years (4) Over 10
4. Do you have children living at home? (1) Yes (2) No
5. (1) Self-employed (2) Executive (integrate and develops)
   (3) Supervisor (determines and interprets) (4) Manager
   (coordinates) (5) Specialist (reporting and/or carries out
   prescribed action) (CHOOSE ONLY ONE)
6. How many times during the past six months have you
   participated in community meetings.
   (1) None (2) 1-3 (3) 4-7 (4) 8-12 (5) 13 or more
7. What is the highest level of education you completed?
   (1) Eighth grade (CHOOSE ONLY ONE)
   (2) Part high school
   (3) High school graduate
   (4) Some college or significant non-college training
   (5) College graduate
   (6) Graduate or professional degree beyond bachelor's
8. Do you pay real property taxes in Kankakee County?
   (1) Yes (2) No
9. What is your religious preference?
   (1) Protestant (2) Catholic (3) Jewish (4) None (5) Other
10. Please indicate the number of the age category which includes
    your age (1) 21-30 (2) 31-40 (3) 41-50 (4) 51-60 (5) 61+
11. Please indicate the number of the income category which
    best represents your total annual income
    (1) Below $5,000 (2) 5-10 (3) 10-15 (4) 15-19 (5) 20+
12. What is your political preference?
    (1) Republican (2) Democrat (3) Other
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<tr>
<th>Question</th>
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<tr>
<td>13. People tend to be curious and without help will explore their environment.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>14. A general overview of life is not necessary to enable us to see the importance of details.</td>
<td>(1) (2) (3) (4) (5)</td>
</tr>
<tr>
<td>15. People in this community as a whole have a somewhat narrow view of the total picture of life.</td>
<td>(1) (2) (3) (4) (5)</td>
</tr>
<tr>
<td>16. The Planetarium gives opportunity for realistic learning experiences which are not possible with other forms of educational mediums.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>17. It is essential to keep up to date with new developments even during difficult times.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>18. Parents should be required to attend school in order to keep informed of what the schools are doing.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>19. The community should offer classes and activities during the late afternoon and evening hours that would be appropriate for every member of the community.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>20. The Planetarium has a unique and vital role to serve as a center for the stimulation of the mind in all disciplines.</td>
<td>(5) (4) (3) (2) (1)</td>
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<tr>
<td>21. It is undesirable to reduce the number of teachers by increasing the size of the classes.</td>
<td>(1) (2) (3) (4) (5)</td>
</tr>
<tr>
<td>22. The number of subjects should be reduced and education should be taught in classical fashion such as the Arts, Humanities, the Sciences, etc..</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>23. Knowledge is not a function of one's personal integration of experience and therefore knowledge falls into separate categories or &quot;disciplines&quot;.</td>
<td>(1) (2) (3) (4) (5)</td>
</tr>
<tr>
<td>24. Spiritual and moral values should also be taught directly at sometime in the formal educational process.</td>
<td>(5) (4) (3) (2) (1)</td>
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<tr>
<td>25. The Planetarium relates the achievements of man and his cultural heritage in relation to it.</td>
<td>(5) (4) (3) (2) (1)</td>
</tr>
<tr>
<td>26. If a person is having fun in an activity, mental growth is taking place and behavior will be altered.</td>
<td>(5) (4) (3) (2) (1)</td>
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<tr>
<td>27. The Planetarium is an educational medium being used to decrease the gap between the common man and the intelligentsia.</td>
<td>(5) (4) (3) (2) (1)</td>
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</table>
28. The school as a social agency is not as vital as others to influence the direction of change in our community.

29. Schools should serve the wishes and needs of children better than they do the wishes and needs of adults.

30. Those qualities of a person's learning which can be carefully measured may not be the most important qualities.

31. Learning can be meaningful and stimulating when it is constructively realistic and lifelike.

32. Our local school systems are not particularly good.

33. Actually, small groups of individuals in the community make the decisions which determine the direction the community will take.

34. The Planetarium offers an unparalleled experience which aids clear understanding, promotes faster learning, and stimulates longer retention.

35. Active exploration in a rich environment, offering a wide array of resources such as television, learning centers, etc., however expensive, will facilitate learning.

36. In the schools of this community not enough educational changes or innovations are being attempted.

37. Every community should have a Planetarium to meet the needs of people as an entertainment and educational medium.

38. The time spent in a planetarium presentation is likely to be as well spent as other forms of entertainment and educational activity.

39. The planetarium encourages worthwhile ideals, values, and beliefs regarding society.

40. The final test of education is what a man is, not what he knows.
Appendix E

Photographs and Publicity
JAMISON AT REED PLANETARIUM

The complex projector and illuminated dome which silhouettes Olivet Nazarene College Professor Marion Jamison are important instruction aids in the science of astronomy—but they may also provide a window through which men can gain better insight into the workings of their own minds, their communities and their theories of education.

(Journal photo by Garry Fortin)
Reed Planetarium building located on the campus of Olivet Nazarene College, Bourbonnais, Illinois
The Spitz 3-axis (RPY) prime sky planetarium projector
A major Mark VI Zeiss planetarium instrument showing the projection of various phenomena for more dramatic impact of the reproduced sky
Exterior view of the planetarium building in Trenton, New Jersey
Appendix F

Planetarium Continuity
OUTLINE

R-3, B 4:30 Turn on Diurnal Motion

Introduce the Pointer Orrerey
Diurnal Motion Annual Motion
#1 Ancient Earth Sunrise Sequence
#2 Earth in Space Twilight
Meteor Shower Sunrise
Bolide Rising Sun
Evolution of Star
#3 Smake Ring
#1 Full Moon
#4 Blast Off
#2 Surface of Moon
#3 Astronaut
#1 Children
#1 Mars Full
#1 Saturn
Point out Big Dipper
Meridian
Geocentric Earth
Coordinates
#2 Rotating Earth
#1 Four seasons of the Earth
REED PLANETARIUM
(ADMINISTRATOR ATTITUDES PROGRAM)

VISUAL
Cove Lights
Red-3 Blue 4:30
Diurnal motion on . . .
Stars on . . .
Planets . . .

AUDIO
Good evening Ladies and Gentlemen, we welcome you to Reed Planetarium for this very special program. You represent some of the most interested and influential people in our community. Many of you have never seen stars in the sky shining as they are this evening . . . pause . . . perhaps it will be the first opportunity you've had to consider the wonder and majesty of the heavens above. If you were to go outside this evening just after it gets dark and the sky was perfectly clear, you'd see these stars shining just like this in the sky above. There are many things you would observe about the sky. One of them I suppose would be the fact the stars are moving violently over you. The earth upon which we
stand is apparently very flat, very solid, and very motionless. And for the most part, we have a feeling we are right in the middle of all this celestial motion, but, Ladies and Gentlemen for thousands of years, before Christ, men have looked to the sky and wondered what it was they saw up there at night. They could see more of the sky than they could of the earth. I would rather imagine they tried to understand the relationship between the two . . . pause . . . The stars shining above you are beyond your reach. Most of us have the feeling they are far, far away. But how far away we may have not considered.

We tend to be very curious, I think, about our outlook upon life . . . pause . . . things that interest and fascinate us tend to be those things we would like to know more about. And so, man's environment seven
thousand years ago was not much different than it is tonight.
There were no television sets, no comic books, no evening newspapers then. The communication bridge has been shortened to the degree that we can, by Satellite, simultaneously see events occur around the world. I rather imagine for most it is difficult.

Pause...

Like ancient man found it difficult, to gain some concept or idea of our place in space — to understand, to see the whole picture and make any sense out of it. Most of you are becoming use to the darkness now, if you look directly above.Pause...this little arrow is a way for me to help you find something in the sky like this. Pause...perhaps, or a group of stars like this and maybe we would want to go clear around the sky from time to time. So if you look directly above, this little arrow
will help us know that Chicago is back over here some 50 miles away in the north. The cities of Gary and Hammond, Indiana are over here to the northeast at the base of Lake Michigan where the gigantic steel mills pulsate night and day, so on the average we can look over there and see very few stars low on the horizon because of it. If you will look directly above, you can see the stars are brighter overhead than they are at the base where the sky seems to meet the earth. You can see the stars over in the east toward New York City rising out of a horizon and moving at an angle across the earth from your line of sight. It appears, to the south, some three miles away is our city of Kankakee. The sun we know seems to go down over here in the west as it has done every night since you have been on the earth and particularly since you have been observing it. The sky looks so real - so
very realistic and lifelike. In fact, ancient man believed the sky was full of living things. He looked above him and saw these objects . . . pause . . . since he could not touch them he believed them to be some kind of metaphysical entities - Gods, Goddesses, Beings of a higher order and man began to worship them. Everyone worships something and it isn't difficult to conceive of the idea that ancient man would cling to the concept of the Gods working in the heavens using man as chessmen on some gigantic board. Our entire civilization in history and our world, today, is riddled with these fables, stories and tales of man's concept of what he believes his place to be in the earth and sky relationship. Some civilizations believed that this dark sky was a dome that was inverted or turned upside down over them on which these tiny stars were pasted, like little
celestial jewels. And there were those people who believed earth to be the ground center of an island and over the ground stretched a gigantic tent. The tent wasn't a very good one—it was full of holes. But it allowed the eternal fires of God to be seen through those holes.

The entire concept of Heaven and Hell began right here, with the simple earth sky relationship. The stars represented the doorway to the beyond. Ancient man believed that everything good, noble and virtuous was in the heavens containing the Gods. Every star group you see was significant. Man was imperfect and surrounded with all kinds of drought, pestilence and plagues as well as other kinds of things which he was destined to spend all of his life with here on this platform... pause... The earth seems to be so small, but, if we could for just a moment take some kind of imaginary trip—to
extend our imaginations to outer space. Look back and see the planet on which we are living . . . pause . . . The earth is a round beautiful object - covered with some 70% water and the land masses just large enough to accommodate the population which is exploding so rapidly and creating one of the major problems of society. The earth is just a very tiny planet going around one little star, we are taught. Our young people in the schools of today are taught that from outer space the earth is an object orbiting the sun . . . pause . . . there are many suns and a great many planets. They are called sun systems. They make us wonder if we are alone in space. You see, thousands of years ago man had no idea the earth was round - a ball like object that did not emit light or kind of heat. It was destined to be captured by the sun for all eternity.
Much has happened since the first man lifted his eyes to the sky with curiosity. Wouldn't you like to know what he thought about when he saw the sun and stars for the first time? Perhaps he became aware of fire as being synonymous with the heat of the sun in the daytime. Curiously enough the sun would disappear and fade away - be gone and the night would surround him. The darkness of superstition and ignorance would enclose him so he lived in darkness for thousands upon thousands of years not knowing the real identity of his position. I said a moment ago that man has always been a curious creature endeavoring to explore his environment and find out what was around him. By observation the earth seems to be very small and it didn't then seem difficult to explore it, so he turned his eyes to the heavens because it was so easy to see so much in just a
short period of time. Mans' search for truth was determined and defined by his ability to make correct or accurate observations. He had his sight, he could feel things of course; he had a rational mind called intelligence. This "inner-curiosity possessed" man led him to explore all of his thoughts and all of his ideas and it has been a spiral up the ladder of intellectual progress ever since.

Today, Ladies and Gentlemen, we know more about the universe, the earth on which we stand, and all of the various agencies within the confines of our earthly organizations than the sum total of knowledge which has ever been accumulated . . .

Things happened in the sky that man couldn't understand . . . pause . . . different objects would appear from time to time and they seem to be stars in utter chaos falling from the heavens.
This filled man with dread, fear and despair. This filled him with superstition. The Moon disintegrated or fell apart . . . He thought these objects were just pieces of the moon colliding with the earth's atmosphere or air around the earth . . . They were thought to be falling stars . . . We use the term even today . . . pause . . .

Then, of course, there were those stars that would appear to shoot across the sky. That really caused consternation for man.

You see he could not use his five senses to make any kind of valid conclusion regarding this phenomena and he knew he had a problem. I guess knowing a problem exists is the first step to its resolution. These things would appear out of nowhere . . . they were unpredictable, you could not tell from whence they came nor where they were going . . . All we know is that they had a beautiful tail that was green and we know also
they appeared, very briefly, be
seen for a very few seconds and
then they were gone . . . man
knew not where. We call them
shooting stars.

There were objects in the
sky that defied the imagination
of man for some strange reason,
a star would all of a sudden . .
. pause . . . blow up. Man
began to wonder and associate
the relationship between life and
death. Maybe the stars were like
men on the earth! Maybe the stars
did have a life cycle! Maybe
there was a birthplace for the
stars! Maybe they were like the
population of a large city . .
like Kankakee. There are the young
ones and they have been born most
recently . . . there are the older
ones, the adolescents, the junior
and senior high school age people
. . . Those in the twenties . . .
Then, definite maturity set in
and we become adults . . . middle
age is a known idea . . . then
finally old age and . . . there
seemed to be a pattern there . . .
Stars seem to be like people
. . . pause . . . they are called
Novae or exploding stars . . .
you can imagine the fright they
would cause . . . They would
appear suddenly and flair as bright
as the noon day sun hanging sus­
pended there for just a moment
of time, change color . . . and
grow smaller as they disente­
grated . . . Perhaps change is
the most important concept known
to man . . . perhaps we knowingly
resist it . . . for ancient man
watched the changes that took
place in the sky and he tried to
predict what those changes would
be and it was most frustrating . .
pause . . . We have some beautiful
evidences of this today and it is
difficult for us to comprehend
all of this activity taking
place in the sky above, but, . . .
isn't the earth a busy place?
All of us have just about as much
as we can do. . . The universe is no exception... "people,"... there is more going on up there than you can possibly imagine. . . but that's the way it is here on the earth. . . changes come. We see objects move, things are altered, things change course, change direction, . . . perhaps in a sense it is essential that we know these things in order for us to understand the orderly developments, in our lives here, that are taking place all around us.

Some of the most beautiful things we see in the sky, of course, having some merit and meaning to us are stars in the sky that appear as stars but are not stars at all even though we call them by that name. They are known as "Dog Stars", "Morning Stars", and Wandering Stars". We are living in the twentieth century. . . we have been to the Moon several times, we have conquered limited space and there are still a vast number of things we don't
know . . . The excitement and the uniqueness of it all is that we are able to come to grips with them and have some assurance that just because we have not found the solution to a problem does not mean there is no solution . . it only means that we need to keep looking until we find it.

One of the very impressive things you can see in the night is man's nearest neighbor, the Moon . . . pause . . . This has had more effect on the population of this planet than any other celestial object in the night. Many men worshiped this as a God. There have been more songs, more poems, more lyrics written about the moon than all celestial objects combined. If you think just a moment, some of the most beautiful contemporary songs have to do with the moon. The Bible says that God made two great lights—a light to rule the day and a lesser light to rule the night. He made the stars also.
The moon is a representative of many like it in the solar system but it has been a source of tremendous, magnificent fascination for centuries. At one time the moon was thought to be made of green cheese. There have even been cows accused of jumping over the moon. The dark spots appear to represent lakes, bodies of water or oceans and the areas that are raising upward are deserts appearing white. We could see only one face - turned toward us. My! . . . we wondered what the other side looked like. The moon traveled through phases we could not understand and there was an intense desire to worship the God of night the great creator of light in the evening, but man did try to understand some of the problems associated with it and some of the mysteries surrounding it. The moon has been a goal to man for twenty-some years now and only since 1961 did it obtain a national priority in the country.
and changed the lives of all of us in one way or another. It has contributed directly or indirectly to the good life we have today.

"We set sail on this new sea, because there is new knowledge to be gained and new battles to be won . . . and they must be won for the progress of all people . . . but why, some say, the Moon? Why choose this as our goal? . . . some way as well ask why climb the highest mountain? . . . Why 35 years ago, fly the Atlantic? . . . We choose to go to the moon . . . We choose to go to the Moon in this decade and do the other things, not because they are easy but because they are hard . . . because that goal will serve to organize a nation's skills and resources . . . because that challenge is one we are willing to accept . . . not postpone . . . and one that we
can win . . . . . . . . . .

NIXON . . . "Because of what
you have done . . . The heavens
have become a part of mans'
world . . . for one priceless
moment . . . the whole history
of man . . . all of the people
on this earth are truly one . . ."

Ladies and Gentlemen that
national Priority cost this
country some 24 billion dollars
. . . which averaged somewhere
around 19 dollars each year
for every man, woman, boy and
girl in the United States . . .

But, it yielded over 240 patents
per month on items that had
previously been unknown. The
day Neil Armstrong landed on the
moon over 800 young people witness
the phenomena on the moon in its
relationship to the earth here in
the Planetarium night. The
lecturer generated and stimulated
the discussion regarding the
advance of one small step for man
and one giant leap for mankind.

Here, in the Planetarium,
concepts are considered for somewhere between 25 and 30 thousand people every year. Large groups in here can be accommodated to see graphic simulations of the sky and those dramatic events that take place over a period of years and years. We can reproduce and duplicate, in here, celestial conditions without regard to time, place, and weather.

The schools need to be almost all things to all men somehow and more effectively bring people up to date on our accomplishments and the good things that are taking place in this world around us during such a short period of time. Obviously, today, we live in a time of disparagement, there is a gap between vast segments of our society and the institutions of this country. There is a tremendous communication need, to bring us together so that we, all, know where we are going. Ancient man long time ago had communication problems also. You
see he did not have the rapid transit means whereby he could communicate with his neighbor by telephone. Today, executive meetings are held in airplanes at 30,000 feet. Executive meetings and conferences are held on trains. Hotels in Chicago are filled to capacity from time to time by the desire of man to come together and be brought up to date on recent developments. Man comes together and contemplates the events that are taking place all around him. Research is benefitting us to a tremendous degree and it seems reasonable to assume that we would want to share in the developments and enjoy the fruits of our effort.

There are many practical benefits tonight for those of us who live in the 20th Century and the environment in which we find ourselves. Ancient man tried to appreciate his environment also . . It was a closed system, however, it wasn't as open as we know today, but, the applications of what man

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has found over thousands of years effect our lives to a marked degree. Sometimes we take these things very much for granted. Just a moment ago, I suggested to you there were two great lights - one that rules the day and the one to rule the night, but, many of you probably do not know that back in historical times, names of the days of the week had their origin with the stars. The word Sunday is so obvious and the day Monday used to be the Moons-day or the second great light . . . Believe it or not there are many civilizations still believing a great many things like that which have been given to us through the centuries.

Mars, for instance, is a planet in our solar system - and . . . through a telescope it look like this . . . pause . . . It's about the size of the earth . . . It has very little in the way of conveniences that you and I know about on the earth . . . it is not a place conducive to life as we
know it... The snow is a very rare type and the green areas appear as dark valleys during the winter seasons of the Martian landscape. It is not vegetation you and I know about. You see, man believed there was majesty, beauty, and order to be found in these celestial objects. Because Mars is red, men associated it with the characteristic color of War. Today, we commemorate that planet with the Norse word "Thor" which was the God of War. Thursday is a special day.

I suppose there is not one of you that does not appreciate or know about the most unique and beautiful object in our solar system... We call it Saturn..... It is the last visual object you can see with the unaided eye among the planets in this system... It has rings encircling the planet with ten Moons instead of our one. We tell young people the word Saturday is a nice name because
it commemorates this planet. It's the day the children get out of school...Saturday gives them some time...some leisure time. They do not have to work so hard on Saturday as they do during the week....pause....

Schools have always been in our Democracy a vital and necessary part of our success story. It is easy to see where we get the familiarizations for these things from the stars. You and I know that in just a few days we are going to have the first day of Spring. The weather will change for the better, perhaps. The change is brought on by the motions and the placement of the earth...The weather helps us change our mode of living and our habits. We will do things differently as a result of the weather...Spring arrives and becomes a reality on March 21. The Sun is brighter it seems, the trees bud our and turn green, the grass flourishes and becomes
like a carpet. Students look forward to the end of Spring and the arrival of a new season. Somehow summer is always better than winter to them....

Ladies and Gentlemen, thus far all you have seen is the motion of the stars as they progress across the sky caused by the rotating earth from West to East...It is surely a grand illusion, for what you are really witnessing is not what is happening at all.

I think, perhaps, it might be well at this moment to give you an idea of a reference point. First, look here, if you will, and you will find the Big Dipper - four stars in an imaginary shape of a cup or bowl and the three stars seeming to form an imaginary handle of the Dipper here. This group of stars is probably the most familiar group of stars in the sky to young and old alike. Ancient man believed the weather came as a result of the Big Dipper
being upside down to the observer on the earth blanketing the earth with rain during the Spring and Summer months of the year. Two stars in the front of the bowl are called pointer stars and if we use these pointers and draw an imaginary line between these stars...extend that line five distances, we find a star that isn't very bright, but, is perhaps the most important star in the sky...With the stars moving from one place to another, notice this star remains fairly stationary. It's exceptional, it's a star that doesn't move as all other stars seem to do.....

This star is called a Navigational star, and it is also called our Stellar reference point...it is that star we use to locate our important Cardinal points on the earth....

If you were at the North Pole tonight, this star would be directly over head to us and there would be no direction such as East,
West, or North... everything would be to the South of us wouldn't it? now... because of the way we look at this star in the sky and it's altitude... We see this star pretty much in the same place in the sky all of the time....

If we drew an imaginary line from the North Cardinal point here... up through the pole star... here...through the Zenith point... and extend the line over here toward the South....We can divide the sky into equal halves of East and West....like this. Notice Polaris changes very little and all stars seem to move in apparent reference to it.......

Ladies and Gentlemen.... Polaris will not always be in that part of the sky...it will not always be in that position...it will change slowly over a period of 13,000 years and a new star will take its place in the sky...This we can accurately predict. Because of the position of Polaris we can know where we are....Pilots,
Captains of ocean going vessels and people who are traveling by car or on foot across this continent will quickly recognize the importance of this particular star...pause...

Friends, what if that reference point did, in fact, change? Is it not true that we also would change our entire way of looking at things? The perception of reality would be altered...We would not see the stars like this if we were to go to any other place...North or South of the equator...for the stars shining above are uniquely ours...Let's take an imaginary trip...and get an idea of what I'm saying...it's a tremendous concept and if we could, let us imagine we can travel straight down to the center of the earth some 4,000 miles...as the earth continues to move and we turn around and see the inside view of our world...the ocean areas of the world are crystalline or
transparent and we see the dark land masses with the stars shining in the background beyond. . . .

We easily see, over here, the Continent of Europe and Asia where so many events are taking place with local and worldwide significance. Here, one can see dark continent of Africa where the emerging nations are endeavoring to make a place for themselves among the family and community of Man. . . This is where we live . . . every student of Geography and every person who reads a magazine, newspaper or watches television knows about the activities that are taking place on this continent . . . here on the North American land mass . . . pause. . . are the Great Lakes and below Lake Michigan is our position in Kankakee. . . Notice where the stars are above the particular land mass we have considered. It all depends on where you are as to how you would view these things . . . .

Back on the surface, we see
nothing but the stars . . . Let us move across the surface of the earth some 1,900 miles South . . . that would take us to the general vicinity of the Equator . . . back in the North, the stars would seem to drop toward the horizon . . .

the next 5 seconds new stars will appear in the southern part of the sky. The stars on the Sphere will be viewed together quite differently. All the stars on the great celestial sphere have changed positions and new stars would seem to appear out of the South. Notice how Polaris moves as we move . . . like this . . . Now, notice what has happened to our perspective . . . we look at the sky and the stars are not rising at an angle . . . they are not traveling anywhere except vertically . . . all the stars are appearing in the sky together throughout the entire celestial Sphere . . . We find again ourselves looking at the beautiful stars from a different
vantage point. The Sun, Moon, and
the Planets also rise over in the
East and move directly over us
like this . . . We are at a point
on the earth about 1,900 miles
away from our home . . . You see,
now, how differently things appear?

The stars appear to be
moving much more rapidly than they
were in the Chicagoland area . . .

Chicago moves with the earth at
an approximately the speed of
770 miles per hour while at the
equator, because of the greater
circumference of the earth . . .

the equator is traveling nearly
1,000 miles per hour.

Here, at the equator, there
would be no need for sweaters to
buy or wear . . . Snowmobiles
would not be a thing for anyone
to own and I doubt seriously if
anyone would know what a snowmobile
was . . . here . . in this place
. . . light colored clothing would
be the dress and umbrellas common
for the day . . . Let's go home
... very quickly ... notice all fixed stars in the sky move together like this with Polaris as our guide or reference point assuming it's fixed place in the sky ... .

Ladies and Gentlemen, we now are back in the latitude of about 40 degrees north and we are in a position to consider some further complications of motion. Not only is the earth turning wildly around itself ... but . . . the earth is traveling violently around the star we call the Sun . . . . We don't know really why the earth is tilted . . . we do not know why except by natural law, the earth travels the way it does around the sun. We do know the Sun is not in the center of this circular movement and the revolution the earth takes defines that special something of tremendous importance to us all.

Whether you know it or not our entire concept of time is
based upon this particular phenomena. I have such a small amount of time with you tonight, because of your other pressing responsibilities at home and place of work . . . .

We are almost servants of this concept . . we don't really control time - we are not its' master . . . in reality we are its' slave . . . we are bound to the clock watch, and the calendar. Can you perceive that we are now approximately 12 years older than we were when we first arrived as far as defined time is concerned? Allow the earth to stand still for just a moment . . . We can witness the miracle of the heavens . . . time is standing still . . . for if our concept of time is based on events and happenings . . . here . . . words like eternity, forever, and everlasting become very real.

Ladies and Gentlemen most of us know the earth is not the center
of the solar system or even the
universe. The most intelligent
individuals know from what they
have been taught in childhood
that the planets are traveling
around the sun. It isn't difficult
for us to see this in a textbook,
it's not difficult to believe
the sun does not come up in the
morning for it seems so obvious
... It seems to move across the
sky in majesty and invade the
lighted side of the earth,
bathing it with light and heat.
It allows man to live on the earth
and gives the break from routine
and pressure of the day we need
so badly. When night comes, we
let up and get needed rest and
relaxation.

What if I were to tell you
the sun does not come up in the
morning? It is only an apparent
event ... What is really
happening ... the planets, the
sun, and the moon are all travel-
ing around the sky from west to
east. We are, in fact, going in
the opposite direction around the
sun and it is an illusion on the
grandest scale. Sometimes these
planets turn around and go in
the opposite direction . . . what
tremendous debate for centuries
this caused . . . We do not see
these easily . . . it takes time
. . . what you are watching here,
takes place over a period of
years in earth time. Men of long
ago had nothing to do for a past-
time and relatively speaking, they
had all the time in the world . .
they watched the sky . . . it was
their world . . . remember,
because they could see more of it
. . . . they watched these events
take place very slowly like this .
. . . . . .

It is difficult for us to
understand how this happens because,
this, we think, is what we see.
The problem is that it does not
happen that way . . . the sun
really moves eastward. The planets
follow it and the earth, itself, travels at an amazing 66,000 miles an hour . . .

Ladies and Gentlemen, it took man 1,500 years to unravel this particular problem and I have the feeling some of us want to solve some of our problems, instantaneously.

Mention has been made this evening of several salient ideas or concepts which are familiar to us all . . . things like self-importance, responsibility, time, change, relativity, growth, logic, and mental health . . . I have implied a number of others. These ideas emerged with man in the early beginning of his efforts on this planet. Man did not want to live alone and he still doesn't, but, we apparently have great difficulty resolving how to live together . . .

The Bible says "God created you and me in his own image. He breathed into us the breath of life and we became living souls. . ."
In this respect the earth is the most important object or (planet) we know . . . we live here . . . it seems to us that all of these things move around us and maybe we are the most important of God's creation . . . We can think, dream, make choices, we can laugh, we can create and communicate . . . . We are all supreme in this respect. . . . pause . . . I have tried to influence you tonight . . . An influence is an act or power of producing an effect without producing the apparent exertion of force or direct exercise of commands.

Just as you are as different from each other as the stars in the sky . . . you possess one vital powerful force in common . . . you have a great amount of influence, authority, and power to bring to bear upon those around you . . . the result can be the formation of a better community and world in which to live . . .

Thomas Jefferson said and
I quote "to be civilized - to be ignorant and free is something that can never be."

We, in this country, are committed to the education of the entire population and in every respect, you have a tremendous responsibility because of your position in the community... The institutions of society should exist for and with the community... you are a part of those institutions...

There are many reasons for considering the state of affairs for us living in the 1970's... Among those reasons exists the possibility of doing something useful with our lives and making a social contribution.

H.G. Wells said it poetically very well when he said "Human history becomes more and more a race between catastrophe and education:"

America prizes its democratic dream of a nation in which each man
is respected as an individual; where men work together for common concerns and where the use of intelligence can be the instrument of progress.

Our time has passed so rapidly, and with the passing of events directly above us, we can see the dramatic passing of time. . . . this night must come to an end. . . . and a new day is what we have to look forward to. . . . let's meet the day as best we can and always follow well God's plan to make tomorrow better still.

Yes, Ladies and Gentlemen, we are beautifully bound to this earth on which we live and we see the sun beginning to make its appearance over on the eastern horizon. . . . it symbolizes to me the dispelling of the darkness of ignorance, superstition, and despair with the coming of the dawn of increased knowledge . . .

Light is synonymous with intelligence and when we use
rational thought, it's such a beautiful day . . . here now blazes forth this magnificent rich red ball of fire . . . and "in the infinite meadows of heaven fade away these stars - the forget-me-nots of the angels" . . . we have no idea of what this day will hold . . . but you and I have the power to make it what we want it to be . . . . . GOOD MORNING . . . . .
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January 31, 1972

Mr. Marion Jamison  
Olivet Nazarene College  
Reed Planetarium  
P.O. Box 592  
Kankakee, Illinois 60901

Dear Marion:

Your letter to Jack Spoehr of December 14 finally landed on my desk. You certainly threw us a whopper, and Jack has asked me to do a bit of cerebrating about it. After 20 years at Spitz, he figures I should have some feeling for your dilemma. Maybe I'll discover that 20 years might better have been invested elsewhere, but I doubt it.

At any rate, give me a couple of weeks. We'll see what comes up.

At least, it does give me a chance to re-establish contact with you. It's been too long a time since our first meeting in Oklahoma City years ago. Do you remember lunch with the Admiral? We've both covered a bit of ground since then.

Warmest regards,

Herbert N. Williams  
Director of Special Projects

HNW: mbh
February 9, 1972

Mr. Marion Jamison  
Director  
Reed Planetarium  
Olivet Nazarene College  
P.O. Box 592  
Kankakee, Illinois 60901

Re: Letter of January 12, 1972 to H. Milburn.

Dear Mr. Jamison:

I read your referenced letter with great interest and congratulate you on the topic you have chosen for your graduate thesis.

Unfortunately, the information you requested is not readily available from Planetariums Unlimited. As far as supplying you with prints on various installations and instruments which we sell, this is certainly a distinct possibility. However, a published work containing the aforementioned, other than our standard brochures, is not available, and it is not the policy of this company to expend corporate funds to aid individuals in such an endeavor as you are presently embarked on.

As to your question #1, in actuality we have no specific and documented evidence as to how long planetariums have been in existence in Asia and Europe. I am afraid you will have to research this material yourself.

In relation to your question #2, we have not run into any situation whereby we had to justify the cost of a planetarium to any school administrators. In most cases we are called upon to present that equipment which we sell on the basis of a pre-existing interest on the part of the school system.

In relation your third question, you pose some very interesting thoughts. However, due to our extremely heavy

(cont'd.)
work load, at this time I would find it impossible to detach one of my personnel to develop this idea in any great depth.

I regret that we cannot be more helpful. However, as you know, we are operating a rapidly growing business and must direct all of our efforts toward the completion of our existing contractual agreements. I am sure you will understand our situation.

As I mentioned above, I will be sending prints of some of our newer instruments and installations which could be incorporated into your thesis if you so desire. I might suggest that you contact Mr. Dennis Gallagher, with whom I am sure you are familiar, for the type of research information that you are looking to acquire.

Thank you for thinking of Planetariums Unlimited and our sincerest wishes for your success in obtaining your PhD degree.

Sincerely,

Harry F. Milburn
General Manager
Vita
Vita of

MARION MERLE JAMISON

EDUCATIONAL BACKGROUND

Hutchinson Junior College - 1949; Science
Bethany Nazarene College - 1950; Bachelor of Science
Oklahoma City University - 1951; Business
Franklin Institute - 1953; Advanced Space Science Center
Southern Methodist University - 1956; Biology
Central State College - 1957; Mathematics
Colorado College - 1958; Geology
Carleton College - 1959; Astronomy
Oklahoma University - 1960 - 1965; Master of Science
University of Illinois - Candidate for Doctor of Philosophy in Education, to be conferred June, 1972. (Administration and Supervision)

TEACHING AND SUPERVISORY EXPERIENCE

Casady Middle School - 1957 - 1962; Science Department
Casady Middle School - 1958; Headmaster (Assistant)
Kirkpatrick Planetarium - 1960 - 1964; Director
Bethany Nazarene College - 1964; Science Department
Olivet Nazarene College - 1966 - ; Professor of Physical Science, Director of Reed Planetarium.

PROFESSIONAL ORGANIZATIONS

Phi Delta Kappa
American Association of University Professors

PUBLICATIONS

The Federal Government: Defender of the Faith
This fifty-page paper is a research document into the role of the Federal Government in defending the rights of education and the sanctity of the individual. It deals primarily with the establishment of the United States Constitution and the landmark cases subsequent to the establishment of that Constitution in defending the religious rights and liberties of men in the educational process. Published 1969.
What is a Planetarium?
This publication examines the role of a planetarium from Anaximander through Zeiss and the changes and innovations which have taken place in the last few years as a result of the space race and the role of the planetarium in communicating that race to the public-at-large. Published 1970.