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ACTIVITIES AND ATTITUDES OF INSTRUCTIONAL MEDIA BUILDING COORDINATORS: A FOLLOW-UP TO TWO M.S.U. SUMMER INSTITUTES

By

Arthur David Katser

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ABSTRACT

ACTIVITIES AND ATTITUDES OF INSTRUCTIONAL MEDIA BUILDING COORDINATORS: A FOLLOW-UP TO TWO M.S.U. SUMMER INSTITUTES

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Arthur David Katser

This exploratory field study developed from a concern for the great expense and effort that successful in-service teacher education programs require. In order to bring about improvement, teacher educators need more adequate information with respect to the subsequent behaviors of in-service education program participants. By examining the activities and attitudes of participants of past programs, it was felt that teacher educators would be able to specify with greater precision the entry or exit behaviors for future in-service programs.

A survey instrument was designed and data were gathered from a panel of 12 experts who had been responsible for instruction at the 1965 and 1966 summer media Institutes held at Michigan State University, 174 Institute participants of the 1965 and 1966 summer in-service media education program at M.S.U., and from 72 building principals of media coordinator respondents.

This study proposed eight areas of investigation. First, a panel of 12 experts who had taught at the two Institutes held at M.S.U. was consulted to determine what activities educational media building coordinators who attended summer Institutes at M.S.U. should be performing. This panel suggested 18 activities, mostly consultative, and ranked them according to their appropriateness in the development and maintenance of an effective media program.

Second, 194 of the participants who attended the Institutes were sent a questionnaire designed to compare the panel ratings with actual performance. Third, the frequency with which coordinators performed the 18 activities was measured. And fourth, the Pearson Product-Moment Correlation Coefficient technique was employed to determine what correlation existed between the rating of the 18 activities by the experts and (1) the activities actually performed by the coordinators, as well as, (2) the frequency with which the coordinators performed these activities.

Fifth, 24 demographic characteristics of the building coordinators and their school settings were examined for possible relationships to the activities they performed. There were no precise patterns observed with respect to these relationships.

The final three areas investigated by the study dealt with the attitudes of coordinators and the administrator to whom they are responsible. After coordinators and principals were both asked to rate the appropriateness of the 18 activities, the Pearson Product-Moment Correlation Coefficient technique was used to determine what relationship existed among the appropriateness ratings of the experts, coordinators, and principals. Correlations significant at the .0005 level or smaller were found among all three groups. Attitudes of the panel of experts are highly correlated with those of coordinators and their principals.

Finally, when given the opportunity to respond to an open-ended question pertaining to observed changes in activities since attending the Institutes, most respondents stated that their media program had grown as had their responsibilities. In addition, the coordinators generally felt that they were now more knowledgeable and confident in their administration of a media program.

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Particularly, I would like to thank Dr. Charles F. Schuller, Chairman of the Advisory Committee, for his continued interest, guidance, and wholehearted encouragement during the entire length of my doctoral program. To Dr. Paul Witt, who acted in absence of Dr. Schuller, as well as the remaining members of the Advisory Committee, Dr. John Barson, Dr. Charles Blackman, and Dr. Donald Olmsted, I wish to extend my appreciation for their direction and support.

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CHAPTER I

THE PROBLEM

Introduction

In the last twenty-five years we have witnessed a profound change in American education, a vast revolution whose end is not yet in sight. If we are to look for the starting point of this cataclysmic period, "we must turn to a date near the end of World War II when in 1944 the Veterans Readjustment Act, known more generally as the GI bill was enacted."[1] Millions of returning service men took advantage of the provisions of this act. As they entered classrooms across the nation, both as students and teachers, they brought with them a demand for improved instruction. Because of their increased maturity and exposure to military training techniques, they were able to dramatize the need for innovation in instructional programs. Wiseman points out:

> When the war ended, the men who returned to civilian life brought with them new teaching materials and equipment. In addition, they also brought with them new methods of teaching. The final result has been increased attention to the role of audio-visual materials in education and the

[1]Frank G. Jennings, "It Didn't Start with Sputnik," Saturday Review, September 16, 1967, p. 77.

> integration of these new materials into the curriculum. Along with new concepts of teaching, the realization developed that schools needed personnel responsible for the development and administration of a program of instructional materials and methodology.[2]

In the decade after the war, a growing body of critics mounted an ever more vocal attack on American education. And in 1957, when the Soviet Union launched its first satellite, concerned Americans voiced their distress over the quality of public education. The following year, in 1958, the Congress responded to this concern with the National Defense Education Act (NDEA). NDEA and many subsequent acts have promoted and accelerated educational innovations in several ways. One is through the provision of funds for local schools to purchase the equipment and materials necessary to implement newly developed instructional techniques.

Another major provision of the NDEA legislation, the in-service institute for teachers, has appeared to many educators as the most valuable feature of the entire NDEA program.[3] The significance of the institute program

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[2]Robert Charles Wiseman, "Job Duties of the Full-Time Audio-Visual Directors in the Public Secondary Schools of the North Central Association Geographical Area" (unpublished Ph.D. dissertation, Indiana University, 1966), p. 1.

[3]Donald W. Johnson, "Title III and the Dynamics of Educational Change in California Schools," in Innovation in Education, ed. by Matthew B. Miles (New York: Bureau of Publications, Teachers College, Columbia University, 1964), p. 179.

may be partially indicated by the continued use of the term "awarded" when identifying teachers who had been selected as participants. During the first three years of an expanded NDEA program from 1965 to 1967, over 60,000 teachers participated in institutes covering a broad range of subjects, including educational media.[4] In fact, 107 institutes have served some 4400 educational media specialists. In 1965, alone, these institutes operated on budgets which averaged $27,000, exclusive of participants' stipends.[5] A number of the institutes, including two at Michigan State University, have sought to prepare teachers who have been designated educational media building coordinators and, as such, are responsible for the administration and coordination of media activities in their school building.

Today, there is a need to examine the impact the institutes have had on those teachers who attended them. At least two major points may be stated which provide a rationale for empirical investigations in this area.

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[4]James W. Brown, "Educational Media Institute Evaluation Project, Department of Audiovisual Instruction," Evaluation of Summer 1966 NDEA Institutes (San Jose: Educational Media Institute Evaluation Project), pp. 1-2.

[5]James W. Brown, "Educational Media Institute Evaluation Project, Department of Audiovisual Instruction," Evaluation of Summer 1965 NDEA Institutes (San Jose: Educational Media Institute Evaluation Project), pp. 2-6.

First it should be noted that in view of the great expense and effort a successful summer institute requires, teacher educators must continually reevaluate the final efficacy of their institute programs. In order to bring about improvement, teacher educators need more adequate information with respect to subsequent behaviors of institute participants. By examining the activities and attitudes of participants of past institutes, teacher educators may be able to specify with greater precision the entry and exit behaviors for future in-service education programs for teachers.

Second, it has been noted that "audio-visual program administration is a relatively new area in education. Accordingly, there is a dearth of reported empirical research directly related to this administrative function." In addition, many educators question the validity of the research methodology used in existing research.[6] While studies preceding the present endeavor[7] have already examined short-term changes in the attitudes of institute

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[6]Charles F. Schuller, ed., The School Administrator and His Audio-Visual Program (Washington, D.C.: Department of Audio-Visual Instruction, National Education Association, 1954), p. 266; also, Paul Saettler, A History of Instructional Technology (New York: McGraw Hill Book Company, 1968), p. 362

[7]Brown, Evaluations of Summer 1965 NDEA Institutes; also, Evelyn Perloff, Conpass News, Report of the Consortium of Professional Associations to Supervise Studies of Special Programs for the Improvement of Instruction in American Education, Washington, D.C., September, 1967, p. 4 (and other unpublished documents

participants immediately after their participation in an institute, and have even made tentative inquiries into the long-term effects, no research to date has surveyed the activity of media specialists after they return to their schools from such an institute.

The Purpose of the Study

It was the purpose of this study to obtain descriptive information about media-related activities and attitudes of educational media building coordinators who attended either the 1965 or 1966 summer instructional media Institutes held at Michigan State University as well as information related to selected variables which may affect these activities and attitudes. It was also intended that this exploratory survey would lead to the identification of specific areas in which additional research might be conducted in order to improve the quality of in-service education for educational media building coordinators.

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of the consortium gathered by the Instructional Media Center at Michigan State University, East Lansing).

More explicitly, this study proposed:

1. To identify, by means of a panel of experts, the media related activities educational media building coordinators might be expected to perform after attending a Michigan State University summer media Institute, and in so doing to provide a base line to which the reports of building coordinators who attended one of the Institutes might be compared.
2. To identify the media-related activities these coordinators perform and the frequency with which each activity is performed.
3. To examine the relationship between the media-related activities specified by the panel of experts and those reported by the coordinators in order to determine whether coordinators are performing activities which experts in the media field believe they should be performing.
4. To determine whether certain demographic variables such as age, professional preparation, responsibility, and school characteristics are related to the media-related activities performed by the educational media building coordinator.
5. To investigate the attitudes of institute participants and their building principals

regarding the appropriateness of the activities performed by these building coordinators, and

6. To determine whether there is a similarity between the attitudes of the panel of experts, the coordinators, and the principals.

To achieve these purposes the study focused on the following eight questions:

1. What activities might coordinators who attended summer institutes at Michigan State University be expected to perform in conducting a building educational media program?
2. What major activities do these educational media building coordinators actually perform?
3. How does the educational media building coordinator distribute his time among the activities he performs?
4. Is there a significant correlation between the activities performed by these building coordinators and the activities which the faculty and other staff members who taught at the institutes espoused?
5. What relationship, if any, exists between the demographic characteristics of the building coordinator and of his school setting, and the activities performed by the coordinator? (For example, do coordinators who teach in

elementary schools perform different activities than coordinators in high schools?)

6. What activities do the coordinators themselves consider most appropriate in promoting an educational media program?
7. Do the coordinators' attitudes toward these activities correlate with the position taken by the faculty and other instructors at the Institutes?
8. Is the building principal's attitude toward the use of new educational media related to the activities and attitudes of building coordinators?

The Plan of the Study

This study, primarily an exploratory survey, investigated the activities reported by media specialists who attended Institutes at Michigan State University during the summers of 1965 and 1966. According to Kerlinger such studies can perform three functions: "to discover significant variables in the field situation, to discover relationships among variables, and to lay a ground work for later, more systematic and rigorous testing of hypotheses."[8]

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[8]Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart and Winston, Inc., 1964), p. 388.

To collect the data for this survey, a questionnaire was designed to elicit the demographic and attitudinal data regarding building coordinators, as well as descriptive information regarding their media activities. Information was gathered from three different populations: (1) the Institute faculty and other media experts, (2) the educational media building coordinators, and (3) their principals. Information was gathered about three distinct variables: (1) media related activities, (2) characteristics of building coordinators, and (3) attitudes of administrators.

Media Related Activities

The first step in this study was to generate a list of activities the building coordinators who attended M.S.U. summer institutes might be expected to perform after they returned to their jobs. Beginning with a list of eight activities in Godfrey's survey of more than 3,000 school districts in 1962,[9] the Institute faculty and media experts were asked to (1) made additions, (2) suggest deletions, and (3) rate the appropriateness of the activities and objectives espoused during the Institutes. Using the data thus collected, a new list of building coordinator media activities was developed.

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[9]Eleanor P. Godfrey, The State of Audiovisual Technology, 1961-1966 (Washington, D.C.: Department of Audiovisual Instruction of the National Education Association, 1967).

This new list provided relatively objective criteria for what activities building coordinators who attended Institutes at Michigan State should be engaged in.

Characteristics of Building Coordinators

All participants in the 1965 and 1966 summer Institutes who were presently in the education profession were considered to be members of the population of coordinators examined in this study. Data were obtained from this group by means of a two-part questionnaire distributed by mail.

The first part of this questionnaire was designed to elicit specific background information about: (1) the school setting in which the coordinator served, (2) the audiovisual program of that school, (3) the coordinator's assignment in that school, and (4) the professional preparation and background of the coordinator. The second part solicited information about the media-related activities performed by the building coordinator who was asked to respond by selecting activities from the revised list of media activities in answer to the following questions:

1. Which activities did you perform prior to attending an M.S.U. summer Institute?
2. Which activities do you presently perform in your role as a building coordinator?
3. What amount of time do you devote to each of these activities?

4. How appropriate do you consider each of the various activities?

The participant was asked to respond to one final open-ended question: "How are you operating differently today in your media role than you did before participating in an NDEA summer Institute at M.S.U.?"

Attitudes of Administrators

The final section of this study was designed to determine whether the attitudes of building principals were related in any way to the activities and attitudes of building coordinators. Each administrator directly responsible for a building coordinator was asked to complete a shortened version of the questionnaire dealing with media-related activities. The administrators' responses to this questionnaire were matched with the responses of their coordinators' to determine whether any significant correlation existed between their attitudes.

Each building principal was asked to complete a second questionnaire, "The New Educational Media Attitude Inventory,"[10] developed by Curtis Ramsey and later

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[10]Curtis P. Ramsey, A Research Project for the Development of a Measure to Assess Attitudes Regarding the Uses of New Educational Media, Title VII Project #492 Grant #740095 (Nashville, Tennessee: George Peabody College for Teachers, 1961.

modified to some extent by Guba and Synder.[11] This instrument, used to determine whether an individual is in sympathy with or antagonistic toward the uses of newer educational media in the classroom, was statistically analyzed to determine whether principals holding positive attitudes about media tend to have coordinators whose activities generally fulfill the expectations of the Institute faculty.

Limitations of the Study

This study, as herein proposed, is limited by the population under investigation, the intended generalization, and the statistical treatment.

This investigation is an ex post facto field study and its greatest limitations are due, primarily to the inherent characteristics of such research. Kerlinger points out that:

> Ex post facto research may be defined as that research in which the independent variable or variables have already occurred and in which the researcher starts with the observation of a dependent variable or variables.[12]

This study deals only with the educational media building coordinators who attended summer Institutes at

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[11]Egon G. Guba and Clinton A. Synder, Instructional Television and the Classroom Teacher, RF Project 1367, Final Report, Research Foundation (Columbua, Ohio: Ohio State University, April, 1964).

[12]Kerlinger, Foundations of Behavioral Research, p. 369.

Michigan State University in 1965 and 1966. Therefore, the findings of this research are generalizable to other Institutes and their participants only to the extent that the M.S.U. Institutes were similar to other media Institutes and that the Institute participants at M.S.U. may be representative of other educators who attended summer media Institutes and that these media specialists hold similar educational positions in their schools.

The statistical procedures carried out in this research are limited to a description of the distribution of scores on media related activites, on attitudes toward those activities, and on certain demographic characteristics and their statistical relationship to the activities and attitudes.

Description of Terms

The terms operationally defined in this section include only those which delimit the area of investigation by their appearance in the thesis title, those employed in the questions to be investigated, and those bearing a meaning in any way different from the usage in educational literature.

Educational Media Building Coordinator:

A professional staff member of a public or parochial school system who (1) possesses at least a bachelor's degree, (2) holds a teaching certificate, (3) is officially assigned as

coordinator of the instructional media program in an elementary or secondary school building, and (4) attended one of the two institutes at Michigan State University during the summer of 1965 or 1966.

Summer Institute:

An in-service summer training program authorized under the conditions of Title XI of the National Defense Education Act of 1958 as amended in 1965 to provide advanced study programs for teachers, supervisors, school library personnel, and educational media specialists in public and private non-profit elementary and secondary schools.

Institute Faculty and Other Media Experts:

The 12 full and part time instructors who participated in both the 1965 and 1966 M.S.U. Institutes.

Media Related Activities:

A list of activities which educational media building coordinators might be expected to perform after attending an M.S.U. summer Institute. This list of activities was determined on the basis of a survey of the Institute faculty and other media experts, who were asked to rank by appropriateness some of

the activities suggested during the Institutes.

Media Related Attitudes:

Attitudes of educational media building coordinators and their principals regarding the appropriateness of the media related activities to their building media program.

Principals:

The chief administrative supervisor of a school and immediate superior of an educational media building coordinator who attended a summer Institute at M.S.U.

Principals Attitude Toward the Use of New Educational Media:

Scores of principals on the New Educational Media Attitude Inventory, and principals' attitudes regarding the appropriateness of the media related activities to their building media program.

Overview

In this first chapter, an attempt has been made to present a statement of the problem and of the need for the study, the purpose of this study, questions to be investigated, the plan for the study, limitations, and definitions of terms.

In the second chapter, the pertinent related literature is reviewed. This review deals with studies

of the development of technology in education, the role of the audiovisual specialist in the public schools, and a chronological view of the activities performed by the media personnel in education. In Chapter III the methodology and procedures of the study are presented in detail including a description of the population, the development of the questionnaires, all procedures of the survey, the handling of data, recording procedures, and statistical treatment. An analysis of the data and statement of findings are provided in Chapter IV. And finally, in Chapter V, a summary, conclusions, and recommendations for further research are stated.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter reviews the literature which best describes the explosive changes that are occurring in American education, as well as the literature on the educational media specialist and the administration of building media programs. In addition, a chronological examination of the activities performed by media personnel who are responsible for the administration of building programs will be presented so that a framework is built for the current study.

Technological Change in Education

Many explanations have been suggested for the recent phenomenal growth of the American educational establishment. Of course, as Ely reminds us, "no one can speak authoritatively about all of the new developments in educational technology. The new frontiers are too vast, too complicated, and changing too rapidly."[1] Many factors have influenced this revolution: according

[1]Donald Ely, "Facts and Fallacies About New Media in Education," in Revolution in Teaching: New Theory, Technology, and Curricula, ed. by A. DeGrazia and D. Sohn (New York: Bantam Books, 1964), p. 42.

to Hudspeth, such factors as "the population explosion, the knowledge explosion, the view that education is a natural resource, the use of new tools (such as the computer to study social behavior) and the insertion into education of considerable energy from outside agencies."[2]

The work of Paul Mort and Henry Brickell reflects the extremely rapid rate of innovation in education today, a key feature of the educational revolution. For example, until the late 1950's we could say that

> the spread of an innovation through the American schools proceeds at a slow pace . . . Typically, an extravagantly long time elapses before an insight into a need (or discovery that past practice is indefensible) is responded to by innovation destined for general acceptance in the schools. This period is measured in decades.[3]

In many cases, Mort said, 50 to 100 years were needed for adoption to be considered complete; adoption rates this slow could only produce chaos today. But just a few years later, Brickell found "that the rate of innovation in the public schools had more than doubled in the

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[2]DeLáyne R. Hudspeth, "A Study of Belief Systems and Acceptance of New Educational Media with Users and Non Users of Audiovisual Graphics" (unpublished Ph.D. dissertation, Michigan State University, 1966), p. 20.

[3]Paul R. Mort, "Studies in Educational Innovation from the Institute of Administrative Research: An Overview," in Innovation in Education, ed. by Matthew B. Miles (New York: Bureau of Publications, Teachers College, Columbia University, 1966), p. 325.

fifteen months following the launching of the Soviet Sputnik."[4]

Pressure, interest, energy, and money from the outside have all accelerated the pace of change in most public schools. During the period discussed by Mort, the public schools were for the most part "closed systems," virtually inpenetrable, with any changes coming from within. But as our cultural environment has impinged more directly on the schools, as the public has urged quality education and the federal government assumed greater leadership, we have witnessed "a massive infusion of technological capital and personnel into the system as well as a massive program of research and development."[5] We have become a technological culture, one, that is, "that finds technological solutions to its problems." This means, Morris says, "that the environment which contributes to the problems of education also contains the elements that can help to solve them."[6]

Discussing this technological sophistication, Finn suggests that our present rate of development originated

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[4]Henry M. Brickell, "State Organization for Educational Change: A Case Study and a Proposal," in Innovation in Education, ed. by Matthew B. Miles (New York: Bureau of Publication, Teachers College, Columbia University, 1966), p. 495.

[5]Barry Morris, ed., "The Function of Media in the Public Schools," Audiovisual Instruction, VIII (January, 1963), p. 11.

[6]Ibid.

with the industrial revolution in the 19th century. He examined various models of economic growth for their pertinence to the educational structure, and finds that the economic model presented by Walt Rostow[7] best fits the educational frame. Rostow's five stages in the growth of a traditional culture into a high-order technological culture are:

1. the traditional society,
2. the pre-conditions for take-off,
3. the take-off,
4. the drive to maturity, and
5. the age of high mass-consumption.

Finn states,

> that American education, considered as a culture in transition, is now beginning the take-off stage into a high-order, high-energy culture, and that it is the first educational system in the world to reach this stage.[8]

This study goes on to discuss the indicators which signal these stages of educational growth, in which the rates of audiovisual equipment utilization and material production figure prominently. Finn says, there are other indicators we know little about: "The most

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[7]Walter W. Rostow, The Stages of Economic Growth (Cambridge: The University Press, 1960).

[8]James D. Finn, D. Perrin, and L. Campion, Occasional Paper No. 6, Studies in the Growth of Instructional Technology, Audiovisual Instrumentation for Instruction in the Public Schools 1930-1960--A Basis for Take Off (Washington, D.C.: N.E.A., 1962), p. 6.

important of these are in the general area of technical-professional manpower."[9]

In 1963 a DAVI task force set the current revolution in education in this frame:

> A new technology for instruction has been developed and proved through basic research and practice. This development has now reached a level that will permit rapid expansion of application and of further innovation.
>
> The new educational technology is capable of meeting and solving certain of the schools' major problems in instruction, organization and administration.
>
> Application of the new technology will result in major changes affecting the administration, organization and physical facilities of the public schools.
>
> Methods of instruction will be modified to a major degree, particularly in the presentation of information.
>
> Teachers and learners will have new roles and changed activities as a result of this technological change.
>
> A new kind of professional will be required to provide leadership in design, implementation and evaluation of programs of education which make the fullest use of new media. The functions performed by this leader and the resources he brings will be among the essential determinants of success or failure in tomorrow's schools (emphasis mine).[10]

This raises the question of what role the media person may assume within this ferment.

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[9] Ibid.

[10] Morris, "The Function of Media . . . ," p. 11.

The Role of the Media Specialist in an Administrative Framework

A number of scholars discuss the place of media personnel in the schools as an individual, independent of his activities. Most important, we must recognize that the role of the media specialist is changing.

In the past, according to Godfrey, "the media coordinator functioned chiefly as a logistics specialist, ordering and scheduling equipment and materials,"[11] being considered little more than a "mere custodian of materials and doctor of ailing equipment."[12] In the past, a lack of equipment and materials in sufficient quantity necessitated such coordination, a lack described by Godfrey in her 1962 research:

> The 517 schools surveyed had a reasonable variety of audiovisual equipment. Essentially, every school had at least one 16mm projector, slide-filmstrip projector, and record player. Almost all of the secondary schools had tape recorders; and the majority of the secondary schools had at least one opaque projector, television set, and overhead projector.[13]

For equal distribution, then, the principal, a librarian, or a classroom teacher served as a part-time supply officer.

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[11]Godfrey, The State of Audiovisual Technology, p. 47.

[12]Marie McMahan, "Building Coordinator: Professional Partner?" Audiovisual Instruction, VIII (November, 1963), p. 662.

[13]Godfrey, The State of Audiovisual Technology, p. 50.

With the enactment of such federal legislation as the National Defense Education Act and the Elementary and Secondary Education Act, new funds permitted a rapid increase in the quantity of equipment and materials in the public schools. Godfrey reports that between 1962 and 1964 school equipment inventories increased "from a minimum of 27 per cent (for 16mm projectors) to a maximum of 176 per cent (for overhead projectors)."[14] And with this tremendous increase in the amount of equipment and materials, the role of the media coordinator took on a new meaning and importance.

Miller proposed that "building coordinators with training and ability are important to a strong program of instruction. If their function is to work as clerk-technicians, however, then their time and talents are badly wasted."[15] He maintained that the building coordinator's mechanical activities should be given to a paraprofessional who could fill the clerical-technical role, relieving the professional coordinator for more important activities. Other leaders in the media field also suggested that the educational media building coordinator become "an active member of the curriculum team, dedicated

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[14] Ibid., p. 77.

[15] Elwood E. Miller, "Proposed: A Media Clerk-Technician," Audiovisual Instruction (November, 1964), p. 606.

to improving learning."[16] For example, Eboch maintained that the media specialist should be involved in "the design and implementation of information transmission and display systems which are appropriate to specific instructional objectives in well-defined educational situations."[17] He went on to state:

> There is an optimum combination of elements and circumstances for the effective solution of every instructional problem. It is the audiovisual designer's job to analyze, predict, and deliver that optimum solution.[18]

And Norberg speaking for the NEA's department of Audio-Visual Instruction, sums up the current trend:

> The role of the media professional in education is changing from that of a keeper and dispenser of teaching aids to that of an analyst and designer or instructional systems who must be centrally involved in the planning of learning environments and in providing for related support functions and evaluative procedures.[19]

In essence, then, the building coordinator must maintain his role as a logician and in addition become a member of an instructional development team which serves to evaluate, redesign, and produce instructional materials, media; and

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[16]McMahan, "Building Coordinator: Professional Partner?" p. 662.

[17]Sidney C. Eboch, "The AV Specialist: Some Reflections on an Image," Audiovisual Instruction, VIII (January, 1963), p. 15.

[18]Ibid., p. 16.

[19]Kenneth Norberg, ed., Wesley C. Meierhenry, Donald P. Ely, Jerrold Kemp, and Anna L. Hyer, "The Role of the Media Professional in Education," Audiovisual Instruction, XII (December, 1967), p. 1027.

systems. He must take his place among other professionals on the curriculum team.

The Media Specialist as a Change Agent

Up to this point we have dealt with the literature describing the curricular aspect of the media specialist's role. Yet another point from which to view the media specialist is as a communication agent within the school. David Berlo, delivering the keynote address to the DAVI national convention in 1963, stressed that the media specialist must enlarge his professional perspective beyond instructional technology or the audiovisual business, rather he must view himself as a part of "the people business."[20] Berlo challenged the field to broaden its view when he stated,

> In short, you are not a media specialist--you are a communication specialist. You are not just a technical advisor on the use of media. You are a change agent, and as such, you are involved in the planning and design of messages that will attain desired objectives. The entire process, not just the message media product, is your field of concern.[21]

In fact media specialists and particularly building coordinators, Wendt says, "are actually change agents or advocates of change . . . although many of them would

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[20]David K. Berlo, "You Are In the People Business," Audiovisual Instruction, VIII (June, 1963), p. 374.

[21]Ibid.

not recognize the terms."[22] Therefore several studies about the change processes and innovation adoption practices in our schools merit examination at this time.

Rogers has identified four major elements in the diffusion of innovations: (1) the innovation, (2) communication between individuals, (3) communication within a social system, and (4) diffusion over time.[23] It is with the second element, communication between individuals, that the building coordinator serves an important function. Basically diffusion is the process by which an innovation spreads from its source to its ultimate users. Rogers explains that "The essence of the diffusion process is the human interaction in which one person communicates a new idea to another person."[24] More specifically, he reaches these few conclusions:

1. Awareness of an innovation may be created by personal influence from others. However, for most individuals, awareness is caused by impersonal communications such as mass media. Personal influence is apt to be more important in making the relatively later adopters aware of an innovation than in creating awareness for innovators and early adopters.

2. Once formed, opinions about an innovation are reinforced by interaction with others. In the

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[22]Paul Wendt, "Generals or Foot Soldiers" in Media and Educational Innovation, ed. by Wesley C. Meierhenry (Lincoln: The University of Nebraska Extension Division, 1964), p. 404.

[23]Everett M. Rogers, Diffusion of Innovations (New York: The Free Press of Glencoe, 1962), p. 12.

[24]Ibid., p. 13.

face of a high degree of uncertainty, most individuals wish to validate their opinions with those of others. Thus personal influence not only helps to determine original opinions about an innovation at the awareness stage, but also consensually validates this opinion once it is formed.

3. Norms on innovativeness are generally communicated to group members via personal influence networks. These norms probably are most important at the evaluation stage where the individual is deciding whether or not to try the new idea.

4. A performance comparison of the innovation with existing ideas may be communicated from peers. This function of personal influence is most important at the trial stage of the adoption process. In fact, for those innovations that are not divisible for trial, personal influence from peers may in some ways replace a small scale trial.[25]

The individual in the system who informs others about new ideas, defined as "that individual from whom others seek information and advice,"[26] is called an opinion leader. To the degree that he is oriented to events outside his particular social system, he is said to be a cosmopolite. Rogers further defines the "professional person who attempts to influence adoption decisions in a direction that he feels is desirable,"[27] as a change agent. Thus, he says,

> Most change agents are local-level bureaucrats whose purpose is to inject a cosmopolite influence to innovate a clients social system. The change agent functions as a communications link between two social systems.[28]

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[25] Ibid., p. 223.

[26] Ibid., p. 16.

[27] Ibid., p. 17.

[28] Ibid., p. 255.

Regarding the role of the change agent, (1) a cosmopolite information source is most important at the awareness stage of the innovation process, (2) opinion leaders will be more cosmopolite than their followers.[29]

This definition well suits the educational media building coordinator who has returned to his school after attending a summer institute. Indeed, some educational leaders envision the entire Title XI program as a change agent in itself.[30] Returning coordinators link two systems, their own school with the larger system of media specialization.

Drawing on additional diffusion theory presented by Katz and Lazarsfeld,[31] then, Knowlton[32] attempted to determine whether patterns of influence in the schools affected the use of audiovisual materials. A survey was made of 1,458 high school teachers who had attended National Science Foundation Summer institutes and these participants were considered a normative sample. A non-normative group was also surveyed consisting of teachers of English,

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[29] Ibid., p. 311.

[30] Donald N. Bigelow, "Title XI National Defense Education Act," Audiovisual Instruction, X (October, 1965), p. 634.

[31] Elihu Katz and Paul F. Lazarsfeld, Personal Influence (New York: The Free Press of Glencoe, 1964).

[32] James Q. Knowlton, Studies of Patterns of Influence in the School Situation as They Affect the Use of Audiovisual Materials (Bloomington: Indiana University, 1963).

math, science, and social studies who taught in six Indiana high schools. "In an attempt to determine the extent to which the NSF results might be generalized, we tried to determine just how summer institute participants differed from their non-participating counterparts."[33] Specifically, the study attempted to determine who led opinion within schools and what patterns of communication existed through which relevant A-V information might pass. In conclusion, Knowlton found:

> that informal groups existed and that group members differed in the degree of their influence. But it has not been determined, and indeed it apparently was not the case, that any very noticeable number of the more influential teachers exercised influence in the area of AV matters.[34]

But he did uncover a demographic factor which seemed to related to the patterns of communication and influence.

> In the attempt to discover whether "AV networks" existed it became clear that the subject a teacher taught was the most important determinant relating to the formation of any such networks.[35]

Since no clear evidence appeared showing patterns of influence within the schools, some students have been drawn to the conclusion that there are no institutionalized change agents in public education. As Carlson says,

> the change agent counterpart of the county extension agent has no office in our public school enterprise. And, as has been indicated, many

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[33] Ibid., p. 3.

[34] Ibid., p. 28.

[35] Ibid., p. 88.

> attribute the slowness of change in educational practices to the absence of a change agent.[36]

Others maintain that administrators control innovation in the public schools; Brickell observes that "two distinct groups of people might be expected to influence structural change in the local public schools,"[37] the public, which is external to the school system, and the profession:

> New types of instructional programs are introduced by administrators. Rearrangements of the structural elements of the institution depend almost exclusively upon administrative initiative. Teachers are not change agents for innovations of a major scope.[38]

Brickell suggests that administrators act as gate keepers for the innovation process within their jurisdiction: "the administrator may promote or prevent innovation. He cannot stand aside, or be ignored."[39]

Leu and Rogers,[40] examined the diffusion process in three Michigan schools in order to determine what factors or indicators were associated with innovation assimilation

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[36]Richard O. Carlson, et al., Change Processes in the Public Schools (Eugene: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965), p. 4.

[37]Brickell, "State Organization for Educational Change . . . ," p. 502.

[38]Ibid., p. 503. [39]Ibid.

[40]Donald J. Leu, et al., The Diffusion of an Innovation in Three Michigan Schools: Institution Building through Change (East Lansing: The Institute for International Studies in Education and Department of Communication, Michigan State University, 1966).

in those schools. They also attempted to examine communication patterns, sources of information, decision making processes, and other phenomena related to the diffusion process, finding that

> The supervisor seemed to be the most important source of information about the innovation. One fifth of the teachers in the sample learned of the innovation through him. The next two most frequent communication sources were college instructors and fellow teachers; they combined to supply more than one third of the respondents with information.[41]

Kelly[42] studied how several background variables influence teachers' attitudes toward the use of audio-visual materials. Using information from 995 teachers in the Boston area, he found among other things, a significant relationship "between teachers attitudes toward audio-visual materials and whether or not they have had the encouragement of the various supervisors in the school system and between ease of ordering materials and attitude toward AV materials."[43] Again we see how the administrator controls the belief systems operating in his area of responsibility.

In this section we have reviewed studies of the media specialist, his purpose in the school setting, and

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[41] Ibid., p. 38.

[42] Gaylen B. Kelly, "An Analysis of Teachers' Attitudes Toward the Use of Audio-Visual Materials" (unpublished Ph.D. dissertation, Boston University, 1959).

[43] Gaylen B. Kelly, "A Study of Teachers' Attitudes Toward Audio-Visual Materials," Educational Screen and Audiovisual Guide, March, 1960, p. 119.

his role as an audiovisual expert. The next section of this review will deal with studies of the administration of audiovisual programs and the activities performed by media directors and coordinators.

Media-Related Activities and Programs

Earlier in this chapter it was pointed out that an innovation in education might take from 50 to 100 years from introduction to adoption. The adoption of audiovisual programs in the public schools have been no exception to the innovation process. Audiovisual materials, methods, and programs have generally reached the classroom only after an extremely slow and difficult process. In that this study is attempting to describe the current status of the building level program as well as the personnel who administer those programs, a historical review of the development of this innovative and currently changing educational program is essential to a clear understanding of the present study. This historical review will include a description of several of the early programs that were organized in the public schools and will describe the method with which they operated. In addition, this section will examine, chronologically, those studies which have dealt with media-related activities performed by educational personnel. By linking this historical examination with previous sections of this chapter which dealt with the educational role of the building coordinator

as well as his role as a change agent, it is hoped that a comprehensive frame of reference for the current study will be developed.

Audiovisual materials and methods are by no means new to the public schools. Paul Saettler[44] labeled the time of their first use, the "visual education period," as the decade following World War I. Four basic lines of growth marked this early development, "(a) the emergence of school museums, (b) the founding of slide libraries, (c) the establishment of film libraries, and (d) the non-departmentalized systematization of audio-visual education."[45]

While each of the early programs played an important part in the early development of visual education, the early impetus came indisputably from the school museum movement.

> In fact, the early label "visual education" came into widespread use and acceptance more than a decade after the first educational museums were established at St. Louis (1905), Reading (1908) and Cleveland (1909), and more than twenty-five years after New York state began to collect and distribute lantern slides for the public schools.[46]

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[44]Paul Saettler, "History of Audiovisual Education in City School Systems," Audiovisual Communication Review, Vol. 3, No. 2 (Spring, 1955), p. 108.

[45]Ibid., p. 109.

[46]F. Dean McClusky (introduction to 5th chapter), A History of Instructional Technology, by Paul Saettler (New York: McGraw Hill Book Company, 1968), p. 79.

The St. Louis Educational Museum, founded in 1904, was the first administrative unit for audio-visual education organized in a public school system. Saettler points out that the museum's first curator, Amelia Meissner, introduced the phrase "bringing the world to the child." At the St. Louis museum, (1) collections were built to supplement rather than supplant the course of study, (2) provision was made for transporting materials between museum and the school, and (3) a catalog of materials arranged by course of study was made accessible to teachers in the system.[47]

A second major development was the introduction of slide libraries in such cities as Philadelphia, Detroit, and Chicago. The Chicago program was one of the most interesting. Ten Chicago principals organized a projection club within the system, but indepednent of the Chicago Board of Education. Starting in 1895, each of the principals contributed $25 to a "slide fund" which they used to purchase slides and projection equipment. They distributed slide sets among their schools and in the community, and maintained the collection in good repair as well. The club became so popular that soon it could no longer be maintained according to original voluntary agreement. So in 1917 the entire collection was turned over to the Board

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[47]Saettler, "History of Audiovisual Education . . . ," p. 113.

of Education with the understanding that "it be built up, its use fostered, and its advantages extended" to all schools in Chicago.[48]

The third track of this growth pattern was the development by 1920 of film libraries in the public school audiovisual departments of Chicago, Detroit, Kansas City, and several other cities. Saettler believes that all of these libraries developed primarily "from the impetus induced by the introduction of motion picture in the classroom."[49] Los Angeles, Buffalo, New York, Atlanta, Pittsburgh, Berkeley, and Sacramento, he says, had formed libraries by 1922. Furthermore, with the advent of organized motion picture libraries, a series of scientific studies was launched to determine the learning efficacy of films. Thus winning quite early "a modicum of respectability"[50] for visual education within the academic community.

The last avenue of initial development Saettler called the "non-departmentalized systematization" of audio-visual education in the schools. When he surveyed 14 city schools in 1923, F. Dean McClusky discovered three types of organization:

1. An audio-visual education committee, composed of teachers and administrators, which concerned

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[48] Ibid., p. 115. [49] Ibid.

[50] Paul Saettler, "Historical Overview of Audio-Visual Communication," Audiovisual Communication Review, Vol. 2, No. 2, p. 111.

itself with the problems and administration of audiovisual education in the school system.

2. A committee placed in control of audio-visual education, identical with the first type, however, the constituent members of this committee were representatives of a group of teachers and principals interested in audio-visual education rather than official representatives of the superintendent or board of education.

3. Audio-visual activities confined to the individual school. The responsibility for audio-visual education service rested entirely with the principal or teacher for each respective school within the district, independent of the city audio-visual department.[51]

Saettler calls McClusky's unpublished administrative survey the most reliable and extensive source of data on the early administrative history of audiovisual education in city school systems.[52] In it McClusky reported on the salaries of audiovisual personnel, types and quantities of equipment and their value, distribution techniques, and utilization procedures. He found that:

> The slide was the principal audio-visual material circulated. This was closely followed by the film, steriograph, picture exhibit, graphic booklet, chart, costume doll, and model. One of the most important problems of city audio-visual education departments was the distribution of audio-visual materials. In the early city audio-visual departments two general methods of distribution were used. These methods were known as the "circuit" and "special order" methods, and were quite

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[51] Saettler, "History of Audio-Visual Education . . . ," p. 116.

[52] Ibid.

> different in purpose and operation. Both however, were used in varying degrees by the same audio-visual departments.[53]

The circuit method passed materials from one building to another on an established circuit; thus each school could depend on receiving films at specified intervals throughout the year. Still the special order technique was most popular. To secure the use of a film, a teacher would contact the audio-visual department and make his request for a specific day and hour; virtually all departments used this system during the 1920's.

> In 1923 the Berkeley audio-visual department distinguished itself by being the first to publish a graded list of films. A short time later, Chicago prepared the first graded catalog of slides.[54]

The period from 1928 to 1941 witnessed the introduction of instructional motion pictures with sound. In 1936 there were about 500 16mm sound projectors in schools and colleges, by 1941 this number had increased to 10,000. Important distribution, production, and research centers for motion pictures were established on a national scale, and programs for training teachers in classroom utilization were initiated.[55]

George McIntire completed a study in 1931 dealing with the status of visual instruction in Indiana secondary

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[53] Ibid.

[54] Ibid., p. 117.

[55] Wayne Roger Dralle, "The Status of Senior High School Audiovisual Programs in Indiana in 1963-64 with Recommendations for Improvements" (unpublished Ph.D. dissertation, Indiana University, 1964), p. 10.

schools. This is the first study that specifically deals with the personnel of the media program. He surveyed 237 out of the 400 secondary schools in the state inquiring about the audiovisual director, equipment owned, films and slides both owned and rented, sponsored materials used, means of diffusion employed within the schools, and types of projection facilities available.[56] McIntire found that

> 147 schools of the 183 reported a department that had no systematic organization for the administration of visual instruction, 27 schools had the work carried on by the general administration, and only nine had the desirable organization featuring a director.[57]

McIntire believed that teachers and administrators seldom had the time or training to effectively direct an audiovisual program:

> There must be some organized plan and some one person responsible for such a plan if fundamental learning is to take place. A director must be secured, or in smaller schools an interested teacher may act as director provided such a teacher is relieved from regular teaching for a definite number of hours each week.[58]

In 1938, Hazlett[59] studied eight of the 12 largest American cities, each with departments of visual-sensory aids: Chicago, Cleveland, Detroit, Los Angeles,

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[56]George McIntire, "The Status of Visual Instruction in the Secondary Schools of Indiana" (Master's thesis, Indiana University, 1931).

[57]Ibid., p. 17. [58]Ibid., p. 12.

[59]Roy J. Hazlett, "Analysis and Evaluation of the Organization, Administration, and Supervision of Departments of Visual-Sensory Aids" (unpublished Ph.D. dissertation, University of Pittsburgh, 1938).

New York, Philadelphia, Pittsburgh, and St. Louis. All these systems except Pittsburgh then had full-time directors for their departments. Hazlett investigated the organization, administration, and supervision of visual-sensory aids departments in these cities. Having surveyed the available research, he developed a standardized check list, his basis for personal interviews in five schools; in three cities the director was asked to fill out the check list and return it by mail. From his survey, Hazlett developed a list of six activities which these directors considered basic:

1. Knowing the sources of materials.
2. Being available for interviews with teachers and principals.
3. Furnishing a catelog of materials which were available from the department.
4. Administering the routine of the department.
5. Making rules and regulations relating to the operation of the department.
6. Preparing reports for superior officers.[60]

In 1949 Francis W. Noel, then heading the Bureau of Audio-Visual Education for the California State Department of Education, examined "the various aspects of the audio-visual program in relation to the administration and supervisory problems involved in operating the program."[61]

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[60] Ibid., p. 171.

[61] Francis W. Noel, "Principles of Administering Audio-visual Programs," Forty-eighth Yearbook of the National Society for the Study of Education (Chicago: The University of Chicago Press, 1949), pp. 180-200.

Noel made use of three reports reflecting the thinking and experience of some sixty-one county and city directors in California. And he outlined the following functions of the Audio-Visual Department:

1. Provide those materiél and professional services which will make it possible to use audio-visual education materials in classrooms under the best possible conditions.

2. Provide those services which will make it possible for teachers to have materials and equipment when they need them.

3. Provide the materials and services which will make it possible for teachers to select and use audio-visual materials appropriate to the teaching-learning situation.

4. Provide the facilities and professional services which will assure that the audio-visual materials will be used as an integral part of the total instructional program.

5. Provide those materiél and professional services which will enable teachers to make full use of community resources.

6. Provide those professional services which will assure teacher competency in the use of audio-visual instructional materials as well as competency at the supervisory and administrative levels.

7. Provide those materiél and professional services which will help administrative staff and other school personnel interpret the school's program to both professional and lay groups.[62]

Noel suggested that, since the audio-visual staff serves instructional needs for the entire school system, it can operate most effectively in the administrative

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[62] Ibid., pp. 184-192.

organization, in a co-ordinate relationship with other units of the curriculum or instruction division.

Audio-Visual personnel should be reponsible, he said, for leadership in the following areas:

1. Evaluation and selection of materials and equipment.
2. Supervision of all aspects of utilization within the schools.
3. Consultation services to teachers, principals, supervisors, audio-visual coordinators, architects, and outside agencies on problems and activities in audio-visual education.
4. In-service education programs for school personnel.
5. Experimentation and research on evaluation, uses of materials, and needs for future production.
6. Interpretation of the school's program, including audio-visual education, to the school personnel, and the public.
7. Production of special curriculum materials.[63]

Frazer, on the other hand, condensed the audio-visual director's activities into three categories: he must (a) see to it there are suitable places to use, adequate equipment, and a full supply of materials, (b) organize an efficient service for providing materials and equipment, and (c) counsel teachers about effective use.[64] But Harcleroad and Hite reported a 1952 survey which showed

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[63] Ibid., p. 194.

[64] Alexander Frazier, "How Much Does the Audio-Visual Director Need to Know?" School Review, Vol. 57 (October, 1949), pp. 416-424.

that the audio-visual building coordinators had actual duties in nine main areas of responsibility:

1. General administration, such as recommending the budget.
2. Ordering and scheduling of materials and equipment.
3. Maintenance of equipment and facilities.
4. Improvement of utilization, including giving demonstration lessons.
5. Liaison with central audio-visual services.
6. Preparation and distribution of information.
7. Development and upkeep of school library for audio-visual materials.
8. Care of school-produced materials.
9. Preparation of community relations programs.[65]

In 1955 Barnard[66] studied the audio-visual administrators' supervisory and administrative functions in fifteen randomly selected vocational and adult education schools in Wisconsin. Using interview check lists developed from the literature, Barnard found (a) very little administration or supervision of evening school audio-visual programs, (b) insufficient released time for coordinators to maintain their duties, (c) no procedures for

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[65]Fred F. Harcleroad and Herbert Hite, "Enthusiastic, Well Trained Audio-Visual Building Coordinator," NEA Journal, 41 (March, 1952), pp. 150-151.

[66]David P. Barnard, "A Study of the Audio-Visual Administrative and Supervisory Functions in Selected Schools of Vocational and Adult Education in Wisconsin," (unpublished Ph.D. dissertation, Indiana University, 1955).

previewing, evaluating and selecting materials, (d) no facilities for acquisition of materials or equipment, (e) no formal in-service training, (f) budgets not planned on a "need" basis, (g) no planning for production needs, and (h) virtually no leadership at the state level. When audio-visual duties were assumed, the most frequently mentioned administrative activities were (1) ordering and scheduling materials and equipment, (2) compiling and making available to all teachers bibliographies and digests, and (3) preparing a financially sound budget.[67] And the most frequently mentioned supervisory functions included (1) training students and teachers in the use of audiovisual equipment, (2) helping teachers select appropriate materials, and (3) giving demonstration lessons.[68]

Also, in 1955, Rugg[69] surveyed 61 audio-visual coordinators in schools located in the North Central Association geographical area. Rugg dealt with the professional characteristics of the audio-visual administrator's position, identified his duties, and examined activity patterns, thus producing the most comprehensive listing of coordinator activities to date, a list of 161 possible practices for audio-visual building coordinators.

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[67] Ibid., p. 358. [68] Ibid.

[69] Kenneth C. Rugg, "An Analytical Study of the Position of the City School System Audio-Visual Director" (unpublished Ph.D. dissertation, Indiana University, 1955).

A questionnaire Rugg designed and validated has since been used in other similar descriptive studies. Categories of activities used in Rugg's study include administration, budgeting, staffing, office activities, evaluation, cataloging, maintenance, scheduling, production, in-service training, professional consultation, public relations, housing, and research. The building coordinators ranked these as their first few duties: (1) serving as liaison officer between the audio-visual department and the school building, (2) supervising the distribution and storage of materials and equipment within the school building, (3) consulting with teachers who were seeking information and helping them evaluate, select, and schedule materials and equipment, and (4) ordering materials and equipment from the audio-visual department.[70]

In 1963, Marie McMahan[71] surveyed 381 building coordinators in Michigan elementary and secondary schools, and found that 87 per cent had no released time for their media activities, although 12 per cent of the secondary school coordinators had one or two hours of released time daily. McMahan divided coordinators' activities into three categories--professional, clerical, and technical.

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[70] Ibid., p. 267.

[71] McMahan, "Building Coordinator: Professional Partner," p. 662.

She found that the activities coordinators performed included:

Professional

- Selecting materials for purchase
- Organizing school-owned materials
- Assisting teachers with selection and evaluation techniques
- Assisting staff and/or students with projection techniques
- Assisting staff and/or students with utilization techniques
- Assisting staff and/or students with production techniques

Clerical

- Cataloging school-owned materials
- Distributing materials
- Distributing equipment
- Keeping equipment records

Technical

- Servicing materials
- Selecting audiovisual equipment
- Servicing equipment[72]

So much is expected that the coordinator who has no released time cannot provide in depth the services teachers request. McMahan concluded that coordinators are in need of more time if they are to complete the tasks assigned to them. She found, in addition, that coordinators with very little released time were expected to perform as many clerical and technical activities as professional duties, and that as the amount of released time increased the proportion of professional activities increased drastically: "Half time coordinators were expected to perform more than four times as many and full time coordinators five times as

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[72] Ibid., p. 663.

many professional duties as were coordinators with no released time."[73]

The most comprehensive research on audiovisual programs in the public schools to date was done by Godfrey[74] in 1967. Her monograph, "The State of Audiovisual Technology: 1961-1966" surveyed the resources, demographic characteristics, philosophy, and attitudes of media specialists, administrators, teachers, and media programs in the public schools, based on data collected from nearly three thousand school districts across the nation collected over a five year period.

Godfrey's findings regarding the activities performed by building coordinators helped in the design of procedures and questionnaires for this study. She summarized her findings:

> The coordinator functions chiefly as a logistics specialist, ordering and scheduling equipment and materials. His other most frequent services were teaching teachers how to operate equipment, providing them with information about materials, and, if was a secondary coordinator, repairing and maintaining equipment. Very few building coordinators were called upon to prepare special materials for a specific subject or teacher.[75]

Then, asking each building coordinator to select the three most important activities he performs from a list provided

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[73] Ibid.

[74] Godfrey, "The State of Audiovisual Technology . . . ," p. 17.

[75] Ibid., p. 47.

in her questionnaire, Godfrey obtained the following ranked order:

1. Orders and schedules media
2. Teaches operation of equipment
3. Provides data on new materials
4. Suggests appropriate materials
5. Classifies and stores materials
6. Maintains equipment
7. Suggests new uses for materials
8. Prepares specialized materials.[76]

The only significant difference in ranking among groups was that classroom teachers tended to rank the consultative functions higher.

Conclusion

This chapter has sought to provide the research framework within which the current study should be examined. After describing the technological change which has occurred, and is occurring in education, this survey covered literature related to the role of the media specialist, as a professional educator, as a member of a social system, and as an administrative functionary.

Since the early 1900's, our nation has undergone a vast technological revolution. The population explosion, the knowledge explosion, and the advent of near-cybernetic

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[76] Ibid., p. 48.

computer systems have subtly altered our national goals and in turn the purposes and design of our educational structure. As Finn points out, this technological revolution has thrown education into the "take-off stage of a change process which will convert it into a high-order, high energy system unique in man's history."

Changing the structure of an educational system obviously changes the roles of most educational personnel, including that of the building media coordinator. Today the coordinator is conceived as having two distinct roles within the school: as a mere custodian of materials and doctor of ailing equipment as McMahan notes, and as an active member of the curriculum team serving as a change agent for innovation within the school. We need more research into the role of the media coordinator in the change processes of the school. But interestingly enough, modern diffusion research suggests that most change agents are low-level bureaucrats who serve to inject a cosmopolite influence toward innovation within a social system, a description closely fitting the building coordinators who have attended in-service training programs at Michigan State. So a coordinator who has the backing of his local administrator might serve as a change agent or opinion leader to promote the diffusion of desired innovations within the social system of the school.

Educational media programs have operated in the public schools since the turn of the century, though clearly the role of the coordinator has changed radically since these beginnings. Originally, media personnel were responsible for school museums, slide libraries, or the early film libraries. Most research into the activities of media personnel before the end of World War II suggests these major functions were:

1. Providing bibliographies of such materials as slides, films, and models.
2. Administering the ordering and scheduling of equipment and materials for use within the school, and
3. Providing in-service training for teachers and students in the operation, preparation and utilization of equipment and materials.

But more modern spokesmen for the media field believe the media specialist should function as an analyst and designer on the curriculum team, an activity media specialists like to consider part of their responsibility though in fact few do exercise this sort of influence.

However, recent research suggests that the following activities have been added to the repertoire of the building coordinator:

1. Consulting with teachers regarding the selection and utilization of appropriate materials.

2. Organizing and presenting demonstration lessons, and
3. Providing information about new materials and techniques.

Since the National Defense Education Act has funded a vast in-service teacher re-training program, continued research into the actual behavior of teachers who participated in these programs becomes imperative. This study will examine for the first time the activities and attitudes of building coordinators who attended NDEA media institutes at Michigan State and hopefully identify those factors which best improve the utilization of the materials and methods of the new media.

CHAPTER III

DESIGN AND PROCEDURES

This dissertation reports an exploratory field study which is defined by Kerlinger as an ex post facto investigation of the interrelationships among educational variables in the real world.[1] Specifically this study inquires into the day-to-day activities and attitudes of educational media building coordinators who attended either the 1965 or 1966 summer institute at Michigan State University. The information obtained by means of such research should (1) aid in the assessment of the impact of these Institutes, (2) help prepare more effective institute programs for media personnel, and (3) perhaps help us understand better how building coordinators function in real life.

The Population

The teachers who attended the two summer Institutes at M.S.U., as shown in Table 1, qualified for participation on the basis of the following criteria: (1) a minimum of one year's teaching experience, (2) a Bachelor's degree and a teaching certificate, (3) assigned to an

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[1]Kerlinger, Foundations of Behavioral Research, p. 378.

educational media position in an elementary and/or secondary school, either presently or assured of such an assignment during the 1965-66 or 1966-67 school year, (4) never taken part in, or attended an instructional media institute under Title XI (or under Title VI of the Act before the October, 1964 amendments), and (5) received the recommendation of their superior.[2]

TABLE 1.--Distribution of male and female teachers who applied for and participated in a 1965 or 1966 Summer Media Institute at Michigan State University.

Year	Applicants	Participants		Participants
		Male	Female	Total
1965	325	64	31	95
1966	450	93	27	120
Total	775	157	58	215

Source: James L. Page, Final Technical Report on the NDEA Institute for Advanced Study for Educational Media Specialists: Code 3. (1965 and 1966) (East Lansing: Michigan State University), appendix.

Of the 215 teachers designated educational media building coordinators, who attended the institutes, 95

[2]James L. Page, Final Report of the NDEA Summer Institute for 95 Elementary and Secondary Coordinators of Educational Media Programs (East Lansing: Michigan State University, 1965), p. 7.

participated in 1965 and 120 took part in 1966; in all there were 157 males and 58 females.

At the time this research was initiated, four of the 215 participants were deceased. The author of the current research has been a building coordinator and participated in the 1965 institute but was not included in the survey. Sixteen participants had moved from their last address. A search of the National Education Association and the Division of Audiovisual Instruction directories, as well as the local telephone directory of the city last reported by each of these participants failed to locate any of them. Therefore, it was decided to proceed with the survey using the remainder of 194 coordinators, or 90% of the original population.

Instrumentation

Two instruments were used in this study: the N.D.E.A. Media Institute Participant Survey and the New Educational Media Attitude inventory, or NEMA. The first was administered to building coordinators, and to their principals in a shortened version, and the second was administered to the principals of building coordinators who attended institutes to determine their attitudes toward the newer media.

The N.D.E.A. Media Institute Participant Survey form was an adaptation of an instrument prepared by Eleanor P. Godfrey in her massive survey of "The State

of Audiovisual Technology: 1961-1966"[3] (see Appendix I). The first section of her instrument called the "Audio-visual Coordinator Questionnaire" was selected, a section primarily asking for background information. All scales used in this instrument are rated on a five point Likert-type-scale. Activities and attitudes are rated from 1 - high to 5 - low. As a staff member of the Bureau of Social Science Research, Inc. Godfrey designed the questionnaire for administration to a stratified sample of 33,038 school districts reported by the Bureau of the Census in 1959. She received usable returns "from 2,927 districts, or 40 per cent of the total sample of 7,236."[4] A follow up study of 354 of the non-respondent school districts checked into the questionnaire's internal consistency.

> Through personal letters, telegrams, or phone calls we were able to contact all of the 354 superintendents, and 322 (or 91 per cent) furnished the requested information. Somewhat to our surprise, and certainly to our gratification, these "late responses" did not differ significantly from the initial responses on any of the variables tested.[5]

In consequence of the above results slight modifications were made in the basic questionnaire used in Godfrey's study. Job classifications were added to the section describing the participant's official title, and

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[3]Godfrey, The State of Audiovisual Technology.

[4]Ibid., p. 19.

[5]Ibid., p. 20.

10 activities[6] were added to the sections on functions performed by coordinators, the frequency of performance, and their attitude toward each function. The questionnaire was then submitted to the Research Consultation Office of the College of Education at Michigan State University and slight changes were made in the wording and lay-out. The questionnaire was then given to a pilot group of six institute participants for examination and comment. Further clarifications were made on the basis of their suggestions. At this point the questionnaire was regarded as suitable for distribution to the survey population.

The second instrument used in this study was the New Educational Media Attitude inventory (see Appendix II). In research for "The Development of a Measure to Assess Attitudes Regarding the Uses of Newer Educational Media,"[7] Ramsey devised an instrument useful in discriminating between individuals possessing attitudes hostile toward or in sympathy with the uses of new educational media for instructional purposes. Starting with 375 statements from the literature reflecting sympathy with or hostility toward newer educational media, Ramsey prepared a final collection of 78 statements which he

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[6]The procedures used to obtain these ten additional activities are described later in this chapter.

[7]Ramsey, A Research Project for the Development of a Measure to Assess Attitudes. . . .

rephrased "in conformity with the general criteria suggested by Wang (1932) for the construction of attitude statements."[8] On the basis of an initial trial, a final list of 39 items was accepted. This instrument, termed NEMA, was later modified by Guba and Synder in their 1964 "Research and Evaluation of MPATI Telecasts" which used the instrument to distinguish between teachers who were favorable and unfavorable toward instructional television.

> The original form of the instrument was judged unsuitable for direct use because its terminology seemed oriented toward the older audio-visual media, and it was a simple matter to adapt this device to the task at hand.[9]

Accordingly, Guba and Synder reduced the instrument from 39 to 23 items and substituted the word "students" where "children" had appeared in the Ramsey instrument. This Guba and Synder form is used in the current study.

Scoring was done using a six point Likert-type-scale ranging from "1 - agree strongly" to "6 - disagree strongly." Fifteen of the 23 items were reverse-scored in order to avoid ambiguities caused by the negative phrasing of statements. Therefore, a strong disagreement with a negative item was scored as a high positive attitude. Those items marked with "R" in Appendix II represent reverse scored items.

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[8] Ibid., p. 7.

[9] Guba and Synder, ITV and the Classroom Teacher, p. 59.

Data Collection

The initial step in this research was to determine what media-related activities an educational media building coordinator who attended an M.S.U. summer institute might be expected to perform. So, a panel of experts was selected, namely those faculty and other staff members who had taught at both summer institutes discussed in this research.

On February 5, 1968 a letter was sent to each of these experts enlisting their aid in the research project (see Appendix III), and enclosing the list of coordinator activities from Godfrey's 1967 survey.[10] Since this list was the most up-to-date and comprehensive available, it was considered a suitable starting point for the current endeavor. The experts were asked to examine it and then, based on the objectives and activities espoused during the institute, suggest any additions, deletions, and modifications to the list. Once all 12 had responded, the lists were pooled and 10 additional activities added to the list of eight. This new list of 18 activities comprised the total listing used in the remainder of the survey. Now a second letter was sent to the panel (see Appendix IV) including the new list of 18 activities. Each expert was asked to rate

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[10] Godfrey, The State of Audiovisual Technology, p. 48.

each activity on a five point Likert-type-scale which ranged from 1 for highly appropriate, to 5 for highly inappropriate. Each expert was asked to base his judgment on the appropriateness of the activity to developing and maintaining an effective media program. These responses were tallied and the activities rank-ordered.

After inserting the new list of 18 activities, the N.D.E.A. Media Institute Participant Survey was mailed on March 19, along with a cover letter (see Appendix V), and a stamped addressed envelope, to all 194 participants. Within three weeks 114 responses had been received. At this point a second letter (see Appendix VI) urging the participants' cooperation was sent to all who had not responded. By April 25, 60 additional questionnaires had been received, bringing the final number of responses to 174, or 90 per cent of the total survey population.

From responses to question 22, "to whom are you immediately responsible for your educational media responsibilities?" a list was made of the building principals of the media coordinator respondents, a group of 84 principals. On May 5 letters were again sent out, but now to the principals (see Appendix VII) including the list of 18 activities to be rated on their appropriateness to the building media program and the NEMA questionnaire. A follow up letter was sent out

(see Appendix VIII) on May 16 to all principals who had not yet responded. Finally 78 principals responded, or 93 per cent of the entire principal group. But since six of these principals failed to identify themselves and could not be matched with their coordinator, 72 principals' questionnaires were used, or 85 per cent of the entire group.

Analysis of the Data

Six sets of data were used in this study:

1. Experts' Media-Related Activity scores
2. Coordinators' Frequency-of-Performance scores
3. Coordinators' Attitude-Toward-Appropriateness scores
4. Coordinators' Demographic Information responses
5. Principals' Attitude-Toward-Appropriateness scores
6. Principals' New Educational Media Attitudes (NEMA) scores.

The Pearson Product-Moment Correlation Coefficient was used to determine the relationships between attitudes and activities as well as among experts, coordinators, and principals:

> Such a correlation coefficient takes into account not only the individual's position in the group, but also the amount of his deviation above or below the mean.[11]

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[11] Ane Anastisi, Psychological Testing (New York: The MacMillan Company, 1954), pp. 103-104.

Hayes suggests that one may apply this correlation statistic to any set of paired-score data, and the results will be valid descriptions of: (1) "the particular linear rule that best applies, and (2) the goodness of the linear prediction rule as a summarization of the tendency of Y scores to differ systematically with differences in X in these data."[12] Hayes also points out that the correlation coefficient is particularly useful in descriptive studies, such as this current research, because "it is not necessary to make any assumptions at all about the form of the distribution, the variability of Y scores within X columns or arrays, or the true level of measurement represented by the scores in order to employ linear regression and correlation indices to describe a given set of data."[13]

Having reduced coordinators' scores on question 30, frequency of performance,[14] to a dichltomous variable, performed frequently and performed rarely, these scores were correlated with various sub-sets of demographic data using the Sign Test for Related Samples, "a simple,

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[12]William L. Hayes, Statistics for Psychologists (New York: Holt, Rinehart and Winston, 1963), p. 510.

[13]Ibid.

[14]Responses were originally classified (1) performed with great frequency, (2) performed with moderate frequency, (3) performed infrequently, (4) performed rarely, and (5) never performed.

but efficient test for small samples"[15] according to Kerlinger. The use of this correlation statistic was primarily due to the nature of the population involved in the study and the assumptions of discreteness related to the variable under investigation. The sign test makes no assumptions about the form of the distribution of differences, nor does it assume that all subjects are drawn from the same population.

All data were first punched into IBM data processing cards at the Michigan State University Computer Center. Then these cards were processed using MDSTAT,[16] a program that is capable of calculating basic statistics such as means, sums and standard deviations, as well as simple correlations, sums of cross-products, moments, variable variances and covariances. Since this program takes into account missing data, all returned questionnaires could be used even though some questions were unanswered, or had inappropriate information. A second program, ACT,[17] capable of forming two-dimensional

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[15]Kerlinger, Foundations of Behavioral Research, p. 261; also see, Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill, 1965), p. 68.

[16]"Calculation of Basic Statistics when Missing Data in Involved (the MDSTAT Routine)," STAT Series Description No. 6, Agricultural Experiment Station, Michigan State, 1966.

[17]"Basic Statistics Program - ACT - Analysis of Contingency Tables," Computer Institute for Social Science Research, Program Abstracts, Michigan State University, 1967.

contingency tables as well as row, column, and total means, standard deviations, chi squares, and product-moment correlations was used to organize all demographic information for interpretation. Data was analyzed on the Control Data 3600 Computer at the Michigan State University Computer Center.

Summary

Data for the current study was gathered from (1) 12 faculty and other staff members from the two summer institutes held at Michigan State University in the summers of 1965 and 1966, (2) 174 educational media building coordinators who attended those institutes, and (3) 72 of the principals who were directly responsible for one of the building coordinators.

Two instruments were used: the N.D.E.A. Media Institute Participant Survey, a modified version of the questionnaire prepared by Eleanor Godfrey, and the New Educational Media Attitude Inventory, prepared by Curtis Ramsey and modified by Guba and Synder. Both questionnaires use a Likert-type-scale to record responses.

Six sets of data were collected: one set from the panel of experts on the appropriateness of coordinator activities; three sets from the building coordinators on demographic information, frequency of performance, and appropriateness of coordinator activities performed; and

two sets from building principals, on appropriateness of coordinator activities and attitude toward new educational media.

Two correlation statistics were used: the Pearson Product-Moment Correlation Coefficient and the Sign Test for Related Samples. Two computer programs were supplied by the Michigan State University Computer Center: MDSTAT, a program used when missing data is present; and ACT, a program that provides two-dimensional contingency tables.

CHAPTER IV

ANALYSIS OF RESULTS

This chapter will summarize the major findings of the study following the order of the questions for investigation presented in the first chapter, namely

1. What activities might coordinators who attended summer Institutes at Michigan State University be expected to perform in conducting a building educational media program?
2. What major activities do these educational media building coordinators actually perform?
3. How does the educational media building coordinator distribute his time among the acvitivies he performs?
4. Is there a significant correlation between the activities performed by these building coordinators and the activities proposed by the faculty and other staff members who taught at the Institutes?
5. What relationship, if any, exists between the demographic characteristics of the building coordinator and of his school setting, and the activities performed by the coordinator?

6. What activities do the coordinators themselves consider most appropriate in promoting an educational media program?
7. Do the coordinators' attitudes toward these activities correlate with the position taken by the faculty and other instructors at the Institutes?
8. Is the building principal's attitude toward the use of new educational media related to the activities and attitudes of the building coordinator?

Anticipated Coordinator Activities

In order to judge what activities coordinators who attended Institutes at Michigan State University might be expected to perform in conducting educational media programs in a single building, a panel of 12 experts selected from among the 1965 and 1966 Institute staff members was asked to suggest addition, deletions, and modifications to an eight item list developed by Godfrey[1] in 1967. This list of activities included,

1. Ordering and scheduling media
2. Teaching the operation of audiovisual equipment
3. Providing information and data on new materials
4. Suggesting appropriate materials

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[1]Godfrey, The State of Audiovisual Technology, p. 48.

5. Classifying and storing materials
6. Maintaining and making minor repairs to equipment
7. Suggesting new uses for materials
8. Preparing specialized materials

The panel of experts made additions, deletions, and modifications to this list basing their decisions on the objectives and activities recommended during the Institute. After pooling all responses to this procedure, a new listing of 18 activities was developed. This new list included all activities recommended by the panel as well as those activities suggested by Godfrey's listing. This 18 activity list was re-submitted to the 12 member panel. Each expert rated the individual activities on a five point Likert-type-scale ranging from 1 for highly appropriate to 5 for highly inappropriate. The experts based their judgments on the appropriateness of the activity to developing and maintaining an effective media program. Scores were tallied and activities ranked according to their mean scores with the lower mean representing the higher ranks. If two activities received the same numerical rating by the panel of experts the variance, or the dispersion, of the set of scores for each activity was used to break the tie whenever possible. The standard deviation was computed for the set of scores for each activity. The activity with the lower standard deviation, and therefore the smallest spread of scores, was

given the higher rating. This procedure allowed for the higher rating of activities according to degree with which the experts were in agreement with respect to its appropriateness. Table 2 lists the activities suggested by the panel of 12 experts together with their rank order.

"Providing an on-going in-service education program for faculty" was the activity given the highest rating by the panel of experts. This activity was rated as being highly appropriate for performance by building coordinators. Of the remaining activities, 13 were rated appropriate for coordinator performance. Only four activities were given lower ratings: (1) "Preparing specialized audiovisual materials," (2) "ordering materials and scheduling equipment," (3) "classifying and storing materials," and (4) "repairing and maintaining the equipment," were given the lowest ratings. Each of these four activities are of the clerical or mechanical type and were a part of the list provided by the Godfrey study. According to these ratings it may be concluded that the panel of experts does not consider clerical-mechanical tasks as being within the realm of appropriate activity for the educational media building coordinator that attended M.S.U. summer Institutes in 1965 and 1966.

Of the 14 activities given highly appropriate or appropriate ratings by the panel of experts, most may be considered administrative, consultative, or an activity

TABLE 2.--Summary of data describing media activities which educational media building coordinators who attended summer Institutes at M.S.U. in 1965 and 1966 might be expected to perform as suggested by a panel of 12 experts.

Activity	Mean	S.D.	Rank
Providing an on-going in-service training program for faculty to include (a) skills training, production, and equipment operation; and (b) training of utilization techniques.	1.00	.0	1
Encouraging interest in media utilization by faculty.	1.08	.28	2
Suggesting new or different uses of available materials.	1.16	.38	3
Keeping teachers up-to-date on audiovisual materials.	1.16	.38	3
Participating in curriculum and instructional development activities.	1.16	.38	3
Participating in budget planning for media program.	1.16	.38	3
Providing means for evaluation of materials and equipment.	1.16	.38	3
Participating in the planning for and use of new instructional space.	1.33	.49	4
Providing a production facility which allows for limited slide photography, tape production, basic transparency, and graphic production by faculty.	1.33	.49	4
Suggesting appropriate audiovisual materials for classroom use.	1.33	.65	5
Teaching teachers to operate equipment.	1.50	.52	6
Organizing, and training students for projectionist service.	1.50	.52	6
Providing a professional media library.	1.75	.96	7
Providing appropriate public relations services and materials for the media program.	1.83	.83	8
Preparing specialized audiovisual materials.	2.08	.90	9
Ordering materials and scheduling equipment.	2.08	1.44	10
Classifying and storing materials.	2.50	1.00	11
Repairing and maintaining the equipment.	3.41	1.37	12

which places the coordinator in a role of an information agent. All of these highly rated activities place the coordinator in a position where he is centrally involved in the planning of learning and in providing for related support functions and evaluative procedures.

With the 18 activities suggested by the panel of experts in mind, then, a questionnaire was developed and then mailed to 194 participants from the 1965-66 summer media Institutes. The initial response to this first mailing was 114 returned questionnaires. A follow-up mailing yielded 60 additional responses bringing the total number of responses to 174 or 90 per cent of the total survey population.[2] Later a second questionnaire sent to the principals of 84 of the building coordinators yielded 78 responses, or 93 per cent of the principal population. Responses to these two questionnaires provided the data analyzed and reported in this study.

Actual Building Coordinator Activities

The second question examined by this study inquires into what major activities educational media building coordinators report that they actually perform. The coordinators were given the list of 18 activities and

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[2]Kerlinger, Foundations of Behavioral Research, p. 397. This percentage of response, and the percentage of principals response below, well exceeds the 80-90 per cent return suggested by Kerlinger as being necessary before any valid generalizations can be reached.

asked to check all activities that they had performed in connection with their instructional media role before attending a summer Institute at Michigan State University, and then to check activities presently performed. Table 3 provides a description of data which summarize the information thus collected, listing the number of institute participants who performed each activity before attending the Institute, after attending the Institute, or both before and after attendance. In addition, Table 3 provides the ranks for each activity within the same three categories as well as an over-all ranking based on a totaling of all the acknowledgments of performance, whether before, after, or before and after. As in the previous statistical manipulation, ties were broken by selecting the lowest measure of standard deviation.

The activity most frequently performed prior to attendance at an Institute was the "organizing and training of students for projectionist services." In addition, "repairing and maintaining equipment," "ordering and scheduling equipment and materials," and "classifying and storing materials" were the second, third, and fourth rated activities prior to attendance at a summer media Institute at M.S.U. All of the activities performed with great frequency prior to attendance at an Institute are of the clerical or mechanical type.

TABLE 3.--Summary of data describing the activities actually performed by building coordinators before, after, and before and after attendance at an M.S.U. summer Institute for instructional media building coordinators during the summer of 1965 and 1966.

Activity	Number of Coordinators who Performed This Activity			Rank			Over-all Rank	Standard Deviation
	Before	After	B/A	B	A	B/A		
Ordering materials and scheduling equipment.	19	29	97	3	12	1	4	4.76
Suggesting appropriate materials for classroom use.	8	67	66	10	4	4	7	2.82
Teaching teachers to operate equipment.	19	45	83	3	10	2	2	3.53
Suggesting new or different uses of available materials.	12	78	52	6	1	9	3	3.29
Keeping teachers up-to-date on new audiovisual materials.	11	76	55	7	2	8	5	2.41
Repairing and maintaining the equipment.	20	28	58	2	13	7	9	4.48
Classifying and storing materials.	14	55	59	4	8	6	6	1.67

Preparing specialized audio-visual materials.	11	67	32	7	4	13	10	3.26
Participating in curriculum and instructional development activities.	8	72	34	10	3	12	12	3.85
Participating in budget planning for media program.	8	48	35	10	9	11	15	.81
Participating in the planning for and use of new instructional space.	7	67	36	11	4	10	11	3.08
Organizing, administering, and training students for projectionists services.	21	32	61	1	12	5	8	4.51
Providing a means for evaluation of materials and equipment.	10	56	31	8	7	13	14	2.61
Providing an on-going in-service training program for faculty.	9	72	29	9	3	14	13	4.53
Providing appropriate public relations services and materials on the media program.	5	41	23	12	11	15	18	2.19
Provide a production facility which allows for limited production by faculty.	7	62	21	11	6	16	17	4.08
Providing a professional media library for faculty.	10	55	21	8	8	16	16	3.78
Encouraging interest in media utilization by faculty.	13	63	68	5	5	3	1	.94

Note: Over-all Rank represents the average of the Before, After, and Before and After Rankings. All ties were broken by using the lowest standard deviation.

It should be noted that the activities performed by coordinators prior to Institute attendance are part of the group of activities given the lowest rating by the panel of experts. The activities performed by coordinators before attending an M.S.U. Institute were considered inappropriate, for the development and maintenance of an effective media program, by the panel of experts who were responsible for instruction at the two summer Institutes.

After attending a summer Institute, activities such as (1) "suggesting new or different uses of available materials," (2) "keeping teachers up-to-date on new audiovisual material," and (3) "participating in curriculum and instructional development activities," were reported most frequently by coordinators as the activities they presently performed. This would suggest that many coordinators became aware of the importance of these new activities during their participation at a summer Institute. While no attempt was made to collect data necessary to the development of a causal relationship between the performance of these new activities and attendance at the M.S.U. summer Institutes, these findings do suggest the need for additional longitudinal research to determine whether such a relationship does exist. At present, however, it is important that the activities performed by coordinators after Institute attendance are of the group

recommended by the panel of experts. These new activities were of the administrative, consultative, and information disseminating type.

In the third category of activities performed both before and after attendance, "ordering materials and scheduling equipment" ranked first and was, in fact, selected more frequently than any other activity in any category. "Teaching equipment operation" ranked second and "encouraging interest in media utilization by faculty" ranked third in this category. While the panel of experts had selected activities such as "providing in-service training for faculty" and "participating in curriculum and instructional development activities" as most appropriate for building coordinators, the coordinators' response to this question suggests that they actually perform more mechanical or clerical activities than those suggested by the panel. More coordinators are scheduling materials and equipment, showing teachers how to operate projectors, and classifying and storing materials than are engaged in the more professional activities suggested by the panel.

Many barriers may stand in the way of coordinators performing the type of activity that will promote the development of an effective media program. The attitude of superiors toward media activities, the amount of released time for media functions, the availability of funds, and the lack of support personnel may all stand

in the way of the coordinator as he attempts to perform the type of activities suggested by the panel of experts. In many cases the amount of time necessary to perform assigned activities may serve as a deterrent to the development of an effective media program. In that it has already been determined that coordinators performed clerical and mechanical activities prior to attendance at summer Institutes and that after attending many began performing administrative, consultative, and information disseminating functions, next it should be determined "how much time do these activities take to perform?"

Frequency of Activity Performance

To determine how the educational media building coordinators who attended Michigan State University summer media Institutes distributed their time among the activities they performed, they were asked to estimate how often they performed each of the 18 activities measured on a Likert-type scale and rated from one - great frequency, two - moderate frequency, three - infrequently, four - rarely, and five - never. Scores were totaled for each activity, means determined, and activities ranked; the lower the mean scores the more frequently performed. Table 4 summarizes these data.

Of the total list only two activities were performed with great frequency according to the report of the

TABLE 4.--Summary of data describing the frequency with which educational media building coordinators perform the activities which are a function of their position. (N = 145)

Activity	Mean	Rank
Ordering materials and scheduling equipment.	1.73	1
Encouraging interest in media utilization by the faculty.	1.79	2
Keeping teachers up-to-date on new audio-visual materials.	2.17	3
Suggesting appropriate audiovisual materials for classroom use.	2.20	4
Suggesting new or different uses of available materials.	2.33	5
Classifying and storing materials.	2.44	6
Teaching teachers to operate equipment.	2.57	7
Organizing, administering, and training students for projectionists service.	2.76	8
Participating in curriculum and instructional development activities.	2.80	9
Preparing specialized audiovisual materials.	2.82	10
Providing an on-going in-service training program for faculty.	2.88	11
Providing a means for evaluation of materials and equipment.	2.90	12
Participating in the planning for and use of new instructional space.	2.93	13
Providing a professional media library for the faculty.	2.94	14
Providing a production facility which allows for limited production by the faculty.	3.02	15
Repairing and maintaining the equipment.	3.03	16
Participating in budget planning for the media program.	3.06	17
Providing appropriate public relations services and materials on the media program.	3.40	18

building coordinators. "Ordering materials and scheduling equipment" and "encouraging interest in media utilization by the faculty" received the highest rating. Of the time media coordinators have to fulfill their media responsibilities they spend the greatest amount of time ordering and scheduling equipment and material. In that this activity is clerical in nature it may be assumed that it takes far more time than the second rated activity, encouraging interest in media utilization by the faculty. Only one of the clerical-mechanical activities included in the total listing of 18 was reported by the coordinators to be performed infrequently. "Repairing and maintaining equipment" received the third lowest rating. All other clerical-mechanical activities were among those most frequently performed. If educational media building coordinators spend a greater share of their time performing the clerical-mechanical activities it is obvious that they will have less time to devote to the activities suggested by the panel of experts. In fact, (1) "participating in the planning for and use of new instructional space," (2) "providing a professional media library," and (3) "participating in budget planning for the media program" were three of the six lowest rated activities.

The Relationship Between Actual and Expected Coordinator Activities

To determine how the activities actually performed by educational media building coordinators relate to the activities which the panel of experts think they should perform, a comparison was made between the mean scores of the ratings given by the panel of experts pertaining to the activities they judged appropriate for performance by an educational media building coordinator who attended a summer Institute at Michigan State in 1965 or 1966 (described in Table 2) and the mean frequency score provided by the building coordinators (provided in Table 4). The mean of the scores as determined by the panel of experts was compared by means of the Pearson Product-Moment correlation coefficient technique with the means of the scores as determined by the building coordinators when estimating the frequency with which they actually performed the activities - 18 means for the experts' ratings were compared with 18 means for the coordinators' ratings.

As discussed in Chapter III, the Pearson Product-Moment Correlation coefficient technique was used to examine the relationship between these two groups of data because it is a simple and effective way of taking into account not only an individual's position in a group, but also the amount of his deviation above or below the mean.

It is particularly useful because it is not necessary to make any assumptions about the form of the distribution, the variability of scores, or the level of measurement represented by the scores.

The correlation statistic thus obtained, $r = .15$, yielded an F ratio of .38, a statistic having an approximate significance probability of .54, or about the same as would occur by chance. These findings suggest that no predictable relationship exists between the 18 means for the experts' ratings and the 18 means for the coordinators. The statistics describe a relationship no better than one that would occur by chance.

As has been suggested previously, one of the barriers to the performance of the activities recommended by the panel is the amount of time spent performing clerical and mechanical tasks. The barriers that stand in the way of the performance of administrative, consultative, and information disseminating activities by building coordinators need further investigation so that methods may be found to eliminate them. In this way the professional role suggested by the panel and other leaders in the media field may eventually be reached.

Relationship Between Demographic Variables and Coordinator Activities

A list of 24 demographic characteristics of the building coordinator and of his school setting was

examined for possible relationships with the activities performed by the educational media building coordinator:

1. Coordinator's sex
2. Coordinator's responsibility - does the coordinator operate in one school or more than one?
3. Size of student body in the coordinator's school
4. Size of faculty in the coordinator's school
5. Type of school - elementary, junior high, or high school
6. Regularly assigned teaching or no teaching
7. Number of grade levels taught
8. Number of subjects taught
9. Title of job assignment
10. Number of responsibilities other than media
11. Number of years with present media responsibility
12. Professional degrees held
13. Amount of time since last formal media training
14. Number of different types of media training
15. Varying types of formal training - Undergrad, Grad, Masters, beyond Masters.
16. Coordinator's expression of most valuable type of training
17. Administrator to whom coordinator is responsible
18. Availability of special funds for the media program
19. Coordinator participation in budget preparation
20. Coordinator participation in the preparation of proposals for outside funding
21. Number of sources of funding for the media program
22. Types of funding for the media program
23. Major source of funding for the media program
24. The year the coordinator attended a summer Institute

Each of these variables was compared with the frequency with which building coordinators performed the activities, after first reducing the five point ratings on the Likert-type-scale to a dichotomous variable "performed frequently" (the first two categories of the Likert-type scale) and "performed rarely" (the last two categories). These new scores were then correlated with various sub-sets of

demographic data using the Sign Test for Related Samples. The Sign Test was selected because of its ability to make use of the greatest quantity of data collected. This test is applicable when the experimenter wishes to establish that two conditions are different in the case of two related samples. The test does not make any assumptions about the form of the distribution or does it assume that all subjects are drawn from the same population. Thus all of the data describing the frequency with which building coordinators performed their activities were analyzed in relation to each of the 24 demographic variables. The results of this statistical procedure suggest that no definite pattern was observed with respect to the relationship between activity performance and demographic characteristics. Further investigation is needed in this area. A starting point for additional research in this area may be found in four of the variables studied during this investigation. Four demographic variables - (1) the title of the job assignment, (2) the number of grade levels taught by media personnel having teaching responsibilities, (3) whether or not the coordinators participated in the preparation of the media budget, and (4) whether or not the coordinator participated in the preparation of proposals for outside funding for the media program--came closest to providing evidence necessary to

reach valid empirical conclusions. Summary data regarding these four variables may be found in Appendix IX.

The 24 demographic variables investigated in this portion of the study tell a great deal about the building coordinators. Of the respondents, 128 were males and 45 females, with an average age of 40.7 years. While 131 were responsible for media services in only one school, 34 had responsibilities in more than one. Schools where respondents functioned averaged 1070 students and 52 faculty members. When coordinators had teaching responsibilities they taught at 2.2 different grade levels. In all 75 coordinators had regularly assigned teaching responsibilities while 51 did not; 33 coordinators taught in elementary schools, 36 in junior high schools, and 56 in high schools. In addition to their media responsibilities they taught 1.6 different subjects and had 1.4 additional assignments on the average.

When asked to list the title that best described their major assignment, 72 listed educational media building coordinator, 33 listed classroom teacher, 18 listed media director for school system, and 17 listed school librarian (see Appendix X for complete results of all job descriptions). Respondents had held their media positions for an average of 3.9 years. Regarding current degree status, 94 held a Masters degree plus additional hours of credit (see Appendix X for complete results). The

greatest number, 82 received their last formal media training in 1966, 34 listed 1965 as the year of last formal media training, 30 listed 1967 and 23 listed 1968. Other than NDEA Summer Institutes, undergraduate instruction ranked highest as the level at which most had received formal media training (see Appendix X). When asked to select the most valuable media training, 126 selected their NDEA Summer Institute. In other words, more than 80 per cent of the respondents selected the Institutes as their most valuable form of media training. While the coordinators may have responded to this question for the benefit of the investigator, the large percentage of response and the possible importance of this findings suggests the need for further investigation to validate this response.

Regarding the administrative organization of the media program, 95 coordinators listed their principal as the administrator to whom they were directly responsible, 32 listed a subject matter coordinator or director and 20 listed their superintendent. In response to questions about funding, 104 coordinators stated that their media program had its own budget, while 49 said theirs did not. A total of 93 participated in the preparation of the media budget while 61 did not, and 76 participated in the preparation of proposals for outside funding while 77 did not. When asked to list all sources of funding

for their media program the coordinators selected "Federal NDEA funds" as the source most often available (see Appendix X for complete data) and also selected NDEA funds as the major source of funds for their media program. This would suggest that local school districts depend to a great extent on the federal government for the support necessary to maintain a building media program. This finding also suggests that local schools may not have access to the necessary funds to operate the media program or have not developed a deep enough commitment to such a program in order to commit these funds. While it is possible to suggest that the current development of building level media programs might not be possible without the availability of NDEA funds, there is still some question as to the affect these funds have on the initiation of sound local media funding practices.

Finally, the respondents were asked to state what percentage of their time was devoted to instructional media responsibilities. In response to this question it was determined that the average coordinator spends about 50 per cent of his time on his media responsibilities. Previous research[3] has found that building coordinators usually had very little, if any, time available for media responsibilities. At the most, coordinators have had

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[3]Godfrey, The State of Audiovisual Technology, p. 47; and McMahan, "Building Coordinator: Professional Partner?" p. 662.

25 per cent of their daily time assigned to the coordination of the building media program. In that the release of a teacher from conventional instructional activities is an administrative decision. The current finding suggests that some change may be occurring among local building administrators with respect to their interest and commitment to the development of the media program. However, further research is needed to determine whether Institute participation has been responsible for this interest.

Coordinators' Attitudes Toward Activities

To determine what activities the coordinators themselves considered to be most appropriate in promoting an educational media program, the same procedure used with the panel of experts was followed. The Institute participants rated each of the 18 activities using a five point Likert-type scale: from 1 for highly appropriate to 5 for highly inappropriate. Scores were tallied and activities ranked according to their means, the lower the mean score the higher the rank, as listed in Table 5.

All but three of the 18 activities listed were rated "highly appropriate" by the building coordinators. Interestingly, no clerical or mechanical activities were among those rated highest, all of which appeared to be more professional. The activities given especially high

TABLE 5.--Summary of data describing the attitudes of educational media building coordinators who attended summer Institutes at Michigan State University in 1965 and 1966 toward the Activities they perform.

Activity	Mean	S.D.	Rank
Encouraging interest in media utilization by the faculty.	1.11	.35	1
Keeping teachers up-to-date on new audiovisual materials.	1.26	.57	2
Suggesting appropriate audiovisual materials for classroom use.	1.28	.46	3
Suggesting new or different uses of available materials.	1.30	.56	4
Participating in planning and use of new instructional spaces.	1.40	.74	5
Providing on-going in-service training for the faculty.	1.42	.71	6
Participating in curriculum and instructional development activities.	1.43	.75	7
Participating in budget planning for the media program.	1.48	.85	8
Providing a means for evaluation of materials and equipment.	1.57	.75	9
Ordering and scheduling equipment.	1.63	.95	10
Providing a production facility for the faculty.	1.65	.91	11
Providing a professional media library for the faculty.	1.71	.91	12
Teaching teachers to operate equipment.	1.72	.73	13
Providing public relations services and materials on the media program.	1.82	.99	14
Preparing specialized audiovisual materials.	1.94	.97	15
Organizing, administering and training students for projectionists services.	2.05	1.08	16
Classifying and storing materials.	2.15	1.17	17
Repairing and maintaining the equipment.	3.17	1.21	18

ratings by the coordinators included those where the media specialist disseminated information. The highest rated activities included (1) "encouraging faculty interest in media utilization," (2) "keeping teachers up-to-date on new materials," and (3) "suggesting appropriate uses for audiovisual materials in the classroom." Instructional planning and development activities ranked next highest along with certain types of administrative and budgetary activities. Among the ten activities given the lowest ratings, however, six were of the clerical or mechanical type; the lowest rated included (1) "ordering and scheduling equipment," (2) "classifying and storing materials," and (3) "repairing and maintaining equipment."

By simple observation it would appear that the attitudes of the education media building coordinators who attended M.S.U. summer Institutes are quite similar to the ratings developed by the panel of experts responsible for instruction at those Institutes. Both groups appear to approve of the same types of activities. More important, both groups appear to find the same activities inappropriate, those in the clerical and mechanical classification.

These coordinator attitudes may represent the greatest impact that the Institute program has brought about. While surveying related literature, in Chapter II, it was suggested that the building coordinator filled the

role of a cosmopolite opinion leader within the local school setting. If these coordinators have adopted a new set of attitudes relating to the development of their media program, these attitudes may soon begin to have their affect on others within the school setting. As an opinion leader, the coordinator may begin to affect not only his teacher peers but also his local administrator and in so doing he may bring about gradual change within the school. This study point out, again, the need for additional research in the field. A longitudinal study is needed, examining Institue participants prior to, during, and after attending an Institute. In this way a causal relationship linking Institute participation with changed attitudes and practices may be developed.

Relationship Between Coordinators' and Experts' Attitudes Towards Activities

To provide precise empirical data so as to determine whether the educational media building coordinators' attitudes toward the 18 activities were similar to the attitudes of the panel of 12 experts who had served as faculty and instructors at the Institutes, a Pearson Product-Moment correlation coefficient was generated using the scores for appropriateness from the panel of experts (described in Table 2) and the mean scores for appropriateness from the building coordinators (presented in Table 5). All 18 means for the coordinators' ratings

were thus compared with all 18 means for the experts' ratings. The correlation statistics obtained from the above procedure, r = .91, yielded a F ratio of 77.75 which is statistically significant at less than the .0005 level. Accordingly it may be stated that there is a very high correlation between the attitudes of the panel of experts and those of the educational media building coordinators who attended Institutes at Michigan State University with regard to the appropriateness of the activities these coordinators perform. This statistical procedure strongly supported the investigator's observations stated in the preceding discussion summarizing the attitudes of the building coordinators.

Relationship Between Principal Attitudes and Coordinator Activities

To determine whether the attitudes of building principals were related in any way to the activities and attitudes of the building coordinators, each building principal directly responsible for one of the coordinators was asked to complete a shortened version of the basic Participants' Survey questionnaire (see Appendix XI) and to rate the appropriateness of all 18 activities using the same five point Likert-type scale. The principals were also asked to respond to an additional measure,

the New Educational Media Attitude Inventory, to determine their sympathy with or antagonism against the uses of newer educational media in the classroom. With a six point Likert-type scale - from 1 - agree strongly to 6 - disagree strongly - this test instrument identified individuals with attitudes sympathetic to newer Media utilization by low scores, while high scores represent individuals antagonistic toward media utilization. All procedures identified by Ramsey,[4] Guba and Synder[5] were followed. These procedures were the same as had been used when the above mentioned researchers checked into the internal consistency and validity of this instrument and utilized it in several studies of national scope.

Summing the principals' scores on the New Educational Media Attitude Inventory yielded a mean score of 55.59, and with this figure principals were placed in two groups: those whose NEMA inventory score was below 55.59, the "positively oriented principals," and principals whose NEMA inventory was above 55.59, "negatively oriented principals." All these principals' judgments on the appropriateness of media related coordinator activities, as reported on the shortened version of the basic Participants' survey questionnaire, were then correlated both

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[4]Ramsey, A Research Project for the Development of a Measure to Assess Attitudes. . . .

[5]Guba and Synder, ITV and the Classroom Teacher, p. 59.

with the attitude scores and with the frequency of performance scores of their respective building coordinators, these correlations identified according to the orientation of the principals, positive or negative. Each set of correlations consisted of two Pearson Product-Moment Correlation Coefficients, one comparing principals' appropriateness ratings with coordinators' appropriateness ratings, and a second comparing principals' appropriateness ratings with coordinators' frequency of performance scores. Table 6 summarizes the data thus obtained.

TABLE 6.--Summary of correlation statistics describing the relationship between principals attitudes toward coordinators activities and coordinators appropriateness scores and coordinators frequency of performance scores.

	Coordinators Appropriateness Scores			Coordinators Frequency of Performance Scores		
	r	F	Sig.	r	F	Sig.
Positively Oriented Principals Appropriateness Scores	.83	36	.005	.36	2.4	.136
Negatively Oriented Principals Appropriateness Scores	.82	32	.005	.30	1.64	.281

The purpose of this portion of the investigation was to determine whether the building principal's attitude toward the use of new educational media related to the

activities and attitudes of the building coordinator. All correlations obtained using the above procedure were so similar that it was impossible to make any positive statement regarding the affect of principals' attitudes on coordinators' activities. Further research in this area is needed.

Coordinators Subjective Statements

Finally, this study encouraged each participant to respond subjectively to the question: "How are you operating differently today in your media role than you did before participating in the NDEA summer Institute at M.S.U.?" Responding coordinators mentioned, in all 18 different subjects, with two predominating. Most frequently, the responding educational media coordinators felt that they were more knowledgeable, competent, and effective in their ability to handle their responsibility as an educational media representative, and second, they often noted how their programs and responsibilties had grown considerably since their attendance at an Institute. Many respondents stated that due to Institute participation they now had a firm grasp on their understanding of their media responsibilities.

Generally respondents used their replies to describe how their program and professional role had grown since their attendance at an Institute. Many had become

full-time media coordinators while others had been given a larger part-time assignment. Many had recently been included in curriculum development activities and felt that their peers viewed them as consultants rather than technicians. Many now had additional help with their media program, from full-time professional assistance and student-assisted programs as well.

Quite a few coordinators felt there had been little or no change in their media program since attending an Institute; some had even had their media responsibilities limited or curtailed. In virtually all of these cases, the limitation of media related activity had been caused by a reduction in available funds for the school or district, although in a few cases new district boundary lines, annexations, or new administrators were listed as causes. Several coordinators felt they were provided too little time by local administration to do the kind of job that they felt they wanted to do. Table 7 provides a description of the 18 subjects mentioned in this open-ended questionnaire and how often each was listed by the respondents.

Summary of Results

This study proposed eight areas of investigation. First, a panel of 12 experts who had taught at the two Institutes held at M.S.U. was consulted to determine what

TABLE 7.--A summary of categories and frequencies with which educational media building coordinators who attended summer media institutes at M.S.U. in 1965 and 1966 described changes in their media programs since attendance at an institute.

Subject Area Mentioned	Frequency
Coordinator feels more knowledgeable, competent, and effective.	45
The media program has grown and responsibility has increased.	38
Coordinator feels that he has more insight into the definition of his role, a firmer understanding, and an enlarged conception.	28
Media position is now a full time assignment.	28
There has been very little or no change in the coordinators program and in a few cases a reduction.	25
Coordinator is now consulted on curricular matters.	19
Would like to participate in additional M.S.U. summer Institutes for advanced training.	16
Before Institute the coordinator was considered a logician and is now considered a consultant.	12
Coordinator has gone on to further graduate study in the media field.	11
Institute participant is no longer in the media field.	8
Coordinator feels he is now better organized.	7
Coordinator is now assigned released-time on a part-time basis for media activities.	7
Coordinator feels improved due to the opportunity of meeting others in the field during the Institute.	7
Coordinator now has additional professional or student help with which to operate the media program.	5
Coordinator feels he is not given enough time with which to provide an adequate program.	2
Coordinator is now providing a better student operator program.	2
Coordinator saw the benefit and welcomed federal participation in public education.	1
Coordinator felt that more effort should be made to educate the public to the needs of education.	1

activities educational media building coordinators who attended summer Institutes at M.S.U. should be performing. This panel suggested 18 activities, mostly consultative, and ranked them according to their appropriateness in the development and maintenance of an effective media program.

Second, 194 of the participants who attended the Institutes were sent a questionnaire designed to compare the panel ratings with actual performance. Third, the frequency with which coordinators performed the 18 activities was measured. And fourth the Pearson Product-Moment Correlation technique was employed to compare the relationship between the ratings of the 18 activities by the experts and (1) the activities actually performed by the coordinators, as well as (2) the frequency with which the coordinators performed these activities. In general, the panel rated administrative, consultative, and information disseminating activities highest. Coordinators' attitudes were similar to the experts ratings yet they were not performing these types of activities. They were on the other hand, performing clerical and mechanical activities.

Fifth, 24 demographic characteristics of the building coordinators and their school settings were examined for possible relationships to the activities they performed. No predictable relationship was observed with respect to the relationship of these 24 demographic variables to the activities performed by the coordinators.

The final three areas investigated by the study dealt with the attitudes of coordinators and the administrator to whom they are responsible. After coordinators and principals were both asked to rate the appropriateness of the 18 activities, the Pearson Product-Moment Correlation Coefficient technique was used to examine the relationship among the appropriateness ratings of the experts, coordinators, and principals. While no definite pattern was observed regarding the affect of principals' attitudes on the activities performed by their building coordinators, we can state that correlations significant at the .0005 level or smaller were found among all three groups. Attitudes of the panel of experts are highly correlated with those of coordinators and their principals.

Finally, when given the opportunity to respond to an open-ended question pertaining to observed changes in activities since attending the Institutes, most respondents stated that their media program had grown as had their responsibilities. In addition, the coordinators generally felt that they were now more knowledgeable and confident in their administration of a media program.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The present study has sought to survey the current attitudes and activities of educational media building coordinators who attended one of two summer instructional media Institutes, funded under the National Defense Education Act and held at Michigan State University in 1965 and 1966, and who have since returned to their regular school assignment. Hence the study examined the media-related activities to which building coordinators actually devoted time after attending a summer Institute at Michigan State, seeking as well to determine how these activities might be correlated with the demographic and attitudinal characteristics of the coordinator, his building principal, and his school setting.

In general, it was found that educational media building coordinators who attended the Institutes were presently spending the greatest portion of their time performing clerical and mechanical tasks. They were "ordering and scheduling equipment" and "teaching others to operate equipment." On the other hand, the coordinators were of the opinion that these clerical and mechanical

activities were not as appropriate to the development of an effective media program as were the professional activities suggested by a panel of experts who taught at the two Michigan State University summer media Institutes.

Summary of Procedures

First, a ranked list of activities that all building coordinators might be expected to perform was elicited from a panel of experts who had been members of the Institute faculties. Then survey questionnaires were prepared and mailed to 194 participants in the 1965 and 1966 M.S.U. summer Institutes, of which 174 (90%) were returned. This part of the questionnaire requested information about (1) the school setting in which the building coordinator served, (2) the type of audiovisual program in the school, (3) the coordinator's assignment, and (4) his professional background. The second part of the questionnaire, based on the list of 18 activities prepared by the panel of experts, asked the respondents to indicate (1) which activities were performed prior to Institute attendance, (2) which activities were presently performed, (3) the amount of time devoted to each activity, and (4) the appropriateness of each activity.

A subsequent portion of the study examined the relationship between the attitudes of building principals and their media coordinators. Principals in 84 schools

were mailed questionnaires and 78 (93%) were returned. These principals also responded to a second questionnaire, the New Educational Media Attitude Inventory, which is used to determine whether or not an individual sympathizes with the use of newer educational media.

In all, six sets of descriptive data were evaluated:

1. Experts' Media-Related Activity Ratings,
2. Coordinators' Frequency of Performance Scores,
3. Coordinators' Attitude-Toward-Appropriateness Scores,
4. Coordinators' Demographic Information Responses,
5. Principals' Attitude-Toward-Appropriateness Scores,
6. Principals' New Educational Media Attitude Scores.

The Pearson Product-Moment Correlation Coefficient was used to determine the relationship among coordinator activities and the attitudes of all three groups--experts, coordinators, and principals. Demographic information was examined by means of the Sign Test for Related Samples. All data were punched into IBM Data processing cards and analyzed using MDSTAT, a program for calculating basic statistics, and ACT, a program used to form two-dimensional contingency tables. All analyses were conducted on the Michigan State University Computer Center's Control Data 3600 computer.

Findings

1. According to a panel of 12 experts who were faculty members at both summer Institutes held at Michigan State University, we might expect building coordinators who attended these Institutes to engage in the following 18 media-related activities:

Providing an on-going in-service training program for faculty to include (a) skills training, production, equipment operation, (b) training in utilization techniques.

Encouraging interest in media utilization by faculty.

Suggesting new or different areas of available materials.

Keeping teachers up-to-date on audiovisual materials.

Participating in curriculum and instructional development activities.

Participating in budget planning for the media program.

Providing means for evaluation of materials and equipment.

Participating in the planning for and use of new instructional space.

Providing a production facility which allows for limited slide photography, tape production, basic transparencies, and graphic production by faculty.

Suggesting appropriate audiovisual materials for classroom use.

Teaching teachers to operate equipment.

Organizing, administering, and training students for projectionists service.

Providing a professional Media library.

Providing appropriate public relations services and materials on the media program.

Preparing specialized audiovisual materials.

Ordering materials and scheduling equipment.

Repairing and maintaining the equipment.[1]

2. Educational media building coordinators who attended the two M.S.U. summer Institutes, on the other hand, seem to spend most of their time on clerical or mechanical activities. While "encouraging interest in media utilization by faculty" was the single activity performed by the greatest number of coordinators, other prevailing activities included "ordering and scheduling the use of equipment and materials" and "teaching teachers to operate equipment."

3. Clerical and mechanical activities also appear to be among the activities which account for the greatest expenditure of coordinators' time. "Ordering and scheduling equipment and material" was ranked highest by the coordinators when asked to list those activities they performed with the greatest frequency.

4. When the relationship between the activities performed by the building coordinators and the activities espoused by the panel of experts was analyzed, no

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[1]The 18 activities suggested by the panel appear in rank order according to the degree of appropriateness assigned by the panel.

predictable pattern could be determined with regard to the similarity between the two sets of scores. As the Pearson Product-Moment Correlation Coefficient yielded an r = .15, having an F ratio of .38 and a significance of .54, it was concluded that no predictable relationship existed between coordinators' activities and experts' opinions.

5. Furthermore, no definite patterns were observed when 24 demographic characteristics of the coordinators and their school setting were compared with the activities performed by the building coordinators. Four demographic variables--(1) the school in which the coordinator served, (2) the audiovisual program, (3) the coordinator's assignment, and (4) his professional education and background--came closest to providing evidence necessary to reach valid empirical conclusions.

6. Like the experts, the coordinators themselves considered consultative activities as being most appropriate for their position even though in actual practice they were spending most of their time on clerical and mechanical activities. They gave "encouraging interest in media utilization for the faculty" the highest score on the appropriateness scale. Other activities they rated highly included acting as an information agent for faculty; providing data about new materials, equipment, and strategies of instruction; providing in-service

education for teachers and participating in the planning and budgeting of the media program.

7. The building coordinators' attitudinal rankings of media-related activities were quite similar to the rankings of the panel of experts and the building principals when these two groups were asked to rate the appropriateness of the 18 activities. A correlation statistic of .91 was obtained when all 18 appropriateness ratings for the panel of experts were matched with the ratings of the coordinators. Correlations of .82 and .83 were obtained when positively oriented principals ratings and negatively oriented principals ratings were compared respectively with the coordinators. However, the use of the New Educational Media Attitudes Inventory, NEMA, as a tool to dichotomize the principals according to their media attitudes failed to prove effective. The statistics show that a relationship no better than a chance one exists regarding the effect of principals' attitudes on the media-related activities performed by their coordinators.

8. The coordinators' informal observations regarding changes in their activities since attending an Institute at Michigan State suggest that their media programs have grown along with their responsibilties. Most coordinators felt that they were more knowledgeable and

confident of their ability to administer an effective media program after attending an Institute.

Conclusions

This study was stimulated by recommendations from several leaders in the media field who feel that a new kind of professional will be required to provide leadership in design, implementation, and evaluation of programs of education which make fullest use of the new media. The review of related literature has traced shifts in the developing role of the media specialist. Leaders in the field today maintain that building coordinators may no longer act solely as technicians or keepers of machines. Indeed, Morris, Miller, and Eboch have called for a new kind of media specialist able to serve as a catalytic agent for change in the planning of educational strategies. The conclusions reached in this section speak to this new role.

1. In the coordinators' view a building media specialist should perform administrative, consultative and information disseminating activities. These coordinator attitudes are significant mainly in that they are similar to the opinions held by the panel of experts who were responsible for the instruction at the Institutes. In addition, most leaders in the media field agree that the most effective role that the building coordinator can

hold should involve the performance of administrative, consultative, and information disseminating activities.

The agreement between coordinators, experts, and educational leaders grows in significance when the coordinator is viewed as a change agent in the diffusion process. Rogers points out that most change agents are local-level bureaucrats whose purpose is to inject a cosmopolite influence to innovate a client's social system. The change agent functions as a communication link between two social systems. This definition of a change agent seems to describe quite closely the role of the educational media building coordinator who has returned to his school after attending a summer Institute. The coordinators appear to have reached the second step of the adoption process. They have become aware of a new innovation, namely their role in the local media program. Second, they have adopted a rationale for the diffusion of that innovation. In so doing coordinators are linking two systems, the general media field and the local school, for the overall improvement of their educational programs. While this innovation is far from total adoption, the results of this study suggest that the diffusion process has begun.

2. While the words of the media field leaders just cited and the opinions of the panel of experts employed in this study may offer direction for the future, they do

not accurately describe the activities that certain building coordinators are presently performing. Although these 18 activities endorsed by the M.S.U. Institute faculty experts do fit the frame suggested by the literature, it is obvious that coordinators who attended these Institutes are not performing these activities with any great frequency.

3. Both the building coordinators and their administrators agreed with the experts in their selection of appropriate activities. What remains unclear is the effect of the Institutes in developing this agreement. However, the findings suggest that the Institutes have created an awareness among the participants and their administrators of what that new role should be.

4. Building coordinators typically have received little or no released time for the performance of their media activities. But 174 coordinators who responded to the present study spent an average of half their time with media activities. These data, again, suggest that the role of the coordinator is changing and in the direction suggested by the panel of experts and media field leaders.

5. This research casts serious doubts on the validity of the New Educational Media Attitude Inventory, NEMA. Since this instrument was designed for use with educators whose main concerns did not include educational

media, it might have been anticipated as findings of the present study demonstrate, that the NEMA questionnaire is too general for making sophisticated discrimination.

6. Finally, the participants' responses to the open-ended question suggest that the Institutes have indeed influenced the attitudes and professional pride of the coordinators. When asked to list the form of media training they considered most valuable, the vast majority of participants (over 70%) selected the NDEA summer Institutes. One of the most common responses to the open-ended question, in fact, was that the respondent would like to participate in future Institutes.

Recommendations for Further Research

1. This study might well be replicated as media adoption continues to expand in the schools. Should such replication take place, the following modifications in methodology are suggested: (1) the population of future research in this area might include participants from several Institutes held at different colleges and universities; (2) such studies should be conducted on a longitudinal basis, evaluating activities and attitudes both before and after attendance at an Institute so that a causal relationship may be more clearly developed, and (3) the panel of experts should include more leaders in the field and not just those affiliated with a particular Institute.

2. Such research might be expanded to study how Institute participation influences other members of the school faculty served by the participant.

3. Extensive research should be initiated into the barriers to implementing the innovative practices developed during participation in a summer Institute program. Such research would undoubtedly draw on previous studies relating administrative behavior to the diffusion of innovations.

4. The effect of Federal spending and participation on long term curricular planning, administrative decision making, budgeting practices, and educational media financing should be examined more closely. Are Federal expenditures for the training of media personnal and acquisition of equipment the most effective and efficient means of obtaining the desired results? How do school personnel and the public feel about this Federal participation?

5. The structure of communication between the university and public schools should be examined for new avenues of sharing educational innovations more effectively.

6. Further research should be carried on to develop a more sensitive instrument for measuring the attitudes of educational personnel toward the use of new educational media. This research should attempt to identify evaluative techniques that would allow the researcher to

examine, precisely, the disposition of those educators involved with the use of new educational media.

Concluding Statement

This study has shown that the role of the educational media building coordinator is changing. The summer institute program has done much to bring about this change. Yet much still needs to be done. The role of the building coordinator is not yet clearly defined and at least one final statement regarding the upgrading of his position can be made.

While not a recommendation for additional research, this statement pertains directly to the improvement of the coordinators' role. It would appear that one of the major deterrents to the development of a more professional stature for the building coordinator has been the lack of qualified supportive personnel and funds to obtain them. Most building coordinators, it would appear, perform clerical and mechanical tasks simply because there is no one else to do them. Two positive steps may be taken to aid this situation. Two-year and four-year institutions of higher education should investigate the possibilities of initiating training programs for para-professional personnel in the media field. Second, a new source of funding for the training and employment of such para-professionals should be investigated. While

current Federal programs might serve to initiate such a training program, local and state sources should be involved in the continued development of such a program. The precedent has already been set for the use of part-time and para-professional assistance in many local school systems. Public and professional education are needed so that an awareness of the problem and practical solutions are developed for media programs as well.

APPENDICES

APPENDIX I

N.D.E.A. MEDIA INSTITUTE PARTICIPANT SURVEY

1. Your Name _____ 2. Age _____ 3. Sex _____
   last first middle

4. Legal Name of School District: _____

5. Post Office Address _____ City _____
   County _____ State _____ Zip _____

6. Your Official Title _____

   If your responsibility is in one school building, please complete questions #7 through #13. If not, go on to number 14.

7. School Name _____ Address _____

8. Size of Study Body: _____ 9. Size of Faculty: _____

10. Please Circle the grade levels taught in your School:
    K 1 2 3 4 5 6 7 8 9 10 11 12 13 14

11. Do you have regularly assigned teaching responsibilities?
    _____ Yes _____ No

12. If yes circle the grade levels you teach:
    K 1 2 3 4 5 6 7 8 9 10 11 12 13 14

13. What subject(s) do you teach: If more than one, please give your major assignment first.

14. Which of the following titles best describes your major assignment? (please check one)

_____Classroom Teacher
_____School Librarian
_____Educational Media Building Coordinator
_____Assistant Principal
_____Principal
_____Counselor
_____Curriculum Coordinator
_____Helping Teacher
_____Subject Matter Coordinator
_____Media Director for System
_____Director of Instruction or Curriculum
_____Assistant Superintendent
_____Superintendent
_____Regional Coordinator or Director of Curriculum or Media
_____Other _____

15. **Please list any other responsibilities you may have in addition to your Instructional Media responsibilities: (major responsibility first)** _____

_____

16. **How many years have you had your present Instructional Media responsibilities?** _____

17. **Please check the one term which best describes your present professional degree status:**

____Teaching Certificate	____Masters plus hours
____B.A., B.S., B.Ed.	____Specialists
____B.A. Plus hours	____Ph.D., Ed.D.
____M.A., M.S., M.Ed.	____Other _____

18. **What is your major area in the highest degree you hold?** _____

_____

19. **In what year did you receive your last formal training in the field of instructional media?** _____

20. **Please check each of the following areas in which you have had formal training in the field of instructional media.**
(check as many as apply)

____a. Undergrad. instruction	____f. Regional Workshops
____b. Graduate instruction but not for degree credit	____g. NDEA Summer Institutes
	____h. Commercial Workshops
____c. Masters degree instruction	____i. Intern Programs
____d. Graduate instruction beyond the masters degree	____j. Employment in Business or Industry
____e. In-service instruction in your local school system	____k. Other _____
	_____

21. **Which of the above areas do you consider to be most valuable in the performance of your instructional media responsibilities? (fill in one letter for the most valuable area)** _____

Comments: _____

_____

22. **To whom are you immediately responsible for your instructional media activities:**

Name _____
Title _____
Address _____

23. Does the media program for which you are responsible have a budget specifically ear-marked for its operation _____ _____
yes no

Comments: _____

_____

24. As a part of your instructional media responsibilities, do you participate in the preparation of the budget (or that part of the budget) on which your media program operates?

_____ _____
Yes No

25. As a part of your instructional media responsibilities, do you participate in the preparation of proposals for outside funding with respect to the development or maintenance of the instructional media program?

_____ _____
Yes No

26. Please check each source that is used as a means of funding your particular instructional media program. (check as many as necessary)

___a. Local ear-marked (Media) funds for each school building
___b. Local ear-marked (Media) funds for entire district program
___c. Local instruction funds for each school building
___d. Local instruction funds for entire district
___e. Local administrator's discretionary funds
___f. Special state project funds
___g. Federal NDEA or ESEA funds ets.
___h. Other _____
_____

Comments: _____

_____

27. Which of the above funding sources is the major source of funds for your media activities? (please fill in one letter for the major source of funds) _____

Comments: _____

_____

_____

28. **Below, is a list of media services and activities which public school media personnel may perform. First, please check all activities that you performed, with respect to your instructional media responsibility, before a summer institute at M.S.U. Next, check all activities that you perform now.**

	activities performed before institute	activities performed now
Ordering materials and scheduling equipment.	_____	_____
Suggesting appropriate audiovisual materials for classroom use.	_____	_____
Teaching teachers to operate equipment.	_____	_____
Suggesting new or different uses of available materials.	_____	_____
Keeping teachers up-to-date on new audiovisual materials.	_____	_____
Repairing and maintaining the equipment.	_____	_____
Classifying and storing materials.	_____	_____
Preparing specialized audiovisual materials.	_____	_____
Participating in curriculum and instructional development activities.	_____	_____
Participating in budget planning for media program.	_____	_____
Participating in the planning for and use of new instructional space.	_____	_____
Organizing, administering, and training students for projectionists service.	_____	_____

Providing a means for evaluation of materials and equipment. _____ _____

Providing an on-going in-service training program for faculty to include (a) skills training, production, equipment operation, (b) training of utilization techniques. _____ _____

Providing appropriate public relations services and materials on the media program. _____ _____

Providing a production facility which allows for limited slide photography, tape production, basic transparencies, and graphic production by the faculty. _____ _____

Providing a professional media library for the faculty. _____ _____

Encouraging interest in media utilization by the faculty. _____ _____

29. What portion of your time is devoted to your instructional media responsibilities?

5% or less	15% - 25%	50%	75%	Full

30. How much of this instructional media do you spend on each of the activities listed below?

	Performed with great Frequency	Performed with moderate Frequency	Performed Infrequently	Rarely	Never Performed
Ordering materials and scheduling equipment.	____	____	____	____	____
Suggesting appropriate audio visual materials for classroom use.	____	____	____	____	____

Teaching teachers to operate equipment.	____	____	____	____	____
Suggesting new or different uses for available materials.	____	____	____	____	____
Keeping teachers up-to-date on new audio-visual materials.	____	____	____	____	____
Repairing and maintaining the equipment.	____	____	____	____	____
Classifying and storing materials.	____	____	____	____	____
Preparing specialized audiovisual materials.	____	____	____	____	____
Participating in curriculum and instructional development activities.	____	____	____	____	____
Participating in budget planning for the media program.	____	____	____	____	____
Participating in the planning for and use of instructional space.	____	____	____	____	____
Organizing, administering, and training students for projectionists service.	____	____	____	____	____
Providing a means for evaluation of materials and equipment.	____	____	____	____	____
Providing an on-going in-service training program for faculty.	____	____	____	____	____

Providing appropriate public relations services and materials on media program. ____ ____ ____ ____ ____

Providing a limited production facility for faculty use. ____ ____ ____ ____ ____

Providing a professional library for the faculty. ____ ____ ____ ____ ____

Encouraging interest in media utilization by the faculty. ____ ____ ____ ____ ____

31. How important or appropriate is it for a media person such as yourself to perform each of the specific activities listed below for the development and maintenance of an effective media program?

	Highly Appropriate	Appropriate	Can't Decide	Inappropriate	Highly Inappropriate
Ordering materials and scheduling equipment.	____	____	____	____	____
Suggesting appropriate audiovisual materials for classroom use.	____	____	____	____	____
Teaching teachers to operate equipment.	____	____	____	____	____
Suggesting new or different uses of available materials.	____	____	____	____	____
Keeping teachers up-to-date on new audiovisual materials.	____	____	____	____	____
Repairing and maintaining the equipment.	____	____	____	____	____
Classifying and storing materials.	____	____	____	____	____

Preparing specialized audiovisual materials.	____	____	____	____	____
Participating in curriculum and instructional development activities.	____	____	____	____	____
Participating in budget planning for the media program.	____	____	____	____	____
Participating in the planning for and use of new instructional space.	____	____	____	____	____
Organizing, administering, and training students for projectionists service.	____	____	____	____	____
Providing a means for evaluation of materials and equipment.	____	____	____	____	____
Providing an on-going in-service training program for faculty.	____	____	____	____	____
Providing appropriate public relations service and materials on the media program.	____	____	____	____	____
Providing a production facility for use by the faculty.	____	____	____	____	____
Providing a professional media library for the faculty.	____	____	____	____	____
Encouraging interest in media utilization by the faculty.	____	____	____	____	____

32. **In your eyes, how are you operating differently today, in your media role, than you did before participating in the NDEA summer Institute at M.S.U.?**

FEEL FREE TO ADD ANY OTHER COMMENTS THAT YOU WISH.

APPENDIX II

NEWER EDUCATIONAL MEDIA ATTITUDE INVENTORY

During the past twenty years or so, many new teaching aids have been developed. Some of these are sufficiently elaborate to change, or even to replace temporarily, the classroom communication processes which were formerly pretty much limited to children and teachers. Radio, television, motion pictures, slides and film-strips, and phonograph and tape recorders, certain types of teaching machines and programed learning methods -- all are examples of what might be termed the "Newer Educational Media". (NEM)

In American education today, there is some controversy concerning these NEM. The following statements represent various points of view on this question.

Please indicate the extent of your agreement or disagreement with each statement. Please don't make efforts to be consistent or to select the "right answer" -- there are none. Simply enter the proper number in the space before each sentence according to the following code:

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

____ 1. The widespread use of the NEM will revolutionize the process of instruction as we know it now.

____ 2. The possible uses of the NEM are limited only by the imagination of the person directing the usage.

____ 3. The wide resources of the NEM stimulate the creative student.

R* 4. There are no educational frontiers in the NEM -- just new gadgets.

R 5. Most children see the NEM mainly as entertainment, rather than as education.

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

__R__ 6. Most teachers lose the gratification of personal accomplishment when the child is taught by machine.

____ 7. Use of the NEM constitutes a major advance in providing for individual differences in the learning needs of students.

____ 8. Much wider usage of the NEM is needed.

__R__ 9. The vicariousness of learning by NEM aids is not conducive to the most effective learning.

____ 10. If surplus funds exist which could be spent only for supplementary books or for more NEM equipment, the latter should be chosen.

__R__ 11. Children can learn the basic value of a good education only when taught by conventional methods -- not by the NEM.

__R__ 12. The problems of getting materials and equipment when you need it, darkening rooms, setting up the equipment, and otherwise disrupting classes tend to counteract the value of most NEM.

__R__ 13. The "authoritative" presentations of most of the NEM tend to produce an uncritical acceptance on the part of most children.

__R__ 14. The passive quality of learning by NEM is not conducive to the most effective learning.

__R__ 15. The proper student attitudes for effective learning are not developed as well by the NEM as by conventional methods of teaching.

____ 16. Only through the NEM can vicarious learning experiences be provided in the classroom.

Please indicate the extent of your agreement or disagreement with each statement:

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

R 17. The expense of most of the NEM is our of all proportion to their educational value.

R 18. The NEM give little opportunity to provide for the invidi-dual differences of children.

R 19. The personal relationship between teacher and child is essential in most learning situations.

R 20. NEM materials are so specific as to have little adapt-ability to different teaching requirements or situations.

R 21. With increased usage of the NEM, the teaching role may be downgraded to clerical work, proctoring, grading, and other simple administrative tasks.

____ 22. The development of NEM centers in every school unit should be encouraged and facilitated.

R 23. The NEM do not suitably provide for the special needs of either slow learners or brighter children.

* "R" Represents those items which were reverse scored to avoid negative sets.

APPENDIX III

FIRST LETTER TO EXPERTS

TO: Faculty Members of the 1965 and 1966 NDEA Summer Institutes for Educational Media Building Coordinators at M.S.U.

FROM: Arthur D. Katser, Graduate Student Title VIB Institute for Instructional Development

RE: Determination of a list of media-activities that Educational Media Building Coordinators might be expected to perform

At the present time I am in the process of instituting an exploratory study with respect to the media-related activities performed by building coordinators who attended NDEA summer institutes at Michigan State. I would like to enlist your aid, as a former faculty member in this program, to prepare a "base-line" list of media activities for building coordinators which can be used as a comparative device as I survey the coordinators who attended our institutes.

As you will note, I have attached a set of media-related activities derived by Eleanor P. Godfrey when she surveyed the media programs in more than three-thousand school districts in 1962. Would you please examine this list and then, on the basis of the objectives and activities espoused during the institute, suggest any additions or deletions. Once again, the purpose of this procedure is to develop a comprehensive, up-to-date list of building coordinator media practices based on our position during the institutes which took place during 1965 and 1966 at Michigan State.

The "Godfrey" list of building coordinator activities as published in the DAVI Monograph #3 "The State of Audiovisual Technology: 1961-1966" findings based on data gathered in 1962.

1. Orders and schedules media
2. Teachers operation of equipment
3. Provides data on new materials
4. Suggests appropriate materials
5. Suggests new uses for materials

6. **Maintains equipment**
7. **Classifies and stores materials**
8. **Prepares specialized materials**

Suggestions for additions or deletions to the "Godfrey" list.

APPENDIX IV

SECOND LETTER TO EXPERTS

May 21, 1968

TO: Faculty Members of the 1965 and 1966 NDEA Summer Institutes for Educational Media Building Coordinators at M.S.U.

FROM: Arthur D. Katser, Graduate Student
Title VIB Institute for Instructional Development

RE: Rating of a list of media-related activities that Educational Media Building Coordinators might be expected to perform.

The attached form is the second, and last, portion of the exploratory study of media-related activities performed by building coordinators who attended NDEA summer institutes at Michigan State. I would like to ask your help, once again, in obtaining some "base line" data for the study that I am involved with as a part of my dissertation.

The attached form includes media-related activities which you helped to modify and describe in February of this year. Would you please examine this list and then, on the basis of the objectives and activities espoused during the institute, rate each of the eighteen activities using the Likert-type-scale provided. As you will note, the questionnaire asks: how appropriate is it, in your opinion, for an instructional media building coordinator to perform each of the specific activities listed. As you rate each activity please keep in mind that your decision should be based on the objectives and activities espoused during the institute.

Below is a list of instructional media services and activities which public school instructional media personnel may perform. How appropriate is it, in your opinion, for an instructional media building coordinator to perform each of the specific activities listed below for the development and maintenance of an effective media program?

	Highly Appropriate	Appropriate	Can't Decide	Inappropriate	Highly Inappropriate
Ordering materials and scheduling equipment.	____	____	____	____	____
Suggesting appropriate audio visual materials for classroom use.	____	____	____	____	____
Teaching teachers to operate equipment.	____	____	____	____	____
Suggesting new or different uses for available materials.	____	____	____	____	____
Keeping teachers up-to-date on new audiovisual materials.	____	____	____	____	____
Repairing and maintaining the equipment.	____	____	____	____	____
Classifying and storing materials.	____	____	____	____	____
Preparing specialized audiovisual materials.	____	____	____	____	____
Participating in curriculum and instructional development activities.	____	____	____	____	____
Participating in budget planning for the media program.	____	____	____	____	____
Participating in the planning for and use of instructional space.	____	____	____	____	____

Organizing, administering, and training students for projectionists service.	____	____	____	____	____
Providing a means for evaluation of materials and equipment.	____	____	____	____	____
Providing an on-going in-service training program for faculty.	____	____	____	____	____
Providing appropriate public relations services and materials on media program.	____	____	____	____	____
Providing a limited production facility for faculty use.	____	____	____	____	____
Providing a professional library for the faculty.	____	____	____	____	____
Encouraging interest in media utilization by the faculty.	____	____	____	____	____

APPENDIX V

FIRST LETTER TO INSTITUTE PARTICIPANTS

March 19, 1968

Mr. Henry Adamski
4130 Alpha St.
Lansing, Michigan

Dear Mr. Adamski,

Because of your participation in the 1965-66 N.E.E.A. summer institute program at Michigan State University, I am writing to you to ask your assistance.

You are very much aware, I know, of the importance of effective in-service teacher education, particularly in the field of instructional media. We are now in the process of evaluating our own in-service media program here at M.S.U. and are undertaking several studies to provide essential information.

Essentially, we need your cooperation in completing the enclosed questionnaire on or before April 15th. For our results to have maximum significance, it is extremely important to have a 100% return. Our questionnaire should require approximately twenty minutes to complete. You can be assured that your time will be greatly appreciated and the information derived put to valuable use.

In addition, all individual responses will be treated confidentially in accordance with the ethics of such research. Neither names or responses will be individually identified in the interpretation and reporting of results.

Please feel free to make comments on the questionnaire. The last page has been specifically included for this purpose. You will note that a stamped and addressed return envelope has been provided. When you have completed the questionnaire please place it in this envelope and return it to us at your earliest convenience.

You will have our deep appreciation for your assistance in this project.

Cordially,

Charles F. Schuller, Director
Instructional Media Center

Enclosures

APPENDIX VI

FOLLOW-UP TO PARTICIPANTS

April 15, 1968

Mr. Bill Grady
Box 1398
University of Arkansas
Fayetteville, Arkansas 72701

Dear Mr. Grady:

I am writing to you once again to ask your help with respect to our M.S.U. follow-up survey of NDEA summer institute participants. We have reached a point in our research where we have to set a closing date of April 25th for data recording.

A search of our records indicates that, as of this date, we have not received your follow-up survey questionnaire. If we have erred, we apologize for taking your time. If not, we do hope that you will take a few moments to assist us in gathering this needed data.

Research shows that late return on questionnaires come from important respondents who absolutely must not be neglected. They are often involved with other important matters requiring their attention; they may have strong feelings about the subject matter of the questionnaire, or conversely, the matter at hand may seem totally irrelevant to them. All of these indicate that you are "special people". Therefore, it is extremely important that your views not be omitted.

In case our questionnaire materials were misplaced, we are enclosing another set for your convenience. Please note that we have included a stamped return envelope.

Thank you very much for your cooperation in this project. We certainly hope to hear from you in the very near future.

Cordially,

Charles F. Schuller, Director
Instructional Media Center

APPENDIX VII

FIRST LETTER TO PRINCIPALS

May 5, 1968

Mr. Arthur Sheppard, Principal
Kennedy School
Lansing, Michigan

Dear Mr. Sheppard:

Because your faculty includes a participant in the 1965-66 N.D.E.A. summer instructional media institute program at Michigan State University, I am writing to you to ask your assistance.

You are very much aware, I know, of the importance of effective in-service teacher education. We are now in the process of evaluating our own in-service media program here at M.S.U. and are undertaking several studies to provide essential information. One vital portion of this project includes the gathering of opinions from local administrators such as yourself.

Essentially, we need your cooperation in completing the enclosed questionnaire on or before May 15th. For our results to have maximum significance, it is extremely important to have a 100% return. Our questionnaire should require approximately ten minutes to complete. You can be assured that your time will be greatly appreciated and the information derived put to valuable use.

In addition, all individual responses will be treated confidentially in accordance with the ethics of such research. Neither names or responses will be individually identified in the interpretation and reporting of results.

Please feel free to make comments on the questionnaire. You will also note that a stamped and addressed return envelope has been provided. When you have completed the questionnaire please place it in this envelope and return it to us at your earliest convenience.

You will have our deep appreciation for your assistance in this project.

Cordially,

Charles F. Schuller, Director
Instructional Media Center

Enclosures

APPENDIX VIII

FOLLOW-UP TO PRINCIPALS

May 16, 1968

Mr. Sheppard, Principal
Kennedy Junior High School
23050 - 13 Mile Road
St. Clair Shores, Michigan

Dear Mr. Sheppard:

I am writing to you once again to ask your help with respect to our M.S.U. In-Service Media Survey. We have reached a point in our research where we must bring our collection of data to a close. We are attempting to obtain all completed questionnaires by the 24th of May.

A search of our records indicates that, as of this date, we have not received your survey questionnaire. If we have erred, we apologize for taking your time. If not, we do hope that you will take a few moments to assist us in gathering this needed data.

Research shows that late returns on questionnaires come from important respondents who absolutely must not be neglected. They are often involved with other important matters requiring their attention; they may have strong feelings about the subject matter of the questionnaire, or conversely, the matter at hand may seem totally irrelevant to them. All of these indicate that you are "special people". Therefore, it is extremely important that your views not be omitted.

In case our questionnaire materials were misplaced, we are enclosing another set for your convenience. Please note that we have included a stamped return envelope.

Thank you very much for your cooperation in this project. we certainly hope to hear from you in the very near future.

Cordially,

Charles F. Schuller, Director
Instructional Media Center

APPENDIX IX

TABLE 8.--Summary of data describing the differences in the frequency with which media related activities were performed by classroom teachers serving as coordinators and educational media directors after attending an M.S.U. summer media Institute in 1965 or 1966.

Number of Classroom Teachers Who,		Activity	Number of Media Directors, Who	
Performed Activity Frequently	Performed Activity Rarely		Performed Activity Frequently	Performed Activity Rarely
14	3	Ordering and Scheduling equipment	14	2
10	5	Suggesting appropriate materials use	15	0
10	3	Teaching Teachers to operate equipment	12	2
9	6	Suggesting new or different uses of available materials	15	2
9	8	Keeping teachers up-to-date on new materials	16	0
11	10	Repairing and maintaining equipment	9	8
9	10	Classifying and storing materials	12	1
4	10	Preparing special AV materials	14	2
5	15	Curriculum and Instruc. Devel. Activities	9	1
5	14	Budget Planning	11	1
7	13	Planning new instruc. space	11	2
13	8	Administering student projectionists	10	5
4	15	Evaluation of equipment and materials	11	2
6	11	Providing on-going, in-service training	12	1
3	16	Providing public relations service	12	4
7	15	Providing production facility	12	1
3	16	Providing media library	7	0
14	4	Encouraging interest in media utilization	17	1

TABLE 9.--Summary of data describing the differences in the frequency with which media related activities were performed by librarians and educational media building coordinators after attending an M.S.U. summer media Institute in 1965 or 1966.

Number of Librarians Who,		Activity	Number of Coordinators, Who	
Performed Activity Frequently	Performed Activity Rarely		Performed Activity Frequently	Performed Activity Rarely
11	1	Ordering and Scheduling equipment.	63	3
12	1	Suggesting appropriate materials.	48	5
4	5	Teaching Teachers to operate equipment.	37	6
6	4	Suggesting new or different uses of avail. materials.	46	7
11	2	Keeping teachers up-to-date on new materials.	53	6
3	12	Repaired and Maintained equipment.	32	21
12	1	Classifying and storing materials.	47	14
3	8	Preparing special AV materials.	37	17
6	5	Curriculum and Development Activities.	30	18
3	9	Budget Planning	34	26
7	4	Planning New Instruc. space.	30	23
7	8	Administering Student Projectionists.	48	16
4	7	Evaluation of equip.-materials.	31	14
2	8	Providing on-going in-service training.	36	12
1	11	Providing public relations service.	25	30
6	7	Providing production facility.	33	23
11	1	Providing media library.	33	20
14	1	Encouraging interest in media.	62	4

APPENDIX X

TABLE 10.--A summary of major job assignments held by participants of the 1965 and 1966 summer media Institutes held at Michigan State University with the total number of respondents holding each job.

Job Title	No. of Respondents Having This Title	Job Title	No. of Respondents Having This Title
Classroom Teacher	33	Media Director	19
School Librarian	17	Curr. or Instruc. Dir.	0
Ed. Media Bld. Coord.	72	Asst. Superintendent	0
Assistant Principal	3	Superintendent	0
Principal	7	Regional Coord. or Dir.	2
Counselor	1	College Faculty	5
Curriculum Coordinator	1	Graduate Student	3
Helping Teacher	2	Federal Programs	1
Subject Mat. Coord.	1	Other	6

TABLE 11.--A summary of the current degree status of 174 participants in the 1965 and 1966 summer media Institutes held at Michigan State University.

Degree Status	Frequency	Degree Status	Frequency
Teaching Certificate only	0	Masters plus hours	94
B.A., B.S., E.Ed.	6	Specialists	2
B.A. plus hours	47	Ph.D., Ed.D.	1
M.A., M.S., M.Ed.	16	Other	0

TABLE 12.--A summary of the frequency with which participants in the 1965 and 1966 summer media Institutes at Michigan State University have received formal media training in varying academic levels.

Academic Area in Which Media Training Has Been Taken	Freq.	Academic Area in Which Media Training Has Been Taken	Freq.
Undergraduate Instruction	76	Regional Workshop	36
Graduate Instruction	60	NDEA Institute	174
Masters Level Instruction	64	Commercial Work shops	24
Grad. Level beyond Masters	61	Intern Programs	2
In-Service Training at Local School	69	Employment in Business or Industry	13
		Other	9

TABLE 13.--Summary of sources of funding for building media programs selected by educational media building coordinators who attended the 1965 or 1966 summer media Institutes at Michigan State University and reported this to be their major source of funds.

Major Funding Source	Freq.	Major Funding Source	Freq.
Local Ear-Marked Funds for each school building	41	Local Administrator's discretionary funds	8
Local ear-marked funds for entire district program	22	Special State project funds	1
Local instruction funds for building	12	Federal NDEA or ESEA funds, etc.	42
Local instruction funds for district	16	Other	5

APPENDIX XI

N.D.E.A. IN-SERVICE MEDIA SURVEY

1. Your Name _____ 2. Age _____ 3. Sex _____
last first middle

4. How long have you held your current position as principal? _____

5. Newer Educational Media

During the past twenty years or so, many new teaching aids have been developed. Some of these are sufficiently elaborate to change, or even to replace temporarily, the classroom communication processes which were formerly pretty much limited to children and teachers. Radio, television, motion pictures, slides and film-strips, and phonograph and tape recorders, certain types of teaching machines and programed learning methods -- all are examples of what might be termed the "New Educational Media". (NEM)

In American education today, there is some controversy concerning these NEM. The following statements represent various points of view on this question.

Please indicate the extent of your agreement or disagreement with each statement. Please don't make efforts to be consistent or to select the "right answer" -- there are none. Simply enter the proper number in the space before each sentence according to the following code:

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

_____ 1. The widespread use of the NEM will revolutionize the process of instruction as we know it now.

_____ 2. The possible uses of the NEM are limited only by the imagination of the person directing the usage.

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

____ 3. The wide resources of the NEM stimulate the creative student.

____ 4. There are no educational frontiers in the NEM -- just new gadgets.

____ 5. Most children see the NEM mainly as entertainment, rather than as education.

____ 6. Most teachers lose the gratification of personal accomplishment when the child is taught by machine.

____ 7. Use of the NEM constitutes a major advance in providing for individual differences in the learning needs of students.

____ 8. Much wider usage of the NEM is needed.

____ 9. The vicariousness of learning by NEM aids is not conducive to the most effective learning.

____ 10. If surplus funds exist which could be spent only for supplementary books or for more NEM equipment, the latter should be chosen.

____ 11. Children can learn the basic value of a good education only when taught by conventional methods -- not by the NEM.

____ 12. The problems of getting materials and equipment when you need it, darkening rooms, setting up the equipment, and otherwise disrupting classes tend to counteract the value of most NEM.

____ 13. The "authoritative" presentations of most of the NEM tend to produce an uncritical acceptance on the part of most children.

____ 14. The passive quality of learning by NEM is not conducive to the most effective learning.

Please indicate the extent of your agreement or disagreement with each statement.

1. Agree strongly
2. Agree moderately
3. Agree slightly
4. Disagree slightly
5. Disagree moderately
6. Disagree strongly

_____ 15. The proper student attitudes for effective learning are not developed as well by the NEM as by conventional methods of teaching.

_____ 16. Only through the NEM can vicarious learning experiences be provided in the classroom.

_____ 17. The expense of most of the NEM is out of all proportion to their educational value.

_____ 18. The NEM give little opportunity to provide for the individual differences of children.

_____ 19. The personal relationship between teacher and child is essential in most learning situations.

_____ 20. NEM materials are so specific as to have little adaptability to different teaching requirements or situations.

_____ 21. With increased usage of the NEM, the teaching role may be downgraded to clerical work, proctoring, grading, and other simple administrative tasks.

_____ 22. The development of NEM centers in every school unit should be encouraged and facilitated.

_____ 23. The NEM do not suitably provide for the special needs of either slow learners or brighter children.

Part II

Below is a list of instructional media services and activities which public school instructional media personnel may perform. How appropriate is it, in your opinion, for an instructional media building coordinator to perform each of the specific activities listed below for the development and maintenance of an effective media program?

	Highly Appropriate	Appropriate	Can't Decide	Inappropriate	Highly inappropriate
Ordering materials and scheduling equipment.	____	____	____	____	____
Suggesting appropriate audio visual materials for classroom use.	____	____	____	____	____
Teaching teachers to operate equipment.	____	____	____	____	____
Suggesting new or different uses for available materials.	____	____	____	____	____
Keeping teachers up-to-date on new audiovisual materials.	____	____	____	____	____
Repairing and maintaining the equipment.	____	____	____	____	____
Classifying and storing materials.	____	____	____	____	____
Preparing specialized audiovisual materials.	____	____	____	____	____
Participating in curriculum and instructional development activities.	____	____	____	____	____
Participating in budget planning for the media program.	____	____	____	____	____

Participating in the planning for and use of instructional space.	____	____	____	____	____
Organizing, administering, and training students for projectionists service.	____	____	____	____	____
Providing a means for evaluation of materials and equipment	____	____	____	____	____
Providing an on-going in-service training program for faculty.	____	____	____	____	____
Providing appropriate public relations services and materials on media program.	____	____	____	____	____
Providing a limited production facility for faculty use.	____	____	____	____	____
Providing a professional library for the faculty.	____	____	____	____	____
Encouraging interest in media utilization by the faculty.	____	____	____	____	____

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AVIAN UTILIZATION OF SMALL WOODLOTS IN SOUTHEASTERN MICHIGAN.

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AVIAN UTILIZATION OF SMALL WOODLOTS IN SOUTHEASTERN MICHIGAN

by

Gordon Laidlaw Kirkland, Jr.

A THESIS

Submitted to
Michigan State University
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ABSTRACT

AVIAN UTILIZATION OF SMALL WOODLOTS IN SOUTHEASTERN MICHIGAN

by

Gordon L. Kirkland, Jr.

The once great deciduous forests of southeastern Michigan have been reduced during the last 250 years to a mosaic of isolated wooded areas which dot the landscape. These woodlots are acquiring increasing importance as bird habitats, especially in urban areas. Including only 16 percent of the land which was formerly 95 percent covered with forests, the woodlots represent the last refuges for woodland birds in southeastern Michigan. During 1968, an investigation of three woodlots near East Lansing, Michigan, was undertaken to determine their bird species composition and the ways in which birds may utilize them.

Three major forest types of southeastern Michigan were represented in the study. Toumey Woodlot on the Michigan State University campus in Ingham County contained a relatively undisturbed 15-acre stand of Beech-Maple forest. Red Cedar Woodlot, also on the MSU campus in Ingham County, was a much-disturbed 20-acre remnant of the Silver Maple-American Elm riverine association. The third study area included a 15-acre stand of oaks at the Rose Lake Wildlife Research Center in Shiawassee County. It stands on a peninsula created by the damming of run-off and is known as the Floodings.

A total of 250 hours of field work was conducted during 142 trips to the woodlots: 49 to Red Cedar, 51 to Toumey, and 42 to the Floodings. Each study area was visited an average of four times (range, two to seven) monthly. Data were collected on the species present, numbers of individuals, conspicuous activities, and behavior.

One hundred and twenty-one species representing 16 orders and 36 families occurred in the three woodlots. This was 88 percent of the orders, 67 percent of the families, and 36 percent of the species known to have occurred in the state up to 1959. Red Cedar had 88 species, Toumey 78, and the Floodings 87. Thirty-nine of the species were recorded in only one woodlot: 9 in Red Cedar, 7 in Toumey, and 23 at the Floodings. Thirty-four species were found in two of the three study areas: 17 species in Red Cedar and Toumey, 12 species in Red Cedar and the Floodings, and 5 in Toumey and the Floodings. Forty-eight species occurred in all three woodlots with 23 of them exhibiting significant differences in frequency of occurrence in the woodlots.

The differential distribution of the species between the three woodlots indicates that they have certain unique properties: their similarities in species composition indicate there are factors which promote the presence of the same species in more than one woodlot. However, the absence of a species, particularly one which is infrequently encountered, from a woodlot does not

necessarily indicate that it cannot or did not occur there; only that it was not recorded there. It is possible to identify factors in the woodlots which may influence the presence or absence of certain species, including the amount of water, presence of conifers, openings, grassy areas, proximity of urban centers, and the number of dead trees.

The great diversity of bird species recorded in the three study areas in 1968 is evidence of the importance of such small areas to the local avifauna. As the pressures for increased land utilization by an expanding population and economy continue to grow, it will be important to give serious thought to preserving more woodlots and wooded lands, particularly near urban centers.

ACKNOWLEDGEMENTS

I would first like to express my appreciation to my wife, Carol, whose confidence, aid, and encouragement have been instrumental in the completion of this work. She has sacrificed time and effort to assist in its typing, analysis, and revision.

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Assistance outside the Department of Zoology was provided by Mr. Robert F. Trojanek of the Campus Parks and Planning Division, who allowed me to utilize aerial photographs of Toumey and Red

Cedar Woodlots. Mr. William Fouch on the staff at the Rose Lake Wildlife Research Station provided me with maps of the Floodings area.

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INTRODUCTION

Michigan was a forest wilderness when first seen by European explorers in the 17th century. Forests covered 95 percent of the land; marshes, lakes, natural openings, lake beaches, shifting dunes, and garden-sized clearings of the Indians made up no more than 5 percent of the land surface of the state (Veatch, 1953). However, Day (1953) places emphasis on the the Indian's clearing operations as an important factor in the formation of sizable openings in the continuous forest. Today the original forest area has shrunk until only 55 percent or 20 million of the state's 36 million acres are still forested in either original or second growth forest. Much of this land is in the Upper Peninsula and the northern half of the Lower Peninsula, so that the percentage of forest cover in the southern part of the Lower Peninsula averages only about 17 percent (Schneider, 1966).

From the period 1950-55, the 20 counties of southeastern Michigan (Figure 1) averaged only 15.72 percent forest cover (Table 1). Cunningham (1946) classifies this region as either (1) agricultural areas or (2) primarily agricultural lands with from 15-55 percent of the land supporting forest. Forested, or or more precisely wooded, areas in southeastern Michigan consist

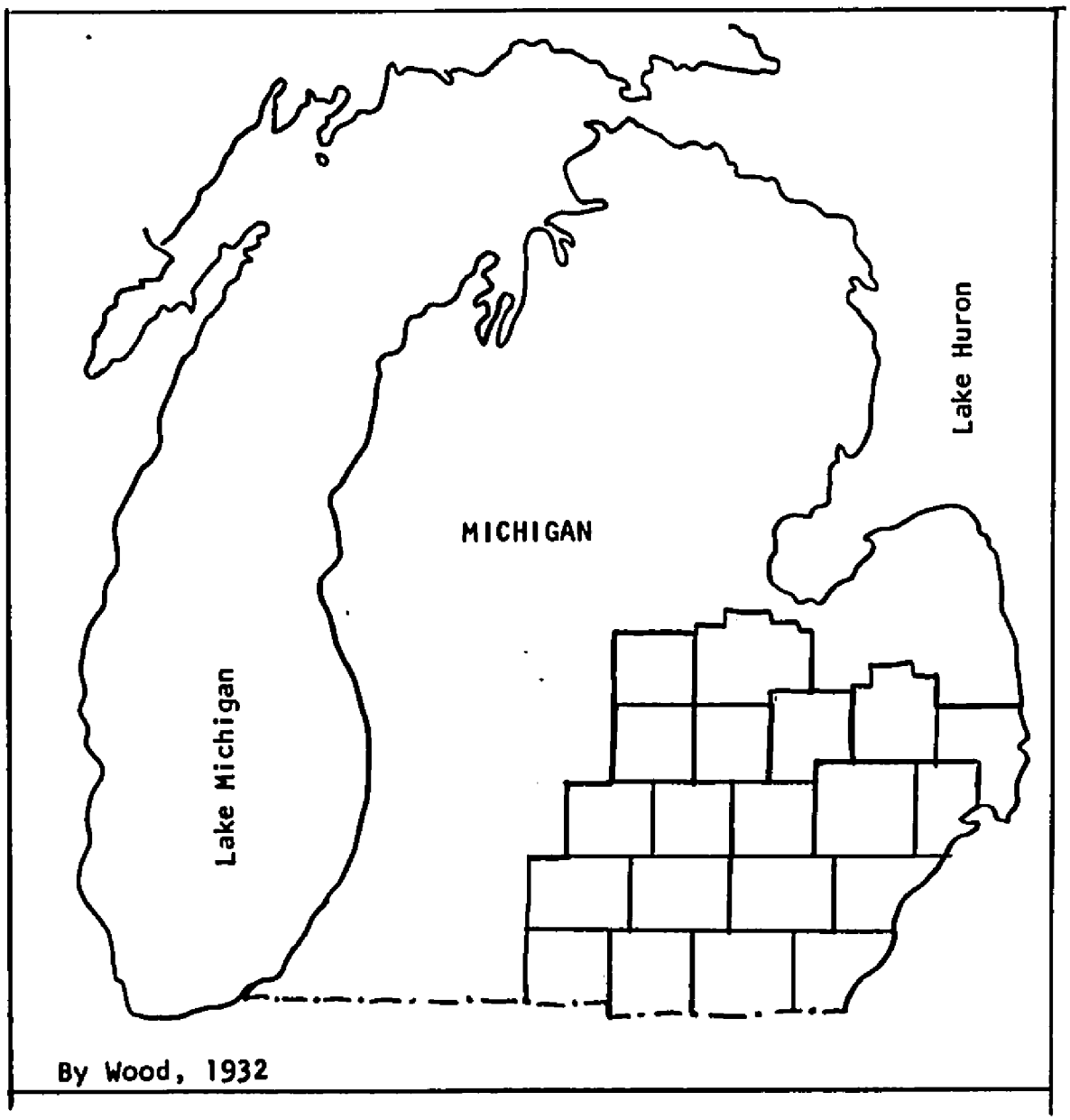

Figure 1. 20 Counties of Southeastern Michigan

Table 1. Forest Survey - 20 Counties of Southern Michigan

COUNTY	TOTAL ACRES	FOREST ACRES	PERCENTAGE FOREST
Branch	323,800	35,900	11.1
Calhoun	453,800	45,100	9.9
Clinton	365,400	32,700	8.9
Eaton	362,900	35,100	9.7
Genesee	412,200	59,800	14.5
Gratiot	362,200	56,700	15.7
Hillsdale	384,600	44,000	11.4
INGHAM	357,800	38,100	10.6
Jackson	451,200	58,300	12.9
Lapeer	421,800	106,900	25.3
Lenawee	482,600	63,100	13.1
Livingston	365,400	96,800	26.5
Macomb	307,800	35,600	11.6
Monroe	359,700	36,900	10.3
Oakland	561,300	127,200	22.7
Saginaw	519,700	110,500	21.3
St. Clair	473,600	106,600	22.5
SHIAWASSEE	345,600	38,800	11.2
Washtenaw	458,200	87,800	19.2
Wayne	388,500	35,400	9.1
	7,958,100	1,251,300	15.72

Compiled from Michigan Department of Conservation, Forest Survey 1950-55.

primarily of small, isolated woodlots, often situated on lands not suited for agricultural purposes. Narrow, more continuous wooded areas occur along rivers and streams.

This drastic change in the vegetative cover, with an 85 percent reduction in forest cover between the 1830's and the 1960's in southeastern Michigan, has undoubtedly had an effect upon the bird life. It may be assumed that birds for thousands of years had become accustomed to the almost continuous forest cover. The present study is concerned with the possible significance of forest reduction upon the present and future avifauna in southern Michigan. McAtee (1926) addressed the problem when he stated that "most birds are born in trees, spend a great deal of their time in trees, and obtain much of their food from trees." Thus the continued existence of wooded or forested areas would seem a requisite for the maintanence of forest bird life as we know it today in southern Michigan. If the clearing of forests has not already had a major effect upon the avifauna, the question must be asked, "How much of the remaining wooded areas can be sacrificed without danger of extirpation of many bird species from their former ranges?" Also, "Which types of woods can be sacrificed with the fewest number of species being affected?"

An analagous situation in Iowa lends a note of urgency to these questions. The nearly total destruction of that state's many small ponds and marshes has led to a severe reduction

in the number of nesting waterfowl, and thus the elimination of Iowa as an important producer of ducks (Linduska, 1964). The former presence of these small bodies of water provided waterfowl with food, protection, and nesting sites, notably the same functions performed by woodlots for their resident birds.

With the reduction of the once great expanses of Michigan forests to a mosaic pattern of woodlots as a background, this study was undertaken to investigate the avifauna of three "typical" woodlots in the East Lansing, Michigan area. The purpose was to collect data on the species composition, abundance, and distribution of the birds in the woodlots during the twelve months of 1968. Further it was hoped that these data would indicate the importance of small woodlots in southeastern Michigan to the resident and migrant birds which frequent them.

METHODS AND MATERIALS

Each woodlot is an entity, unique from all other woodlots on the basis of a large number of characteristics including size, species composition of its trees, the density of the canopy, number of dead trees, and the land use of surrounding open spaces. Thus, it is difficult to choose one or more woodlots which can be described as "typical". The choice of three woodlots was based in part on the fact that there are three major types of hardwood forests in southeastern Michigan: (1) beech-maple, (2) oak or oak-hickory, and (3) silver maple-American elm (riverine association). Three woodlots also provide sufficient diversity for a study covering an entire year, without placing undue strain upon the investigator to keep the lots surveyed sufficiently. Additional lots might have been studied, but at a sacrifice in depth and length of the other studies.

The woodlots were chosen on the basis of a number of considerations including:

1. Accessibility, which involved both distance from the Michigan State campus and the fact that all were on State-owned lands where trespassing would not be a problem.

2. The size of the lot, with all three of sufficient size to meet Kendeigh's (1944) size requirements for bird population studies.

3. A prior knowledge of the three areas through birding trips in 1965-67, in order to be sure that these lots were to be "representative" of woodlots in the East Lansing, Michigan area.

The three woodlots, designated as Red Cedar, Toumey, and the Floodings will be described in detail in the section on Southern Michigan Forests and the Study Areas.

During 1968, 142 visits, totalling approximately 250 hours, were made to the study areas (Table 2). Most visits were made between 6-10:00 A.M., in order to see birds when they are characteristically the most active and conspicuous. To sample species not commonly diurnal, several visits were taken in the late afternoon (3-5:00 P.M.) and early evening (7-8:00 P.M.). Although data were recorded on the activity of the birds observed during visits, the primary purpose of this study was to determine the species composition of the woodlots; thus,the visits were mainly in the morning hours which are best for observing most birds, although certainly it is not possible to obtain a complete picture of their daily behavior with such an approach.

Bushnell "Banner" 7 x 50 binoculars were used to observe the birds. Field notes were recorded on a 3M Wollensak portable tape recorder, Model Number 4200, which was purchased with part of the funds of a Sigma XI Grant-in-Aid of Research of $150. Field notes on tape were then transcribed to written form upon return from the field. Additional data on bird locations were

Table 2. Dates of Visits to Woodlots

MONTH	RED CEDAR	TOT.	TOUMEY	TOT.	FLOODINGS	TOT.
January	2, 7, 14, 21	4	4, 9, 16, 21	4	5, 11, 18, 23, 25	5
February	1, 3, 8, 18, 27	5	2, 13, 20	3	6, 16, 22	3
March	7, 14, 18, 26	4	2, 10, 16, 21	4	5, 11, 17, 22 27, 28	6
April	5, 14, 23, 26, 30	5	2, 10, 19, 21, 28	5	7, 12	2
May	1,8, 14, 15, 19, 25, 31	7	8, 14, 18, 23, 25, 29, 31	7	3, 5, 21, 22	4
June	1, 7, 11, 23	4	6, 18, 21	3	4, 17	2
July	4, 7, 26, 29	4	7, 15, 19, 28, 30	5	2, 9, 16, 25	4
August	4, 12, 23	3	2, 7	2	1, 6	2
September	7, 13, 22, 25	4	6, 12, 15, 17, 26	5	3, 19, 28	3
October	8, 13, 20	3	1, 10, 12, 15, 23	5	2, 11, 16, 24	4
November	9, 16, 23	3	6, 9, 14, 22, 27	5	10, 20, 25, 30	4
December	1, 6, 9	3	2, 7, 11	3	4, 8, 11	3
		49		51		42

plotted on maps of the three woodlots. These maps were used primarily during the breeding season when birds are less likely to wander.

Because the woodlots were not uniform in size and shape, it was difficult to survey the lots with a consistent and identical method. The method of censusing of each lot was influenced by its size, shape, topography, and water "hazards". In general, the periphery was censused at a distance of from 20-75 feet inside the border. Then, where possible, transects were walked through the interior with stops every 150 feet to listen for birds. Observations to determine species identity, numbers of individuals, location (type of vegetation, height), and interactions (intra- and inter-specific) were recorded where possible. In some cases, it was not possible to identify birds to species (e.g., some warblers, flycatchers, and woodpeckers). Identifications were made to the lowest taxon possible. Common and scientific names of birds used in this study follow the A.O.U. Checklist of North American Birds, Fifth Edition (1957).

Vegetative analysis of the three woodlots was limited to the identification of the major tree species and some of the major understory elements. This information was used to classify the woodlots in accordance with the classification by the Society of American Foresters of forest cover types of the Eastern United States (1932). Maps of the vegetative composition of the lots were constructed in an attempt to learn vegetative preference of the birds.

SOUTHERN MICHIGAN FORESTS AND THE STUDY AREAS

Southern Michigan Forests

Michigan's Lower Peninsula (Figure 2) is covered by forests of the Canadian and Carolinian Biotic Provinces, with elements of each overlapping in the Transition Zone which separates them (Cleland, 1966). The forests are primarily those of the Beech-Maple and the White Pine-Northern Hardwoods regions of Braun (1964), plus scattered representation of the northward extension of the Oak-Hickory Region from Indiana. Braun (op. cit.) notes that the vegetative composition of Michigan is complex due to its recent escape from the influence of the continental ice sheets of the Wisconsin Glaciation. Time has not permitted a regional stabilization of the forests in a climax, and thus Michigan is contrasted with the vegetative uniformity of southern regions without histories of recent disturbances. Bog woods and Oak-Hickory communities of a climax character are interspersed within the dominant Beech-Maple Forests of the southern portion of the state.

Quick (1923) characterizes the forest in the southern Lower Peninsula as mesophytic with deep shade beneath the dominants and

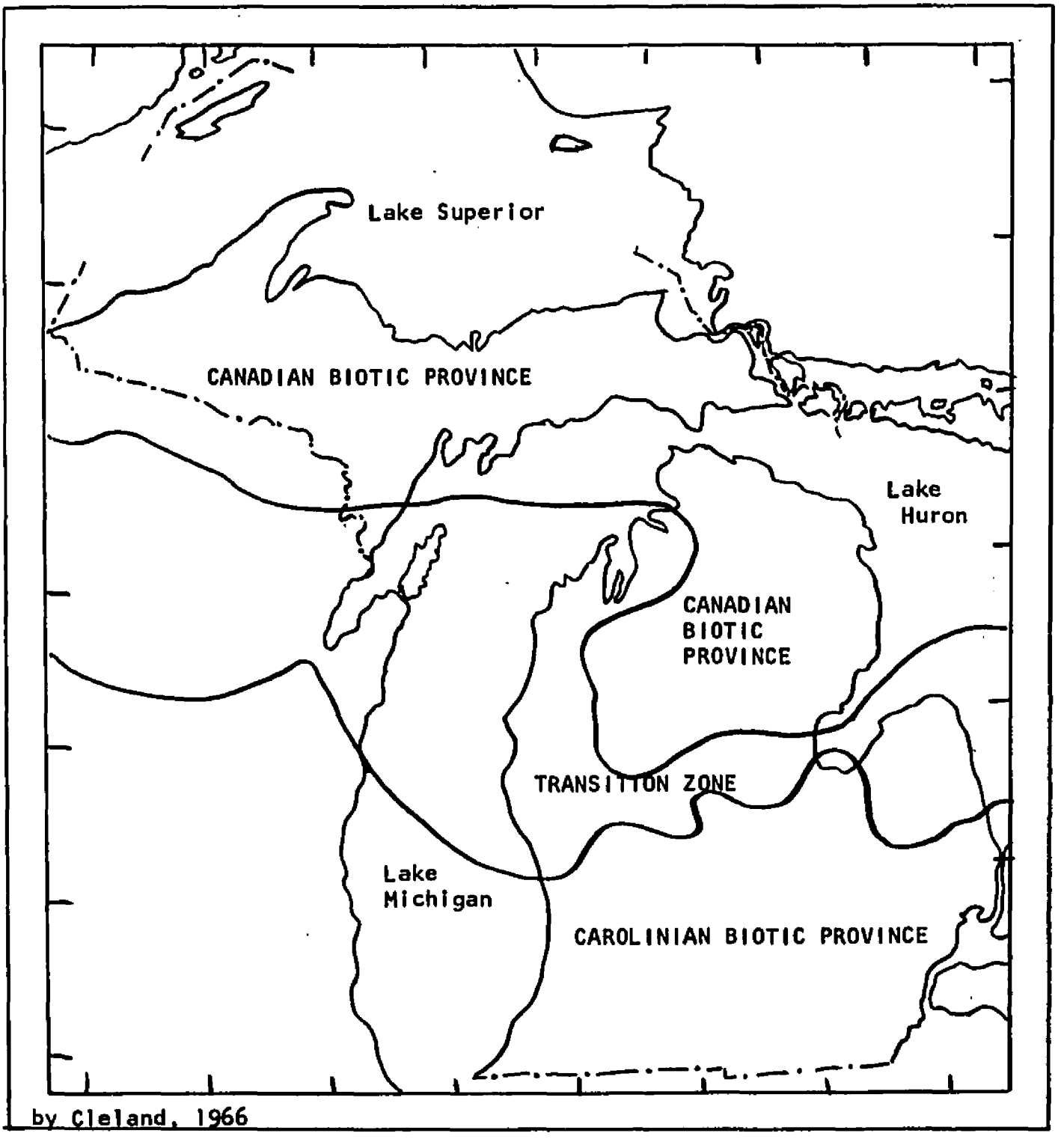

Figure 2. Biotic Provinces of Michigan

a ground cover of moist humus. Dominants include: Acer saccharum, Betula lenta, Carya cordiformis, Fagus grandifolia, Fraxinus americana, Ostrya virginiana, Tilia americana, Quercus rubra, and Ulmus americana. Cain (1935) in discussing a virgin Beech-Maple forest in Berrien County, Type 57 of the Society of American Foresters (1932), describes the flora as rich, but that in the virgin portion the herbaceous and shrub layers are very open due to the density of the crown and the arborescent layer.

Parmelee (1953) states that the Oak-Upland forest, a term for the Oak-Hickory, was an extensive and distinctive element of the primary vegetation of southern Michigan. This forest was prominent in varying degrees south of a line west from Saginaw Bay (Figure 3). Dominance of this type occurred on soils with increasing sand and gravel content, in sandy loams, gravelly loams, loamy sands, and sand (Wood, 1930). Those sites with better soils supported Beech-Maple. Early settlement in the 1830's produced a significant reduction in this type, as it generally occupied well-drained sites. Such sites were considered the best locations for early roads, as well as farms. Thus, the Oak-Hickory forests were felled before heavy cutting took place in the other forest types.

Although originally a minor portion of the forests of Michigan, the Lowland Hardwoods Forest (Bryant, 1963) or the Southern Wetland Forest (Veatch, 1953) now represents 6-10

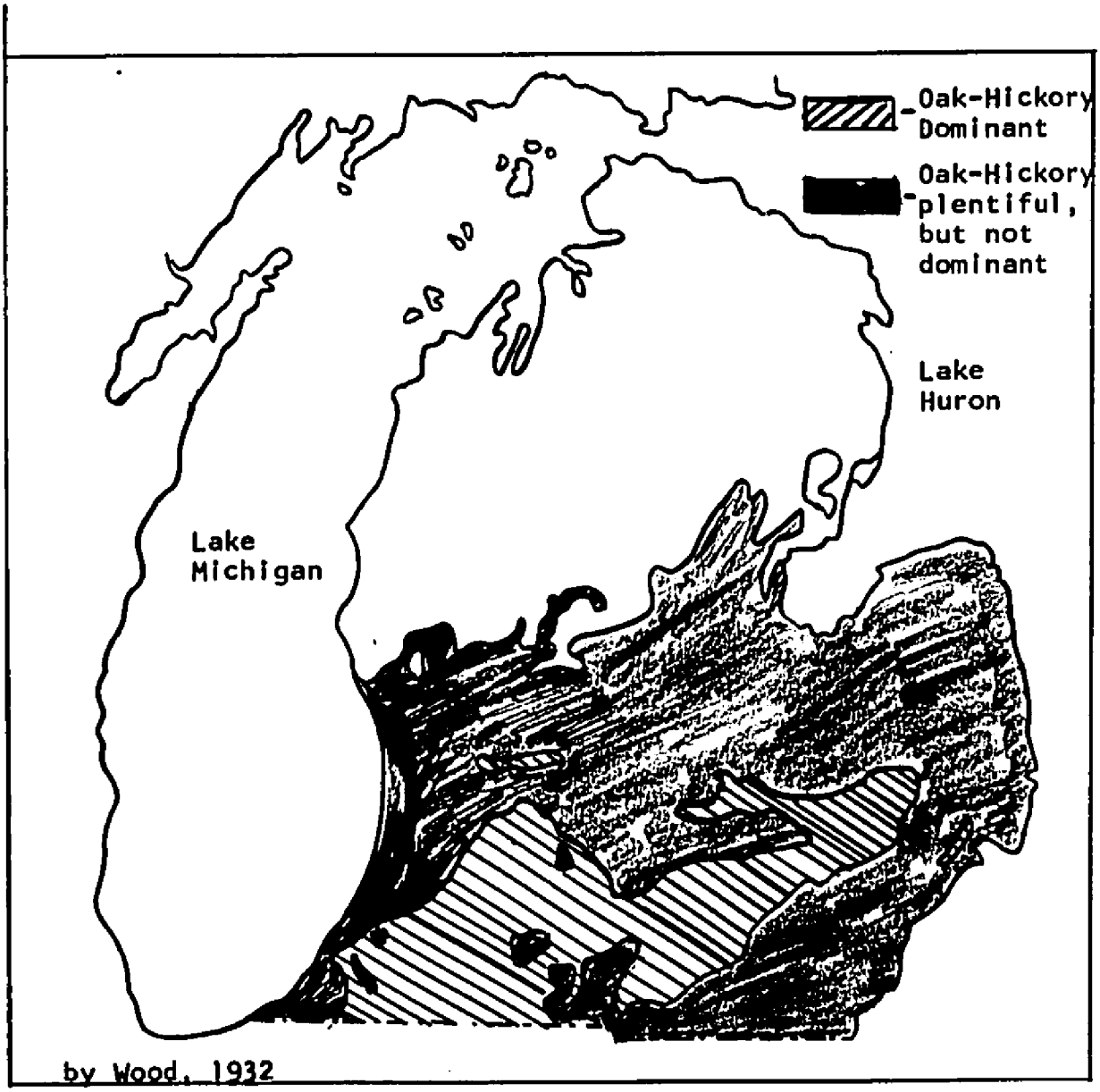

Figure 3. Oak-Hickory Forest in Michigan

percent of the commercial forest lands in the Lower Peninsula (Bryant, 1963). This primarily riverine forest is characterized by American elm, ash, swamp white oak, silver maple, basswood, and shagbark hickory, along with occasional sycamores, cottonwoods, sourgums, and aspens (Veatch, 1953). Undoubtedly, the fact that this forest type is located in wet areas has prevented its destruction to the extent of other forest types in southeastern Michigan.

Although Michigan was first viewed by European explorers early in the 17th century, its forests suffered relatively little exploitation by the first settlers who were primarily interested in the fur trade. For nearly two centuries the interior of Michigan remained virtually untouched. This fact is substantiated by the absence of any roads leading into the interior as late as 1817 (Parmelee, 1953). However, the period following 1830 brought a significant increase in the population of the state which rose from 32,000 in 1830 to 175,000 by 1838. By 1837, there were 433 sawmills in operation in the southern part of the state (Parmelee, 1953). Trees were felled to open the land, to provide ash for manufacturing glass and soap, and to build fences. Bryant states that in Ingham County 21 sawmills were in operation before 1860, and that 80 percent of the land had been cleared for agricultural purposes. At that date, only 15 percent of the county remained in forests, 5 percent more than that of today

(Michigan Department of Conservation Forest Survey, 1950). Schneider (1963) reports that much of the land in Ingham County, cut over during the lumbering operations, remained open as it was further cleared for agriculture. This task was nearly completed by the 1860's. Little major damage to the remaining wooded areas which may have been burned over one or more times prior to adequate fire protection in the 1920's.

The three woodlots used in this study were chosen to represent the major forest types previously discussed. They will be described in some detail so that the reader may become acquainted with the various factors which may have had an effect upon the birds of each woodlot. Included in the following descriptions will be the relevant history of the woodlots, their size, vegetative composition, amounts of water, the character of surrounding lands, and any other pertinent factors. The discussion is basically vegetative in nature, rather than floristic, and is supplimented by maps of each woodlot.

Red Cedar Woodlot

Red Cedar Woodlot is situated in the SE corner of section 14, T 4N, R 1W of the Michigan meridian in Ingham County, Michigan. It lies along the south bank of the Red Cedar River and is bounded on the north and the east by Kalamazoo Street, on the west by a small inlet of the river, and on the south by MSU's University

Village plus shrublands and fields. This woodlot is a portion of the Michigan State University lands; however, this status has not spared it from exploitation and destruction. Parallel sewer lines running east and west have necessitated the removal of 20-50 foot wide strips of trees for the length of the lot. A power line also bisects the woodlot, north-south.

The Red Cedar study area comprised a total of 23 acres of wooded and open lands which may best be classified as silver maple- American elm forest, Type #60 of the Society of American Foresters (1932). The open areas, the result of the construction of the above-mentioned sewer and power lines, plus the old stream channel (oxbow), constitute approximately 25 percent of the area. This woodlot was the most diverse of the three both vegetatively and floristically, and thus it is difficult to describe.

The study area's proximity to the Red Cedar River and the old channel has a decided effect upon it with standing water occurring in the woodlot throughout much of the year. The high water table certainly promotes the presence of such trees as silver maple(Acer saccharinum), cottonwood (Populus deltoides), sycamore (Platanus occidentalis), peach-leafed willow (Salix amygdaloides), and boxelder (Acer negundo). The herbaceous cover is abundant due partly to the high water table and partly to the open canopy in many sections.

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The Red Cedar study area comprised a total of 23 acres of wooded and open lands which may best be classified as silver maple- American elm forest, Type #60 of the Society of American Foresters (1932). The open areas [illegible] result of the construction of the above-mentioned sewe[illegible]us the old stream channel (oxbow), constit[illegible]t of the area. This woodlot was the mo[illegible]vegetatively and floristically, and [illegible]be, .

The study area's [illegible]iver and the old channel has a decided [illegible]ding water occurring in the woodlot throu[illegible]ne year. The high water table certainly promotes the presence of such trees as silver maple(Acer saccharinum), cottonwood (Populus deltoides), sycamore (Platanus occidentalis), peach-leafed willow (Salix amygdaloides), and boxelder (Acer negundo). The herbaceous cover is abundant due partly to the high water table and partly to the open canopy in many sections.

Red Cedar Woodlot is in a state of flux in its tree species composition. The effect of the Dutch elm disease has been to kill most of the mature American elms, thus opening the canopy. The large number of dead elms is an important characteristic of the woodlot. An unfortunate aspect of this die-off has been the cutting of many of the more conspicous dead elms by the MSU Grounds Department in compliance with an East Lansing ordinance against standing dead elms. Since Red Cedar Woodlot is designated as a natural area (nature preserve), such interference with natural succession would seem unpardonable, particularly in view of the operation of bulldozers and large trucks in the interior of the woodlot. Possibly as serious is the dumping and burning of the trees along the south trail in the lot.

At least eight distinct areas or sectors are present within the study area based on vegetative types and degree of isolation (Figure 4) These brief descriptions indicate only the most important vegetative elements, and not necessarily the degree of floristic variety.

Area I lies along the south side of the south road and is 1000 feet long and from 125-225 feet wide. The canopy ranges from 40-75 feet high. Several low sections collect rainwater and run-off; sometimes standing water remains for several weeks. Major components include silver maple, sugar maple (Acer saccharum), white

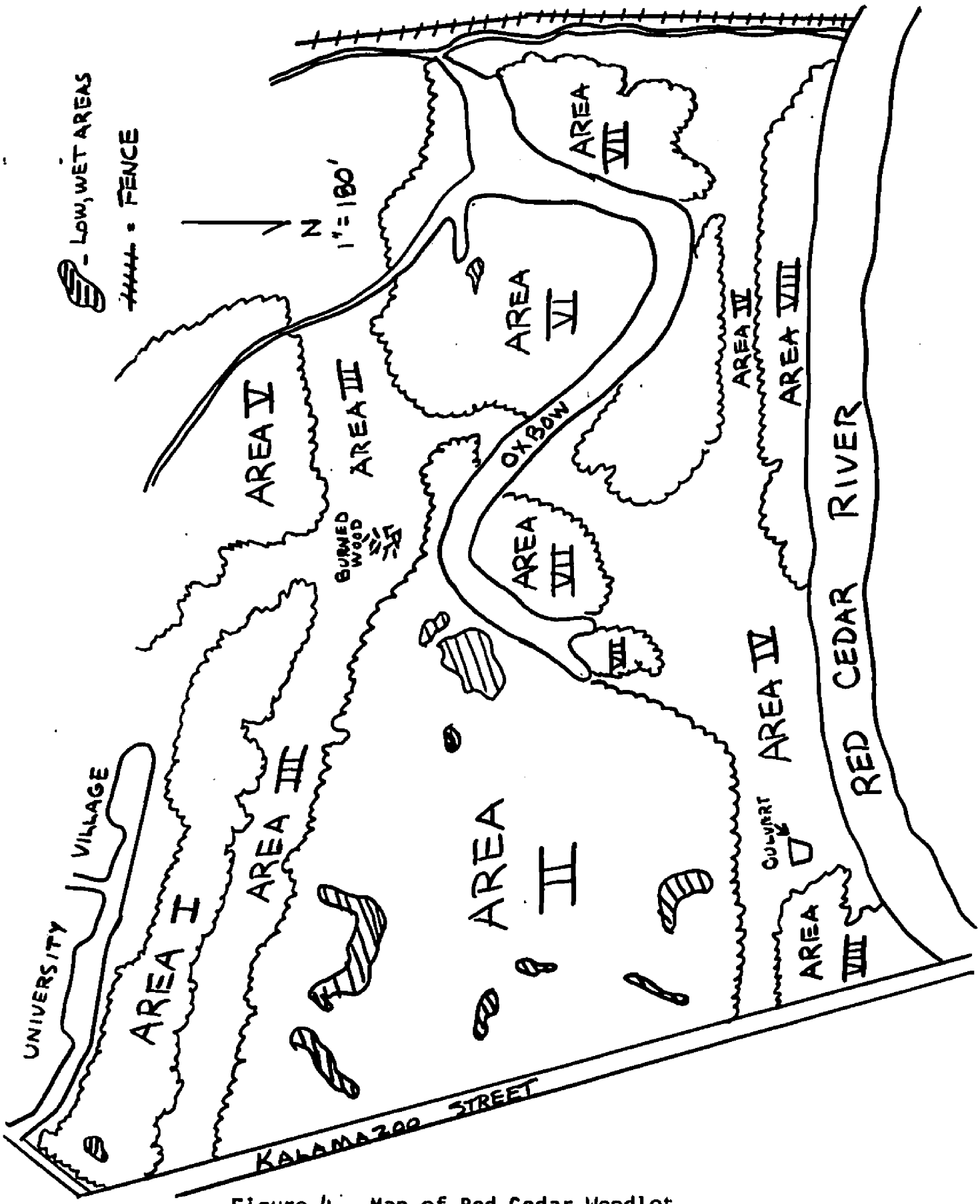

Figure 4. Map of Red Cedar Woodlot

oak (Quercus alba), black cherry (Prunus serotina), white ash (Fraxinus americana), cottonwood and willow (Salix so.). Undergrowth is abundant, both woody and herbaceous. Poison ivy (Rhus toxicodendron) is plentiful in both prostrate and climbing form, in nearly all portions of the study area.

Area II is the largest contiguous wooded portion of the study area and measures 600 feet on the east, 800 feet on the south, and 500 feet on both the north and the west. Within this area are numerous low portions representing flood channels. These support few trees but do have heavy growth of herbaceous and low woody materials, especially poison ivy. Water often collects in these for considerable periods of time. The dominant trees are very large with the canopy at 60 or more feet in much of Area II. Major trees include white ash, sycamore, sugar maple, silver maple, black cherry, cottonwood, willow, beech, basswood (Tilia americana), slippery elm (Ulmus rubra), and American elm. With the most complete canopy of any section, the interior ground cover is like that found in Toumey Woodlot with much young woody growth. Saplings are abundant, especially sugar maple.

Between Areas I and II lies the south trail or Area III. The trail marks the site of the south sewer line and the open area varies in width from 50-125 feet. In the central portion it is crossed by the power line which has an accompanying N-S

cleared strip. The vegetation of the south road is primarily grasses and weeds slowly being encroached upon by pioneer trees, especially sycamores. One major feature is a large pile of burned wood. Several standing dead elms are present in the eastern end.

Area IV is similar to Area III and runs along the north side of the woodlot. It lies between the pond and the river and was created by the sewer line. Luxuriant growths of grasses up to six feet in height are found in the moister places. Other herbs and weeds are found along the length of the trail which varies in width from 20-150 feet.

A small area, Area V, 300 feet by 150 feet, lies south of the western section of the south road which supports a relatively young growth of trees. These include cherry, white oak, white ash, and silver maple. Few of these exceed 40 feet in height. A dense growth of sapling black cherry borders on the road.

That area west of the power line lying between the south road and the pond is designated Area VI. Most of the trees are large and scattered. Silver maples, willows, white ashes, cottonwoods, white oaks, and basswoods are dominant, while there are many young boxelders. There is dense underbrush bordering the open space by the power line. Area VI is a low region supporting a dense shrubby and herbaceous layer, especially nettle (Urtica dioca) which is found in the wet shady locations.

Between the pond and the north trail and extending west of the pond, is Area VII. This is a strip of trees along the trail only one tree wide in the central portion but up to 125 feet wide at the east and west ends. Large trees include slippery elm, white oak, silver maple, cottonwood, and boxelder. The western end supports a grassy region with many small trees, including a large number of sapling sycamores.

The northern side of the north trail next to the river, Area VIII, is similar to Area VII. It runs nearly the length of the study area and varies from 25-100 feet in width. The only break in this occurs where the power line crosses. Dense underbrush and herbaceous layers occur between the silver maple, sycamore, American elm, white ash, boxelder, basswood, beech, and slippery elm.

Red Cedar Woodlot is subjected to periodic flooding, usually in the spring but also in the summer of 1968. The extent of the flooding varies, and at times nearly 100 percent of the woodlot is under water. The retreat of the flood waters deposits a layer of mud on vegetation and the ground. The low places retain standing water for weeks or months after the river has returned to its banks.

Thus it may be seen that Red Cedar Woodlot is both diverse and subjected to influences both natural and man-made which may have an effect upon its bird species composition. There are more varied habitats in close proximity than occur in other

woodlots, and the die-off of American elms has created open spaces, a temporary source of food, and nesting sites for cavity nesters. The one aspect of this study area which has possibly prevented even further destruction and exploitation is the abundance of poison ivy, which certainly must deter all but the most hardy or foolhardy from setting foot inside its borders.

Toumey Woodlot

As described by Schneider (1963), Toumey Woodlot is a 15 acre stand of relatively undisturbed beech-maple forest acquired by Michigan State University from the estate of Frank Bennett in May, 1939. The property is located in the NE 1/4 of the SE 1/4 of section 30, T 4N, R 1W of the Michigan meridian, Ingham County, Michigan. The woodlot extends west of Hagadorn Road, 1/4 mile south of the Chesapeake and Ohio Railroad tracks. Conifer plantings at the eastern and western ends, plus an open area at the eastern end increase the size of the study plot by another five acres bringing the total to approximately 20 acres. The surrounding lands consist of pastures on the north and south with experimental fields on the west and pasture land east beyond Hagadorn Road. The woodlot stands as an island of trees on a slightly elevated piece of land surrounded by MSU agricultural lands.

The topography of the woodlot is simple with the western half essentially level. In the eastern half the land gradually dips to the east into a depression 40 feet lower than the western end. In the depression is a pond, 120 by 20-40 feet. It contained water throughout 1968. East of the pond is an abrupt ridge 25 feet in height which gradually grades to the east. Another depressed area occurs along the southern edge near the eastern end which contains standing water in the spring and after heavy rains.

The major portion of the woodlot, nearly 75 percent, is predominately beech (Fagus grandifolia) and sugar maple (Acer saccharum), making up the canopy as well as sapling and pole stage trees. Young trees are mostly maples with much of the summer herbaceous layer composed of young maples no more than two feet in height. The degree of development of the herbaceous layer varies within the woodlot and also with the season. In April and May, spring beauty (Claytonia caroliniana), bloodroot (Sanguinaria canadensis), Mayapple (Podaphyllum peltatum), trillium (Trillium grandiflorum), and dog-toothed violet (Erythronium americanum) are abundant, covering much of the forest floor. The development of the canopy in May causes a regression of the green portions of many ground plants, and in the summer only a few of these persist. Virginia creeper (Parthenocissus quinquefolia), along with the maples, make up most of the herbaceous cover during

summer and fall. Along the western fence there is a dense shrub layer in the central portion of the woodlot composed of sapling sugar maples and elderberries (Sambucus canadensis). This nearly impenetrable section gradually thins to the east until visibility is relatively unobstructed, although herbaceous and shrubby cover persists.

In addition to beech and maple, minor canopy components of the main woodlot include basswood (Tilia grandifolia), black cherry (Prunus serotina), American elm (Ulmus americana), white ash (Fraxinus americana), ironwood (Ostrya virginiana), black oak (Quercus rubra), slippery elm (Ulmus rubra), and prickly ash (Zanthoxylem americana). These are uncommon in the central portion and more abundant along the periphery, especially at the southern and eastern ends. Few of these, as well as beeches or maples, are present as standing dead trees. Although there are many trees with dead upper portions, few dead trees remain standing. There are several scattered sections of blowdowns within the woodlot.

The eastern and western ends of the woodlot are distinct from the central portion primarily due to the conifer plantings. At the eastern end planting of red pine, spruces, tamaracks, and cedars extend in a SW-NE direction in 700 foot strips extending north of the south border. The conifer strips run along the ridge east of the pond and vary in width from 60-240 feet. The

tamaracks are confined to the southern end in a depressed area. The spruce section in the middle is extensive enough to give the impression of a boreal forest in its interior. The conifers vary in height from 15-30 feet. North of the conifer strip is an extension of prickly ash and locusts up to 40 feet in height. Three other major areas in the eastern end are the central area of large poplars (Populus sp.), a small group of white birches near the wet area, and two large oaks at the southeast end with associated tamaracks. The remainder of the eastern end is grassy with blackberry or other growths scattered. A shrub strip extends along the eastern fence. There is a woodpile up the hill from the birches and 1/4 acre of blackberries west of the conifers on the south side.

In the western end there is less variety with more extensive portions of single habitats. West of the west fence there is a 200-foot wide strip of rather open woods with very large scattered maples and beeches. The distribution and density of the brush and sapling growth are spotty. There is one sod research area in this section. At the northwest corner is a 100 by 150 foot planting of young spruces up to 15 feet in height, planted 6-10 feet apart. Next to these trees is an open parking area where farm machinery is stored. Shade is provided by two large oaks. A 40-foot wide pine belt extends south of the spruces along the west end, and then continues east of the south-

west corner for another 150 feet. Grassy areas are present where there is sufficient light reaching the ground. The southwestern end borders on the south on part of the MSU nursery with many ornamental shrubs. There is also a large 50 by 200 foot area south of the woodlot used by the MSU Grounds Department as a compost dump where hay and corn are thrown. This supports abundant growths of weeds and appears to provide excellent cover.

The above-mentioned sections of Toumey Woodlots are labelled in Figure 5. In general this woodlot presents a rather homogeneous environment on the interior with the peripheryal areas providing a fair amount of variety.

The Floodings

The woodlot at the Floodings (Figure 6) consists of a 13-acre peninsula in the NE corner of section 21, T 5N, R 1E of the Michigan meridian, Shiawassee County, Michigan. The area of the Floodings lies southwest of the corner of Woodbury and Clark Roads and comprises part of the northeastern section of the lands of the Rose Lake Wildlife Station of the Michigan Department of Natural Resources. This land was acquired by the station in 1946 with Pitman-Robertson Act monies.

The present flooded condition has resulted from the damming of the drainage in 1955, with the present water level reached in 1957. The rising waters have isolated timber along the eastern and southern shores. These trees are now dead and

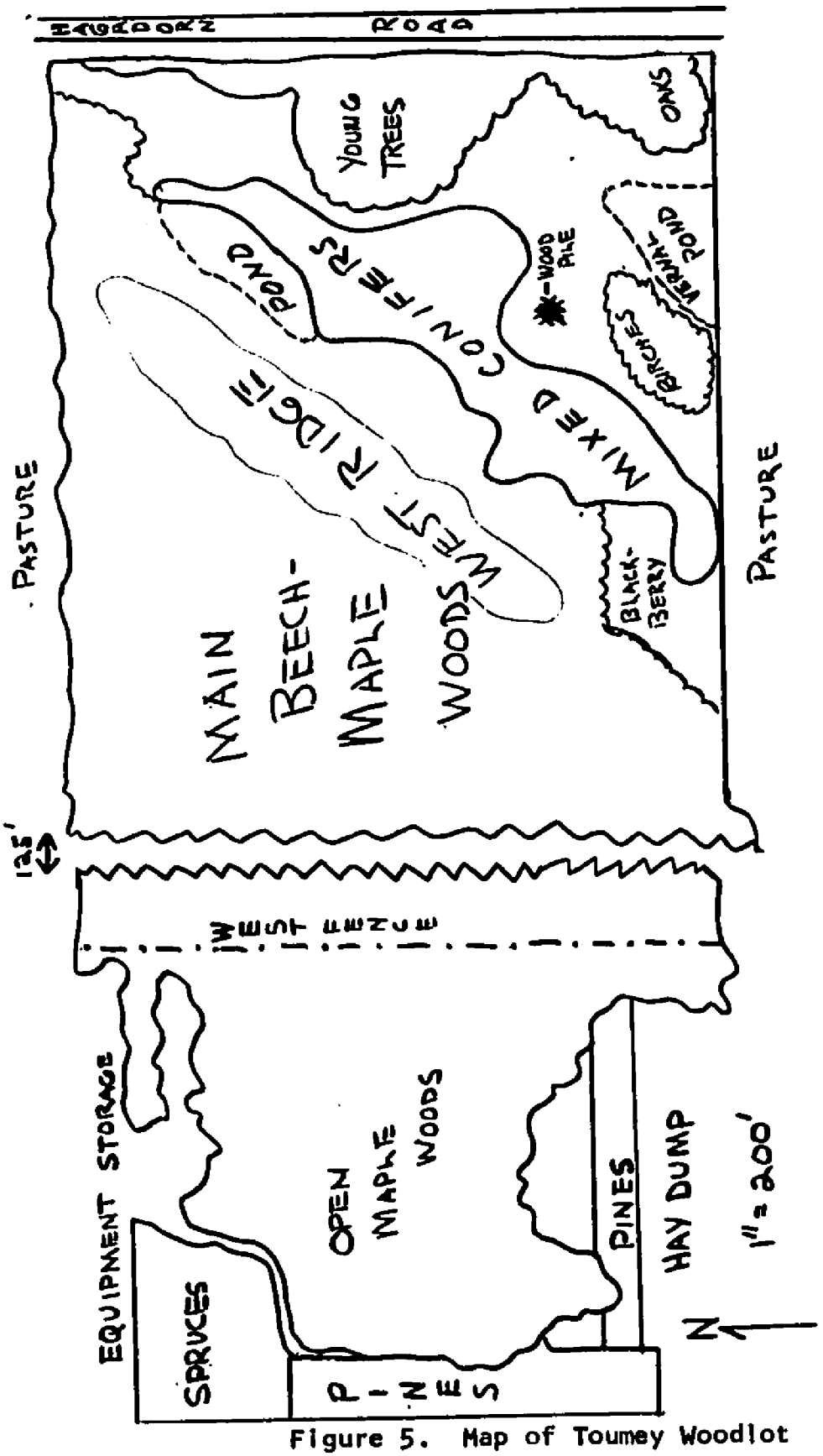

Figure 5. Map of Toumey Woodlot

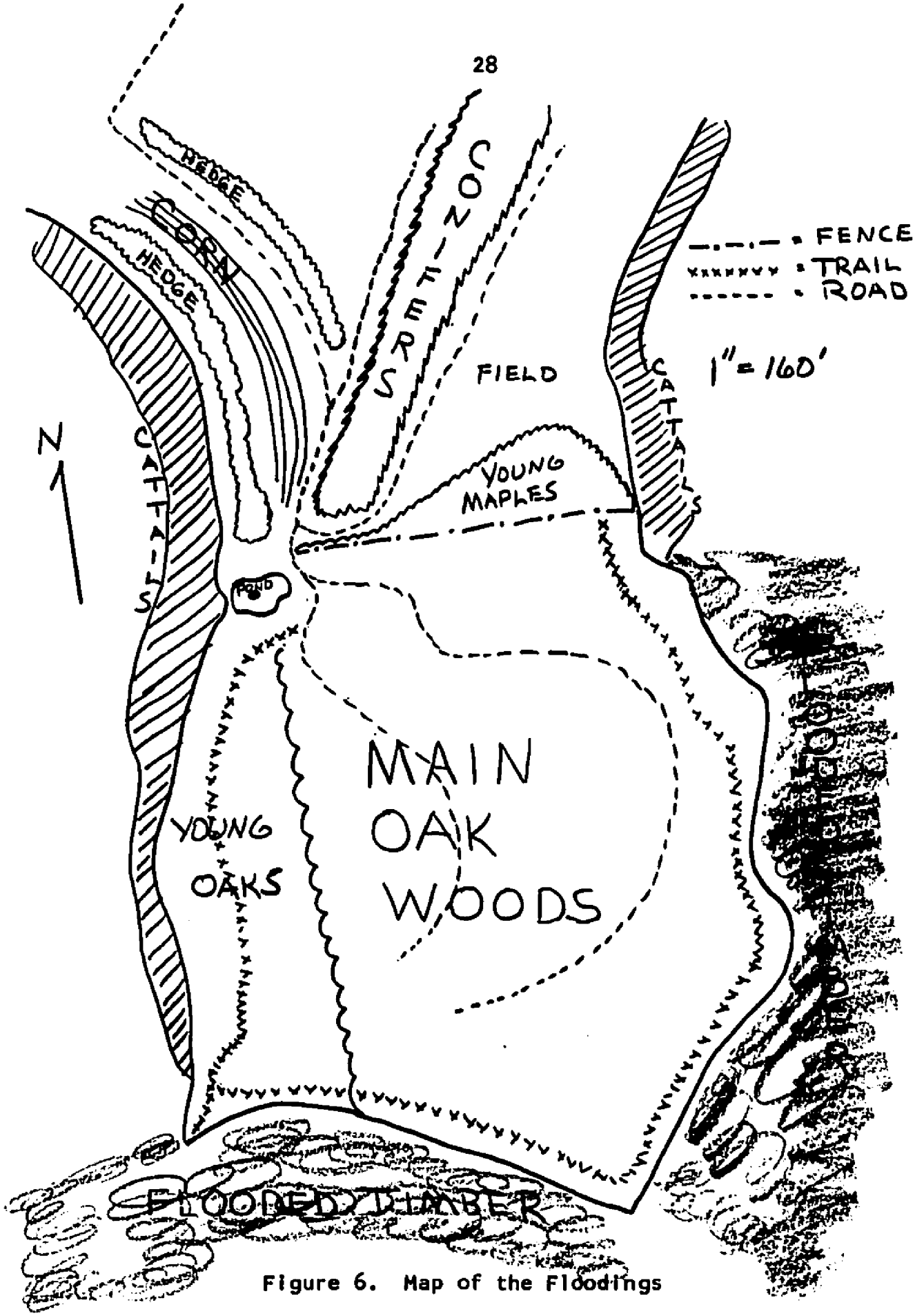

Figure 6. Map of the Floodings

extend up to 1/4 mile south of the peninsula. Typical marsh vegetation of cattails grows along the shores not bordered by timber.

The main woodlot is primarily a young, even-aged black oak (Quercus velutina) stand and contains very few dead trees. A few white oaks contribute to the canopy, but these do not appear healthy and seem to be dying. Under the 40-50 foot canopy is a poorly developed subcanopy comprised of black oaks and black cherry (Prunus serotina) with maples (Acer saccharum and Acer rubrum) along the eastern shore. There is little new growth of trees and the shrub layer is composed primarily of scattered ironwood (Ostrya virginiana), red-osier dogwood (Cornus stolonifera), American hornbeam (Carpinus caroliniana), and bitternut hickory (Carya cordiformis). Herbaceous growth is sparse, being limited to those few places where sunlight can penetrate the canopy, especially near several old roads which wind through the woodlot. Mushrooms are common in both the well-lighted and shady areas, along with Indian pipe (Monotropa uniflora) in late summer.

Most shrub and young tree growth was associated with the southern and western shorelines where willows (Salix sp.), buttonbush (Cephalanthus occidentalis), bigtooth aspen (Populus grandidentata), witch hazel (Hamemalis virginiana), quaking aspen (Populus tremuloides), riverbank grape (Vitis

riparia), gooseberry (Ribes sp.), and raspberry (Rubus sp.) were found. Herbaceous growth was more abundant in these areas. Broad-leaved cattail was abundant along the shore.

Experimental cutting in 1959 of approximately 1/8 of the woodlot along the western shore has produced a re-growth of oaks towards the interior and aspens near the shore. The only pronounced transitional stage between the mature oaks and fields occurs along the northern border of the woodlot where a band of young red maples grades into grass and goldenrod fields for a distance of 25-60 feet. The field also contains a few young cherry trees and ground blackberry (Rubus sp.). At the northwest corner there is a growth of young sassafrass (Sassafras albidum).

A 35-foot wide windrow of pines and spruces planted in 1951 extends north of the woodlot from the center of the peninsula. To the west of the windrow are fields in which wildlife plantings have been made over the last 15 years. Two extensive hedges lie in a NW-SE orientation and are separated by a cornfield 40 yards wide. The northern hedge is smaller and is bordered by a dirt road on the south. It is composed of multiflora rose (Rosa multiflora) in the western end and honeysuckle (Lonicera sp.) at the eastern end. The southern hedge is larger and borders the western pond. It is composed of honeysuckle, autumn olive (Elaeagnus umbellata), and highbush cranberry (Viburnum trilobum).

with several 20-30 foot aspens in the middle section.

The areas at the Floodings surveyed in this study included the 13-acre block of woods, the 2-3 acres of corn and hedge, plus eight acres of flooded timber and ponds for a total of 23 acres. A number of different habitats were found in this area which included: (1) Hedges and cultivated fields, (2) Open fields at the northern end, (3) Large oak woods, (4) Flooded timber, (5) Cattail marsh, (6) Western cut-over area and the brushy shoreline, and (7) Conifers.

RESULTS AND DISCUSSION

Before beginning a discussion of the results, I believe that it is necessary to point out the limitations of this one year study. First is the fact that in any census it is not possible to observe or record all species present. There will always be a small percentage which will escape detection, even after four visits (Kendeigh, 1944). Also the mobility of birds means that they are not restricted to a particular area, as are many terrestrial forms, but they can move from woodlot to woodlot with relative ease. Such movements tend to obscure distributional patterns which are seen in less mobile forms. Spatial isolation is not a dominant factor, although habitat patterns do influence bird distribution of "rare" and certain migrant species. Low populations often prevent these species from utilizing all areas in which they might possibly occur. Thus the absence of a "rare" species in one woodlot does not necessarily mean that suitable habitats are not present; it may indicate that there were not enough individuals to occupy all potential areas of occurrence. However, species which are common in one woodlot and absent from another might indicate a lack of suitable habitats in the woodlot from which they are absent. With these

limitations in mind, I have attempted to discuss the results of this study.

Avian Distribution Between the Woodlots

During 1968, a total of 121 species of birds were observed in the three study areas. Certain species were seen in only one lot, others occurred in two of the three, and still others were observed in all three. The following material is a discussion of the occurrence of the birds in the three woodlots.

Birds Observed in a Single Woodlot

Thirty-eight species were sighted only in a single woodlot; 9 in Red Cedar, 7 in Toumey, and 22 in the Floodings. It may be noted that these species suggest that there may be niches in one woodlot which are absent from the others; however, the absence of a species, particularly one seen on less than four occasions, does not mean that the species could not or did not occur in the other two woodlots. On the other hand, there are certain species which can be said to be associated with areas which are more or less unique to that lot.

Of the nine species found only in Red Cedar Woodlot (Table 3), seven (yellow-bellied sapsucker, yellow-bellied flycatcher, white-eyed vireo, Cape May warbler, bay-breasted warbler, blackpoll warbler, and purple finch) were transients.

Table 3. Birds Found Only in Red Cedar - 9 Species

SPECIES	*	SPECIES	*
Gadwall	1	White-eyed Vireo	1
Ruby-throated Hummingbird	2	Cape May Warbler	1
Yellow-bellied Sapsucker	2	Bay-breasted Warbler	2
Yellow-bellied Flycatcher	2	Blackpoll Warbler	3
		Purple Finch	2

* - Number of days sighted

The ruby-throated hummingbird was a summer resident seen during the nesting season. The gadwall was a winter visitor.

The seven species observed only in Toumey Woodlot (Table 4) were either transients or visitors. Migrants seen in the spring included the winter wren, veery, parula warbler, and black-billed cuckoo, while the red-breasted nuthatch was observed in the fall. The golden-crowned kinglet was present both in the spring and in the fall. Bewick's wren was a summer visitor.

Most of the 22 species associated with the Floodings and the surrounding marshy areas were primarily aquatic or semi-aquatic (Table 5). Of the six species of ducks, the bufflehead and the hooded merganser were spring transients; the blue-winged teal, scaup, and baldpate were spring and fall migrants; while the ring-necked duck was a summer resident breeding in the marshy areas south of the lot. The broad-winged and sharp-shinned hawks are summer residents in the Ingham-Clinton-Shiawassee County area, although they were not frequently encountered in or near the lot. The immature bald eagle would, no doubt, best be termed an occasional visitor, as its presence in the Lansing area is unusual. Also seen as spring migrants were the sandhill crane and common snipe. Summer residents included the Virginia rail, common gallinule, coot, tree swallow, and prothonotary warbler. The bank and rough-winged swallows were

Table 4. Birds Observed Only in Toumey - 7 Species

SPECIES	*
Black-billed Cuckoo	1
Red-breasted Nuthatch	2
Winter Wren	1
Bewick's Wren	1
Veery	1
Golden-crowned Kinglet	8
Parula Warbler	1

* - Number of days sighted

Table 5. Birds Observed Only at the Floodings - 22 Species

SPECIES	*	SPECIES	*
Bittern	1	Coot	12
American Widgeon	4	Common Snipe	1
Blue-winged Teal	9	Tree Swallow	11
Ring-necked Duck	6	Bank Swallow	1
Lesser Scaup	4	Rough-winged Swallow	1
Bufflehead	1	Mockingbird	1
Hooded Merganser	3	Solitary Vireo	1
Sharp-shinned Hawk	2	Prothonotary Warbler	3
Broad-winged Hawk	1	Swamp Sparrow	1
Bald Eagle	1		
Sandhill Crane	1	* - Number of days sighted	
Virginia Rail	1		
Common Gallinule	5		

summer visitors from nearby nesting areas. The only fall visitor was the swamp sparrow, while the mockingbird was a spring visitor.

Thus of the 38 species observed only in one lot, a majority (29 of 38 or 76.8%) can be classified either as transients or visitors of one type or another. This indicates that many of the birds are not found in the Ingham-Shiawassee County area during extended periods of the year, or that when they are present, they are rather rare. The fact that these species are either "rare" or transitory possibly accounts for their not being seen in more than one woodlot, rather than that the other woodlots do not have suitable habitats.

Birds Observed in Only Two Woodlots

In addition to the 38 species found only in one of the three lots, there were 35 species seen in only two of the woodlots. Red Cedar and Toumey had 17 species in common (Table 6); Red Cedar and the Floodings had 13 species in common (Table 7); while Toumey and the Floodings had only 5 species in common (Table 8).

The characteristics of the species shared by two lots indicate the amount of similarity between the woodlots. From these figures, Red Cedar and Toumey would seem to be the most similar, and Toumey and the Floodings the least. If one notes the

Table 6. Birds Common to Two Woodlots - Red Cedar and Toumey - 17 Species

SPECIES	NUMBER OF DAYS SIGHTED	
	RED CEDAR	TOUMEY
Rock Dove	1	3
Yellow-billed Cuckoo	6	1
Acadian Flycatcher	1	1
Hermit Thrush	1	1
Swainson's Thrush	5	2
Ruby-crowned Kinglet	4	2
Warbling Vireo	6	4
Red-eyed Vireo	9	6
Magnolia Warbler	1	1
Blackburnian Warbler	1	1
Chestnut-sided Warbler	2	1
Pine Warbler	1	1
Ovenbird	2	1
Wilson's Warbler	1	1
Canada Warbler	1	2
American Redstart	4	2
House Sparrow	9	10

Table 7. Birds Common to Two Woodlots - Red Cedar and the Floodings - 12 Species

	NUMBER OF DAYS SIGHTED	
SPECIES	RED CEDAR	FLOODINGS
Pied-billed Grebe	1	11
Great Blue Heron	3	14
Green Heron	1	12
Mallard	8	17
Black Duck	1	6
Spotted Sandpiper	2	1
Chimney Swift	2	2
Belted Kingfisher	6	14
Red-bellied Woodpecker	1	7
Eastern Kingbird	6	14
Least Flycatcher	5	1
Wood Thrush	1	1

Table 8. Birds Common to Two Lots - Toumey and the Floodings - 5 Species

	NUMBER OF DAYS SIGHTED	
SPECIES	TOUMEY	FLOODINGS
Cooper's Hawk	1	1
Bobwhite Quail	2	1
Barn Swallow	2	4
Eastern Meadowlark	1	1
Tree Sparrow	2	3

species which are shared by woodlots, it is possible to see some correlation between the habitat preferences of the birds and the habitats included within the lots. Red Cedar and Toumey Woodlots hare birds associated with diverse hardwood forests (warblers, vireos, thrushes) or human habitation (house sparrows and pigeons). Red Cedar and the Floodings share many birds primarily associated with water and wet areas (ducks, herons, and kingfisher). Toumey and the Floodings have birds in common which are characteristic of fields and open areas surrounding the lots (bobwhite, barn swallow, meadowlark).

Birds Common to All Three Woodlots

Forty-eight species were found to occur in all three woodlots. This would suggest that the habitats utilized by these birds were found in each study area. Of this total, 25 species (Table 9) exhibited neither significant differences in the number of days sighted nor in the rankings as determined by X^2 tests. It might be assumed that the habitats utilized by these 25 species were present in each woodlot to approximately the same degree. Since 4 orders and 13 families are represented in these 25 species, a large number of niches must be present.

Of the 48 species common to the three areas, 23 did exhibit significant differences in numbers of days sighted, in rankings, or both. For the seven species which showed only differences in number of sightings (Table 10), it is difficult

Table 9. Species Exhibiting Neither Significant Difference in Number of Days Sighted Nor in Rankings of Individuals

Red-tailed Hawk	Black-throated Green Warbler
Killdeer	Baltimore Oriole
Yellow-shafted Flicker	Cowbird
Downy Woodpecker	Scarlet Tanager
Wood Pewee	Cardinal
Common Crow	Rufous-sided Towhee
House Wren	Savannah Sparrow
Catbird	Vesper Sparrow
Brown Thrasher	Slate-colored Junco
Robin	Chipping Sparrow
Cedar Waxwing	White-crowned Sparrow
Yellow-throated Vireo	White-throated Sparrow
Myrtle Warbler	

Table 10. Species Exhibiting Signicant Differences in Number of Sightings

	RC-T	RC-F	T-Fl
Great-crested Flycatcher	X	X	
White-breasted Nuthatch		X	
Brown Creeper	X	X	
Tennessee Warbler	X		
Rose-breasted Grosbeak	X	X	
Indigo Bunting		X	
American Goldfinch	X	X	

X - Indicates significant difference between pairs of woodlots

to estimate how important this is, due to the fact that there was an unequal abundance of birds in the three woodlots. All seven species were more common in Red Cedar Woodlot which had the greatest total number of sightings. Thus any difference might be due simply to the fact that Red Cedar had more birds.

More important were the 16 species which had either significant differences in rankings or ranking and numbers of sightings. If a species differed in ranking, it meant that it was contributing more (or less) to the avifauna of one woodlot than to another. This difference might represent a basic difference in the avifauna and thus the habitats of the study areas. Two species (mourning dove and blue jay) were more common in Toumey and three (chickadee, red-winged blackbird, and field sparrow) at the Floodings. This is contrary to what might be expected on the basis of birds being more abundant in general at Red Cedar Woodlot. It is obvious that the redwing's abundance was influenced by the cattail marshes surrounding the woodlot at the Floodings, while the mourning dove utilized the conifer plantings at Toumey Woodlot both for roosting and nesting.

Of the 11 species with significant differences in both numbers of sightings and rankings, six (pheasant, red-headed woodpecker, tufted titmouse, hairy woodpecker, grackle, and song sparrow) were most common in Red Cedar; two (great horned owl and starling) were most common in Toumey; and three (wood

duck, yellow warbler, and yellowthroat) were most common at the Floodings. Thus, again, the general higher abundance of birds in Red Cedar Woodlot is not reflected in all species.

To note how these 16 species differ in their rankings when pairs of woodlots are compared, using a X^2 test at the 5 percent level of significance with one degree of freedom, see Table 11. . In Red Cedar the pheasant and the tufted titmouse have higher rankings than in either Toumey or the Floodings. The tufted titmouse may have shown a preference for the moist bottom lands as suggested by Pough (1949). The open areas between the wooded sections of the study area at Red Cedar may have provided the habitat diversity necessary to keep the pheasants within the lot during the entire year, whereas at the other two woodlots they left these areas during the summer months, possibly for the extensive open areas surrounding them. The number of red-headed woodpeckers appears to be correlated with the abundance of dead timber, as this species was ranked significantly higher in both Red Cedar and the Floodings than in Toumey. It is difficult to explain the significant difference in the ranking of the song sparrow. It ranked higher in both Red Cedar and Toumey than at the Floodings. Possibly the fact that there are less grassy areas associated with the Floodings,most of the woodlot being surrounded by water, may account for this difference. Starlings rank higher both in Red Cedar and Toumey than at the Floodings, most likely due to their association with man and his agriculture.

Table 11. Comparison of Woodlots with Regards to the Species Exhibiting Significant Differences in Ranks

COMPARISON OF PAIRS OF WOODLOTS	SPECIES
Ranked higher in Red Cedar than in Toumey	Ring-necked Pheasant Red-headed Woodpecker Tufted Titmouse
Ranked higher in Red Cedar than at Floodings	Ring-necked Pheasant Hairy Woodpecker Tufted Titmouse Starling Song Sparrow
Ranked higher in Toumey than in Red Cedar	Mourning Dove Great Horned Owl Blue Jay Field Sparrow
Ranked higher in Toumey than at Floodings	Great Horned Owl Starling Song Sparrow
Ranked higher at Floodings than in Red Cedar	Wood Duck Mourning Dove Blue Jay Black-capped Chickadee

Table 11 (cont.)

COMPARISON OF PAIRS OF WOODLOTS	SPECIES
Ranked higher at Floodings than in Red Cedar (cont.)	Yellow Warbler Red-winged Blackbird Yellowthroat Field Sparrow
Ranked higher at Floodings than in Toumey	Red-headed Woodpecker Black-capped Chickadee Yellow Warbler Red-winged Blackbird Yellowthroat Common Grackle

The fact that the Floodings is a decidedly different area in respect to habitat is reflected in the number of species which ranked higher there than at Toumey and Red Cedar Woodlots. The Floodings had eight species ranking higher than those in Red Cedar and six higher than those in Toumey. Some of these such as the red-winged blackbird, yellow warbler, and yellowthroat are species associated with marshy areas and are easy to explain. The wood duck was a summer resident in the waters south of the Floodings woodlot, whereas it was only a visitor at the other two woodlots. The grackle is another species associated with watery areas, and although it ranked significantly higher at the Floodings than at Toumey, the largest number of grackles seen on any one visit was 125-175 on September 15 in Toumey Woodlot. The red-headed woodpecker, blue jay, mourning dove, and field sparrow have been mentioned previously. The black-capped chickadee's significantly higher ranking at the Floodings than at Red Cedar or Toumey is also difficult to explain.

Monthly Distribution

As might be expected, the graph of the number of species per month in the woodlots exhibits a bimodal curve for 1968, clearly indicating the influxes of spring and fall transients (Figure 7). A two-way analysis of variance of the totals per month indicates that at the 5 percent confidence interval there

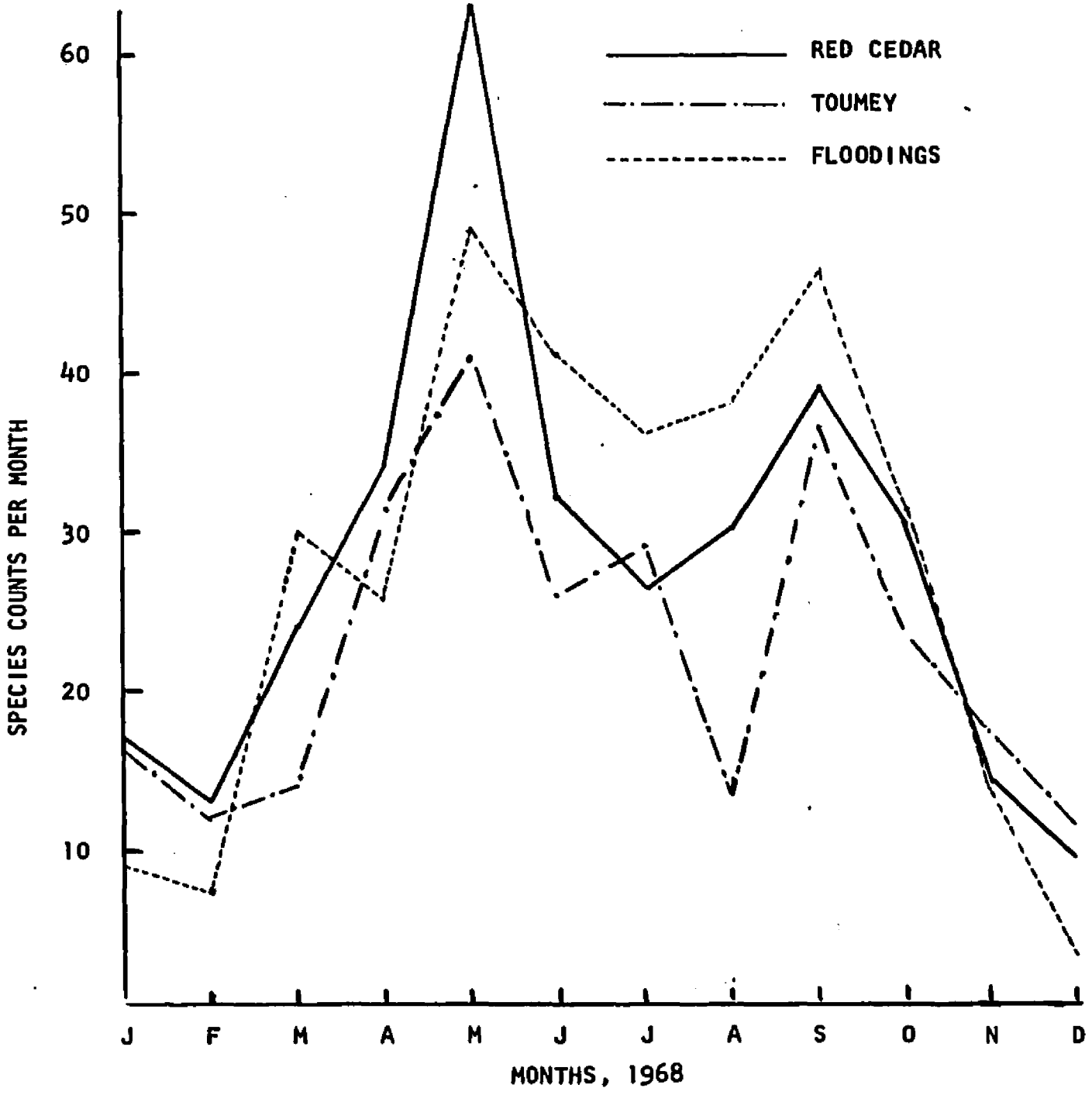

Figure 7. Graph of Number of Species per Month

is a significant difference between the months (Tables 12 and 13). This would be expected due to the great range between the months with the lowest and highest totals. The same analysis indicates that there was no significant difference between the three woodlots in the total species per month during 1968. Thus the species differences between the woodlots, which have been discussed previously, are qualitative rather than quantitative in nature.

Influencing Factors

In discussing avian utilization of woodlots, it is appropriate to consider the ways in which birds use woodlots, or in other words, the roles which woodlots play in the lives of the birds. This is discussed partially in the species accounts; however, no attempt is made in that section to classify the various functions of woodlots. Depending upon the species involved, woodlots are important in the lives of birds in varying degrees. Certain species spend much of their lives within the borders of the woodlot, and for them the woodlot provides many of the requirements to sustain life. Other species whose niches encompass areas beyond the borders of the woodlot obtain only a portion of their life needs within it. No distinction will be made in this section with regards to the total effect of the woodlot on the lives of the birds mentioned. The following is a

Table 12. Species Totals per Month.

MONTH	RED CEDAR	TOUMEY	FLOODINGS
JANUARY	17	16	9
FEBRUARY	13	12	7
MARCH	24	14	30
APRIL	34	31	25
MAY	63	41	49
JUNE	32	26	41
JULY	26	29	36
AUGUST	30	13	38
SEPTEMBER	39	36	46
OCTOBER	30	23	31
NOVEMBER	14	17	13
DECEMBER	9	11	3

Table 13. 2-Way Analysis of Variance of Monthly Totals

SOURCE	d.f.	SS	M.S.	F
Treatments	2	203.7	101.85	2.483
Blocks	11	5320.2	483.65	11.793*
Error	22	902.3	41.01	
Total	35	6426.2		

Test - H_o: Difference between treatments (woodlots) = 0

$$\frac{\text{M.S. TRTS}}{\text{M.S. ERROR}} = F(.05,2,22) = 2.483$$

.05 = 3.44 Not significant

Test - H_o: Difference between blocks (months) = 0

$$\frac{\text{M.S. BLOCKS}}{\text{M.S. ERROR}} = F(.05, 11, 22) = 11.793$$

Significant at less than .05 level

.05 level > 2.23 < .23

list of ways in which woodlots may be important in the lives of birds:

1. Nesting sites
2. Habitat diversity
3. Food
4. Shelter
5. Water

Nesting Sites

One of the most important functions of the woodlot is to provide nesting sites for summer residents. The number of possible sites is a function of the vegetative diversity. Since birds nest at levels from the ground to the upper canopy, and at heights in between, any increase in the layering or stratification of the woodlot is going to increase the number of possible nest sites, and thus the number of potential breeding species. In fact, MacArthur and MacArthur (1961) state that in deciduous forests the species diversity of birds is related to the height and density of the foliage and the resulting stratification, rather than to the plant species composition, per se. Even-aged stands, such as that at the Floodings, often have poorly developed strata beneath the canopy due to the dense shade (Smith, 1966) and thus would tend to have fewer nesting species. In the three woodlots used in this study, 36 species were known or presumed to have nested in 1968. Not included in this list are either

aquatic birds or those nesting in trees and vegetation in the water. These 36 species, when classified according to their preferred nesting localities (Table 14), on the ground, in shrubs or low trees, in the canopy, or in cavities of any height (using figures compiled by Pough, 1946 and 1951), indicate that 17 percent nested on the ground, 55 percent nested in shrubs and low trees, 31 percent nested in the canopy, and 25 percent nested in cavities. Since certain species nest in a variety of locations, and since some individuals may change their nest site from one nesting to the next, such as the rufous-sided towhee, field sparrow, and song sparrow (Van Tyne and Berger, 1959), I have placed several of the species in two categories. These figures are somewhat comparable to those obtained by Turcek (Smith, 1966) in oak-hornbeam forest of Europe, where 15 percent were ground nesters, 25 percent nested in the herb and shrub layers, while 29 percent nested in the canopy. Certainly the heavy utilization of the shrubby layers of the woods signifies their importance in maintaining a large diversity of breeding species within the woodlot.

Habitat Diversity

Habitat variability has been correlated with species diversity and abundance, and this is particularly noticeable when one considers habitat interspersion and the edge effect.

Table 14. Birds Known or Presumed to Have Nested in the Woodlots During 1968, with Preferred Nest Locations According to Pough (1946, 1951)

SPECIES	GROUND	SHRUBS, 0-15'	UPPER CANOPY	CAVITY
Ring-necked Pheasant	X			
Woodcock	X			
Mourning Dove		X	X	
Yellow-billed Cuckoo		X		
Ruby-throated Hummingbird			X	
Yellow-shafted Flicker				X
Red-headed Woodpecker				X
Hairy Woodpecker				X
Downy Woodpecker				X
Kingbird		X	X	
Crested Flycatcher				X
Acadian Flycatcher		X		
Least Flycatcher		X		
Wood Pewee			X	
Blue Jay		X		
Black-capped Chickadee				X
Tufted Titmouse				X
White-breasted Nuthatch				X
Catbird		X		
Brown Thrasher		X		
Robin		X	X	
Cedar Waxwing		X	X	
Starling				X
Yellow-throated Vireo			X	
Red-eyed Vireo		X	X	
Warbling Vireo			X	
Red-winged Blackbird		X		

Table 14 (cont.)

SPECIES	GROUND	SHRUBS, 0-15'	UPPER CANOPY	CAVITY
Baltimore Oriole			X	
Grackle		X	X	
Cardinal		X		
Rose-breasted Grosbeak		X		
Indigo Bunting		X		
Goldfinch		X		
Towhee	X	X		
Field Sparrow	X	X		
Song Sparrow	X	X		
Totals	5	20	11	9

Birds commonly require more things for survival and reproduction than can be found in a single field or woodlot, and the chances for survival are increased if both habitats are close at hand as along an ecotone (Welty, 1962). This effect can be illustrated when comparing Red Cedar and Toumey Woodlots. In both cases, the highest numbers of birds and the greatest species diversity were associated with the edges of these woodlots. In Red Cedar the amount of edge was approximately 5200 feet and was interspersed throught the lot due to cutting of trees for sewage and power lines. In Toumey the edge was confined primarily to the perimeter of the woodlot and measured approximately 4000 feet. This may have accounted in part for the larger total number of sightings in Red Cedar, 709 vs. 507, which was 39.8 percent more than in Toumey. Lay (1938) indicates that margins of clearings or edges have 95% more birds representing 41% more species than the interior of corresponding woodland.

In addition, the greater development of the forest shrub understory in Red Cedar may have been a factor in its larger population since the development of the forest shrub understory is believed to be a key factor in producing higher bird populations (Odum, 1950). One of the more striking aspects of this study was the conspicuous absence of many birds in the interior sections of the Floodings' woodlot. Although birds were seen on the trunks of trees (woodpeckers and nuthatches) or in

the canopy (redwings, blue jays, and tanagers) very few were seen below 10 feet. Certainly the conspicous lack of herbaceous and shrubby layers was a factor since numerous birds were recorded from these moderately to well developed layers in Toumey and Red Cedar Woodlots.

Food

Woodlots provide food for first order consumers in the form of sap, buds, nectar, fruits, and mast; and to second and third order consumers, through both invertebrates and vertebrates which occur there. Inasmuch as a major part of animal diversity is thought to be the result of the exploitation of new niches related to sources of food, the diversity of avian taxa feeding in woodlots gives an index of the magnitude and variety of the food resources within the woodlot. From my observations, I concluded that 94 species representing 11 orders and 27 families (Table 15) fed within the woods or utilized the woods in obtaining food. These can be divided into five major categories which are:

1. Those feeding on plants and animals (invertebrates) directly associated with the trees, shrubs, and herbs of the woodlot(the largest category, which includes: Phasianidae, Columbidae, Cuculidae, Picidae, Tyrannidae, Mimidae, Turdidae, Sylviidae, Bombycillidae, Sturnidae, Vireonidae, Parulidae, Ploceidae, Icteridae, Thraupidae, and Fringillidae).

Table 15. Diversity of Birds Feeding Within the Three Woodlots

ORDER	FAMILY	NUMBER OF SPECIES
Ciconiiformes	Ardeidae	2
Anseriformes	Anatidae	2
Falconiformes	Accipitridae	3
Galliformes	Phasianidae	1
Charadriiformes	Scolopacidae	3
Columbiformes	Columbidae	1
Cuculiformes	Cuculidae	2
Strigiformes	Strigidae	1
Coraciiformes	Alcedinidae	1
Piciformes	Picidae	6
Passeriformes	Tyrannidae	6
	Corvidae	2
	Paridae	2
	Sittidae	2
	Certhidae	1
	Troglodytidae	3
	Mimidae	2
	Turdidae	5
	Sylviidae	2
	Bombycillidae	1
	Sturnidae	1
	Vireonidae	5
	Parulidae	18
	Ploceidae	1
	Icteridae	4
	Thraupidae	1
	Fringillidae	16

2. Those feeding on animal matter which is present in response to the woodlot environment, both invertebrates such as mosquites or earth worms and vertebrates such as squirrels and birds (includes: Accipitridae, Strigidae, Tyrannidae, Turdidae, Sylviidae, Parulidae, and Fringillidae).

3. Those feeding in waters which may be present within the woodlot, and those which might not feed in like-sized areas in more exposed situations (indludes: Ardeidae, Anatidae, Scolopacidae, and Alcedinidae).

4. Those perching in the woodlot and hunting in open areas either in the interior or along the edge (includes: Accipitridae, Strigidae, Tyrannidae, Corvidae, Turdidae, and Icteridae).

5. Those returning to the woodlot to eat or digest food obtained often at some distance outside the woodlot (includes: Accipitridae, Strigidae, Alcedinidae, Corvidae, Sturnidae, and Icteridae).

Although it was impossible in many cases to identify the food eaten by birds and in others it could only be assumed that the bird had fed within the woodlot, the large number of species which utilized the food resources of the woodlot indicates the broad spectrum of food items available.

Shelter

Woodlots provide shelter for many species. I would divide shelter into two basic types: shelter from potential enemies and shelter from the elements. Another system, which combines these two to some extent, was devised by Leopold (1933) and has five major categories: (1) winter cover (protection from snow and cold, a place to remain hidden); (2) escape cover (an area which is safe from predators); (3) loafing cover(shade in the summer and cover in the winter); (4) roosting cover (protection at night); and (5) nesting cover (previously discussed and providing protection for nests and parents). Providing shelter is somewhat dependent upon the time of year, since some species which are summer residents of fields return to woodlots in the winter for protection, both from the weather and predators. In addition, just as woodlots vary with regard to their nest sites and food resources, they also vary in the amount and quality of shelter.

The degree of protection from predators varies with the species composition, density, and the stratification of the woody vegetation. In the light of my experience in attempting to locate birds in various types of woods, the denser the foliage, the more protection. Well-developed herbaceous and shrubby layers will provide shelter for more species than if they are reduced or absent. Either natural or planted conifers can be

particularly important as shelter areas, especially during those seasons when deciduous trees are without leaves. However, even conifers can vary in the degree of protection they afford depending upon the size of the tree and the type of needles.

Of course, it is sometimes difficult to separate protection from predators and protection from inclement weather. Were birds such as pheasants, mourning doves, crows, grackles, great horned owls, golden-crowned kinglets, and chickadees, which were observed in the conifers at the Floodings and Toumey, present because of shelter from natural enemies or the weather or both?

The moderating effects of woodlands on climate are well documented. In the interior of the woodlot, the humidity is higher, the temperature is more moderate, and the wind velocity is decreased (Smith, 1966). These factors vary within the woodlot depending upon height and distance from the edge; however, the woodlot does present an environment which is overall less severe than that encountered in surrounding open areas. This is particularly important in winter when small birds can benefit from even the slightest decrease in cold stress.

Water

Although free water is not necessary for all species of birds, it is important in those species which obtain little moisture in their foods (Van Tyne and Berger, 1959). Thus the presence of open water can influence the occurrence of some species. Water may also be used for bathing, and in the case of more aquatic species may provide sources of food and nest sites. The effect of water on the distribution and abundance of birds may be seen in the three woodlots. Water was more abundant at the Floodings and Red Cedar than at Toumey. At the Floodings 14 of the 21 species found only at that lot had a direct or indirect relationship with the watery areas surrounding the woodlot. The gadwall at Red Cedar was observed on the river. Of the 12 species shared by Red Cedar and the Floodings, seven were associated with the water. Neither the birds found only at Toumey nor those species also recorded with another lot were water birds. Only the wood duck and the red-wing, common to all three woodlots, might be considered as birds associated with water.

However, water is not only important in the lives of those species considered aquatic or semi-aquatic; it is an important factor in the lives of many other species. Certain arboreal species which do not ordinarily descend to the ground may depend on small pockets of rainwater in leaves and branches or moisture

in their food; however, many species regularly visit pools, springs, and streams specially to drink (Thomson, 1964). Certainly the lack of water can place a hardship on many species, forcing them to travel to areas outside their territories for water. Such travels, particularly if they involve flying beyond the boundaries of a woodlot, would expose the bird to unnecessary dangers, especially if water was its only reason for making the trip. Thus the presence of standing water in a woodlot is a benefit to many of the resident birds, and may even promote higher densities. This fact is discussed by Odum (1950) who states that so much emphasis has been placed on temperature as a factor controlling the distribution and abundance of birds that the importance of the water factor has been overlooked. In addition to the importance of standing water for drinking, is its effect on moderating temperatures, in producing more luxuriant vegetation with a consequent greater variety of niches, and in increasing food.

Woodlots vs. Residential Areas as Bird Habitats

The destruction of the three study areas would of necessity require the species and individuals to utilize other areas. Certain species, especially those which were partial to the edges, could successfully inhabit in residential areas. At least 25 species recorded as summer residents in the three woodlots have been observed as nesting birds in urban residential areas

in Illinois (Graber and Graber, 1963) (Table 16). However, from 75-80 percent of the individuals were of only four species, house sparrow, robin, starling, and rock dove. In comparing the urban summer residents with the twenty most common summer residents in the three study areas (Table 17), it appears that most woodlot birds are at a competitive disadvantage in urban areas. The natural areas, as represented in the woodlots, seem to provide a competitive advantage to native species over introduced species. Only the robin appears to benefit significantly from urbanization. Whereas there were 36 breeding species in the 60 acres of the study areas, a total of only 28 species were recorded in 333 urban acres (Graber and Graber, 1963). Species not recorded as urban residents, but present in the three woodlots indluded: ring-necked pheasant, woodcock, yellow-billed cuckoo, ruby-throated hummingbird, hairy woodpecker, eastern kingbird, acadian flycatcher, least flycatcher, black-capped chickadee, white-breasted nuthatch, brown thrasher, cedar waxwing, yellow-throated vireo, red-winged blackbird, baltimore oriole, rose -breasted grosbeak, indigo bunting, goldfinch, and field sparrow.

Woodlot destruction would also adversely affect transients which depend upon woodlots for shelter and food. Although these items might be found in residential areas, woodlots provide more continuous and extensive habitats for these species. Heavy uses

Table 16. Summer Avifauna of Illinois Urban Residential Areas (Birds per 100 Acres)

SPECIES	NORTHERN ZONE	CENTRAL ZONE	SOUTHERN ZONE
House Sparrow	435	378	271
Starling	121	119	180
Robin	132	109	102
Common Grackle	96	27	22
Rock Dove	69	40	38
Mourning Dove	31	38	17
Chimney Swift	14	27	24
Blue Jay	16	16	21
House Wren	17	13	16
Catbird	1	4	22
Cardinal	6	4	9
Yellow-shafted Flicker	6	8	4
Brown Thrasher	1	4	3
Great-crested Flycatcher	----	-----	5
Tufted Titmouse	----	-----	5
Chipping Sparrow	3	-----	----
Eastern Wood Pewee	1	1	1
Red-headed Woodpecker	----	-----	2
Wood Thrush	----	-----	2
Warbling Vireo	1	-----	1
Downy Woodpecker	1	-----	1
Red-eyed Vireo	1	-----	1
Brown-headed Cowbird	----	1	----
Rufous-sided Towhee	----	-----	1
Song Sparrow	----	1	----

Table 17. Twenty Most Common Summer Residents in the Three Study Areas

RANK	SPECIES	TOTAL NUMBER OF SIGHTINGS	NUMBER OF MONTHS RECORDED
1	Blue Jay	86	12
2	Cardinal	82	11
3	Song Sparrow	71	12
4	Starling	69	12
5	Red-winged Blackbird	68	9
6	Tufted Titmouse	67	12
7	White-breasted Nuthatch	60	12
8	Goldfinch	59	11
9	Grackle	59	8
10	Crow	58	12
11	Robin	54	9
12	Ring-necked Pheasant	53	12
13	Yellow-shafted Flicker	53	9
14	Black-capped Chickadee	52	11
15	Downy Woodpecker	51	12
16	Mourning Dove	48	11
17	Catbird	37	6
18	Hairy Woodpecker	27	11
19	Cowbird	26	4
20	Indigo Bunting	22	4

of insecticides and domestic cats are often added dangers encountered in residential districts. It is also questionable whether urban areas would provide habitats attractive to many of the birds classed as visitors.

SUMMARY AND CONCLUSIONS WITH RECOMMENDATIONS FOR THE FUTURE

Summary and Conclusions

An indication of the importance of woodlots to the avifauna of southeastern Michigan is that 121 species representing 15 orders and 36 families were recorded from the three study areas during 1968. If one considers that Zimmerman and Van Tyne (1959) list a total of 339 species from 17 orders and 54 families which have been recorded in Michigan, it is evident that the 60 acres in this study provided habitats for a substantial portion of the species known from the state in 1959. This amounted to 36 percent of the species in 88 percent of the orders and 67 percent of the families with many of those not recorded in the study areas characteristic of the larger bodies of water of the Great Lakes, the northern boreal areas, and the prairies of the southwestern portions of Michigan.

The recording of such a large number of species in a limited area supports the conclusions of Graber and Graber (1963) in their work in Illinois, which indicate that the forest has the greatest avifaunal variety of any habitat in that state, although five others (urban residential areas, marshes, shrublands, orchards, and field crop areas) support larger populations.

This would enhance the general relationship which has been found between habitat complexity and faunal diversity. However, with the low frequency of occurrence in many species (69 were seen on fewer than ten visits in the three woodlots combined) indicative in many cases of low population levels, it can be concluded that these forms would be more affected by habitat loss and deterioration than species with higher population levels.

I feel that there is sufficient evidence from this study to conclude that there are differences in avifauna between various woodlots. It would be naive to presume that the three woodlots used in this study are anything more than representatives of three basic types of woodlots which are found in southeastern Michigan: Beech-Maple, Oak-Hickory, and Silver Maple-American Elm. With the rather unique character of each woodlot due to its size, vegetative composition, amount of dead timber, character of the surrounding areas, and amount of standing water, the avian species composition probably varies to a greater or lesser degree with each woodlot in southeastern Michigan. By knowing the characteristics of the woodlot and having a knowledge of the life histories of local birds, it should be possible to predict which woodlots will support populations of which species of birds.

In addition to differences in species composition between the woodlots, there were also evidences of habitat preference

within the woodlots. Certain species preferred open areas; others remained close to water; while a few were mostly seen in or near conifers. Information of this sort is valuable in evaluating which habitat factors in a woodlot are influencing the presence of certain birds. In noting these preference, I see an opportunity in lands not dedicated as "natural" areas to promote woodlot birds in the same manner in which game biologists have manipulated their lands to produce high yields of game species. McAtee (1918) makes a similar proposal for a variety of public and private lands. A manipulation of plant species, water availability, etc. of woodlots could increase species diversity in many cases. Several which I consider impartant are:

1. Planting of conifers. Conifers provide food and shelter for many species, as well as ameliorating the effects of wind upon the interior of the woodlot if planted on the periphery.

2. Artificial openings. Openings in more extensive woodlands increase the edge and promote species favoring such situations, including robins, catbirds, and cardinals.

3. Increasing water. The damming of streams and springs can create impoundments which provide habitats for water-loving birds (herons, rails, sandpipers, water-thrushes, and ducks). A secondary aspect might be the increase in dead timber caused by the rising water, favoring woodpeckers, tree swallows, and other hole-nesting species.

4. Planting of food plants for birds (honeysuckle, multiflora rose, corn, highbush cranberry). These provide nest sites for edge species, plus an added food supply to maintain winter bird populations.

5. Increasing the amount of dead standing timber. Woodpeckers plus other cavity nesters would benefit. This would be important in young, even-aged stands of trees. The erection of nest boxes might be another way in which this could be accomplished.

The implementation of any of these procedures would certainly assist the avian residents of southeastern Michigan woodlots. The results of this study indicate that these birds are present in great variety and often in large numbers. Thus woodlots are important habitats for birds and should be given important consideration for preservation as natural areas.

Recommendation for the Future

It is evident that the clearing of the forests of Michigan has brought about changes in the species composition and abundance of birds in southeastern Michigan. Forest dwellers have become reduced or extirpated while the birds of the open areas and edges have increased. Some species, either not compatable with man's interests (certain hawks), or unable to adjust to the changes wrought by man(sandhill crane) have withdrawn to less densely populated areas. In the place of many of the more aesthetically

pleasing native birds, we have seen an increase in certain less desirable native species, plus the three most common introduced species, the house sparrow, rock dove, and starling. In attempting to reverse the deleterious effects of indiscriminate land clearing, I feel that it is important to conduct studies such as this to determine what birds are present and how they utilize their environment. The natural history of our native birds is poorly known, even of some of the most common species (Batts, 1955). Thus, it is important to conduct studies such as this and those of Batts in Kalamazoo (1957) and Washtenaw (1955 and 1961) Counties in order to determine the types of habitats utilized by birds. This information is needed in evaluating environments for future preservation, and is timely now in view of the development of nature centers.

The woodlots and woodlands in southeastern Michigan often consist of marginal lands, not suited for economic development. In the case of swampy and rocky lands, our present demands and/or technology often do not justify their appropriation for man's use. However, the demand for these lands will increase as predictions of future economic and population growth are realized. Before this land is blindly destroyed in the name of progress, some efforts should be made to evaluate the potentialities of each type of land as wildlife habitats or simply as natural areas. Each acre of woodland has an inherent value as the home of wildlife which has evolved to live in that particular habitat. Just as

the characteristics of the wooded land differ with each woodlot or woods, so do certain of the faunal elements with narrow habitat requirements. Other species with broad habitat tolerances or niches are widespread in a variety of types of woodlands. The species with the narrow habitat tolerances are in the greatest danger of extirpation due to destruction of natural areas, which would lead to a fulfillment of Graber and Graber's (1963) prediction that in the future bird numbers will continue to increase while species diversity continues to decrease.

The effects of man's alteration of the environment upon the native fauna are compounded by the speed at which they are taking place. The great reduction of southeastern Michigan's forest took only a few generations. Although most living organisms possess the ability to adapt to changing conditions, such changes are long term processes especially in birds. The rapid reproduction of smaller organisms, which allows micro-organisms to rapidly acquire resistance to antibiotics or insects to acquire immunity to insecticides, is not approached by birds. In addition, some highly adapted species have less genetic variability than others; they lack the raw material for successful adaptation. These species may be doomed if their habitats are reduced beyond a critical level. The Kirtland's warbler is a classic example of a species lacking the ability to adapt to new or altered environments. The chance of extinction of this species is decreased by prescribed burnings of jack-pines in the

species' summer range, in order to maintain the proper environmental conditions (Line, 1964). Although few of our native woodland bird species require the dramatic measures necessary in the case of the Kirtland's warbler, the time is fast approaching when the preservation of our woodlands may become a procedure necessary to prevent a drastic reduction of avifaunal diversity in southeastern Michigan.

In the case of woodlot birds, especially smaller non-passerines and passerines, it is difficult to interest the public in their welfare. Although for a number of years such groups as the National Audubon Society and the Sierra Club have warned of a troubled future with respect to America's natural resources, there now appears to be an increased public awareness of man's place in and responsibility for his environment. Increases in air and water pollution and pesticide use are conspicuous examples of man's mistreatment of his world; however, I feel that these are no more serious than man's insidious encroachment upon his natural areas. The Inter-State Highway System, suburban sprawl, the growth of urban areas, and more intensive farming practices rapidly have been reducing the amount and variety of our open lands, and little thought has been given to the consequences. It is my hope that public opinion can be turned in the direction of demanding an accounting of the natural areas in the state's regions of high population density. If this does not occur, then there is a good possibility

that the future will see large "sterile" areas surrounding our urban centers where songbirds, especially nesting species, will no longer abound in the diversity present today. And these will not have disappeared so much through the effects of air and water pollution or pesticides., as from lack of suitable places to nest and raise their young.

This study indicates the diversity of avian species which presently occurs in our small wooded areas. It is certainly not feasible, however, to protect all the remaining woodlots in southeastern Michigan. Thus to belie the assertions of many promoters and developers that "conservationists never compromise" (Lindsay, Schmelz, and Nichols, 1969), I would recommend that an effort be made to analyze additional wooded areas such as those used in this study. A sufficient number of such studies could provide an adequate knowledge of the avifauna of the woodlots of southeastern Michigan. By knowing what species occurred in what type of woodlots, it would be possible to evaluate the areas slated for destruction either by private individuals or governmental agencies. Although governmental inertia and bureaucracy make it difficult to alter government projects, public opinion can overcome such difficulties. In the case of private concerns, the local unit of government's powers of eminent domain might play a vital role in preserving much of southeastern Michigan's wooded areas for their avian residents, as well as for the future generations who will want to enjoy the aesthetic value of these birds.

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APPENDIX

APPENDIX

Accounts of Species

The following species accounts include a record of the days on which each species was seen or heard in the three woodlots. The accounts also include a record of the activities of the birds and the locations in the lots where they were found. Any intra- or interspecific interactions which I felt warranted description were included.

As has been indicated previously, the absence of a species from any woodlot does not mean that it did not or could not occur there. It only means that it was not observed there by me during my study. An example is the golden-crowned kinglet which was "absent" from Red Cedar Woodlot in 1968, but was seen there on April 12, 1969. However, the species accounts do provide a record of the utilization of the three woodlots by the 121 species which were recorded in them during 1968.

PODICIPEDIFORMES

PODICIPEDIDAE

Pied-billed Grebe - Podilymbus podiceps

Red Cedar	Toumey	Floodings
March 14	No record	April 7 May 3 June 4, 17 August 1 September 3, 12, 19, 28 October 2, 11

A single individual was seen on the Red Cedar River on March 14, in company with nine mallards (4 ♂♂ and 5 ♀♀), one ♂ black duck, and one ♀ gadwall. This probably represented a visitor.

The pied-billed grebe was a summer resident at the Floodings with at least one brood of two young seen on June 4 swimming 20-60 yards off the south shore. Grebes were seldom seen closer than 20 yards from shore, except on September 28, when a pair was seen within 6 feet of shore, and also on October 2, when one individual was sighted in the cattails near the southwest point. No more than four grebes were seen on any one day.

CICONIIFORMES

ARDEIDAE

Great Blue Heron - Ardea herodias

Red Cedar	Toumey	Floodings
August 4, 23	No record	March 27, 28
September 7		May 3, 5, 21
		June 17
		July 2, 25
		August 1, 6
		September 3, 12, 28
		October 2

Single individuals were sighted in Red Cedar Woodlot on three occasions. The first sighting, on August 4, was of an immature individual possibly hunting at the northeast end of the pond. The second and third sightings were of adults, one of which flew into the area of the pond and could not be located later; the other flew in from the west and perched in a tree at the east end of the pond.. It is possible that the presence of these birds may have been in response to the construction of a section of Interstate 496 through a sizable area of swampy woodland for several miles west of the lot.

The great blue heron is a breeding bird in the swampy and marshy areas near the Floodings. The first birds were seen in the vicinity of the lot on March 27, 28, with three feeding along the shores of the east pond on the latter date. The first immature individual was sighted on August 1. Later immature birds were seen on August 6 and September 3. In general, the birds were observed along the shores of the ponds among the cattails, and also standing in the many dead trees which lie next to the east side of the lot and to the south. No nesting sites could be

located from the shores of the lot.

Great blue herons were never observed together but were always well separated. The only interaction noted between great blues and other birds occurred on May 5 when a low flying individual was chased by two redwings.

These great birds were extremely wary in both localities and took flight readily. It would appear from this behavior that nesting success might easily be jeopardized through interference by man's activities.

Green Heron - Butorides virescens

Red Cedar	Toumey	Floodings
April 30	No record	May 21, 22
		June 4, 17
		July 2, 17
		August 1, 6
		September 3, 12, 19, 28

The only green heron observed in Red Cedar Woodlot was seen on April 30. It flew in from the river and landed on a horizontal limb of a large maple tree at the east end of the pond. It perched on the limb 10 feet from the ground and close to the trunk.

Green herons were common summer residents at the Floodings. They were seen feeding along the marshy shores both in dense vegetation and in exposed areas. From May through July, no more than two herons were seen per visit, often perched from 20-35 feet high in dead trees along the shore.

More birds were seen during August and September with a maximum of 10 on August 6. They often were observed roosting 9-15 feet up in leaved-out red maples along the north end of the lot.

When present in a group, there were often encounters between individuals; one would chase another through the branches of a tree. Often these encounters terminated only when one bird would take flight to another tree.

When surprised while perched, the green herons would either "freeze" or they would take flight, calling loudly until they reached another perch. Their calls often served to warn other birds, which would become alerted or would take flight.

American Bittern - Botaurus lentiginosus

Red Cedar	Toumey	Floodings
No record	No record	May 22

An American bittern was heard calling along the east shore of the east pond at the Floodings on May 22.

ANSERIFORMES

ANATIDAE

Mallard - Anas platyrhynchos

Red Cedar	Toumey	Floodings
March 14, 18, 26	No record	March 22, 27
April 5, 30		April 7, 12
May 1, 15		May 3, 5
June 11		June 4
		July 2
		August 1
		September 3, 12, 19, 28
		October 2, 11, 16
		November 10

Mallards were spring residents in Red Cedar Woodlot, but were not seen after the middle of June. Semi-domestic mallards are year-round residents on the Red Cedar River, due to feeding of these ducks on the MSU campus. This may account for the 9 individuals (4♂♂ and 5♀♀) seen on March 14 (see Pied-billed Grebe). Mallards were seen singly or in pairs in the pond during the months of March through June.

On May 1, one female was seen swimming downstream on the river trailed by 15 young. They appeared to be several days old and may have been hatched from a nest along the banks of the river. Young were not later seen.

The first mallards were seen at the Floodings on March 14 with 2 ♂♂ and a ♀ seen in the company of 18 ring-necked ducks, 12 buffleheads, 2 black ducks, 2 hooded mergansers, and 4 baldpates. Mallards were residents of the areas south of the woodlot for 9 months. In general they were confined to the regions of downed timber and were seldom seen in open water.

During the summer months all mallards were females or males in eclipse plumage. Males were seen only on March 22, 27;

April 7; May 5; June 4; September 28; and October 11, 16. No young were seen at any time during the year, although it is presumed that the swampy areas south of the lot may have produced some broods of mallards. The mallard was the most common duck in the area during 1968; although there were times during migration when they were outnumbered by other species.

The presence of hunters in October led to a drastic reduction in the number of sightings, and an increased wariness of the remaining individuals.

Black Duck - Anas rubripes

Red Cedar	Toumey	Floodings
March 14	No record	March 22 April 12 September 3, 12, 19, 28

A single drake was seen on March 14 in the company of a female mallard. This pair was part of a larger group of 8 mallards, 1 female gadwall, and 1 pied-billed grebe, which was swimming along a portion of the Red Cedar River.

On March 22, a pair of black ducks was seen on the west pond at the Floodings (see Mallard). A pair was also seen flying west from the southwest point.

The blacks seen in September consisted of single individuals except for four, observed feeding 75 yards off the south shore on September 28. The single individual seen on September 13 was in company with 10 mallards, one scaup, and two pied-billed

grebes. All 14 were in the area of a number of prostrate logs, on which they were resting, and around which they were feeding.

Gadwall - Anas strepera

Red Cedar	Toumey	Floodings
March 14	No record	No record

The lone gadwall sighted during 1968 was seen on the Red Cedar River on March 14 (see Pied-billed Grebe). Zimmerman and Van Tyne (1959) describe the gadwall as an uncommon transient and its scarcity at the Red Cedar Woodlot plus its absence at the Floodings agrees with this determination.

Blue-winged Teal - Anas discors

Red Cedar	Toumey	Floodings
No record	No record	May 3, 5 August 1 September 3, 12, 19, 28 October 2, 11

Although the blue-winged teal is recorded as a nesting bird in the East Lansing area (Van Tyne, 1938), no nesting blue-wings were recorded for the area immediately adjacent to the Floodings in 1968, although they have nested previously (Wallace, 1969). The blue-winged teals were characteristically late in arriving (Barrows, 1912), and when first seen, they were exhibiting epigamic behavior. On May 3, two males and one female were seen at the north end of the east pond in an area of rapid encroachment by cattails and other marsh plants. One male chased the other until both took flight, whereupon the aggressive male returned.

A previously hidden female swam slowly to him after about 45 seconds during which time a number of low calls were emitted. On May 5, a single male was seen on the west pond.

During the late summer and fall, blue-winged teals were seen in the areas south of the woodlot, often in the company of mallards, and on one occasion (August 1) a scaup. The ducks were either feeding near logs or lily pads, or they were resting on the many logs. The only sizable number of blue-wings was seen October 2 when 20 individuals were seen in three groups of 12, 2, and 8. The group of two was in association with two baldpates and two coots.

American Widgeon- Mareca americana

Red Cedar	Toumey	Floodings
No record	No record	March 22
		April 7
		September 28
		October 2

The American widgeon or baldpate was present at the Floodings as a spring and fall migrant. Four males were seen on March 22 (see Mallard); and a single male was sighted flying from the west pond on April 7.

A lone male was seen swimming in the middle of the west pond on September 28. The only females observed were two swimming along the east shore of the east pond. They took flight at my approach and circled for five minutes before landing again.

Wood Duck - Aix sponsa

Red Cedar	Toumey	Floodings
April 14	May 8, 18	April 12
		May 3
		June 4, 17
		August 6
		September 12, 19, 28

The only wood ducks in Red Cedar were a pair seen on April 14, which were on the ground in the middle of the lot near the vernal pond. They took flight, heading north and east.

On May 8, a pair of wood ducks was seen flying from north to south in Toumey Woodlot. The birds were seen investigating a hole in a large maple, approximately 40 feet in the air and 70 yards from the small pond up the west hill. Ten days later, a pair was seen swimming on the pond. The male followed the female, giving a series of head bobs, which the female repeated. The male grabbed the female twice by the neck and the back. Subsequent examinations of the tree and observations of the pond did not reveal any further signs of nesting. It was assumed that they did not nest in the woodlot. Although there are numerous hollow trees, the pond may have not been large enough to accomodate the female and her young safely.

Nest boxes have been erected at the Floodings, and whether they were used or not, at least one brood of wood ducks was produced at the Floodings. On June 4, a female with eight young was seen swimming leisurely along the east side of the lot. On August 6, three wood ducks, a female and possibly two

young, were observed resting on two exposed logs along the east side of the lot. They took flight after the excited calls of a fleeing great blue heron.

In September adult and young wood ducks were seen in the waters surrounding the lot in the company of mallards, and blue-winged teals. There were approximately 10 wood ducks at the Floodings during September.

Ring-necked Duck - Aythya collaris

Red Cedar	Toumey	Floodings
No record	No record	March 22 April 7, 12 May 3, 5 June 4

Prior to 1925 the ring-necked duck was not known to nest in Michigan. The breeding range was from Minnesota and Wisconsin north and west through the prairies, as well as in scattered areas in the west (Mendall, 1958). Barrows (1912) notes that the migration was most common between March 20 and April 10 in the spring and in September and October in the fall. In recent years, the ring-neck has substantially expanded its breeding range eastward until it now breeds in Michigan, Ontario, New York, and as far east as Nova Scotia. Zimmerman and Van Tyne (1959) list breeding records of this species from Dickinson, Alger, Roscommon, Schoolcraft, Mackinac, Chippewa, and Kalkaska Counties.

The ring-neck was a breeding bird of the wet areas surrounding the Floodings. The large group of 18 ring-necks

(10 ♂♂ and 8 ♀♀) had dispersed by May 3 until only a single pair was present. On June 4, a female with 7 young was seen swimming in dense cover off the southwest point. This was the last record of ring-necks in the area for 1968. Since the normal incubation is 26-27 days (Mendall, 1958) and the young were probably 2-3 days old when observed, it would appear that incubation was initiated on or about May 7. Mendall (1958) notes that although egg laying is recorded from as early as May 1, it usually does not start before the second week in May. If one assumes one egg layed per day, egg laying in the pair at the Floodings may have begun on May 1 or before if more than 8 eggs were layed.

Lesser Scaup - Aythya affinis

Red Cedar	Toumey	Floodings
No record	No record	May 3 August 1 September 3, 28

The lesser scaup was a spring migrant at the Floodings with three males sighted on the west pond on May 3. Later in August, a female was observed swimming on the south pond in the company of a female blue-winged teal, and near a larger group of mallards and blue-wings. A single female was seen on September 3 in the company of 10 mallards, a black, and 2 pied-billed grebes. Larger numbers were seen September 28 when a raft of 12 was seen in the cattails and downed trees south of the lot.

Bufflehead - Bucephala albeola

Red Cedar	Toumey	Floodings
No record	No record	March 22

The bufflehead was a spring migrant in the area of the Floodings, occurring on March 22 when 6 pairs of buffleheads were seen in the company of 6 other species of ducks (see Mallard).

Hooded Merganser - Lophodytes cucullatus

Red Cedar	Toumey	Floodings
No record	No record	March 22
		April 7
		May 5

Although the hooded merganser was a spring migrant at the Floodings, there is a question of whether it may also be a nesting bird in some years. Although Barrows (1912) restricts the breeding areas to wooded streams, Pough (1951) suggests that this species will nest in hollow trees associated with both running and still waters. If wood ducks can find suitable nesting cavities at the Floodings, possibly hooded mergansers may also.

One pair of mergansers was seen on March 22 in a larger group of six species (see Mallard). On April 7, a group of two males and three females was observed south of the lot sitting on exposed logs and quietly swimming. A larger group of six or more females was observed in the same area on May 5.

FALCONIFORMES

ACCIPITRIDAE

Sharp-shinned Hawk - Accipiter striatus

Red Cedar	Toumey	Floodings
No record	No record	September 19, 28

A single sharp-shinned hawk was observed on September 19 flying across the water south of the lot at a height of from 5-10 feet. It was being pursued by a crow which was giving the "mobbing" call, typically heard when crows are attacking a great horned owl.

On September 28 an immature individual was seen perched about 20 feet high on a limb of a large dead tree, south of the woodlot. On four separate occasions this bird stooped at a kingfisher perched in an adjacent tree. Each time the kingfisher eluded the hawk by flying close to the water's surface. After the fourth "attack" both birds flew to the west. Later the hawk was observed sitting in the original tree with its wings and tail spread in the sun. It appeared that these "attacks" may have been done more in play than in earnest, as most were what might be described as leisurely in nature. The fact that this was a young bird also gives credence to the thought that the hawk was sharpening its flying skills at the expense of the harassed, but unhurt kingfisher.

Cooper's Hawk - Accipiter cooperii

Red Cedar	Toumey	Floodings
No record	December 7	March 22

On March 22, a single individual was seen flying over the fields to the west of the Floodings.

A single adult Cooper's hawk was observed on December 7 perched in a tree at the corner of the road west of Toumey Woodlot. After approximately 10 minutes it flew to the conifers at the west end of the lot and landed in the pines. It returned to the original roosting tree 5 minutes later.

Red-tailed Hawk - Buteo jamaicensis

Red Cedar	Toumey	Floodings
March 26	January 11	January 23
May 31	July 30	June 17
August 4	December 7	July 25
		September 28

Lone red-tails were observed in Red Cedar Woodlot on three occasions in 1968. The March 26 record was of an individual circling in a clock-wise direction at a height of 50 feet in a 30 yard circle. On May 31 four grackles were seen chasing an adult red-tail. The August sighting involved a bird perched 35 feet up in a tree along the south road. The bird flew at my approach towards the northeast end of the lot. Later it was seen perched in another tree close to a group of playing children, whose shouts did not appear to frighten the bird.

The January and July red-tails at the Toumey Woodlot were seen flying over the lot. The December sighting involved a

red-tail working with a large group of crows in mobbing a great horned owl. As the owl was fleeing from the crows, the hawk took one swipe at it. After following it for approximately 75 yards, the hawk flew to the north and left the owl to the crows. Weigand (1967) has a recent account of the attack of a ferruginous hawk (Buteo vegalis) on a great horned owl which might indicate that such attacks by buteos are not uncommon. Red-tails have been recorded as nesting in Toumey Woodlot (Wallace, 1969).

At the Floodings, red-tailed hawks were seen perched on stumps at the edge of the lot in January and June. The January bird was the only species sighted in the lot on that date. In both cases the birds took flight when I approached.

The July and September records involved hearing red-tails calling.

Broad-winged Hawk - Buteo playtpterus

Red Cedar	Toumey	Floodings
No record	No record	September 28

One individual was seen circling in a counter-clockwise direction over the north section of the Floodings at a height of 150-200 feet on September 28. It flew rapidly to the west when a group of four crows began to fly in its direction.

Bald Eagle - Haliaeetus leucocephalus

Red Cedar	Toumey	Floodings
No record	No record	June 4

A single immature bald eagle was observed at the Floodings on June 4. At 8:50 A.M. the bird appeared to the north of the east pond and was flying in a southerly direction. It was being mobbed by 12-15 redwings and grackles. The bird continued south at a height of 18 feet until it reached the water's edge, at which time it descended to just above the surface and flew slowly looking from side to side. After approximately 75 yards, it lowered its legs and snagged a 6-8 inch bullhead. The eagle took the fish to a horizontal limb of a dead tree 50 yards off the east shore and consumed it in 7 minutes. When finished, the bird took flight and headed leisurely towards the south and was not seen again.

The bald eagle, which was originally widely distributed over the state, was severely reduced in numbers by the early 1900's (Barrows, 1912). Inroads on the population by poachers, and more recently by the effects of pesticides have reduced the numbers to a point where each sighting is noteworthy. Although the bird is not rare in southern Michigan, this observation is worthy of mention as it is quite far south of the nesting areas in the northern Lower Peninsula.

GALLIFORMES

PHASIANIDAE

Bobwhite - *Colinus virginianus*

Red Cedar	Toumey	Floodings
No record	June 6	August 1
	September 17	

On June 6, a single bird was heard calling in the field south of Toumey Woodlot. The September 17 bird was calling at the northwest end near the pines.

At the Floodings, the only bobwhite was observed in the corn patch at the northwest end of the lot.

Ring-necked Pheasant - Phasianus colchicus

Red Cedar	Toumey	Floodings
January 21	January 4, 11, 21	January 25
February 18, 27	February 2, 13, 20	March 5, 11, 22
March 7, 14, 18, 26	March 10, 16	October 2, 11, 16
April 5, 14, 23, 26, 30	April 10	November 25
May 1, 8, 15, 19, 25, 31	May 29	December 8, 11
June 1, 7, 11, 23	December 11	
July 7, 26		
August 4		
September 25		
October 8, 13, 20		
November 23		
December 9		

Ring-necked pheasant or evidences of their presence were found in Red Cedar Woodlot in all twelve months of 1968. During the first three months of the year, tracks were noted in all sections of the lot, including along both trails, the heavy timber at the east end, and the more open woods at the west end bordering on the fields. One male and seven females were observed along the south trail on February 18. This group probably represented most of the pheasants in the lot during the winter months.

During the spring months of April, May, and June, fewer

birds were seen; however, it appeared from the number of males heard calling that there had been an influx of two or three males. Three and possibly four were heard calling on May 1. It appeared that the males were located near the four corners of the lot. On June 23, seven young were flushed from the grass along the fence at the west end of the lot. During the second three months males were seen on several occasions; however, vocal identification was used in most cases. Tracks were seen in the mud along the trails, and it appeared that the birds often travelled these pathways.

Observations during the last six months of the year were less frequent. A dust bath area was found along the bank of the river at the edge of the open area on the east end of the north trail. Birds were more frequently seen or heard at the west end of the lot. In December there appeared to be a great deal of activity in the grassy region under the power lines, as evidenced by tracks and droppings.

In Toumey, the ring-necked pheasant was confined mostly to the regions of the conifers at the east and west end of the lot. No birds were heard or observed in the interior portions. Three males were in residence at the west end of the lot during the winter months. They were frequently seen feeding in the fields north and west of the lot, and upon being frightened would seek refuge in the dense spruces and pines along the western border. Only one female was observed at the west end. One male and at

least three females wintered in the conifers at the east end. The females often were flushed from the branches of spruces where they had been roosting. All were below 10 feet. Forms were also discovered under the trees, and on one occasion a pheasant was flushed from one of these depressions. Birds were observed flying into the lot from fields at the east end of the lot. A dead female was found on March 10. Pheasants were neither seen nor heard during the summer and fall months.

The only pheasant found at the Floodings during the winter months was a dead female on the ice 15 feet from the east shore. All that remained of the bird were several long bones, the sternum, and numerous feathers. Bird droppings were found near the body.

In March a male was heard calling along the north border of the lot on March 5, and on March 11 and 22 and a male and four females were seen in the corn field northwest of the lot. All other sightings took place in the corn area with probably no more than one male involved.

It would appear that in those woodlots with no openings in the interior, the Floodings and Toumey, that pheasants avoid the central portions of those lots. Instead their activities are confined to the peripheral areas, particularly the conifer areas in the case of Toumey. The large open areas interspersing the woods at Red Cedar seem to attract pheasants with the birds more prone to travel in the interior regions of Red Cedar than in the other two lots.

GRUIFORMES

GRUIDAE

Sandhill Crane - Grus canadensis

Red Cedar	Toumey	Floodings
No record	No record	March 28

Two were seen at the Floodings on March 28. When first sighted from Woodbury Road, they were flying in a southwesterly direction towards the Rose Lake Station on Stoll Road, where they frequent the nearby marshes. Approximately 10 minutes later, at 6:35 A.M., two sandhills, probably the same birds, were observed wading in the cattails at the northwest end of the lot. At my approach they took flight and flew at 40 feet in a westerly direction uttering a series of "cuk-cuk-cuk" calls.

From checking with the staff at the Rose Lake Station, it appears that this was the first sighting in the Ingham-Shiawassee County area in 1968. The usual date of arrival is March 15-30.

RALLIDAE

Virginia Rail - Rallus limicola

Red Cedar	Toumey	Floodings
No record	No record	May 3

A single Virginia rail was flushed from the cattails along the west side of the lot. It flew for about 6 feet and then disappeared in the heavy vegetation. Although it was not seen again, Barrows (1912) notes that the species probably nest

wherever found. Wallace (1969) found a Virginia rail nest with 11 eggs at the Floodings on May 24, 1961.

Sora Rail - Porzana carolina

Red Cedar	Toumey	Floodings
No record	July 7	May 3, 21, 22 September 12

The sora recorded from Toumey Woodlot was heard calling in the grassy area at the southeast portion of the lot. The severe rains of late June had flooded this field to a depth of several feet with standing water present in all low-lying areas. This bird was apparently a visitor taking advantage of the fortuitous increas in swampy conditions.

Soras were frequently heard calling in the marsh vegetation west of the lot at the Floodings during May, although none were seen. On September 12, a bird was observed moving in the cattails on the far side of the south channel. This species was probably a summer resident at the Floodings with the lack of sightings due to its secretive habits and the fact that the marshy areas were not explored beyond what could be seen from the shore.

Common Gallinule - Gallinula chloropus

Red Cedar	Toumey	Floodings
No record	No record	May 3, 21 September 19, 28 October 2

The common gallinule, along with the sora, coot, and Virginia rail, is a summer resident at the Floodings whose lack of mid-summer sightings was due to the species' secretive habits.

Gallinules were generally confined to the marshy edges of the ponds where they were observed feeding. On one occasion, September 19, several were feeding around the edges of some exposed logs in close proximity to 8 mallards with others feeding 30-40 yards from shore and shelter.

Coot - Fulica americana

Red Cedar	Toumey	Floodings
No record	No record	April 7
		May 22
		June 17
		July 2, 16, 25
		September 12, 19, 28
		October 2, 11, 16

Coots were seen and heard at the Floodings during the late spring, summer, and early fall. Activity was generally confined to dense vegetation at the edges of the ponds. Only on September 19 was an individual seen far from shore, and it was approximately 75 yards from the edge of the vegetation. Coots were seen in the company of blue-winged teals (October 2) and mallards (October 16).

CHARADRIIFORMES

CHARADRIIDAE

Killdeer - Charadrius vociferous

Red Cedar	Toumey	Floodings
April 26	October 15	March 27
July 4		June 17
August 4		October 2, 11

The killdeer, as expected, was associated with the open areas at the west end of Red Cedar Woodlot, and the pond. On April 26 and July 4, single individuals were seen in the field at the west end. One was observed on August 4 flying over the east end of the pond. The killdeer was thus an infrequent visitor to the lot.

The only killdeer observed at Toumey Woodlot was a pair seen flying south to north over the lot on October 15.

All sightings at the Floodings were of birds which were flying over the lot.

In all three lots, it appears that the killdeer is associated with peripheral areas and not with the woods.

SCOLOPACIDAE

American Woodcock - Philohela minor

Red Cedar	Toumey	Floodings
June 11	No record	September 19

Both records of woodcocks were of individuals flushed from grassy areas within 30 yards of water. The Red Cedar individual was in dense grass 20 yards south of the pond just west of the power line.in a depression that is usually moist during much of the year.

The woodcock at the Floodings was flushed from an area of grass and ferns at the southwest corner of the lot, about 30 yards from the west pond. This is an elevated area and rather sandy. The bird flew into the interior of the lot.

Common Snipe - Capella gallinago

Red Cedar	Toumey	Floodings
No record	No record	April 12

A single individual was flushed from the grass at the southwest tip of the lot and flew to the west side of the west pond.

Spotted Sandpiper- Actitis macularia

Red Cedar	Toumey	Floodings
May 1, 15	No record	August 1

Single individuals were observed in Red Cedar on two dates in May. Both were perched near the water, one on a culvert in the north trail and the other on a branch over the stream.

At the Floodings, a single sandpiper was observed on August 1 feeding near several pied-billed grebes on logs off the south point.

COLUMBIFORMES

COLUMBIDAE

Mourning Dove - Zenaidura macroura

Red Cedar	Toumey	Floodings
February 18	January 11, 16	March 17
March 26	February 2, 13, 20	April 7
April 5	March 10, 16, 21	May 3, 21, 22
May 19, 25	April 2, 10, 19, 21, 28	June 4, 17
July 26	May 18	July 16, 25
August 4, 23	June 21	August 1, 6
September 7	July 7	September 3, 19
October 13, 20	August 7	October 2
	September 15	
	October 12, 23	
	November 14, 22	

Mourning doves were seen in small numbers in Red Cedar Woodlot. No more than four were observed in the woodlot on any one day, although as many as six were seen flying through. Most activity was noted at the west end. One bird was seen feeding in October in the area of the tree burnings along the south trail. Birds were absent from the heavy timber sections at the east end of the lot.

Large numbers of mourning doves were observed in Toumey Woodlot during the winter months, especially in the conifer plantings at the east and west ends of the lot. Between 12 and 18 birds spent portions of the winter months in Toumey. Concentrations of more than ten birds were seen on January 12 (12 individuals), February 13 (15 in groups of seven and eight), February 20 (12-25 individuals), and March 16 (15 individuals). The number of doves decreased in late March to four individuals, which were still confined mostly to the conifers.

On May 18, a bird was flushed from the spruces at the east end. A nest containing two eggs was located on a horizontal branch three feet off the ground. The nest was constructed of loosely intertwined sticks.

The birds were vocal during the spring and summer. Feeding was observed in the roads around the periphery of the lot. When perched in hardwoods the birds tended to be in the outer branches in the crowns of the trees.

Mourning doves were observed at the Floodings; however,

they were more common in the fields surrounding the lot, particularly in the corn field. They were in young trees on the west and north sides on March 17 and May 22 and in larger trees at heights of 25-35 feet on May 22 and July 25. It appeared that four individuals were involved. As in Toumey, the conifers near the lot were used as roosting sites. At least at the Floodings, it would appear that the presence of this species in the areas surrounding the Floodings is influenced by the activity of man. Much of the feeding and roosting occurred in plantings made by the Rose Lake biologists. It is questionable whether this species would have been as numerous had the corn and conifers not been present.

Rock Dove - Columba livia

Red Cedar	Toumey	Floodings
July 29	October 1, 10, 23	No record

The rock dove or pigeon was associated with Red Cedar and Toumey in only an indirect manner. Although birds were seen feeding and roosting in fields and buildings within a half mile of the woodlots, on only four occasions did the birds reach their boundaries. At these times birds were seen flying over the lots. Pigeons never landed in the woodlots during any of the observations.

CUCULIFORMES

CUCULIDAE

Yellow-billed Cuckoo - Coccyzus americanus

Red Cedar	Toumey	Floodings
May 19, 25 June 1, 11, 23 July 4	June 18	No record

A pair of yellow-billed cuckoos was observed 35-40 feet up in trees along the south trail near the power lines on May 19. They were flying from tree to tree and calling. A possible second pair was observed at the same height near the river on the same day. The sighting on May 25 involved a pair calling back and forth across the pond near the power line. Single individuals were sighted in each case in June, all approximately 40 feet high in trees along the north trail and the north side of the pond.

On June 18, a single individual was observed in the bushy area at the east end of Toumey Woodlot, at a height of approximately 10-15 feet.

Black-billed Cuckoo - Coccyzus erythropthalmus

Red Cedar	Toumey	Floodings
No record	May 29	No record

A single black-billed cuckoo was heard calling near the southwest end of the lot on May 29.

STRIGIFORMES

STRIGIDAE

Great Horned Owl - *Bubo virginianus*

Red Cedar	Toumey	Floodings
July 26	January 9	July 16
	May 8	
	November 14, 22, 27	
	December 7	

The great horned owl was the only owl seen in any woodlot during 1968. It occurred in Red Cedar on July 26, when a single bird was perched by the power line. At the Floodings on July 16, a single individual was observed perching in a dead tree in the middle of the east pond. This species was thus a rare visitor to these lots.

Great horned owls were observed in Toumey Woodlot on six occasions and involved at least four individuals. On January 9, two owls were seen chasing each other through the tops of the trees at heights of 35-60 feet. One bird was approximately 20 percent larger than the other. Their flights were confined to the periphery of the lot. They generally perched several feet apart on separate branches, although at one time they perched next to each other for five minutes. The chasing continued for at least an hour and a half. It was thought that the birds might be intending to nest in Toumey; however, owls were not observed again until May 8. Then a single bird, being harassed by three crows, finally sought refuge in the conifers at the west end. This

protection was sufficient enough that the crows soon ceased calling and left.

On November 14 the calls of two crows attracted my attention to an owl perched on a pole in a field several hundred yards to the west of the lot. The typical "owl alarm" call soon attracted four other crows. They perched in nearby trees until the owl dropped to the ground, whereupon all six crows hovered over the owl at a height of 20-25 feet and alternately swooped to within three to four feet of the ground. Upon my approach, the owl took flight to the west.

On the same day, two other owls were flushed from their roosting site on the ridge west and south of the pond. Droppings were scattered around the base of the tree; however, no pellets were found. Feathers littered the ground both under the tree and around the east end of the lot. Two owl pellets, as well as droppings, were found under a large oak tree on the west shore of the pond. Crows later returned to the lot and harassed the two owls. Fresh droppings were found on November 22 and a single bird was seen in a large maple at the west end. All birds were seen high in the trees, never lower than 30 feet.

On December 7, a single owl was being mobbed by a large group of crows. A second large bird in the same tree, which originally appeared to be a second owl, was a red-tailed hawk. When the owl finally took flight, the red-tailed hawk pursued it and attempted to intercept it in flight. The owl eluded the hawk.

While harried by the crows, the owl perched in numerous trees, always close to the trunk. It would wait until the crows were on the opposite side of the trunk before taking flight in the direction away from the crows in an attempt to escape.

The great horned owl appears to spend a significant portion of its time in Toumey Woodlot, roosting, feeding, and escaping from the attacks of crows. It did not nest in the lot during 1968, although it has in other years (Wallace, 1969).

APODIFORMES

APODIDAE

Chimney Swift - Chaetura pelagica

Red Cedar	Toumey	Floodings
July 29	No record	May 3
September 25		September 12

Single chimney swifts were observed flying over Red Cedar Woodlot at heights of 50-60 feet on July 29 and September 25. In both cases, neither individual appeared to be hunting. The time was between 7:30 and 9:30 A.M. in each case.

A non-feeding individual was observed flying over the lot at the Floodings on May 3. At the same time tree and barn swallows were feeding over the surface of the water. A severe thunderstorm struck at 9:00 A.M. shortly after the swift was observed flying east. Possibly weather conditions had influenced its flight. On September 12, several chimney swifts, as well as barn swallows, were observed feeding over the surface of the pond south of the lot.

TROCHILIDAE

Ruby-throated Hummingbird - Archilochus colubris

Red Cedar	Toumey	Floodings
May 31	No record	June 17
June 1		

On May 31 a female was observed in the morning feeding on the phlox along the south side of the south trail. She was moving rapidly from blossom to blossom, staying a shorter time at a blossom each time she re-visited it. She worked for several minutes at one group of flowers, staying at a height of three to five feet before flying northeast into the area of larger trees. On the next day a female was seen flying about the branches of a silver maple at a height of 40 feet. It also flew in the dead elms along the east side of the pond.

A female hummingbird was seen flying in the conifers north of the lot on June 17.

CORACIIFORMES

ALCEDINIDAE

Belted Kingfisher - Megaceryle alcyon

Red Cedar	Toumey	Floodings
April 26, 30	No record	April 7, 12
May 1		May 3, 21, 22
July 26		June 17
August 4		July 25
September 13		August 1, 6
		September 3, 12, 19, 28
		October 16

Only single individuals were seen on each day that kingfishers were recorded in Red Cedar Woodlot. In all cases the birds were confined to the regions close to the river or the pond, over which they flew. Kingfishers were never observed perching in the lot during 1968.

The kingfisher was a conspicuous element of the avifauna of the Floodings during seven months of 1968. Much of the activity of these birds, of which there were at least three individuals, was centered around the area of dead timber offshore. The birds were most often observed perching in the limbs of the dead trees, generally from 10-40 feet up, as well as flying back and forth across the waters south and east of the lot. Most birds were observed within 100 yards of the lot.

Intraspecific interactions were observed on August 1 when for 20 minutes a single male chased a single female from tree to tree on the east side. Each flight lasted 20-30 seconds and was accompanied by loud chattering both in flight and while perched. After twenty minutes a third bird, a female, arrived.

An interspecific interaction was noted on September 28 when a young sharp-shinned hawk made three harassing passes at a kingfisher (see Sharp-shinned Hawk). The kingfisher was later seen after the hawk had left the vicinity. On August 6, no interaction occurred when a kingfisher and a red-headed woodpecker were perched within several feet of each other in the same dead tree.

Fishing activity was noted only once, on September 3.

The bird was perched in a dead tree and plunged into the water, capturing a small fish. This was swallowed upon returning to the perch.

PICIFORMES

PICIDAE

Yellow-shafted Flicker - Colaptes auratus

Red Cedar	Toumey	Floodings
April 14, 23, 26, 30	January 21	March 17
May 1, 15, 19, 25, 31	March 10	April 7, 12
June 7, 23	April 2, 10, 19, 28	May 5, 21
July 4, 7, 26, 29	May 18	June 17
August 4, 23	June 6, 18	July 2, 9, 25
September 7, 13, 22, 25	July 7, 19	August 6
October 8, 13, 20	August 2	September 12, 19
	September 6, 26	October 2, 16
	October 15	

The yellow-shafted flicker was the most common woodpecker in Red Cedar Woodlot. It was seen in all portion of the woodlot and from the ground to heights of 40-50 feet mostly in dead trees. In April at least six flickers were present in Red Cedar. They were noisy with frequent calls and numerous cases of birds posturing with flashing tail feathers. On May 1 one individual was observed excavating a hole in a dead tree at a height of 15-18 feet, sticking its entire body down into the cavity and withdrawing with wood chips in its bill. From May 1 to June 7 only one or two individuals were seen on each visit; at least four were present on June 23. Two or three were seen during July, and on August 4 two adults and a young were observed in the trees along the south trail. The young was following the adults through the

trees. Food gathered by the adults was bashed on a tree limb several times before it was offered to the begging young. An increase in numbers was noted in September with as many as eight seen per visit. Flickers were observed feeding on poison ivy berries on several occasions. Feeding was also observed on the ground, although this was less frequent than feeding in trees. The only major interspecific interaction in Red Cedar involved an attack of a Swainson's thrush upon a flicker in October (see Swainson's Thrush).

Flickers were less common in Toumey, although they were as conspicuous when present. Their loud calls were often a clue to their presence. The January record involved a single bird which was perched in the large maple tree at the southwest corner. The flickers were most common in April when upwards of ten individuals were present. They were present in all parts of the lot, but frequented the eastern end more than the western part. On April 10 three were seen along the south side working in dying trees and investigating holes. Ground feeding activity was observed on April 19 along the east side of the conifers. This lasted for 10 minutes. Ground feeding was also observed on July 9 with one flicker feeding at the edge of Hagadorn Road. During the remainder of the year from two to four flickers were seen on each visit with the last recorded vocalization on September 26.

Flickers were summer residents in the area of the Floodings. The first individuals seen on March 17 were investigating holes

in several trees 40 yards south of the lot. During April pairs of flickers were seen off the south tip and in the northwest end. No more than two birds were seen on any visit. Feeding . . activities and the investigation of tree holes continued through June with most activity south of the lot. Most birds were seen at heights of 20-35 feet. On July 9 a pair was seen along the east shore at a height of 12 feet. After standing underneath the bird for several minutes it suddenly dropped from its perch until it was within two feet of my head, at which time I ducked and the bird flew into the interior of the woodlot.

Ground feeding was observed only on August 6 at the north edge of the woodlot. The only observed interspecific interaction occurred on October 16 when a single flicker flew south from the woodlot into the dead timber and attempted to land in a tree occupied by three male redwings. One of the redwings flew at the flicker and chased it back into the woodlot.

Red-bellied Woodpecker - Centurus carolinus

Red Cedar	Toumey	Floodings
January 21	No record.	February 22 March 11, 17 May 5 October 11, 16, 24

A single male red-bellied woodpecker was seen on January 21 in Red Cedar Woodlot. When first observed the bird was feeding at the east end of the south trail in medium-sized trees and uttering series of "chur" notes. It was 18 feet up in a broken

off tree and was probing in and under the bark, rather than hammering.

At the Floodings, red-bellied woodpeckers were observed in the trees off the south and east shore on February 22 (a male) and March 17. On May 5 a single bird was working 40 feet up in the oaks in the southern section of the lot, flying from tree to tree in an area 40 yards in diameter. On March 11, one red-bellied woodpecker was observed chasing a male hairy woodpecker until the latter flew to another tree. The red-bellied then began to feed by probing in the bark. At the same time a second bird called across the east pond.

October sightings involved single birds in trees at the southeast corner and south of the lot.

Red-headed Woodpecker - Melanerpes erythrocephalus

Red Cedar	Toumey	Floodings
May 8, 15, 31	May 18	May 21
June 7, 23		June 17
July 4, 7, 26, 29		July 2, 9, 16
August 2, 12, 23		August 1, 6
September 7		September 12

Although only one individual was observed on May 8, it was evident on May 15 that a pair of red-headed woodpeckers was in residence in Red Cedar Woodlot. In the months of May and June this pair confined its activities primarily to the east end of the lot and along the south trail. They were very vocal.

On July 29 a single bird was observed 30 feet up in trees at the northeast end of the lot, where it was joined by two

other individuals, an adult and a fledgling. Upon the arrival of the two birds, one of the adults began chasing a white-breasted nuthatch and pursued it through six or seven trees. The woodpeckers began working in both densely and thinly foliated trees. At one point the young and one adult screamed at each other from different trees, 15 feet apart before they chased each other about the woodlot. The calling continued throughout 35 minutes of observation. Chasing between adult and young also was observed on September 7.

On August 4 and adult was observed feeding in the live branches of a red maple. After flying into the maple from a dead tree, it began to glean food from the leaves. In most cases, red-headed woodpeckers were seen at heights of from 25-40 feet, mostly in dead trees. On only two occasions were individuals seen on the ground (July 26 and August 12).

The three individuals observed during 1968 were felt to represent a mated pair with one successfully fledged young. With the largest number of records occurring in Red Cedar and the Floodings, it appears that large numbers of standing dead trees may be attractive to this species of woodpecker.

The lone sighting at Toumey Woodlot involved a single individual which flew from the south into the southwest end of the lot. It did not appear to feed, nor did it make any call.

At the Floodings red-headed woodpeckers were confined entirely to the dead trees off the shore of the woodlot, except

for two individuals seen in the west field on July 9 and July 16. Only adults were observed. The birds were observed working trees from heights of 2-25 feet. In general these trees were smaller than those in Red Cedar.

On July 9 two birds were feeding on bark insects in a tree which was also being used as a nest tree for a pair of tree swallows. The parent swallows continually swooped at the woodpeckers, apparently in an attempt to drive the larger birds away from the nest-hole opening. On August 6 one bird was observed working in the same tree as a perching kingfisher. There was no overt aggressive behavior by either species. It is possible that the two birds at the Floodings were either of the same sex or had been unsuccessful at nesting.

Yellow-bellied Sapsucker - Sphyrapicus varius

Red Cedar	Toumey	Floodings
April 14 May 1	No record	No record

On April 14 a single individual was observed at a height of 35-40 feet in a dead tree in Red Cedar Woodlot. It later flew to a partially leafed black cherry and then returned to the dead tree.before moving to the upper branches of a red maple. The May 1 record was of a single individual in the crown of a 30 foot tree. Zimmerman and Van Tyne (1959) describe this species as a summer resident in the northern Michigan area, occurring rarely south as far as Ingham County during the summer. They also suggest that the breeding range of this bird is gradually

shrinking northward as it was formerly a nesting bird south to the Detroit region prior to 1900.

Hairy Woodpecker - Dendrocopos villosus

Red Cedar	Toumey	Floodings
January 2, 7, 14, 21	January 9, 21	March 11
February 8	February 3, 13, 20	May 5
March 14	April 10	
April 5, 14	June 6	
May 15	July 19	
June 1	November 22, 27	
August 4		
September 7, 25		
October 8		
November 23		

Hairy woodpeckers, although not observed during July and December, constituted a conspicuous element of the avifauna of Red Cedar Woodlot. Two males and one female were observed in the lot during January with none observed below 30 feet. Much movement from tree to tree was noticeable, and both sexes frequently gave "peek-peek" calls. On January 14 a male was observed feeding on poison ivy berries in a vine 20-30 feet high on the trunk of a large tree. The individual appeared very thorough in its gleaning of the vines. This bird had been working on dead elms nearby. On January 21 a male working 30 feet up in a dead elm on a branch 2 1/2 inches in diameter exhibited no overt hostility to a brown creeper less than a foot away.

Two females were observed chasing each other and calling back and forth on February 8. This activity was interspersed with periods of feeding. During the year, hairies were observed in close proximity of starlings, hummingbirds, and flickers with no

apparent aggressive behavior. However, on May 15, a male hairy was observed chasing two downy woodpeckers from tree to tree. On September 17 a hairy and downy were observed calling back and forth while feeding in adjacent trees.

In general, hairies were most often observed feeding in dead elms in the east end of the lot. They also fed in live trees. Most activity took place between 20 and 60 feet on trunks and branches larger than 2 1/2 inches in diameter.

Aggression of hairy woodpeckers towards downies was observed in Toumey Woodlot on February 13 when a female hairy in the same tree as a downy persisted in chasing the smaller bird to the terminal branches of limbs. Attacks were only made when the downy would move towards the trunk of the tree, at which time the hairy would fly at it. The hairy kept up a nearly constant "peek-peek" call. The interaction lasted at least 30 minutes.

Hairy woodpeckers constituted a less conspicuous part of the bird life in Toumey. Birds were generally observed from 25-40 feet high in both live and partially dead trees. On January 9, two females and one male were observed feeding on trunks and branches from three inches to three feet in diameter, all lower than 25 feet. A female was observed in the pines at the southwest portion of the lot on January 21, the only observation of this species in a softwood.

Downy Woodpecker - Dendrocopos pubescens

Red Cedar	Toumey	Floodings
January 7, 21	January 21	January 5, 25
February 8, 27	February 13	February 6
March 4, 14, 18, 26	March 21	March 22, 28
April 5, 14, 30	April 10	April 12
May 1, 8, 19, 25, 31	May 18	May 5
June 1, 23	July 7, 15, 19, 28	June 4
September 7, 22, 25	September 15	July 25
October 13, 20	November 14, 27	August 1
November 23	December 7	September 3, 28
		October 24
		December 4

Downy woodpeckers were common year round residents of Red Cedar Woodlot. They did not appear to confine their activities to any one portion of the lot but were seen in all wooded sections. During January and February numbers of individuals seen per visit ranged from one to seven (February 4). Two females and one male were often seen together feeding. Feeding activity was observed at a variety of heights from several feet to 30-40 feet, and this included the bases and trunks of a number of large trees as well as terminal branches. The population of this species decreased in the spring, and from April until November no more than four individuals were observed on any one visit.

Feeding activities were varied. In many cases the birds worked up the trunk of a tree to a height of 25-30 feet and then dropped to the base of an adjacent tree. On several occasions birds were observed on the undersides of smaller branches feeding. On May 8 a female was observed gleaning materials from the spaces

Downy Woodpecker - Dendrocopos pubescens

Red Cedar	Toumey	Floodings
January 7, 21	January 21	January 5, 25
February 8, 27	February 13	February 6
March 4, 14, 18, 26	March 21	March 22, 28
April 5, 14, 30	April 10	April 12
May 1, 8, 19, 25, 31	May 18	May 5
June 1, 23	July 7, 15, 19, 28	June 4
September 7, 22, 25	September 15	July 25
October 13, 20	November 14, 27	August 1
November 23	December 7	September 3, 28
		October 24
		December 4

Downy woodpeckers were common year round residents of Red Cedar Woodlot. They did not appear to confine their activities to any one portion of the lot but were seen in all wooded sections. During January and February numbers of individuals seen per visit ranged from one to seven (February 4). Two females and one male were often seen together feeding. Feeding activity was observed at a variety of heights from several feet to 30-40 feet, and this included the bases and trunks of a number of large trees as well as terminal branches. The population of this species decreased in the spring, and from April until November no more than four individuals were observed on any one visit.

Feeding activities were varied. In many cases the birds worked up the trunk of a tree to a height of 25-30 feet and then dropped to the base of an adjacent tree. On several occasions birds were observed on the undersides of smaller branches feeding. On May 8 a female was observed gleaning materials from the spaces

between the bark of a large tree and the numerous poison ivy vines which grew on its sides.

Aggression by hairy woodpeckers against downies was observed on January 7 and February 13 (see Hairy Woodpecker).

Fewer downy woodpeckers were seen in Toumey Woodlot with a maximum number of three in the January 21, February 13, and March 21 visits. A slight preference for areas at the eastern end of the lot may have been present; however, individuals of this species were also observed in the west end. Feeding activities took place in both large and small trees on the trunks and terminal branches. An immature individual was observed on July 15 in the lower branches of a maple at the east end.

Downy woodpeckers were observed both in the lot at the Floodings and also in the trees off the shores. Three individuals (a male and two females) were seen on January 25, March 22, July 25, August 1, and September 28. On other occasions only one or two were seen. On August 1 a possible immature male was seen. On March 22 a female was chased by an aggressive redwing when it flew too close to the redwing's territory. As in the other lots, feeding activity took place on various sized trees and in various parts of the the trees.

PASSERIFORMES

TYRANNIDAE

Eastern Kingbird - Tyrannus tyrannus

Red Cedar	Toumey	Floodings
May 19, 25, 31	No record	May 21, 22
June 7		June 4
August 4		August 1

Bent's (1952) reference to the kingbird's preference for open areas, rather than dense woods, and its apparent disposition towards swampy areas, may in part explain this bird's absence in Toumey Woodlot. Kingbirds were only observed along both the north and south trails in Red Cedar Woodlot, never in the denser woods. What appeared to be a courtship flight occurred on June 7. Barrows (1912) notes that in the southern portion of Michigan that egg laying commences during the first week of June, and this suggests that nuptual flights might be encountered during this time.

All four sightings at the Floodings involved pairs. In May and June they were in the trees along the water's edge or in trees in the water. On May 21 the birds were hawking insects from perches on dead trees 10-20 yards from shore. From their perches of 10-15 feet, they would swoop almost to the surface of the water, and then return to their perches. On August 1 the birds were perched in the honeysuckle hedgerow northwest of the lot.

Great Crested Flycatcher - Myiarchus crinitus

Red Cedar	Toumey	Floodings
May 8, 19, 25, 31	June 6	July 2
June 1, 23		October 11
July 4, 26, 29		

Great crested flycatchers in Red Cedar Woodlot were observed in the upper portions of trees, generally over 30 feet, on all occasions. Their presence was usually revealed by their song. The birds were present on six of the eight dates in the eastern woods. Single individuals were observed on May 8, 19, 25 and August 29. Pairs were observed on June 23 and July 4, while four birds were seen on June 1 and July 26. This species possibly nested in Red Cedar Woodlot.

On June 6 a pair of crested flycatchers was observed 35 feet up in trees just west of the pond in Toumey Woodlot. They were capturing insects around the trees and chasing each other.

A single pair of birds was observed perched off the east shore of the Floodings on July 2. A single bird was perched 35 feet high in a dead tree east of the southeast point on October 11. It was calling single notes.

Yellow-bellied Flycatcher - Empidonax flaviventris

Red Cedar	Toumey	Floodings
May 15, 31	No record	No record

Single individuals were observed on two dates in May in Red Cedar Woodlot. On May 15 one was perched four feet high in dense woods at the east end of the lot. On May 31 the individual was along the east end of the south trail, perched on an exposed limb over the road. It was flying out to capture insects and returning to the same perch.

Acadian Flycatcher - Empidonax virescens

Red Cedar	Toumey	Floodings
May 19	June 18	No record

The sighting of a single individual on the north trail near the west end appears to represent the first wave of migration of this species. Observations of Walkinshaw (1966) in Calhoun and Muskegon Counties indicate that the early arrival dates average May 17 in the former and May 23 in the latter. As Ingham County lies between these two counties in latitude, it would appear that the Red Cedar observation represents what might be close to an average date of arrival for this bird.

On June 18 a single individual was observed calling and feeding in a tree north and east of the pond at Toumey Woodlot. It was perched on a branch 15-20 feet from the ground. Walkinshaw (1966) indicates that this species has a preference for dense, unpastured woods and that breeding dates range from June 12 to August 6. This species has been recorded as a summer resident at the Floodings prior to 1968 (Wallace, 1969).

Least Flycatcher - Empidonax minimus

Red Cedar	Toumey	Floodings
May 15, 19, 25, 31 June 1	No record	May 22

The least flycatcher in Red Cedar Woodlot was a bird of the edges. It was seen along both the north and south trails, where it perched on exposed branches. The birds were observed catching flying insects by swooping from the perches to capture

their prey. Two individuals were observed on May 19 and June 1. Single individuals were observed on other days.

The May 22 record of the least flycatcher at the Floodings involved a single individual perched in the outer branches of a tree along the east shoreline.

Eastern Wood Pewee - Contopus virens

Red Cedar	Toumey	Floodings
May 15, 31	May 31	June 4, 17
June 1, 23	June 6	July 9, 16
August 4, 23	July 7, 19	August 6
September 7, 13, 25	August 2	

In Red Cedar wood pewees were observed only along the edges of open areas and never in the deeper wooded areas. The birds perched on exposed limbs between 15 and 30 feet from which they would hawk insects. At least two individuals were involved in the observations. On September 7, the bird which was perched on an exposed branch by the river retreated to the cover of more densely foliated trees upon my approach.

On May 31 a pewee was heard singing in the middle of Toumey Woodlot. All other observations were of birds at the east end near the pond. One individual had a perch about 40 feet high in a dead tree along the west shore of the pond. It would preen and sing from this perch, as well as use it for a perch from which to hawk insects. At least one intraspecific aggressive interaction took place when the individual perched there chased a second pewee over the east ridge and then returned. It

would also spend a certain portion of the time in the foliage of trees nearby on the west ridge.

HIRUNDINIDAE

Tree Swallow - Iridoprocne bicolor

Red Cedar	Toumey	Floodings
No record	No record	April 7, 12 May 3, 5, 21, 22 June 4, 17 July 2, 9, 25

The tree swallow was a common summer resident of the Floodings. At least two pairs of birds were involved in nesting activities in the flooded areas south of the lot. One pair nested in a hole in a dead tree 30 yards offshore. The nest was about three and a half feet from the water's surface. It was actively defended against a red-headed woodpecker which was working on the tree. The swallows dove at the woodpecker as long as it remained on the tree.

The swallows were observed flying over the open water areas, the cattail marsh, and the fields to the north and west of the lot. Usually only four birds were seen on any one day, except on May 21 when six or eight were seen flying over the waters to the south and east, and on July 9 when 9-12 individuals were seen swooping at heights of 50-75 feet over the cattails and the fields.

Bank Swallow - Riparia riparia

Red Cedar	Toumey	Floodings
No record	No record	May 5

The six bank swallows observed at the Floodings on May 5 may have represented individuals recently arrived in the East Lansing area, which would later nest in a sand pit several miles southwest of the lot. The bank swallow is known to arrive in Michigan in late April (Barrows, 1912) and the sandpit colony has been described by Johnson (1958). The six were observed flying over the waters south of the lot, apparently feeding.

Rough-winged Swallow - Stelgidopteryx ruficollis

Red Cedar	Toumey	Floodings
No record	No record	June 4

A single rough-winged swallow was observed flying over the waters close to the southern tip of the lot on June 4.

Barn Swallow - Hirundo rustica

Red Cedar	Toumey	Floodings
No record	May 18	May 3, 22
	July 7	August 1
		September 12

A single barn swallow was observed flying over the open area at the east end of the Toumey Woodlot on May 18. It had flown in from the fields to the south and appeared to be hunting. On July 7 another single individual was seen flying over the backs of a group of feeding sheep adjacent to the machinery at

the northwest end.

Barn swallows were observed flying over the south and west ponds of the Floodings on May 3, 22, and September 12. On May 3 two pairs were flying in company with two pairs of tree swallows. A single individual was seen on May 22, and three were seen on September 12. On August 1 a single swallow was observed swooping over the corn field at the northwest end.

CORVIDAE

Blue Jay - Cyanocitta cristata

Red Cedar	Toumey	Floodings
January 21	January 21	January 5
March 7, 14, 18, 26	February 20	February 6
April 5, 30	March 10, 16	March 5, 11, 28
May 1, 15, 25	April 8, 18, 29, 31	April 7
June 1, 11, 23	May 8, 18, 29, 31	May 2, 4, 22
July 4, 29	June 6, 18	June 4, 17
August 4, 23	July 7, 15, 19, 28, 30	July 2, 9, 16, 25
September 7, 13, 22, 25	August 2	August 1
October 20	September 6, 15, 17, 26	September 3, 12, 19, 28
November 16, 23	October 1, 10, 15, 23	October 2, 11, 16, 24
December 1, 9	November 6, 14, 23	November 10, 20, 25, 30
	December 2	

Although blue jays were seen in Red Cedar during 11 months, their numbers were generally lower than in Toumey or the Floodings. From January through the June 11 sighting, from two to four were seen. However, on June 23 six individuals were present, with five at the eastern end and one at the western edge. During July and August, the number per visit ranged from one to four, while in September the numbers increased, with a maximum of 10 on September 22. The population remained higher in the fall than during the

first three months of the year, and most records involved at least three individuals.

The blue jays in Red Cedar tended to move about and were not restricted to one area. They were seen at all heights from ground level to the crowns of the trees. Calls included "jays", metallic "clicks", and imitations of red-tailed or red-shouldered hawks.

The blue jay was the most frequently observed species at Toumey Woodlot occurring on 33 of 51 visits. Jays were seen in all parts of the lot. They often flew into the lot from areas outside the boundaries and on several occasions they carried food. On January 21 a bird flew into the southern edge of the lot from the southwest carrying a kernel of corn. It took this to a tree and crammed it into a crack in the bark before departing in the direction from which it had come. Other individuals were seen with kernels of corn during the year. These were not stored but opened by holding them with their feet against a limb and hammering them with their bills.

From January through March only one to three jays were observed per visit. In April this number increased to four or five and remained at this level until the end of August. A nesting female was discovered on May 18 in the spruces at the east end of the woodlot. The nest was constructed of an outer layer of corn husks and white cloth and an inner layer of sticks and twigs and was lined with rootlets. It was eight feet high

and contained five speckled eggs. The female did not flush from the nest until my hand was within six inches of her.

From September through December the number of blue jays fluctuated from two to more than 10 per visit. The birds made good use of corn stalks with ears which were dumped in the area south of the southwestern portion of the woodlot. They were observed feeding on the corn on October 10, 15, and 23. The birds appeared to take turns with no more than two in the corn at a time; one or two would stay at the edge of the woods. When one individual would carry corn kernels into the lot to hammer on the tree branches, another would take its place. The hammering behavior was also observed with nuts and acorns. During the fall jays continued to bring food into the lot, from adjacent fields and some from the cattle feeding areas to the southwest. It was apparent that the jays were gathering some of their food beyond the borders of Toumey and then returning to the lot to consume it.

At the Floodings, the blue jay was the second most frequently observed bird, seen on 27 of 42 visits. The bright colors and frequent calls of this species made it a conspicuous element of the avifauna of the woodlot. Blue jays were observed in all sections of the lot in both mature and young trees, as well as in the fields to the northwest. Jays frequently flew into and out of the woodlot to areas west of the west pond. During the first six months the number of blue jays fluctuated

slightly with from one to four present on each visit.

Although no nests were found, at least one young was present in the conifers north of the woodlot on July 2. On that date four or five jays were in the pines and on the ground, all calling. From July to the end of November from four to six jays were seen per visit. They continued to spend time within the woodlot, although a greater proportion of their time was spent in the fields than earlier in the year. Jays with corn kernels in their bills were seen in September and October. Acorns were also consumed. These were opened, as was the corn, by holding with the feet against the limb of a tree and hammering with the bill.

Common Crow - Corvus brachyrhynchos

Red Cedar	Toumey	Floodings
January 21	March 16, 21	January 18
February 27	April 2, 10, 21	February 6
March 7, 18, 26	May 8, 18, 29, 31	March 5, 11, 28
April 5, 26	June 6, 18, 21	May 22
May 1, 15, 19, 25, 31	July 15, 19	July 2, 9
June 1, 7	August 2	August 1, 6
July 23	September 17, 26	September 3, 12, 19, 28
September 22, 25	October 1, 23	October 2, 11, 16
October 8	November 14	November 10
December 1	December 7	

Common crows were visitors to Red Cedar Woodlot in 10 months of 1968. Generally only one or two was present on any one date; however, six, a single crow and a group of five, were seen on April 5. Most crows were observed perching in trees at heights of from 20-50 feet. Vocalizations were heard only in about 50

percent of the observations. On April 5, a crow flew into the lot carrying in its bill food which had been obtained outside the lot. On June 7 four crows were seen chasing an unidentified large hawk along the south trail.

The status of the common crow in Toumey Woodlot was similar to that in Red Cedar, a visitor observed in 10 months of 1968. They were more numerous with a maximum of at least 11 individuals in the area surrounding the woodlot. The crows appeared to spend more time in Toumey than in Red Cedar. Portions of the woodlot utilized included the eastern conifers where roosting crows were flushed on March 16 and the main woods where crows were most frequently seen. Mobbing activities of crows were observed on four occasions, May 8, July 19, November 14, and December 7. All involved great horn owls. The mobbing was accompanied by the typical and persistent "owl" call used by crows when they are pursuing owls. On November 14 and December 7 these calls by one or two crows soon attracted others from nearby areas. Crows were observed being mobbed by smaller birds on May 18 (blue jay, redwing, grackles) and June 18 (blue jays). A dead crow was discovered in the woodlot on May 8, one of the days when great horned owls were seen.

A crow returning to Toumey with food was observed flying from the west on September 17 in company with three other crows. Four crows were seen feeding in the area of the hay piles, while two others were perched 50 feet high in nearby trees. All flew

when I approached.

Common crows were present as visitors at the Floodings on at least one day during each of nine months. These crows did a great deal of moving flying from one side of the woodlot to the other. They would often perch in the upper portions of dead trees in the water. Six was the largest number seen. A dead crow with only the sternum and a few feathers remaining was found at the northeastern edge of the woodlot on May 22. Crows at the Floodings were seen mobbing a sharp-shinned hawk on September 19, an immature red-tailed hawk on September 12, and pursuing a broad-winged hawk on September 28.

Feeding activity was centered in the fields to the northwest of the woodlot where crows fed in the corn.

PARIDAE

Black-capped Chickadee - Parus atricapillus

Red Cedar	Toumey	Floodings
January 7, 21	January 21	January 5
February 18	February 13	February 22
March 18	July 7, 19, 25	March 22, 28
July 29	September 6, 15, 17	April 7
August 4	October 10, 15, 23	May 3, 5
September 7, 13, 22	November 14, 22, 27	June 4
October 8, 13, 20	December 2, 7	July 9, 25
November 23		August 1, 6
December 9		September 3, 12, 28
		October 2, 11, 16, 24
		November 10, 20

The black-capped chickadee had an interesting seasonal distribution in Red Cedar Woodlot during 1968. Present during the first three months, the chickadee was absent during the

three spring months, and then present the rest of the year. From January through March three chickadees were seen in the woodlot in the trees along the south trail and also feeding in wild cucumber (Echinocystis lobata) (January 21).

One or two individuals were observed during July and August with two more in September. They were seen feeding in the branches of both live and dead trees. They called frequently. More were present in October with from 10-12 seen on October 20. These were in the woods, along the edges and in the weeds. The same number was present in November with only one in December.

In Toumey, a four month absence (March through June) of the species was noted plus in August. In January four were seen in the southeast corner; eight to ten were scattered through the woodlot on February 13. These were in both large and small trees, feeding in the bark and branches. In July and September only a pair was seen in the eastern end. They were observed in the conifers and around the pond. On October 10, a large group of a dozen or more was present scattered in the eastern end in the fields, pines, spruces, birches, and by the water. Also several were heard calling in the west end. This group was absent later in October when only four were present in the pines and weeds of the west end. This group remained through the rest of the year, feeding with sparrows and juncos. A fifth was seen on November 22 by a blackberry patch.

Chickadees were seen at the Floodings during 11 months

being absent only in December. Only two birds were observed until September 12 when a group of five or six was at the northeast end feeding in the younger trees. Only two were seen after that date. Chickadees were recorded in most parts of the study area. They may have attempted nesting in a dead stump off the south shore. Feeding took place in trees where crevices and holes were explored. Inch worms were consumed by the birds on September 12. Feeding activity was also observed in cattails, honeysuckle, multiflora rose, and the pines.

Tufted Titmouse - Parus bicolor

Red Cedar	Toumey	Floodings
January 7, 21	January 21	January 5
February 3, 8, 27	February 13	April 7
March 7, 14, 18, 26	March 2, 10, 21	May 5, 21
April 5, 12, 26, 30	April 2, 10, 19, 28	June 17
May 1, 8, 15, 25, 31	May 18, 29	July 9
June 7, 11, 23	June 6	August 1, 6
July 4, 26, 29	July 19, 28	September 3, 12, 19, 28
August 4, 12	September 15, 17	October 2, 11, 24
September 7, 25	November 22	November 25
October 8, 13, 20		
November 16, 23		
December 6		

Although the tufted titmouse was the most frequently seen species in Red Cedar Woodlot, it was never numerous. Six individuals was the most seen on any visit, January 21. Certainly the vociferous tendencies of the species account in part for its frequency of being observed. Tufted titmice utilized various habitats in the woodlot from the canopies of the trees in the deeper portions of the woods to the open busy areas. It was encountered in almost all sections of the study area.

Usually seen at medium heights in trees, the tufted titmouse vocalizations were an interesting aspect of this species. Beside the "peter-peter" call, titmice also gave "yank-yank" and "chickadee" notes.

At Toumey Woodlot, the tufted titmouse was also a noisy but not particularly interesting species as far as activity was concerned. Usually solitary, only three individuals were present through the year. The three were seen together on certain occasions and in opposite ends of the lot on others. They were seen both in large and small hardwoods, as well as in conifers and tamaracks.

At the Floodings a pair of tufted titmice was present through much of 1968. Their activities were confined to the main portion of the lot, including the younger trees at the edge. They were never seen in the windbreaks to the northwest or in the fields. September 28 was the only date on which more than two were seen, with four present in the southern edge of the pines north of the woods.

SITTIDAE

White-breasted Nuthatch - Sitta carolinensis

Red Cedar	Toumey	Floodings
January 2, 7, 14, 21	January 9, 11, 21	March 22
February 8	February 20	July 9, 25
March 7, 14, 18, 26	March 2	August 1, 6
April 5, 14	April 2, 10, 19	September 3, 12, 28
May 1, 8, 19	May 29, 31	October 16, 24
June 23	June 6, 18	December 4
July 29	July 15, 19, 28	
August 4	August 2	
September 7, 13, 22	September 6, 15, 26	
October 8, 13, 20	October 10	
November 16, 23	November 27	
December 1, 9	December 7	

The white-breasted nuthatch was a year-round resident at Red Cedar Woodlot. From January through March the number seen per visit ranged from one to ten (January 21), although usually there were only two or three. .The birds were vocal and generally worked the trunks of large trees, from near the ground to 40 or more feet in the tops. They were not confined to any one section of the woodlot.

From April through July only one was seen with the exception of June 23. Activity was the same, plus on April 5 one was seen working on a prostrate log. The population increased in August and continued through November at from three to six. This increase may have been due partially to an influx of birds from other areas, as well as from young produced in Red Cedar. Vocalization continued through this time. Besides feeding on the trunks of the larger trees, the white-breasted nuthatches were observed feeding in other areas in late summer and fall. On October 8 a single bird was feeding with chickadees in the underbrush on the east end of the pond, while on October 20 several were feeding in the weeds along the north road. Poison ivy berries were consumed on October 8 in company with mrytle warblers. In December the population dropped to a maximum of two.

The white-breasted nuthatch was a year-round resident of Toumey Woodlot. The population in the woodlot during the first four months appeared to range between two and eight individuals.

They were seen in a variety of habitats ranging from the deepest woods to the pines at the southwest end. From May through August the number of individuals seen per visit declined and only one or two were seen. On May 29 a nest hole was located west of the pond 25 feet high in a large maple.

There was an increase in the number of birds from September through the end of the year with up to four per visit. These birds were seen in various sections of the woodlot. Feeding on prostrate logs was observed.

The Floodings did not support as many nuthatches as the other two study areas. They were seen primarily in the main portion of the woodlot, although on October 24, one was heard calling in the south end of the corn. Dead and downed trees were utilized, in addition to live trees.

Red-breasted Nuthatch - Sitta canadensis

Red Cedar	Toumey	Floodings
No record	October 1, 15	No record

Single red-breasted nuthatches were observed feeding and calling in the strip of pines along the western border of Toumey Woodlot on two days in October. This species was described by Zimmerman and Van Tyne(1959) as "a transient, sometimes common in Autumn". It breeds in the northern part of the state, rarely breeding south of the pines plains region. Barrows (1912) notes that this species is often abundant near red cedars and the various pines and spruces, from which it gathers seeds to

be stored for winter use.

CERTHIDAE

Brown Creeper - Certhia familiaris

Red Cedar	Toumey	Floodings
January 21	April 2	November 30
March 18, 26		
September 22		
October 8		
November 23		
December 6, 9		

Brown creepers in Red Cedar Woodlot were observed working the trunks of a number of different trees, including silver maple, American elm, beech, boxelder, and oak. They were always seen below 20 feet. On March 26 one was observed feeding in the southeast section of the lot. It would start at the base of a tree and move up the trunk to a height of 12-15 feet, then fly 6-12 feet to the base of an adjacent tree and starting at a height of two feet, work its way up the trunk again. When in the company of downy woodpeckers, there was no overt hostility between them.

On April 2 a single creeper was observed on the trunk of a dead tree along the west shore of the pond at Toumey Woodlot. Another single bird was seen at the Floodings on November 30, working the trunks of both live and dead oaks near the north edge of the lot.

TROGLODYTIDAE

House Wren - Troglodytes aedon

Red Cedar	Toumey	Floodings
September 25 October 8	October 10	October 16

On September 25 and October 8, house wrens were observed investigating in the vines growing on the trunks of trees along the river and the pond at Red Cedar Woodlot. On each day, two birds were at a height of six to eight feet in grape vines. A single wren was seen feeding with a song sparrow around the charred logs on the south trail on September 25.

Four house wrens were diligently investigating the nooks and crannies of a brush pile along the western edge of Toumey Woodlot on October 10. The four birds appeared to be very thorough in their investigation of the pile of brush both along the ground and in the brush itself.

On October 16, a single house wren was observed feeding on the ground beside a large fallen log in the central portion of the lot at the Floodings.

Winter Wren - Troglodytes troglodytes

Red Cedar	Toumey	Floodings
No record	April 2	No record

A single individual was observed feeding around the bases of a number of prostrate logs in the center of the lot on April 2. It made no sound. This species is a regular migrant in the state and a summer resident in the Upper Peninsula and northern third of the Lower Peninsula (Zimmerman and Van Tyne, 1959).

Bewick's Wren - Thryomanes bewickii

Red Cedar	Toumey	Floodings
No record	August 2	No record

A single Bewick's wren was observed feeding along the ridge west of the pond on August 2. The bird was initially on the ground jumping up and grabbing food items from the surfaces of lower branches and leaves of forest floor plants. It later flew to some low shrubs and flitted through them at heights of two to four feet. Zimmerman and Van Tyne (1959) consider this bird a rare or irregular summer resident in the lower tiers of counties in Michigan, most often encountered in April and May.

MIMIDAE

Mockingbird - Mimus polyglottos

Red Cedar	Toumey	Floodings
No record	No record	March 28

A single individual seen flying from tree to tree in the small oaks along the western edge of the lot on March 28. It continued to fly south across the water south of the Floodings.

Catbird - Dumatella carolinensis

Red Cedar	Toumey	Floodings
May 8, 15, 25, 31	April 21	May 3, 21, 22
June 7, 11, 23	May 18, 29, 31	June 4, 17
July 4, 7, 26, 29	June 6, 18, 21	July 2, 9
August 4, 12, 23	July 7, 19	August 1
September 7, 13, 22, 25	August 2	September 19

In Red Cedar Woodlot catbirds were seen only in the edge areas and not in the interior sections of the woodlot. During May four birds were present with one pair along the west end of the south trail near the power line and a pair on the north side along the river. These birds were generally seen low in the shrubs, although later in June and July individuals were observed perching at heights of from eight to 20 feet. Vocalizations occurred from May through September. One young was seen on August 23 when a total of five individuals (possibly six) were present.

Catbirds were observed only in the eastern brushy areas of Toumey Woodlot. It is possible that four birds, two pairs, were present. At least one pair nested in dense brush near the eastern fence. The nest was three feet off the ground and contained two dark blue eggs with no marking on May 29. On June 6 the nest contained one newly hatched young and one unhatched egg. During the inspections of the nest, the parents retired to the nearby shrubs and smaller trees where they called persistently. Most activity was centered around the shrubs at the eastern end, although catbirds were seen in the conifers, as well as around the edges of the pond. On July 19 and August 2 pairs of catbirds were observed feeding amongst the emergent vegetation of the pond.

A single pair of catbirds was present at the Floodings until June 4, when a dead one was found. This pair had been

seen along the low trees and shrubs at the southwestern tip, where it was presumed they were constructing a nest (none was ever found). Throughout the rest of the summer only a single catbird was seen, usually along the honeysuckle hedgerow or in the aspens of the western shore.

Brown Thrasher - Toxostoma rufum

Red Cedar	Toumey	Floodings
April 26, 30	May 18	May 5, 22
May 1	September 17	June 17
		July 16
		August 6

Brown thrashers were present as spring migrants in Red Cedar Woodlot. Single birds were observed on April 26 and May 1. A pair was seen on April 30. The birds were present in trees (35 feet), in bushes, and on the ground.

Single birds were seen at Toumey on May 18 and September 17. The May individual was singing in a bush along the western edge. The fall bird was in a tree at a height of 15-20 feet.

Thrashers were observed at the Floodings in the smaller trees and shrubs which are on the periphery of the lot, in addition to the hedges and small trees adjacent to the lot. Two birds were seen on May 5 in trees along the west shore, and July 16 in sassafras trees in the northwest corner of the lot with one bird consuming a green berry. Two pairs were observed on June 17, one in an old apple tree to the northwest and a second in the shrubs of the northwest portion of the lot, as well

as the evergreen windbreak to the north.

TURDIDAE

Robin - Turdus migratorius

Red Cedar	Toumey	Floodings
January 21	March 16, 21	March 28
March 26	April 2, 10, 19, 21, 28	April 7
April 5, 26	May 8, 14, 18, 29, 31	May 3, 4, 21, 22
May 1, 14, 15, 19, 25	June 6	June 4, 17
June 11, 23	July 7, 15, 19	July 2, 16, 25
July 4, 7, 26, 29	September 26	August 1, 6
August 4, 12	October 1, 15	September 28
October 13, 20		October 2, 16 , 24

The robin was a common summer resident at Red Cedar Woodlot with at least one and probably two successful nestings in the lot during 1968. A single winter bird was heard twice on January 21. Although two individuals were seen on March 26, most robins did not arrive until April. The population was six individuals during April with up to five individuals in May. One pair nested in the woods along the southeastern edge of the woodlot. On May 14 a nest with four newly hatched young was located five feet high in the crotch of a thorn-apple tree. The young remained in the nest until after May 25. They were covered with pin feathers on May 19 and completely feathered on May 25. The robin population increased with the fledging of these three and on July 4 there were at least twelve robins in the woodlot with what appeared to be young from two nestings, some being older and some newly fledged.

Robins were generally seen along the south trail, although other areas of open woods and grassy areas were utilized. On July 4 a male was seen bathing in a puddle in the south trail, while a young bird was gathering worms in the same puddles. At my approach the adult took flight to the cover of trees on the south side of the trail. Upon reaching the trees, the adult called, and the young bird took flight in the direction of the older bird. Cherries were eaten on July 26 along the south trail. In late summer there appeared to be six to eight robins in Red Cedar Woodlot.

Two pairs of robins lived in Toumey Woodlot during 1968, one in the eastern end and one in the western. The first arrivals on March 16 were at the northeastern portion of the woodlot giving single-noted calls. On March 21 a pair was observed feeding on the ground in the hay area. They flew into the pines. At least three robins were seen in the western end, in the more open areas of trees and grass; only two were observed at the eastern end. On April 19, a nest containing four blue eggs was discovered in the conifers at the eastern end in the northern-most spruce, four feet off the ground. The parents called and flew nearby while I examined the nest. The three young had pin feathers on May 8 and were fledged on May 14. No nest was found at the western end, although two adults and a young were seen on May 31 in the western edge of the main lot near the fence. On July 7 a robin carrying food was seen in the large oak at the

southeast end. The behavior of this and a second individual indicated that a nest or young were closeby. On that same date a pair was seen feeding along the pond. On July 19, a female with a large red berry was seen by the pond. Robins remained in the east and west ends of the lot into October.

A pair of robins resided in the area of the Floodings during the summer of 1968. Although several were seen flying about the woodlot on March 28, the first bird in residence was seen on April 7 in the northwest corner. On May 5 a pair was observed building a nest in the center of the lot 10 feet up in a crotch of a branch of a small white oak. This nest was never completed and was found deserted on May 21. The two robins were seen occasionally in the conifers(with some grackles) but no nest was found. On June 17 the female at the south corner made calls generally associated with danger to a nest of young; however, neither could be found. Young were seen on July 16 when four were seen with the parents off the south shore in trees. Three were seen later in the summer. The young made the robins a more conspicuous element of the avifauna and their feeding was observed along the shore, in the fields to the northwest, and in the honeysuckle. It appeared that in September and October the robins moved north out of the lot and were often seen at distances of several hundred yards to the north where there was another growth of pines and old apple trees.

Wood Thrush - Hylocichla mustelina

Red Cedar	Toumey	Floodings
August 4	No record	June 4

Three birds, possibly an adult and two young, were perched in a group of young maples approximately 40 yards east of the pond in Red Cedar Woodlot. All were below seven feet. They dropped to the ground, and began to work the ground and leaves.

On June 4 a single wood thrush carrying nesting material was observed in the maple trees along the north border of the lot at the Floodings.

Hermit Thrush - Hylocichla guttata

Red Cedar	Toumey	Floodings
April 5	April 28	No record

A pair of hermit thrushes was seen along the north side of the south trail on April 5 in Red Cedar Woodlot. One gave a call and both flew deep into the wood.

A single hermit thrush was seen on April 28 along the western border of the woods at Toumey Woodlot. The bird was feeding on the ground before flying into a tree.

Swainson's Thrush - Hylocichla ustulata

Red Cedar	Toumey	Floodings
May 1, 15, 19, 31 October 8	May 18, 31	No record

Swainson's or the olive-backed thrushes were seen in Red Cedar Woodlot as both spring and fall transients. Individuals

were seen from ground level to a height of 20 feet. On May 15 a single thrush was observed feeding at the base of a sycamore tree. It flew into a swampy area along the pond and began to feed much in the fashion of a robin. No more than two individuals were observed at any one visit. On October 8 a single Swainson's thrush emerged from the underbrush east of the pond chasing a yellow-shafted flicker. It pursued the flicker over the water and out into the open grassy area. All the acrobatics of the flicker were to no avail as it was not able to elude the thrush until it flew into a dense tangle of vines on the trunk of a large tree. The thrush landed in the tree but did not continue the chase. There was no indication why the flicker should have attracted such attention from the thrush.

On both dates in May Swainson's thrushes were seen in the western portion of the main woods at Toumey Woodlot. This is an area of much sapling maple growth. The birds were seen either on the ground or low in trees.

Veery - Hylocichla fuscescens

Red Cedar	Toumey	Floodings
No record	September 26	No record

On September 26 a single veery was seen in the branches of a maple 25 feet high along the south border of Toumey Woodlot.

SYLVIIDAE

Golden-crowned Kinglet - Regulus satrapa

Red Cedar	Toumey	Floodings
No record	April 2, 10, 19 September 26 October 1, 23 November 9, 22	No record

Golden-crowned kinglets were seen in Toumey Woodlot during spring and fall migrations. On April 2 a female was seen flitting along the south and west portions of the pond, and on April 10 a pair was observed working along the bases of trees along the south border. They appeared to be investigating nooks and crannies on the trunks. The only kinglet seen in the conifers in the spring was a male in the eastern pines and spruces.

All the kinglets observed in Toumey in the fall were associated with conifers along the east or west ends. Only females were seen, and often they were in the pines in the company of cardinals, white-throated and fox sparrows. Most were seen in the pines along the southwest border of the lot.

Ruby-crowned Kinglet - Regulus calendula

Red Cedar	Toumey	Floodings
April 26, 30 May 1 September 7	September 17 October 10	No record

Spring and fall migrant ruby-crowned kinglets were seen in Red Cedar Woodlot in 1968. Single females were observed on April 26 and 30 working branches and vines at heights of 4-9 feet.

Three individuals were seen on May 1, one in company with myrtle and Nashville warblers and two alone in shrubs along the northeast section of the pond. The September 7 record was of a female in silver maples at the east end of the south trail at a height of 8-10 feet.

Fall transients were seen at Toumey Woodlot. On September 17 a pair was seen in the pines at the southwest end along with black-throated green warblers, white-throated sparrows, and chickadees. Several were seen in the spruces along the eastern end of the lot on October 10.

BOMBYCILLIDAE

Cedar Waxwing - Bombycilla cedrorum

Red Cedar	Toumey	Floodings
April 5	September 26	March 22, 28
May 15, 19, 25, 31		April 7
June 1		July 25
September 25		August 1, 6
October 13		September 12

Migrating cedar waxwings were often abundant at Red Cedar Woodlot. On April 5 and May 15, 19, and 25 from two to five individuals were seen along the edges of wooded areas. On May 31 15 birds were seen, while on June 1, September 25 and October 13, 12, 20, and 11 individuals were observed on those dates respectively. On September 25 at least some of the birds appeared to be immature individuals, and all were feeding on berries under the power line.

On September 26, five cedar waxwings were observed flying

into Toumey from the east.

The windrows and hedges at the Floodings were most attractive to the cedar waxwings, although birds were seen in the large oaks at the northwest corner and also in the dead trees off the southern tip of the lot. On March 28, 20 waxwings were seen in the poplar trees in the middle of the honeysuckle-highbush cranberry hedgerow. They were both in the trees and feeding on the berries left from the fall. At least ten individuals were seen on each occasion with a maximum of 20 on March 28 and September 12.

STURNIDAE

Common Starling - Sturnus vulgaris

Red Cedar	Toumey	Floodings
January 14, 21	February 13, 20	March 27
February 8, 27	March 2, 10, 16, 21	April 12
March 7, 14, 18, 26	April 2, 10, 19, 21, 28	May 5, 21, 22
April 5, 14, 26, 30	May 8, 18, 29	June 4
May 1, 8, 15, 19, 25, 31	June 6, 18	September 12, 28
June 1, 7, 11, 23	July 7, 15, 30	October 2, 11
July 4	August 7	
September 13, 22, 25	September 6, 15, 17, 26	
October 13, 20	October 1, 10, 15	
December 9	November 14	

The starling was a conspicuous element of the avifauna of Red Cedar Woodlot throughout 1968. Individuals were seen in all portions of the lot. Most were in the dead elms along the north and south trails, although many were seen in live trees. Those in trees were seldom seen below 30 feet. Feeding activity was observed in the grassy areas on numerous occasions.

On January 14, 21 and February 8 individuals were seen flying about in the lot, but it was not until February 27 that four were seen perching in trees in the woodlot. From March 7 into May, individuals were primarily seen in dead trees where they were investigating holes. During this time their numbers fluctuated from 12-24, usually in groups of two or four. Copulatory behavior was seen only on March 18 when one bird mounted another for five seconds while they were on a horizontal limb of a dead elm east of the pond at a height of 30-35 feet. During May more activity on the ground was noted.

In the summer there appeared to be a decrease in the number of individuals with only four to six seen per visit, as compared with up to two dozen in the spring. The number increased in the fall to from six to ten per visit, many of which were often seen in company with hairy woodpeckers and flickers.

In 1968 the starling was the most numerous bird in Toumey Woodlot. Up to 150 individuals of this highly vocal species were present. During February from two to six individuals were seen perching in the trees. Even these few individuals were quite vocal making assorted squawks and other notes. They roosted in the tops of trees. The birds would frequently fly in and out of the woodlot.

The largest numbers of starlings were seen in April when from 125-150 individuals were seen on April 2. Most of these were in groups of two to three who were investigating the many holes

present in the crowns of the mature maples and beeches. As many as 100 were present on April 10; however, fewer were seen later in the month with a maximum of 30-50. These birds were often seen flying into the lot from adjacent fields. On April 19 and 21 several were seen on the ground near the machinery at the northwest end. They appeared to be feeding in the grass and were moving in and out of the lot. On April 28 three were seen low in the spruces at the east end.

During May starlings could be heard in the canopies of the trees in the main portion of the lot. In June at least one pair nested in the hole of a dead limb along the northeast edge of the pond at a height of 25-30 feet. In addition birds were seen low in trees along the edge. Many were seen flying into and out of the woodlot. Fewer were observed in July with no birds seen on July 19 and 28. In the later summer, large numbers (50 or more) were observed in fields around Toumey. An increase in number of starlings in the woodlot was noted in the fall with the number of roosting birds at 50-75.

The Floodings had the fewest starlings of any of the woodlots with no more than 10 seen at any one time. Individuals confined their activities to the peripheral areas of the lot, especially towards the south where they were often seen perching in dead trees. Starlings were often in company with redwings and grackles which also perched in the dead trees. Nesting activities or at least nest-hole exploratory activities were observed in May

and June. The nest boxes erected for the use of wood ducks appeared to be used as nesting cavities by the starlings. Occasionally the starlings were seen feeding in the fields to the northwest of the woodlot, and on June 4 a pair was observed gathering food along the shore of the pond and flying with it out into the dead trees offshore.

VIREONIDAE

White-eyed Vireo - Vireo griseus

Red Cedar	Toumey	Floodings
May 1	No record	No record

A single white-eyed vireo was observed in the bushes along the east side of the pond at Red Cedar Woodlot on May 1.

Yellow-throated Vireo - Vireo flavifrons

Red Cedar	Toumey	Floodings
May 15, 31	June 18	June 4
	July 19	September 12

Spring migrants were seen in Red Cedar Woodlot with a single singing bird on May 15 and a second individual on May 31 in company with several other species. The singing bird was 40 feet high in a partially leafed tree.

The two individuals in Toumey Woodlot were seen in the eastern section of the main part of the woods. Both individuals were singing; however, the bird on July 19 was singing infrequently with several minutes of song, followed by several minutes of silence.

On June 4 two yellow-throated vireos were seen feeding about 15 feet up in trees along the southeastern portion of the lot at the Floodings. One was singing, while the other gave scolding notes. On September 12, five individuals were seen at a height of 40-50 feet in maples along the eastern shore.

Solitary Vireo - Vireo solitarius

Red Cedar	Toumey	Floodings
No record	No record	September 12

A single solitary vireo was seen at the Floodings on September 12 feeding at a height of 10-12 feet in trees along the eastern shore of the lot.

Red-eyed Vireo - Vireo olivaceus

Red Cedar	Toumey	Floodings
May 19, 25, 31	May 29, 31	No record
June 11, 23	June 6	
September 7, 22, 25	July 28	
November 16	August 2	
	September 26	

The red-eyed vireo was an infrequently observed summer resident of Red Cedar Woodlot. In May only single individuals were seen. They were calling 40 or more feet high in the crowns of the trees on May 19 and 25, but on May 31 one was seen low in the brush east of the pond. It called only twice. In June single birds were seen again, with one feeding at a height of 25 feet by the south trail in the terminal branches of a maple on June 23. Red-eyed vireos were more common in September with as many as eight on September 22. Most were 15-20 feet in smaller

trees, and on September 25 three were seen feeding around Virginia creeper. An unusually late sighting was made on November 16 when a pair was seen 35 feet up in trees in the middle of the eastern section of the woodlot. They were singing, and then dropped from the tree for six feet before taking flight to the west.

Although red-eyed vireos were seen from May through September in Toumey Woodlot, they were not common. Three individuals on May 31 was the largest number observed on any one visit. Red-eyed vireos were seen in both the denser stands of trees and some of the solitary trees away from the main section of the woodlot. Heights ranged from 10-60 feet in the trees. Songs were heard from May through August.

Warbling Vireo - Vireo gilvus

Red Cedar	Toumey	Floodings
June 1, 11, 23	May 29	No record
July 4, 26	June 6, 18	
August 23	July 7	

Single warbling vireos were observed in Red Cedar Woodlot on three days in June and on July 4. These were all along the north trail and the river. On July 26 three individuals were found with two feeding in bushes under the north edge of the power lines while the third was east of the pond. A pair was also seen on August 23, 40 feet up in maples along the north trail.

Warbling vireos nested in trees just south of the southeast corner of Toumey Woodlot. A pair was seen in the tamaracks and

oaks at the southeast corner on May 29. On June 6 and June 18 the birds were seen on exposed branches of a silver maple about 60 feet south of the fence. Two warbling vireos were seen for the final time on July 7 in locust trees at the eastern end at heights of 15-20 feet.

PARULIDAE

Prothonatary Warbler - Protonotaria citrea

Red Cedar	Toumey	Floodings
No record	No record	May 21, 22 June 4

Prothonatary warblers are summer residents at the Floodings where these birds nest in the flooded timber associated with the lot. On May 21 a single male was heard calling from a perch on a dead tree off the eastern shore. On May 22 a male was calling from a height of 45 feet in trees along the eastern shore. It flew to a dead tree in the water and into a south-facing hole about three feet above the surface of the water. It remained in the hole for only a few seconds and then returned to the woods where it continued singing. It began to feed and flew deeper into the lot. On June 4 the male was seen 10 feet high in a tree off the south shore in the company of a chickadee. No females were seen, and although this species has nested there in previous years, it apparently did not in 1968.

Tennessee Warbler - Vermivora peregrina

Red Cedar	Toumey	Floodings
May 15, 19, 31	May 18	May 21, 22
June 1		
August 23		
September 22		
October 13		

On May 15 five Tennessee warblers were observed in Red Cedar Woodlot. The birds were singing, and generally located in trees bordering the open areas. On May 19, individuals of this species were seen in the woods at the northeast section of the lot. They were seen from eight feet to a height of 35 feet.

The fall migrants included only single birds or pairs generally higher in the trees than spring migrants. Fall birds were seen in a variety of locations in the lot, as were the spring birds.

A single Tennessee warbler was singing in the trees on the ridge west of the pond in Toumey Woodlot on May 18.

At the Floodings one Tennessee warbler was seen on May 21 and two birds on May 22. The May 21 individual was working in trees along the south shore, while the May 22 birds were in the center of the lot at 25-30 feet and at the northwest corner.

Parula Warbler - Parula americana

Red Cedar	Toumey	Floodings
No record	September 26	No record

A single male parula warbler was seen flitting between the pines and beeches at the southwestern portion of Toumey Woodlot

on September 26.

Yellow Warbler - Dendroica petechia

Red Cedar	Toumey	Floodings
May 8	May 29	May 3, 5, 21, 22
September 22		June 4, 17
		July 9
		August 6

Yellow warblers occurred as spring and fall transients in Red Cedar Woodlot. They were seen close to the river. On September 22 a pair was observed in dense tangled vegetation in company with black-throated green and magnolia warblers, a flicker, several chickadees, and a redstart.

On May 29 a male was observed singing in the wet pasture area at the southeastern section of Toumey Woodlot.

Yellow warblers were most common at the Floodings and were summer residents. The birds confined their activities to areas adjacent to the water along the entire western shore including the honeysuckle and highbush cranberry windbreaks, in which they nested. As many as six individuals were seen on May 3 and 22.

On June 17 a female was seen in the aspens in the middle of the windbreak holding food in her bill. Shortly afterwards a male was seen with food. Neither made an attempt to move to the nest while they were under observation. On August 6 a male was seen perched on the tassel of a corn stalk on which it appeared to be searching for food.

Magnolia Warbler - Dendroica magnolia

Red Cedar	Toumey	Floodings
May 15, 19, 31 September 22, 25	May 29, 31 September 26	No record

The magnolia warbler was a spring and fall transient at both Red Cedar and Toumey woodlots. At Red Cedar individuals were seen in various parts of the lot generally near the ground and not above 10 feet. In the fall they were seen primarily along the river, and on September 25 a large group of a dozen or more was observed feeding in the weeds along the edges of the north trail along with song sparrows.

On May 29 a male was seen feeding on a large caterpillar gleaned from the leaves of an aspen at the southwestern side of Toumey Woodlot. The May 31 record was of at least two individuals singing in the trees in the center of the lot. A number of magnolias were seen in the pines at the southwestern portion of the lot on September 26.

Cape May Warbler - Dendroica tigrina

Red Cedar	Toumey	Floodings
May 8	No record	No record

A single male was seen on the north side of the south trail towards the west end in low trees on May 8.

Myrtle Warbler - Dendroica coronata

Red Cedar	Toumey	Floodings
May 1, 8, 19	April 28	May 3, 5, 21
October 8, 13, 20	May 8	

The myrtle warbler was the most common spring and fall transient warbler in Red Cedar Woodlot. At least a dozen were seen on each occasion in May. Individuals were observed in a variety of habitats from low brush to the canopies of trees at heights of 30 or more feet. Myrtles were seen in company with ruby-crowned kinglets, Nashville, blackburnian, and black-throated green warblers, as well as indigo buntings. Songs were frequently heard.

In the fall, the myrtles appeared to be fond of the abundant crop of poison ivy berries, and both adults and immatures consumed them. Myrtles were also seen from the weeds along the north trail and in the tops of trees at heights of 40 feet. The largest number of myrtles on any visit was estimated at between 75 and 100 individuals. On October 20 a female was observed feeding on the abundant grubs and worms that it was finding between the poison ivy vines and the tree on which they were growing.

The spring migrants at Toumey consisted of individuals seen both in the shrubby areas, as well as singing individuals in the interior. On April 28 a pair was seen eight to ten feet high in brushy areas, while a number of singing birds were heard Six were heard on May 8.

At the Floodings spring migrants were seen both in the smaller trees at the edge of the lot and in the larger trees in the interior. Two myrtles and two yellow warblers were observed feeding around the catkins in aspens along the east shore at heights of 10-12 feet on May 3. Three individuals were seen in the middle of the lot on May 5. On May 21 a single female was seen feeding in partially leafed trees along the east shore at a height of 35-40 feet.

Black-throated Green Warbler - Dendroica virens

Red Cedar	Toumey	Floodings
May 19	September 17, 26	September 28
September 7, 22, 25		October 2
October 8		

On May 19 a single black-throated green warbler was seen by the south trail with another along with three other species by the north trail 10 feet high in terminal branches of a maple.

This species was much more common as a fall migrant. On September 7 both adults and immatures were seen chasing each other in various localities in the lot. On other days from five to several dozen birds were seen from near ground level to the canopy heights of 60-70 feet.

In Toumey five or more black-throated green warblers of both sexes were seen feeding on large worms in the pines at the southwest end of the lot.on September 17. On September 26 both adults and immatures were seen feeding in pines and weeds to

the south.

At the Floodings a single female was seen in the honeysuckle on September 28. It remained for several seconds and then flew northwest. On October 2 a male was feeding in the lot.

Blackburnian Warbler - Dendroica fusca

Red Cedar	Toumey	Floodings
May 19	September 26	No record

A pair of blackburnian warblers was seen along the north side of the south trail in the company of myrtle, black-throated green warblers and indigo buntings. They were feeding and singing at a height of 40-50 feet.

A single immautre blackburnian was observed feeding in the pines at the west end of Toumey Woodlot on September 26.

Chestnut-sided Warbler - Dendroica pensylvanica

Red Cedar	Toumey	Floodings
May 15, 31	May 31	No record

Spring migrant chestnut-sided warblers were seen in Red Cedar on two dates in May. On both occasions they were feeding in low branches of trees in the northeast end with a single male on May 15 and two males on May 31.

Two chestnut-sided warblers were seen chasing each other through the lower branches of trees 20 yards in from the south border of Toumey Woodlot. They were below 10 feet.

Bay-breasted Warbler - Dendroica castanea

Red Cedar	Toumey	Floodings
May 31	No record	No record
October 8		

Transient bay-breasted warblers were seen in Red Cedar Woodlot. On May 31 a single bird was observed along the north side of the south trail at the eastern end of the lot. On October 8 one was seen feeding on poison ivy berries while several others were in the crowns of trees with black-throated greens.

Blackpoll Warbler - Dendroica striata

Red Cedar	Toumey	Floodings
May 15, 19	No record	No record
September 7		

On May 15 and 19 a single blackpoll warblers were seen at heights of 30 feet in silver maples along the western portion of the north trail. In both cases the birds were feeding along the inner branches of the trees. Two possible blackpoll warblers were seen on September 7 feeding on the middle branches of large trees along the east end of the south trail.

Pine Warbler - Dendroica pinus

Red Cedar	Toumey	Floodings
September 7	September 17	No record

A possible pine warbler was seen in trees along the river at Red Cedar Woodlot on September 7. Another possible individual was seen on September 17 feeding in pines at the southwest end

of Toumey Woodlot. Zimmerman and Van Tyne (1959) regard this species as a rare or generally overlooked transient.

Ovenbird - Seiurus aurocapillus

Red Cedar	Toumey	Floodings
May 25, 31	September 26	No record

Two ovenbirds were seen in Red Cedar Woodlot on May 25 in dense shrubby areas along the north side of the south trail. On May 31 a single bird was heard calling in the same area.

On September 26 a fall migrant ovenbird was seen on the floor of Toumey Woodlot along the south border.

Yellowthroat- Geothlypis trichas

Red Cedar	Toumey	Floodings
May 31	September 26	May 21, 22 June 4, 17 July 2, 6, 16, 25 August 1, 6 September 12 October 11

A single male yellowthroat was seen by the north side of the pond at the east end in Red Cedar Woodlot on May 31. On September 26 a female was seen in the weeds south of the pines at the southwest corner of Toumey Woodlot.

The yellowthroat was a summer resident at the Floodings; however, it was never seen in the mature sections of the woodlot, always restricting its activities to shrubby areas around the periphery. It appeared that two pairs of yellowthroats nested, one in the honeysuckle windbreak, the other along the shore of the

east pond just north of the main part of the lot. On the west side, yellowthroats were seen from the southwestern point along an arc to the western portion of the windbreak. On the east side, yellowthroats were seen only north of the main lot. The birds were seen only in shrubs or the lower branches of trees.

On September 12 a possible immature individual was seen in the windbreak with a male and female. Yellow warblers nested in the same area as yellowthroats and the two species were seen together in the corn field on August 6. On October 1 a male was heard giving the full song in the low shrubs along the west pond.

Wilson's Warbler - Wilsonia pusilla

Red Cedar	Toumey	Floodings
August 23	September 26	No record

On August 23 a male Wilson's warbler was seen feeding and darting around a boxelder north of the north trail at a height of 8-11 feet.

Two Wilson's warblers were seen in the small spruces at the northwest corner of the Toumey Woodlot on September 26.

Canada Warbler - Wilsonia canadensis

Red Cedar	Toumey	Floodings
May 31	May 18	No record
	September 15	

Several male Canada warblers were seen in young trees along the edge of the south trail at Red Cedar on May 31.

On May 18 a singing male was seen feeding eight feet up in trees along the ridge east of the pond at Toumey Woodlot. Six or more individuals of both sexes were observed feeding in the pines at the southwest corner of the lot on September 15.

American Redstart - Setophaga ruticilla

Red Cedar	Toumey	Floodings
May 15, 31	May 18, 29	No record
September 7, 22		

Spring migrant American redstarts were seen in Red Cedar Woodlot with two males at heights of three and 20 feet along the south trail on May 15 and a female east of the pond on May 31. Fall migrants were more abundant with a single male at the east end of the pond and many females at the west end on September 7. The females were working a dead oak which had fallen into the pond. In addition to at least 20 redstarts there were chickadees, white-breasted nuthatches, goldfinches and black-throated green warblers feeding around the leaves of the dead tree.

Redstarts were spring transients at Toumey Woodlot. On May 18 a male was working 15-20 feet high in the maples at the northeast end of the lot. A second was seen near the pond about 20 feet up. A female was observed feeding 20 feet up in partially leafed ashes by the southwest end on May 29. There was also a male.

PLOCEIDAE

House Sparrow - Passer domesticus

Red Cedar	Toumey	Floodings
January 2, 7, 21	January 9	No record
February 18, 27	February 13, 20	
March 7	April 10, 19, 28	
May 25	May 18	
November 16, 23	July 7	
	November 9, 14	

The house or English sparrow was restricted to the southern edge of Red Cedar Woodlot, especially near the feeding station at the western end of University Village. On February 27, March 27 and May 5 house sparrows were seen along the south trail with only one or two individuals on each date. Winter observations revealed up to 30 individuals clustered near the feeder and never more than ten yards into the lot.

At Toumey Woodlot house sparrows were seen on the opposite side of Hagadorn Road, in the hay area at the southwest end, and the conifers near the machinery. The number of individuals was less than at Red Cedar. The number seen per day was usually only one or two; however, on April 28 approximately ten were observed in the weeds and hay at the southwest end.

House sparrows were absent from the Floodings, and their appearance at the other lots was probably influenced by the cultivated fields, barns, and houses near the other two lots.

ICTERIDAE

Eastern Meadowlark - Sturnella magna

Red Cedar	Toumey	Floodings
No record	April 2	March 28

Meadowlarks were not seen in the interiors of the woodlots; however, they occurred in fields bordering both Toumey Woodlot and the Floodings. On April 2 a single bird was seen in the fields south of the central portion of Toumey Woodlot. Another single bird was observed on March 28 approximately 100 yards northwest of the lot at the Floodings in an open field.

Red-winged Blackbird - Agelaius phoeniceus

Red Cedar	Toumey	Floodings
March 14, 18, 26	March 16	March 11, 17, 22, 27, 2
April 14, 23, 26	April 2, 10, 19, 21, 28	April 7, 12
May 1, 15, 25, 31	May 8, 18, 24, 25, 29	May 3, 5, 21, 22
June 1, 7, 11, 23	June 6	June 4, 17
July 7	July 7	July 2, 9, 16, 25
August 4	September 26	August 1, 6
September 7, 22, 25	October 1, 10, 15, 23	September 3, 12, 19, 28
October 8, 13, 20		October 2, 11, 16, 24
		November 10

Red-winged blackbirds were common summer residents in Red Cedar Woodlot. Singing males were present in the central and western portions of the woodlot, particularly at the edge of open areas. They would perch from 4 to over 30 feet in the trees and would give the "kon-ker-eee" call. The females confined their activities to shrubs and the lower portions of trees. Although the numbers fluctuated from visit to visit, there were usually at least a dozen redwings scattered through the study area. Territories seemed stable in that males were usually present at the same locations on nearly every visit.

On May 25 a nest was located on the south bank of the pond

four feet high in a shrubby tree under the power line. The nest was constructed of grasses and one piece of polyethylene. Four light cream-colored eggs with dark marking on the larger end were present. Four young were hatched by May 31 and these were fledged by June 11. Two males and a female were always present in the trees nearby and called when I came near the nest.

Feeding redwings were seen in grassy and weedy areas. After being common during March through June, there was a decrease in population during July and August. Only one or two were present during these months. September and October showed an increase to 6 to 10 redwings, but never as many as in the spring.

In Toumey redwings were confined to the southeast portion. Two males and two females were present from March through May, and at least one pair nested along the hedge at the east end. On May 18 a nest made of grasses was found 2 1/2 feet off the ground in a bush. It contained three redwing eggs and two cowbird eggs. On May 23 there were two eggs of each species. On May 25 one redwing and two cowbird eggs were present, and on May 29 there were two newly hatched young. The nest was found destroyed on June 6. During May the males were usually in the larger trees calling.

A similar reduction in numbers in July and August as observed in Red Cedar occurred in Toumey. Those birds present in September and October appeared to be transients moving through

the area of the woodlot.

As might be expected with the cattail marshes surrounding the woodlot, the redwing was the most common species at the Floodings. It was also noted that there was no decrease in numbers during July and August. Only males were present until March 22. The males established territories in the northwestern and western cattails and along the northeast shore. They were less common on the southern edges where cattails were lacking. Territorial squabbles were common. After females were first seen on March 27, there were usually from 25 to 70 redwings present. Calling males and a few females were observed in the oaks at the west edge and in the canopy of the largest trees in the woodlot. Although no nests were found, young were seen from June 4 until October.

In late June, July and August large numbers were observed in the fields, corn and hedges. In addition there were still many in the cattails with a bird every four or five feet in some sections. Females were observed feeding grubs and caterpillars to their young. Also males and females were seen feeding along the logs in the water, much in the fashion of grackles.

The wooded areas south of the woodlot were used for perching by males. On one occasion, October 16, a male redwing was observed to drive off a flicker that was attempting to land in the tree where three redwings were perched.

In September and October the number of redwings fluctuated from 35 to over 100. There was more movement than earlier in the year, with flocks of 25 or more birds moving about.

Baltimore Oriole - Icterus galbula

Red Cedar	Toumey	Floodings
May 15, 19, 25, 31	May 18	May 5, 21, 22
June 1, 7, 11, 23	July 7, 19	June 4, 17
August 4, 23		July 9

Baltimore orioles constructed one nest in Red Cedar 35-40 feet up in the terminal branches of a silver maple south of the south trail opposite the woodpile. A possible second nest was constructed in the vicinity of the east end of the north trail. On May 15 the first two orioles were seen along the north trail in the trees adjacent to the nest. On May 19 a female and two males were seen, with a lone male at the northeast section of the lot, and a pair by the nest. The males were calling. The three orioles were seen in the same areas on May 25,31 and June 1. On June 7 the two males and the female were seen together. The brighter colored male chased the duller one away from the branch on which the female was perched. The only young observed in Red Cedar was a single bird perched with an adult female in a tree in the northeast end. Several birds were seen on August 23 chasing a pewee along the north trail.

In Toumey Woodlot the Baltimore oriole was less common than in the other two woodlots. A single individual was seen in the

eastern end of the lot on each occasion. On May 18, a male was heard singing on the west ridge by the pond, while a male on July 7 and a female on July 19 were seen on the eastern ridge by the pines.

On May 5 a pair of orioles was seen in trees along the southern shore where the larger oaks of the Floodings grade westward into younger trees. On the other two dates in May the pair was seen working along the eastern shore where they constructed a nest 35 feet high in a tree overhanging the water. The birds were calling and feeding. On June 4 the pair was still on the east side, and in addition at least three other individuals were seen in the northeast corner. A single male was seen in the western aspens on July 17. On July 9 a female with at least two young was perched in trees along the eastern shore along with a male.

Common Grackle - Quiscalus quiscula

Red Cedar	Toumey	Floodings
March 14, 18, 26	March 21	March 11, 17, 27, 28
April 5, 14, 26	April 2, 19, 21	April 7, 12
May 1, 8, 15, 19, 25, 31	May 18, 29, 31	May 3, 5, 21, 22
June 1, 7, 11, 23	June 6	June 4, 17
July 4, 7, 26, 29	July 19	July 2, 16, 25
August 4, 12, 23	August 7	August 1
September 7, 22, 25	September 15, 17	September 12, 28
		October 11

It is not surprising that the common grackle was an abundant summer resident in Red Cedar Woodlot as originally it was more or less confined to wet areas, although now spreading to open

agricultural areas (Pough, 1949). Up to 20 grackles were present during the summer, although usually only 10-12 were recorded per visit. They were seen on the ground and in all heights of the trees in nearly all sections of the woodlot. One nest was found along the south strip of woods eight feet up in the top of a sapling on May 25. The nest was constructed of rootlets and small twigs and contained three highly speckled blue eggs.

The largest number of grackles was seen on June 23 and July 4. On July 4, 20 were present in a group perching in the many sapling maples in the woods just south of Kalamazoo Street, along a flood channel. They were raucous, as was typical of the grackles throughout the year, and were perched between four and 12 feet.

Feeding activity took place primarily on the ground. Birds were seen drinking at the edge of the pond and by the river edge. Fewer grackles were present in September and October than in July and August.

As was the case in many species preferring open areas or open woods, grackles were seen primarily in either the eastern or western portions of Toumey Woodlot. At the eastern end, most were in the wet area at the southeast corner, while at the western end most were seen in the conifers in the northwest. Generally no more than six to 10 birds were present per visit.

No nests were found; however, a single young bird was observed at the northwest end on July 19. Feeding on the ground was observed.

The most notable observation occurred on September 15 when from 125-175 grackles were seen moving east through the canopy of the main portion of the woodlot at the west end. Concentrating their attention on the newly ripe crop of beech nuts, adults of both sexes and young were voraciously devouring them. Broken hulls and partially eaten nuts fell in such profusion that they sounded like rain on the forest floor. The birds were very active and vocal, moving quickly from branch to branch. On September 17, about half as many grackles with some starling were seen at the western end; however, they were not feeding.

Grackles confined much of their activities to the shoreline and offshore areas at the Floodings, although seen in the fields and the conifers to the north. After observing grackles flying company with redwings on March 11 and 17, the first residents were seen in the dead trees off the south shore on March 27. From eight to 20 were seen on most visits during the summer. These were generally scattered over the area in groups of from two to six. Young were seen along the west shore on June 4 in company with several adults carrying food. Immediately after the late June rains, there was a decrease in numbers seen on July 2; however, the normal number was present on July 16. On

that day a large group of 50 or more was seen on the west shore of the west pond.

Grackles were often seen with redwings and starlings. They fed in the corn fields and in grassy areas. Frequently they were observed walking along the shore or on logs from which they gleaned food from the water. The number of grackles decreased in September and October.

Brown-headed Cowbird - Molothrus ater

Red Cedar	Toumey	Floodings
April 5, 14, 26	April 10, 19, 21, 28	April 7
May 1, 8, 15, 19, 25	May 18, 29, 31	May 5, 22
June 23	June 6, 18, 21	July 2
July 4, 26	July 7	

Brown-headed cowbirds were common summer residents of Red Cedar during 1968. From April through July, up to 14 individuals were seen with from two or three males to every female. They generally were perched in dead trees adjacent to open areas. They appeared to feed in the grassy areas.

The only documented case of cowbird parasitism occurred in Toumey Woodlot. (see Red-winged Blackbird). As was the case in Red Cedar, the cowbirds were associated with open areas of the woodlot. In most cases, cowbirds were observed perching in trees at the edge of the woodlot. On July 7 a male was observed feeding around the feet of sheep in the field next to the north border of the woodlot.

Cowbirds were less frequently seen at the Floodings. Eight

were seen flying through on April 7. Other sightings involved one or two individuals in the plowed field (May 22), in the conifer windbreak (May 5), the sassafras trees at the northwest end (July 2), and feeding along the south shore (May 5).

THRAUPIDAE

Scarlet Tanager - Piranga olivacea

Red Cedar	Toumey	Floodings
May 19, 25	September 15, 26	June 4

On May 19 a presumed pair of scarlet tanagers was observed 30 feet high in maples north of the south trail. The male occasionally chased the female. One and possibly two males were seen on May 25. The male was 30 feet high in an ash tree and was giving two calls, one robin-like and the other a shorter "chip-ching". It was flying out of the trees and back again. A possible second bird was heard calling in dense underbrush near the woodpile on the south trail.

A female was present along the ridge west of the pond at Toumey on September 15. Several were working low in maples at the western end of the woodlot on September 26.

The only scarlet tanager at the Floodings was a male seen high in the canopy of the main woodlot. It was calling and feeding.

FRINGILLIDAE

Cardinal - Richmondena cardinalis

Red Cedar	Toumey	Floodings
January 7, 21	January 9, 21	January 11
February 8, 27	March 10, 16, 21	March 5, 11, 17, 22
March 7, 15, 18, 26	April 2, 10, 19, 21, 29	April 7, 12
April 5, 14, 23, 26, 30	May 18, 25, 29, 31	May 3, 5, 21 ,22
May 1, 8, 15, 19, 25	June 6, 18	June 4, 17
June 1, 7, 11, 23	July 7, 15, 19, 30	July 2, 16, 25
July 4, 26	September 6, 17, 26	August 1, 6
August 4	October 1, 15	September 28
September 7, 13, 22, 25	November 9, 22	November 10, 20, 25, 30
October 20		
November 23		

The vocal and conspicuous cardinal was one of the most frequently observed species in Red Cedar. From two to three pairs of cardinals wintered in Red Cedar and were seen in light woods and open areas. Several songs and clicks were frequently heard. They fed in weeds and in tangled thickets. In March there was a gradual dispersal of these pairs plus a fourth to the north and south trails. These pairs were located by the woodpile, by the pond at the west end of the south trail, along the west section of the north trail, and in the open space by the river at the northeast end. Territorial squabbles were occasionally observed, especially between the two pairs on the west end. No nests or young were found, although they certainly were present.

The cardinals were observed in a variety of types of vegetation and in all heights from the ground to 40 feet. Feeding was seen in weeds and on August 4 a female was observed consuming a large caterpillar by the pond. In the fall, fewer cardinals were observed, and most were seen along the south side with two or three pairs involved.

As was the case with edge species, the cardinal was present only in the lighter woods and open spaces in the east and west ends of Toumey Woodlot. Pairs in the northeast section and in the western end were present in July. They were observed mostly in the conifers. Occasionally a second pair was present in the western end. One nest was found in the eastern end on May 18. It was 3 1/2 feet off the ground and contained five cream-blue heavily speckled eggs. The nest was constructed of pine needles with some sticks on the outside and one small piece of grape bark. The female dropped from the nest at my approach and began clicking. This behavior was repeated on three other occasions. On May 25 there were two small young and two non-hatched eggs. The nest was destroyed by the rains and on May 29 there was one dead young with the two non-hatched eggs.

No nests were found in the west end, but one young was seen on July 15 being fed by its parents. It was perched along the west fence and became excited upon the approach of the parents giving many "zit-it" notes. In the later months cardinals were seen only along the west end in spruces in the northwest and the pines and weeds on the southwest.

Cardinals were seen along the south, west, north, and northwest sections of the woodlot at the Floodings; however, no birds were seen in the main lot or along the east side. A single pair was present during most visits with two pairs seen

on March 5. The resident pair moved around much of the woodlot and did not appear to prefer any one section. The male was often seen in dead trees off the south shore. As in the other woodlot, the pair was seen at varying heights.

More were present in November when much of the hedges and other plants were in fruit. On November 10 four males and two females were seen feeding on highbush cranberry, multiflora rose and red-osier dogwood.

Rose-breasted Grosbeak - Pheucticus ludovicianus

Red Cedar	Toumey	Floodings
May 15, 19, 25, 31	May 8, 18, 31	August 1
June 7, 11, 23		September 12
August 12, 23		
September 7, 13		

Although rose-breasted grosbeaks were seen frequently in Red Cedar Woodlot during the summer months, no young were observed. On May 15 a female was collecting sticks along the south trail, while at least two males were perched in trees nearby. Males and females were seen on May 19 and 25 in the same area. Individuals were recorded by the power lines along the south trail on May 31, June 7 and 11. In most cases the birds were in branches near open areas, rather than in the more densely wooded areas. Only females were seen during August and September. On September 7 a female was feeding on elderberries along the south trail with such vigor that her bill was red from their juice. Other females were seen in trees at heights of 25-50 feet.

Rose-breasted grosbeaks were seen only in May in Toumey Woodlot. On May 8 a male was seen 50-60 feet high in beeches and basswoods feeding on the new growths. On May 15 a male was heard giving an abbreviated song in the west end at a height of 15 feet. A pair was observed on May 31 in low bushes along the west fence with the female collecting sticks (nesting material?) along the ground.

On August 1 a male rose-breasted grosbeak flew from the southwest point of the Floodings into a tree offshore. The grosbeak landed on the vacated branches. Two more birds were seen in the northwest end of the lot on September 12.

Indigo Bunting - Passerina cyanea

Red Cedar	Toumey	Floodings
May 8, 15, 19, 25, 31	May 18, 29	May 21
June 1, 7, 11, 23	June 6, 18	August 1
July 4, 26, 29	July 7, 19	
August 4, 12		

The indigo bunting was a summer resident in Red Cedar Woodlot.during 1968. Three and occasionally four singing males were present during each visit. They were located at the east and west ends of the south trail, at the west end of the north trail and by the power line on the north side. Each was usually perched at the end of an exposed branch from 10-30 feet high. Females were seen on May 31 and July 29 with a young bird (or a female) on August 12. The females kept out of sight in the foliage. On July 29 the female was giving a "peek-peek" call.

The only feeding activity observed was a male feeding on buds on May 8.

A single male and possibly a female was a summer resident in the eastern open areas of Toumey Woodlot. This male usually called from an exposed perch in the small locust trees at the northeast corner, although it was also seen in the tamaracks at the southeast end. On June 6, it was observed feeding in a flowering locust tree.

Male indigo buntings were seen on two occasions at the Floodings. A single feeding male was seen on May 21 on the east shore at a height of 30 feet. On August 1 a male was seen perching on a mullen stalk in the old corn field to the northwest of the woodlot.

Purple Finch - Carpodacus purpureus

Red Cedar	Toumey	Floodings
October 13, 20	No record	No record

Two female purple finches were seen in Red Cedar Woodlot on both October 13 and 20. On October 13 the two birds were seen working in the sapling cottonwoods along the western border of the lot near the fence. Two females flew from the south side of the pond to the north side and landed in young trees along the north trail on October 20.

American Goldfinch - Spinus tristis

Red Cedar	Toumey	Floodings
January 7, 14, 21	April 19, 28	January 18
March 18, 26	May 18, 29	May 3, 22
April 5, 26	June 18, 21	June 17
May 1, 15, 19, 31	July 7, 19, 30	July 2, 9, 16, 25
June 1, 7, 11, 23	August 7	August 1, 6
July 4, 7, 26, 29	September 15, 26	September 28
August 4, 23	October 10, 23	October 16
September 7, 22, 25	November 6	November 10, 25
October 8, 13, 20		
November 9, 16		
December 1		

The goldfinch was a common resident of Red Cedar Woodlot in all months except February when it was absent. It was generally associated with the grassy and weedy areas along the north and south trails. The number of birds per visit ranged from two to 12 during January and in March, usually from six to 12. During this time, goldenrod, other weeds, and small shrubs were utilized for food.

From April through June fewer goldfinches were recorded per visit. They remained in the same areas where they were seen in the winter. On May 1, several were seen feeding in vines on trees at the west end of the north trail. Increasing numbers were again noted in the summer months with from six to 12 per visit. On September 7 a young bird was observed being fed by adults in trees along the south trail. Immature birds were also identified on September 22.

Similar numbers were recorded in the late summer with a slight decrease in December. Vocalizations continued as they had

throughout the year, announcing the presence of perching as well as flying individuals. Activity continued to be concentrated in the open areas.

In Toumey Woodlot the first goldfinches were seen in April with a pair in the wet weedy area in the southeast portion on April 9 and several individuals of both sexes in the spruces at the northwest end. Through the rest of the year, goldfinches were confined to the open eastern areas and in the spruces and near the hay piles in the western end. The number of individuals in each area remained relatively constant throughout the summer with a pair in the east end and two pairs in the west end.

Although three goldfinches were seen flying near the north edge of the woodlot at the Floodings on January 18, goldfinches did not take up residence in the area until April. As was the case in Red Cedar and Toumey, this species confined its activities to open areas, especially the fields to the northwest with their hedges. Only one or two pairs were seen throughout the year, until November when six or eight were seen in the multiflora rose, and on November 25 when 18 were seen in the fields and hedges. When the tassels formed on the corn in August, goldfinches were often seen feeding in the corn.

Rufous-sided Towhee - Pipilo erythropthalmus

Red Cedar	Toumey	Floodings
April 5	April 10, 19	June 4
May 8, 15, 19, 25	May 18	July 2, 25
October 13, 20	June 6, 18	
	September 17, 26	

Although both male and female towhees were recorded in Red Cedar Woodlot during 1968, no young were seen. On April 5 a male was seen by the woodpile in the south trail. He was on an exposed branch and was chasing other species away from its vicinity. Later a male, possibly the same bird, was seen 35 feet high in a tree along the north trail giving the single "drink" note. In May single towhees were observed and heard east of the pond, along the river, and in the southwest woods, as well as near the woodpile. No other towhees were seen until October 13 when two males were observed chasing each other through trees just west of the power line by the south trail at heights of eight to ten feet. A female giving a "drink-drink" call was seen on October 20 by the river.

In Toumey Woodlot, at least one brood of rufous-sided towhees was fledged in 1968. Towhees were first recorded on April 10 when two males were seen in small trees along the south edge adjacent to the blackberries. Another individual was by the pond. They were giving the full "drink your tea" call, the first time it was heard in 1968. On April 19, May 18, and June 6 towhees were seen only at the east end in the conifers. However, the first young were seen at the northwestern end of the main

portion of the lot near the machinery on June 18. A female was feeding at least one young with grey back and red-striped white breast. The fledgling was in a small maple 2 1/2 feet off the ground and was being fed grubs and caterpillars (1") which the female gathered in the grass. After each feeding, the female wiped her bill on a branch before continuing to gather food. The female was calling. Three young were seen on September 17 and 26 in the pines and other trees at the southwestern end of the woodlot. On the latter date an adult male was in company with the young which now had spotted breasts.

Towhees were observed at the Floodings on three dates in 1968. On June 4 a male was perching in the oaks bordering the little pond at the northwest end. A calling bird was heard at the southwest end on July 2. Two young were seen with an adult male in the dense part of the honeysuckle windbreak at its eastern end.

Savannah Sparrow - Passerculus sandwichensis

Red Cedar	Toumey	Floodings
April 26	September 17	August 1
		September 3

A single savannah sparrow was seen perched in a young sapling elm along the western fence at Red Cedar Woodlot on April 26. It was perched at a height of four feet.

On September 17 a single savannah sparrow was observed

feeding in the weeds south of the southwest corner of Toumey Woodlot.

Savannah sparrows were observed on two occasions northwest of the lot at the Floodings. On August 1 a single bird was seen in the grass, while on September 3 a lone savannah sparrow was perched in an apple tree at the western end of the honeysuckle windbreak in company with two field and two song sparrows.

Vesper Sparrow - Poocetes gramineus

Red Cedar	Toumey	Floodings
September 7	April 2, 10	August 1

On September 7 a single vesper sparrow was seen in Red Cedar Woodlot in the burned log pile. The bird was standing on the logs and feeding on the plants nearby by reaching from the logs to eat the seeds.

On April 2 and 10 single vesper sparrows were seen perched in a sapling elm on the furthest northwest corner of Toumey Woodlot. In both cases it was singing from a four feet high perch.

The only vesper sparrow seen at the Floodings was perched in an apple tree at the western end of the honeysuckle windbreak on August 1.

Slate-colored Junco - Junco hyemalis

Red Cedar	Toumey	Floodings
January 2, 7	January 4, 9, 16, 21	March 5, 17, 28
February 8	February 2, 13, 20	October 11
March 7, 18, 26	April 2, 10, 21	November 10, 25, 30
April 5	October 1, 15	
October 8, 13, 20	November 6, 14, 27	
November 16, 23	December 7, 11	

The slate-colored junco was a winter resident in Red Cedar. The population from January into April appeared to be six birds, although eight were seen on March 26. They were seen only along the south edge of the woodlot near the feeder in January and February, but were present along the south trail later in the year.

During October and November seven or eight birds were present in Red Cedar. They were seen on the north trail, in addition to the areas utilized earlier in the year. In no case were slate-colored juncos seen higher than eight feet in trees, and they were often on the ground or in weeds.

Except for juncos seen in the fields just east of Hagadorn Road on January 4 and 9, this species was seen only at the southwest end of Toumey Woodlot. It appeared that 10 individuals spent January through April in Toumey. They were seen feeding in the weeds, on the ground, and perching in the pines.

Later in October, November and December there was a greater fluctuation in numbers with from four to 15 seen per visit. They were only in the southwest corner where they fed on weeds and hay in company with several species of sparrows. Refuge was

sought in the pines.

Tree Sparrow - Spizella arborea

Red Cedar	Toumey	Floodings
No record	January 9	February 6, 22
	December 7	November 10

A large group of 40 or more tree sparrows was seen feeding in the fields just east of Toumey Woodlot on January 9. A tree sparrow was again seen in Toumey Woodlot on December 7 when one bird was in the conifers at the southwest end of the lot.

Eight tree sparrows were seen in the shrubs north of the woodlot at the Floodings on February 6. A single bird was observed at the southern tip of the lot in shrubs on February 22. This species was not seen again until November 10 when two individuals were in the corn to the northwest of the main portion of the lot.

Zimmerman and VanTyne (1959) describe this species as a common transient and a winter visitant, common in the southern half of the Lower Peninsula. Although I did not see any tree sparrows at Red Cedar Woodlot, this species has been recorded there on Christmas bird counts (Wallace, 1969).

Chipping Sparrow - Spizella passerina

Red Cedar	Toumey	Floodings
September 25	May 18	June 17

Chipping sparrows were seen on one date in each woodlot. On September 28 a pair was seen in the grass along the north trail

of Red Cedar Woodlot. At my approach the birds flew to a boxelder and then to the top of a sycamore, a height of 60 feet.

A pair of chipping sparrows was seen in the spruces at the northwest end of Toumey Woodlot on May 18. The June 17 sighting at the Floodings involved two birds perched in the pines at the northern end of the woodlot.

Field Sparrow - Spizella pusilla

Red Cedar	Toumey	Floodings
April 5, 26	April 19	June 17
May 25	May 8, 18, 29	July 2, 16, 25
	July 7, 30	August 1
	October 1	September 3, 19
		October 2

The field sparrow was confined to grassy areas, as well as the shrubs, when seen at Red Cedar Woodlot. On April 5 and 26 a single individual was singing in the grassy area along the power line adjacent to the south trail. On May 25 a single individual was singing 10 feet high in a young ash tree in the middle of the same grassy area.

During the spring and the summer, field sparrows were observed in the field and conifers at the eastern end of Toumey Woodlot; however, on October 1 a number of field sparrows were seen with song sparrows, slate-colored juncos, and white-throated sparrows comprising a group of about 50-75 birds in the conifer plantings, shrubs, and weeds at the southwest end of the lot. Only two individuals were seen at the east end during April and May. They were either in the grass or perching on the wood

pile or small oaks nearby. On July 7 and 30, five or six field sparrows were seen in the conifers at the eastern end particularly the spruces. While moving through the trees, the birds were giving a series of "clicking" notes. One individual on July 30 held what appeared to be nesting material in its beak. Bent (1968) notes the field sparrow's habit of frequenting conifers when they are near the nest site and August nesting particularly if earlier nests are destroyed.

Field sparrows were seen in the field to the northwest of the main portion of the lot. They were seen in the corn stalks on July 16 and August 1. A pair was seen with a savannah and two field sparrows in an apple tree at the west end of the honeysuckle hedge on September 3. Field sparrows were seen in the hedge on July 16, September 19, and October 2. Only one or two individuals were involved in each record except on September 19 when between six and eight individuals were seen.

White-crowned Sparrow - Zonotrichia leucophys

Red Cedar	Toumey	Floodings
May 1	October 10, 15, 23	May 5

The white-crowned sparrow is recorded as an uncommon to fairly common transient in Michigan with only one summer sight record (Zimmerman and Van Tyne, 1959). This species was recorded as a spring and fall transient during 1968.

A number of white-crowns were heard calling in the woods

north of the eastern end of the south trail in Red Cedar Woodlot on May 1. They were working on the ground in company with white-throated sparrows.

All the October records for Toumey Woodlot were from the southwest corner of the woodlot. On October 10 an immature bird was seen feeding in the weeds to the south of the conifers. On October 15 two immature white-crowns were seen in the same weeds, while on October 23 an adult was seen in the pines with two fox sparrows and two golden-crowned kinglets.

On May 5 a single white-crowned sparrow was seen feeding in the road in the northwest field at the Floodings.

White-throated Sparrow - Zonotrichia albicollis

Red Cedar	Toumey	Floodings
April 14, 26, 30	April 28	September 28
May 1	September 17, 26	October 11
September 22, 25	October 12	
October 8, 13, 20		

The white-throated sparrow was a common spring and fall migrant at Red Cedar Woodlot. Most were seen along the south trail or in the woods east of the pond. Although only one adult and one immature individual was seen in the brush by the burned wood on April 14, all other April and May sightings involved at least ten individuals, with 15 on April 26, 10 on April 30, and 12 on May 1. All birds were seen low in trees and shrubs or on the ground. On April 30, the white-throats were congregated around a wet area east of the pond, where

they were grubbing in the moist earth.

The fall records involved at least as many individuals as the spring with a maximum of 20 or more seen on October 8. The fall birds were seen higher in the shrubs and trees than the spring individuals. On September 22, several were seen feeding on poison ivy berries from 10-15 feet high on trees along the southern border of the lot. They were giving low "peek-peek" calls. White-throats were seen feeding by the woodpile in company with three song sparrows, and also on the ground with slate-colored juncos and song sparrows. A full song was heard on October 13.

The white-throated sparrow was seen as a spring migrant on April 28 in Toumey Woodlot when between six and a dozen birds were seen at various locations in the western half of the lot. All were feeding on the forest floor. Fall birds were seen primarily at the southwestern end with both immature and adult birds observed. On September 17 an immature bird was seen being chased by, and then chasing, a male cardinal in the pine trees along the southern border. Two adults and an immature were seen along the north edge of the pond on September 26. On October 1 white-throated sparrows made up part of a group of 50-75 sparrows in the trees and bushes southwest of the woodlot, along with song and field sparrows. A full song was heard at the west end on October 12.

Fall migrants at the Floodings were seen in the low bushes at the southeast corner, in the multiflora rose hedges and in the fields at the northwest end. Only a few were seen at the southeast end on September 28; however, a larger group of possibly 12-15 were seen in the hedge and adjacent fields.

Fox Sparrow - Passerella iliaca

Red Cedar	Toumey	Floodings
April 5	October 23	No record
	November 22	

On April 5 a single fox sparrow was seen in low bushes near the eastern culvert on the south trail of Red Cedar Woodlot.

Fall migrant fox sparrows were seen at Toumey Woodlot on two occasions. Two individuals were seen on October 23, in company with two golden-crowned kinglets in the conifers at the southwestern end. On November 22 a single fox sparrow was seen with one song sparrow in the same locality.

Swamp Sparrow - Melospiza georgiana

Red Cedar	Toumey	Floodings
No record	No record	September 12

On September 12 a single immature swamp sparrow was observed perching in trees in the honeysuckle hedge at the Floodings. It has been recorded as a summer resident in previous years (Wallace, 1969).

Zimmerman and Van Tyne (1959) describe the swamp sparrow as a common transient and summer resident. It is seldom seen due

to its preference for swamps and marshes as nesting sites; however, during migration it may appear almost anywhere, though seldom seen due to its retiring habits (Bent, 1968).

Song Sparrow - Melospiza melodia

Red Cedar	Toumey	Floodings
January 7, 21	January 16	March 11
February 27	February 2, 16	April 7, 12
March 7, 14, 18, 26	March 10, 21	May 3, 5, 22
April 5, 26, 30	April 2, 10, 19, 21	July 16, 25
May 1, 15, 19, 25	May 18, 25, 29, 31	August 1, 6
June 1, 7, 11, 23	June 6, 18, 21	September 3, 19
July 4, 7, 26, 29	July 15	November 10
August 4, 23	August 2, 7	
September 7, 22, 25	September 17, 26	
October 8, 13, 20	October 1, 15, 23	
November 23	November 22	
	December 7	

The song sparrow was seen in Red Cedar Woodlot in each month except December. They were generally in the weedy and brushy areas during the first three months with from two to four seen per day. However, on March 26, 10 were seen scattered through the woodlot in grassy and lightly wooded areas.

Through April, May, and June there were at least four territorial males with one at each end of the south trail, one west of the pond, and one in grassy areas next to the river under the power lines. There were occasionally pairs at each of the territories. The birds would perch in tall weeds or on exposed limbs of trees.

There was an increase in song sparrows in July and a slight decrease in August. Between six and ten remained in the lot

until into October and were heard calling during those months.

Song sparrows often were observed feeding in open areas along both trails, especially the south. They fed on the ground, on downed logs, and in weeds. In later months, they were seen in company with slate-colored juncos, white-throated and white-crowned sparrows.

At Toumey Woodlot, song sparrows were present in the open areas in the east and west ends. Pairs were present near the pond and along the hill south of the spruces and cedars. These were present in March, April, and May but were not seen after that time. In the western end song sparrows were present in all twelve months. One pair was in the northwest end while another was present in the southwest end. One nest was found in the grass near the southwest end on May 18 which contained five speckled eggs. By May 25 five young with pin feathers were present. On May 29 the nest was found flooded with two dead young still in it.

Through the summer song sparrows were seen by the spruces and pines along the west side, often feeding in weeds and on the ground. Later most were seen at the southwest end where they perched in the pines and the weeds in company with juncos and several other species of sparrows. The largest number was seen on October 1 when from 50-75 song, white-throated, and field sparrows were seen in the pines and maples at that portion of the woodlot.

At the Floodings song sparrows were seen at the northern

edges of the woodlot and the fields to the northwest. Singing males were seen in March through May in trees and shrubs close to the woodlot. Only one or two were seen on any one visit. Later more were seen in the fields to the northwest in the trees, corn and windrows. These were occasionally observed feeding in the road and in the honeysuckle.