1971

Sociological Perspective on Farm Accidents in Louisiana: an Epidemiological Approach.

Joseph Anthony Novack
Louisiana State University and Agricultural & Mechanical College

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_disstheses

Recommended Citation
https://digitalcommons.lsu.edu/gradschool_disstheses/2155

This Dissertation is brought to you for free and open access by the Graduate School at LSU Digital Commons. It has been accepted for inclusion in LSU Historical Dissertations and Theses by an authorized administrator of LSU Digital Commons. For more information, please contact gradetd@lsu.edu.
NOVACK, Joseph Anthony, 1937-
SOCIOLOGICAL PERSPECTIVE ON FARM ACCIDENTS IN LOUISIANA: AN EPIDEMIOLOGICAL APPROACH.
The Louisiana State University and Agricultural and Mechanical College, Ph.D., 1971
Sociology, general

University Microfilms, A XEROX Company, Ann Arbor, Michigan
SOCIOLOGICAL PERSPECTIVE ON
FARM ACCIDENTS IN LOUISIANA:
AN EPIDEMIOLOGICAL APPROACH

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in
The Department of Sociology

by
Joseph Anthony Novack
B.S., Wisconsin State University, January, 1964
M.A., Louisiana State University, August, 1969
December, 1971
DEDICATION

This dissertation is dedicated to the memory of my father-in-law, Chester G. Armbuster, who passed away December 14, 1970.
ACKNOWLEDGEMENTS

I would like to express the deep debt of gratitude that I owe the former chairman of L.S.U.'s Department of Sociology, the late Dr. Walfrid Jokinen. It is a debt that, sadly, can no longer be acknowledged to him in person. He made an effort to understand people, and always found the time to help. Future students will never know him—to their great loss.

In a research effort of this scope, both time and territory, too many debt are accumulated to acknowledge individually. However, Dr. Alvin Bertrand, as my major professor, deserves special mention. The help and encouragement he provided over the years have helped the writer reach the point he is now at.

The other members of my examining committee have all encouraged and aided me in my graduate work. They are: Professors Vernon J. Parenton; Perry Howard; J.H. Jones; and Wendell H. Hester, of The Department of Sociology, and Professor William G. Haag, of The Department of Anthropology. Their fortitude in the face of reams of typed copy is to be admired.

Members of the Agricultural Experiment Station, Cooperative Extension, and the Agricultural Engineers provided time, equipment and money. The farm division of the National Safety Council gave this project its
initial impetus. Over 250 members of Home Demonstration Clubs throughout the state did the actual interviewing. I appreciate the help all these groups, and individuals, gave.

Mrs. Neil (Karen) Paterson has my sincere thanks for handling some of the more tiring and difficult aspects of this research.

It seems to be pro forma to thank the members of one's family. Even if it were not, I would. Anything I have accomplished reflects the concern and compassion of my parents.

Finally, a thank you to my wife, Bobbie--who understood and endured--and to my children, Ray Anne and Joey, who endured without understanding.
PLEASE NOTE:

Some pages may have
indistinct print.
Filmed as received.

University Microfilms, A Xerox Education Company
TABLE OF CONTENTS

DEDICATION .............................................. i
ACKNOWLEDGMENTS ........................................ ii
LIST OF TABLES ............................................ vi
LIST OF FIGURES .......................................... ix
ABSTRACT .................................................. x

CHAPTER

I. THE RESEARCH SETTING .............................. 1
   Introduction ...................................... 1
   The Problem ...................................... 5
   Conceptual Frame of Reference ................. 7
   Objectives and Implications of the Study .... 15
   Definitions of Terms ............................. 16

II. A SELECTIVE REVIEW OF THE LITERATURE .... 18
   General Safety Literature ....................... 18
   Specific Safety Studies .......................... 20
   Farm Safety Research ............................. 29

III. THE RESEARCH METHODOLOGY ................... 38
   The Sample ........................................ 38
   Schedule Design-Interviewer Training .......... 42
   Analysis Design and Statistical Techniques ... 44
   Statistical Measure .............................. 46
CHAPTER PAGE

IV. A DESCRIPTION OF THE FARM ACCIDENT SITUATION
   IN SELECTED AREAS OF LOUISIANA .......................... 49
   Introduction .................................................. 49
   Selected Accident Frequency Distributions .................. 49

V. ANALYSIS OF THE DATA ........................................... 70
   Introduction .................................................. 70
   Bivariate Analysis ......................................... 71
   Multivariate Analysis ........................................ 89

VI. SUMMARY AND INTERPRETATION: THE RESEARCH
    FINDINGS, CONCLUSIONS, AND IMPLICATIONS ............... 109
    Differentical Exposure to Hazard .......................... 111
    Ability to Cope With Hazard ................................ 115
    Attitude Toward Possible Hazard ................................ 116
    Suggestions for Future Research .............................. 120
    Limitations of the Study ..................................... 122

BIBLIOGRAPHY ..................................................... 124

APPENDIX A .................................................... 130
   Louisiana Parishes in the Sample Frame ....................... 131

APPENDIX B .................................................... 132
   General Information Form ..................................... 133
   Accident Report ............................................... 140

APPENDIX C .................................................... 149

VITA .............................................................. 151
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Number of Farm Accidents in the Six Land-Type, Crop-Usage Areas, by Severity Categories</td>
<td>51</td>
</tr>
<tr>
<td>II. Comparison of Michigan and Louisiana Farm Accident Severity Rates in Percentages</td>
<td>53</td>
</tr>
<tr>
<td>III. Number of Farm Work and Non-Farm Work Accident Occurrences, by Sex</td>
<td>54</td>
</tr>
<tr>
<td>IV. Agent Involved in Farm Accident, by Sex</td>
<td>55</td>
</tr>
<tr>
<td>V. Number and Percent of Farm Accidents by Age and Sex</td>
<td>61</td>
</tr>
<tr>
<td>VI. Number and Percent of Farm Accidents by Age and Education</td>
<td>62</td>
</tr>
<tr>
<td>VII. Accident, Non-Accident Comparison, by Age Categories</td>
<td>74</td>
</tr>
<tr>
<td>VIII. Accident, Non-Accident Comparison by Sex</td>
<td>76</td>
</tr>
<tr>
<td>IX. Accident, Non-Accident Comparison by Education Level</td>
<td>78</td>
</tr>
<tr>
<td>X. Accident, Non-Accident Comparison by Hours Per Week Spent in Farm Work</td>
<td>80</td>
</tr>
<tr>
<td>TABLE</td>
<td>PAGE</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>XI. Accident, Non-Accident Comparison by Years of Farm Work Experience.</td>
<td>82</td>
</tr>
<tr>
<td>XII. Accident, Non-Accident Comparison by Size of Farm</td>
<td>84</td>
</tr>
<tr>
<td>XIII. Accident, Non-Accident Comparison by Land-Type, Crop-Usage Area</td>
<td>85</td>
</tr>
<tr>
<td>XIV. Accident, Non-Accident Comparison by Attitude Toward Possible Hazard.</td>
<td>87</td>
</tr>
<tr>
<td>XV. Association Between Education and Accidents, Age Controlled.</td>
<td>93</td>
</tr>
<tr>
<td>XVI. Association Between Education and Accidents, Sex Controlled.</td>
<td>95</td>
</tr>
<tr>
<td>XVII. Association Between Hours of Farm Work Per Week and Accidents, Age Controlled.</td>
<td>97</td>
</tr>
<tr>
<td>XVIII. Association Between Hours of Farm Work Per Week and Accidents, Sex Controlled.</td>
<td>99</td>
</tr>
<tr>
<td>XIX. Association Between Years of Farm Work Experience and Accidents, Age Controlled.</td>
<td>101</td>
</tr>
<tr>
<td>TABLE</td>
<td>PAGE</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>XX. Association Between Years of Farm Work Experience and Accidents, Sex Controlled</td>
<td>102</td>
</tr>
<tr>
<td>XXI. Association Between Attitude Toward Possible Hazard and Accidents, Age Controlled</td>
<td>104</td>
</tr>
<tr>
<td>XXII. Association Between Attitude Toward Possible Hazard and Accidents, Sex Controlled</td>
<td>106</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Basic Epidemiological Conceptual Model of Accidents</td>
<td>10</td>
</tr>
<tr>
<td>II. The Research Conceptual Model</td>
<td>11</td>
</tr>
<tr>
<td>III. Specification of the Variables Comprising the Factor-Types</td>
<td>13</td>
</tr>
<tr>
<td>IV. Distribution of Farm Accidents in the Six Land-Type Areas of Louisiana, by Percentage</td>
<td>50</td>
</tr>
<tr>
<td>V. Distribution of Farm Accidents by Place of Occurrence</td>
<td>57</td>
</tr>
<tr>
<td>VI. Distribution of Accidents by Part of Body Injured</td>
<td>58</td>
</tr>
<tr>
<td>VII. Percentage of Population and Percentage of Accidents Experienced in Age Categories</td>
<td>59</td>
</tr>
<tr>
<td>VIII. Distribution of Farm Accidents by Average Number of Hours Per Week Spent Farming</td>
<td>64</td>
</tr>
<tr>
<td>IX. Distribution of Farm Accidents by Average Years of Farm Work Experience</td>
<td>66</td>
</tr>
<tr>
<td>X. Distribution of Farm Accidents by Size of Farm</td>
<td>67</td>
</tr>
</tbody>
</table>
ABSTRACT

This research is a descriptive study of farm accidents and their association with selected socio-demographic characteristics, in twenty-five parishes of the State of Louisiana. It is a longitudinal survey that utilized quarterly interviews, beginning in January, 1970, and ending in December, 1970. The sample population was comprised of 1,561 farms in the randomly-selected 25 parishes in the state. Two-hundred and fifty members of various Home Demonstration Clubs in the state served as voluntary interviewers.

The research problem was conceptualized under an epidemiological frame of reference, and posited the importance of the interrelationship of the three conceptual model components: a viable agent; a susceptible host; and, a predisposing environment. Three factor-types were viewed as encompassing the salient variables in a farm accident situation. They were: differential exposure to hazard; ability to cope with hazard; and, attitude toward possible hazard. These factor-types were considered to be measurable by the following indicators: (1) hours per week spent in actual farm work; (2) number of acres farmed; (3) number and types of equipment used in farming; (4) geographical location of the farm (6 areas in the state);
(5) sex; (6) number of years of farm work experience; (7) educational attainment; (8) safety training in other occupations; and, (9) age. Attitude toward possible hazard was measured by the answers to a series of ten attitude-oriented questions that formed a summated score index of three types of attitudes: positive; neutral; and negative.

Presentation of the data is contained in two chapters. The first type of data display (Chapter IV) is a descriptive presentation utilizing frequency distribution tables, histograms, and comparative tables containing Louisiana farm accident data and farm accidents from other studies. The second type of data display (Chapter V) involves the actual statistical analysis of the relationship between farm accidents and the selected factor-type indicators. The Chi-square statistic was employed in a bivariate analysis of the data as well as a multivariate analysis. The first type of data presentation was employed to present an overview of the farm accident situation in Louisiana; the second type served to analyze the association between farm accidents and the posited indicators.

The research findings indicate that not all of the selected indicators were significantly associated with farm accidents. The number of acres farmed and the geographical location of the farm were of that type. The
number and types of equipment used in farming and safety training in other occupations were eliminated from the analysis, due to insufficient data. All of the remaining indicators displayed varying degrees of association with the phenomena of farm accidents. Sex and age were judged to be so strongly related to farm accidents that they were controlled for, under multivariate analysis. Attitude toward possible hazard proved to be positively associated with farm accidents. That is, those categorized as possessing a negative attitude toward possible hazard were involved in a statistically significant greater number of accidents than those who were categorized as possessing a positive attitude toward possible hazard, particularly in the case of young, male farmers. The number of hours per week spent in farm work was judged to be significantly related to farm accidents at both levels of analysis. The highest rate of involvement was recorded for those who worked 20 hours per week, or less, at farming. Educational attainment, while it displayed a significant relationship to farm accidents, was analyzed as being indeterminately associated to them - further study of this relationship was suggested.

This research was co-sponsored by The National Safety Council - farm division, the Department of Sociology L.S.U. and several other L.S.U. departments.
CHAPTER I

THE RESEARCH SETTING

Introduction

Farm safety represents a fertile field of investigation for the social sciences. Great changes have and are taking place in American agriculture.

One of the most dramatic changes is the much-discussed shift of the United States population from rural to urban residence. The number of individuals directly involved in agriculture, farmers and farm laborers, continues to decline. According to the United States Census, approximately thirty million people were classified as being in the "farm population" in 1940. By the year 1968 the farm population had dwindled to ten million people.\(^1\) Of these ten million people, three and one-half million were directly involved in agricultural production.\(^2\) The numbers of farms in the United States has been halved in the same period--from six million farms to three


million farms in the twenty-eight year period.\textsuperscript{3} Although the number of farms in the United States has decreased in the period of 1940-1968, the size of the individual farm has more than doubled—from 160 acres in 1940, to 360 acres in 1968.\textsuperscript{4} During this time period of great change the output, per man hour, of the farm worker has tripled.\textsuperscript{5} In 1957 Herbert Blumer noted these drastic changes taking place in rural life and admonished that the transformation, "...calls for more, not less concern with the rural segment of our national domain."\textsuperscript{6}

The ability of our decreasing farm population to produce sufficient food for the nation has been accomplished, in part, through technological advancements. Better soil utilization, more effective fertilizers,

\textsuperscript{3}Statistical Abstract, op. cit., p. 586.

\textsuperscript{4}Ibid., p. 586.

\textsuperscript{5}Ibid., p. 586.

efficient and selective chemical treatment of plant and animal diseases, and increased mechanization of planting, harvesting, and other farming procedures, have all played their part in increasing the food-producing capability of United States farmers. The trend toward fewer but larger farms, fewer but more productive laborers, and a myriad of other factors have made agriculture a highly competitive and therefore expensive business, requiring large capital outlays. In a recent five year period in the state of Louisiana (1959-64) the average value of a farm rose from $24,000 to $39,000--based on a constant-dollar valuation. This increase in valuation, approximately forty per cent, highlights the expensive nature, and the financial escalation taking place in modern agriculture.

Because agriculture has become a "big business" and has experienced an increasing mechanization of procedures, it could be assumed that agricultural practices, especially in the area of farm safety, would be well developed—as safety standards in other industries have been.

7Statistical Abstract, op. cit., p. 593.
Such is not the case. Farm safety practices and procedures are, for the most part, of a hit-or-miss nature—a shortcoming that is evidenced by a very high rate of accidents on the farm.

Farming has always been a dangerous occupation. But, because farm residents have experienced a lower accident rate than urban residents it is tempting to view the problem of farm safety as being of minor significance. However, when the comparative basis of accident rates is shifted from place of residence to type of occupation a different picture emerges. For example, most industries exhibit a lower accident rate than farming. High risk occupations such as those involved in highway construction and other types of heavy construction not only have a lower accident rate than farming, their rates are exhibiting a downward trend—a fact accounted for by some as being due to increased mechanization.  


If increased modernization of technique has been responsible for a lowered accident rate in other high-risk occupations the question of why agriculture hasn't benefitted in this way from a similar modernization process presents itself. This is one of the general questions this research attempts to answer.

The Problem

The research problem, in a general formulation, revolves around the question of why farming is as dangerous an occupation as it seems to be. The overall goal of this research is to examine and describe the farm safety status of farmers in selected parishes in the state of Louisiana, and to develop testable hypotheses for subsequent research in the selected problem area.

In any accident situation there are two basic elements that must be considered. The first element is the degree, or amount, of exposure to hazard; the second element is the ability to cope with the hazard situation. In this survey research the exposure to hazard is measured by the numbers of hours per day, the number of days per week, and, the number of weeks per year an individual actively engages in farm work--and is therefore exposed to the probability of having a farm accident. This exposure probability is measured holding other factors, such as the
demographic variables of age, sex, education, etc., constant. The ability to cope with hazards is measured by the experience of the individual in actual farm work, and by the general educational attainments of the individual. While differential exposure to hazards and the ability to cope with these hazards are basic to any study of accident situations other variables, some of which are peculiar to the study of farm accidents, are also important.

The physical environment of the farm itself can be of signal importance to the farm accident incident rate and to the type of accident that occurs. For example, farming procedures, and the equipment utilized to implement those procedures, can vary widely. Sugar cane farmers have a different inventory of mechanical equipment than do truck farmers. Generally, a cane farmer has more land to cultivate, different methods of pest and weed control, and different methods of "bringing in the crop" than a truck farmer. Thus, the size of farm, the type of crop grown, and by implication the area of the state in which the farm is located, can all affect the farm accident incident rate and are therefore important variables in this research.

Individual attitudes toward safety procedures and precautions can also affect the incident rate of farm accidents. In this research these attitudes are measured
by the adherence of the individual farmer to "accepted" safety practices—such as the use or non-use of machinery operating instructions; the installation and/or retention of safety devices on equipment; the discussion of fire or other safety procedures with members of the farm family and workers; and, the proper storage and application of pesticides, etc.. Also of importance to this research is the attitude of the farmer as to what the primary causes of farm accidents are. If, for example, an individual attributes accidents to fortuitous circumstances, bad luck, little can be done to convince him of the efficacy of preventive measures.

The variables outlined in this discussion of the research problem are taken into consideration under a specific frame of reference, which is presented in the following section.

Conceptual Frame of Reference

The methodological orientation of this research employs an epidemiological approach to the phenomena of farm accidents. This approach has been successfully implemented in previous studies of specific types of accidents.  

Epidemiology is a method of investigation developed in the field of medicine, originally, as a means of logical research in the prevalence and incidence of infectious diseases. In its "mother field" it has become, over the years, an area of specialization in its own right. Public health agencies were quick to realize its potential uses in the development of preventive-measures programs concerned with disease. Its wide currency as an accepted research method in disease etiology led to its application to non-disease health problems, such as accidents. Although its use is still predominantly disease-research oriented, its use has been successful enough in the study of accidents to permit one writer to state "...accidents exhibit some of the same biological and physical inter-relationships as do disease processes...when...analyzed in a standard epidemiological manner it has been shown that accident distributions, like disease, show characteristic variations."\(^{11}\) Another writer observes that "...all human blights and injuries have their epidemiology...".\(^{12}\)

\(^{11}\)Ibid., p. 76.

Most epidemiological writings stress the importance of the interrelationships of three factors: (1) a host; (2) an agent; and, (3) an environment. Also of importance to the correct utilization of this method is the awareness that the object of study is not an individual, but groups of individuals with some common life experiences—in short, a cohort.

The primary step in an epidemiological analysis of accidents is a description of the distribution of accidents. This step involves gathering data on who had the accidents, where the accidents occurred, how the accidents occurred, what kinds of accidents occurred, and, the agents involved in the accidents. This data is then organized and analyzed on the basis of the interrelationships of the three previously mentioned factors: the host; the agent; and the environment.

The host in accident epidemiology is the person, or persons, involved in a specific accident. The agent in

---

accident epidemiology is the thing involved in the accident—it may be a tractor, a ladder, a power tool, etc. The environment in accident epidemiology can be broadly dichotomized into the physical and the social. Physical environment is composed of the various climatological and topographical characteristics of the hosts' areal location. Social environment includes such items as family size, education, group identification, etc.,--all the forces that are generally recognized as being part of the socialization process.

Figure 1. Basic Epidemiological Conceptual Model of Accidents.

Figure 1 is a graphic presentation of the accident components involved in basic epidemiological conceptual model of accidents. All relevant variables associated with accident occurrence are subsumed under one or more of
the component parts. In any given accident all three components are represented.

The combination of a viable agent, a susceptible host, and a pre-disposing environment then are the basic requirements of an accident situation, or possible accident situation. Three "types" of factors, used to infer causal or associational relationships, intervene between the agent-host-environment components and the accident, to complete the conceptual model. Figure 2 contains these intervening factor-types in a representation of the conceptual model employed in this research.

Figure 2. The Research Conceptual Model.
This research conceptual model is a modification of a model utilized by Mellinger and Manheimer. The intervening factors in their study are: (1) exposure to hazard; (2) ability to cope with hazard; and, (3) personality maladjustment. In this research "personality maladjustment" has been replaced by "attitude toward possible hazard" because no attempt has been made to gather personality data and because the more-specifically delimited area of hazard attitudes is germane to the research problem under investigation.


The specific variables deemed to comprise the "factor-types" are presented in Figure 3.

Differential exposure to hazard

Ability to cope with hazard

Attitude toward possible hazard

1. hours per week 1. number of years 1. concern with proper operation training
spent in actual of farm work experience
farm work
2. number of acres 2. educational attainment
farmed
3. number and types 3. safety training in other occupations
of equipment 4. age
used in farming
4. geographical location of farm (6 areas in state)
5. Sex

4. concern with safety plans--family fire plans, etc.
5. provision of chemical antidotes, first aid kits and related items.

Figure 3. Specification of the Variables Comprising the Factor-Types.

The number of hours per week of active farming, the number of acres farmed, the numbers and types of farming equipment used, geographical location, and sex are the vari-
ables deemed to be important in the concept of differential exposure to hazard.

The ability to cope with hazards is, for the purposes of this study, viewed as consisting of the number of years of farm work experience, educational attainment, safety training in other occupations, and age.

Lastly, attitudes toward possible hazards are represented by, in this study, the concern shown for: proper equipment operation; safety condition of buildings; safe work regulations; proper fuel storage; family safety plans; and, the provision of chemical antidotes and first aid kits.

Because this chapter of this research paper is primarily concerned with an explication of the conceptual model employed, no mention has been made of the quantification of the several variables. The quantification processes and the statistical measuring and testing techniques are dealt with in Chapter III. That chapter includes a discussion of the methods employed to study the effect of some variable(s) while holding other variable(s) constant.

The three factor-types and the variables assigned to them, are not mutually exclusive. For example, a concern with proper equipment-operation could conceivably affect the ability to cope with hazards; age could be log-
ically felt to affect the differential exposure to hazard. Indeed, the interrelationships of the variables between and within the factor types are the central concern of this research.

Assignment of particular variables or indicators of the factor types was not done in an arbitrary manner. The next section of this paper reviews the various research reports, articles, books, etc., upon which most of the variable-assignment direction is based. Some of the indicators assigned (hours per week spent in actual farm work and number of years of farm experience, for example) seem to be, to the author, logical and appropriate indicators of the factor type to which they are assigned. They, along with several others, were not assigned on the basis of previous research, but on the judgment of the author as to their appropriateness.

Objectives and Implications of the Study

This research has two general objectives. The first objective is to determine the magnitude of the accident rate on Louisiana farms and to determine the characteristic causes and costs, both social and economic of these accidents. The second general objective of this research is to successfully employ an epidemiological conceptual frame of reference to infer and describe causal linkages
between those variables believed to be salient in the farm-accident situation, to the author's knowledge no farm accident survey research has employed this frame of reference.

Subsumed under one, or both, of the general objectives outlined above are the following specific objectives: (1) to provide up-to-date information on farm accidents for the use of safety planners at all levels, including such agencies as the Cooperative Extension Service, the Louisiana Experiment Station (more specifically, the Agricultural Engineering Department), and manufacturers of farm equipment, machinery, and chemicals; (2) to provide a base of comparison of farm accidents in Louisiana with other states; (3) to contribute to the National Safety Council's program designed to standardize farm accident reporting procedures over the nation; and (4) to contribute to the overall programs of the state and nation designed to improve the well being of citizens.

Definitions of Terms

To implement specific objectives numbered (2) and (3), listed above, two key definitions are employed in this study. Their use has been requested by the National Safety Council. They are: (1) Farm - a place which sells $250 or more in agricultural products annually or sells at
least $50 or more in agricultural products annually and is
ten or more acres in size; (2) Accident - an injury to
any person living or working on a farm, or a visitor who is
injured while visiting the farm, that required professional
medical care or the loss of one-half day or more from
usual activities (work, school, play, etc.). These
definitions are incorporated into the body of the survey
questionnaire, which is discussed in a later chapter of
this paper.

The standardized definitions, listed above, if
followed, ensure that this study and all subsequent
studies of this type will, at a minimum, interview the
same range of places considered as farms and will use the
same criteria in deciding if a given incident is an acci-
dent.

The next chapter is a review of literature that
deals with the area of farm safety. Some of the material
reviewed involves previous field work, while some of the
material is primarily of the statistical-compilation
variety. The review is not exhaustive of the available
reports. Rather, an effort has been made to include works
that are representative of the range of methods and inter-
ests.
Chapter II

A SELECTIVE REVIEW OF THE LITERATURE

The following survey of literature is not designed as an exhaustive, intricate re-tracing of all writings that have been offered in the field of safety research. Rather, the purpose of this literature review is to present a sketch of the historical and current trends in safety-oriented research in general and farm safety research in particular.

Historically, the relevance of sociological factors in the question of safety have not always been recognized. Although current research in this area has come to acknowledge the relevance of those factors, the great preponderance of safety research is not carried out under a sociological frame of reference. It has been necessary therefore to include in this review literature and research efforts carried out by individuals or groups in various disciplines and professions. Many of these works are amenable to sociological interpretation; others are useful in highlighting the possibilities of future sociological treatment of safety problems.

The idea that accidents are worth studying and that planning can aid in their avoidance does not have a long history. In the United States it does not, in any signifi-
icant way, pre-date the early part of the twentieth century. The industrialization of this country had, as one of its many consequences, the physical concentration of large numbers of workers, particularly in factories. With this increase in worker proximity, and the increased contact of workers and machinery, accidents become not only more prevalent, but more visible. The economic advantages of accident prevention became apparent in some industries. This awareness was stimulated by various workmens' compensation laws that held the industries increasingly responsible for employee safety. While exact figures on the magnitude of industrial accidents are impossible to obtain, it has been estimated that they "peaked" in the years 1907-08.¹

As the interest in industrial accidents increased, concerned individuals worked singly or formed groups to study accidents and develop workable methods of decreasing their economic and social costs. One such organization is The National Safety Council, which was formed in 1913 as a private organization dedicated to the study of accidents and their prevention. The National Safety Council now

¹Encyclopaedia Britannica, (Chicago; William Benton, Publisher, 1965), Vol. 12, p. 190.
numbers a high proportion of the country's industries as members, and has affiliations with many state and local safety organizations. The scope of interest of the National Safety Council is now so wide that it would be difficult to give even a simple listing of its activities. The present research, for example, has been made possible, in part, through their sponsorship.

In the early years of the century, and to some extent at the present time, the field of accident prevention has attracted the attention of concerned private individuals who have made attempts to contribute to the solution of the safety problem. Some of these works have been well-designed and carefully executed research efforts; some have been little more than rambling collections of homilies. A volume entitled Safety First For School and Home offers an excellent example of the second variety. In the opening pages of this book the author "admits" that most accidents are simply due to "bad luck" but hopes that teachers and parents will still try to teach their children to be careful. This type of approach has several obvious failings. Nowhere in the volume is there

an indication of the author's definition of accident. No data was utilized to determine the magnitude of the safety problems discussed. On the basis of information offered in this work, there is no evidence that a problem in fact existed at that time. The value of this type of work to a scientific study of accidents and their consequences is, at best, questionable.

Individual research and writings in this field should not be viewed, however, as being without value. A more sophisticated approach to the problem area appeared several years after the publication of the previously mentioned work. H.M. Vernon in his *Accidents and Their Prevention* viewed accidents as products of psychological problems.\(^3\) He developed a profile of what he called the "accident prone" individual. Psychological stresses, brought about by the pressures of modern life are seen, by Vernon, as the causes of accidents of all types. While the author does make use of hard data in approaching the problem area his over-emphasis on psychological factors leads him to neglect other factors in the accident situation. Individual physical capacities, weather, topography, and accident agents, are relegated to secondary or tertiary importance. While discussing the prevalence of

accidents in various industries, the author's psychological bias leads him to state categorically that, "... there is reason for thinking that only a small proportion of the accidents now experienced in factories could be prevented by more complete mechanical safeguarding." 4 In the intervening thirty-four years since this was written many mechanical safeguards have been developed and employed to reduce industrial accident rates.

In 1956 a book appeared whose title was destined to very nearly become a cliche. The Accident Syndrome by Morris S. Schulzinger, is based on thirty-five thousand consecutive accidental injury records, spanning a period of eighteen years (1930-48). 5 The injury records were compiled by a single physician and included many "repeat" victims. In addition to standardized accident information, these records contained a wealth of personal information including such items as age, sex, education, family size, occupation, etc. The author takes great care in developing and presenting his definition of the term accident, and eliminates from consideration those recorded accidents which were, in his opinion, due to fortuitous circumstances

4Ibid., p. 328.

(approximately ten per cent of the total). The accident syndrome is held to be composed of"...the usual medical recurrence of signs and symptoms..." and a "...series of detectable recurrences that pave the way for the prediction of accident probability wherever the essential elements of the syndrome are encountered." The sign and symptoms referred to, along with the detectable recurrences mentioned from the etiological chain of accidents, are analogous to the epidemiological analysis method employed in the present research. According to the author the term "accident prone" is unfortunate, if not fallacious. While it was found that an accident-type personal profile could legitimately be constructed the data did not support the hypothesis of individual accident-proneness.

The material reviewed to this point is representative of one type of literature prevalent in the field of safety and accident prevention. The studies covered are all general in nature. That is, they deal with the problem of safety, per se. While this type of research is important to the field, investigations of a more limited nature are also necessary. In an attempt to satisfy

---

6Ibid., p. XVI.
7Ibid., p. XVI.
this need, much research has been done on specific safety problem areas. Typically these studies concern themselves with the accident problems of one particular industry, or with one particular type of accident in a specific population. The present endeavor is of that type. The report format of this type of research is usually succinct with little or no peripheral or outside corroborative material. The great bulk of these studies have concentrated on environmental or other physical aspects of accidents. A notable exception to this concentration on environmental factors is a 1961 publication of the American Public Health Association.

In his foreword to Accident Prevention, A. L. Chap­man specifies the frame of reference of the studies it contains. He states that:

It is the purpose of this book to place before the reader the opinions and points of view of experts in the field of safety and the pertinent facts and data that have been developed up to date. More than usual emphasis has been placed on the three basic groups of human factors: the physical, the psychologic, and the physiologic.


9 Ibid., p. V.
The bulk of the studies contained in this volume are descriptive in nature and primarily based on frequency counts of the particular type or types of accidents with which they are concerned. Their area of safety interest, ranges from home safety to safety in private aircraft. Their orientation is unmistakably weighted toward the human factor in accidents. Thus, one author attributes the high rate of fatal "falling" accidents in the aged as "...the mental and physical condition of the individual, his lack of skill in a specific activity...and...his failure to recognize hazards."\(^{10}\) In this and other studies in this volume, other salient factors in accident situations are also recognized and dealt with. However, the dominant theme throughout involves the human factor—physical and psychological.

\(^{10}\text{Ibid.}, pp. 97-98, Paul V. Joliet and Eugene Lehr, }\underline{\text{Home Safety}.}\)
As previously mentioned, sociological approaches to the phenomena of accidents is not common. This uncommon approach, however, can be found in the research of Edward A. Suchman.\textsuperscript{11} In a report published posthumously, Professor Suchman treats accidents as a form of social deviance.\textsuperscript{12} Suchman's working hypothesis was that "...the more the individual displays...deviant characteristics, the more likely he will be to sustain accidental injuries."\textsuperscript{13} The research was carried out in 1967 and involved a sample of 495 college students and 1,067 high school students. A self-administered questionnaire was used in conjunction with personal interviews.


\textsuperscript{13}Ibid., p. 7.
Respondents were asked over one hundred questions within which questions relating to accidents and social deviance were embedded. No indication was given to the respondents that the primary interest of the researcher was in accidents and deviance. Suchman's definition of accident was an unusually restrictive one as it required seven days of disability or interference with normal routine.

Suchman found that high school students are more likely to report having had an accident than are college students, and that males of both groups reported higher accident rates than females. Among the college students queried it was found that the deviant behavior indicator employed related significantly to the occurrence of accidents. The deviant behavior patterns of high school students also correlated significantly with the occurrence of accidents, but the indicators of deviance for this group were of a milder variety. Overall, according to Suchman, "students displaying the most extreme deviant behavior are from three to five times more likely to

14 Ibid., p. 8.
have incurred accidental injuries in the past year than are students at the conforming end of the response scale."\textsuperscript{15}

It was also found that those students who held a self-image of a deviant were more likely to suffer accidental injuries. Deviance then represents a rejection of safe behavior in favor of nonconventional or accident-producing behavior.

While Suchman's study does offer a fresh insight into the problem of accidents and their distribution, it does seem possible that it suffers from a few shortcomings. First, it has the obvious limitations that all survey research has. In this instance the two most likely sources of error were in sampling and in the veracity of responses given. The respondents were selected from a California College and two Pittsburgh High Schools. The report states that the college students were selected randomly—no such claim is made for the high school students. The completion rate for the college students was eighty-one per cent, with five percent refusals. No data is given for the high school students, except to say that all students present were interviewed. All the students, both college and high school were given lists of words and asked how well a given word described them.

\textsuperscript{15}Tbid., pp. 9-10.
Many of the descriptive words were of a glamorous type that could be assumed to have special appeal to the age group under examination. Examples of these words are "antiestablishment", "hippie", "wild", and "daring". Secondly, since no accident information was taken, the possibly important effects of these variables was ignored. No data was gathered as to when, where, or how the accident occurred, nor was any attempt made to discover the severity of a given accident. Thus, a sprained ankle was allotted the same weight as an amputation. These shortcomings limit the usefulness of the research but in no way negate its usefulness. However, it is a form of monocausal explanation and as such presents, naturally, a one-sided perspective.

Most of the studies examined to this point have their counterparts in farm safety research. General safety studies were examined because, for the most part, they were first on the scene. It is true, however, that more and more attention is being afforded the problem of farm safety. Transportation Secretary John A. Volpe has recently urged Congress to give private industry a maximum of five years to cut the rate of farm tractor accidents.16

16 The Morning Advocate (UPI), Baton Rouge, Louisiana, January 7, 1971.
To date, farm safety research has not matched the volume nor sophistication of safety research in other fields.

In recognition of this problem, Maynard Coe has outlined a program on which to develop a sound base of farm safety information. Coe's recommendations deal with the basic essentials of any accident prevention program. Of primary import is the gathering of accident data in an orderly and regular manner, utilizing standard techniques and definitions. Coe lists four factors that he feels should be investigated more thoroughly. The first factor is the farmer's response to multiple hazards— in the course of one work day farmers engage in a variety of operations. The use of uncontrolled power is seen by Coe as warranting more attention— the average farmer deals with machinery capable of producing high power output yet there are no regulations or controlling factors in the use of this power. Next, Coe feels the lack of experience on the farm is responsible for many accidents— workers operating dangerous, high powered machinery are often ill-trained. Finally, Coe cites the lack of supervision on

17Maynard Coe, "Farm Safety" in Maxwell N. Halsey, Accident Prevention, op. cit.
the farm as being a contributing factor in the high accident rate.\textsuperscript{18} Coe's suggestions go on to include specific reportorial practices and various specific types of accidents that need primary attention.

Doyle points out that the lack of experience in farm work is particularly evident in the handling of toxic chemicals.\textsuperscript{19} He cites the wide range of chemicals in use as an important factor in chemical accidents. The United States farm worker is usually unknowledgeable and ill-equipped to understand the potential dangers of toxic chemical misapplication. Because of the individualized nature of farm work, control factors are usually non-existent or ineffective.

Two studies of farm safety in specific states have recently been completed, one in the state of Ohio and the other in Michigan. The Ohio study was conducted in twelve randomly selected counties in 1967.\textsuperscript{20} The stated purpose of the Ohio study was "...to measure the incidence of

\textsuperscript{18}Ibid., p. 151.


accidents to rural Ohio people...and...describe the situation in which these accidents occurred. In keeping with its purpose, the study went on to show that in 1967 over twenty-two thousand Ohio farm people were involved in accidents. Sixty-four per cent of these reported accidents happened to males; ninety-seven per cent required a doctor's case; and, fifteen per cent required hospitalization. Further, the total cost of the average farm accident, exclusive of property damage, was $217.30 while the average labor-replacement cost per accident was $19.74. Sixty-nine per cent of the accidents reported occurred in the afternoon or evening hours. It can be seen from the preceding outline of the Ohio findings that the "situational" description referred to in the statement of purpose of this study was primarily a physical and economic description. No attempt was made to consider the social factors involved in the accidents, nor was there any allusion to the possible involvement of psychological factors. In essence, this study is a compilation of accident statistics for selected areas of the state of Ohio. Although no sociological interpretation was attempted, the methodology of the study makes it useful to subsequent sociologically-oriented studies.

Ibid., p. 1.
The second, or Michigan, study was carried out in ten counties of Michigan in 1967-68. The objectives pursued in this study were: (1) to determine the characteristics of farms and farm families by size of farm, sex and age composition, and exposure to accidents; (2) to compile information on the total accident picture in Michigan by frequency, severity, types, causes, and costs; (3) to obtain supplemental information on agricultural workers' compensation; and, (4) to collect information to be used in safety education and in future farm accident surveys.

In the course of this research, it was found that approximately fifty-two per cent of farm accidents occurred in a work situation, and that sixty-five per cent of the accidents reported happened on farms that were 100-500 acres in size. Three-quarters of all accidents occurred to males, due mainly to the rate of exposure. The total incidence of accidents was 29.8 per 1,000 farm family members. This report is more exhaustive than the Ohio study and contains a good deal of information that is amenable to sociological interpretation, although no such analysis was attempted. Both studies used the same definition of

---

22 Rural Manpower Center Report No. 14; Michigan State University, East Lansing, Michigan, November, 1968.

23 Ibid., pp. 2-3.
farm and accident that are employed in the present research thereby enhancing their usefulness to this research as bases of comparative analysis.

A study of farm accidents in the United States published in 1964 offers the sociological perspective on farm accidents that is missing in the previously cited studies. The rates of accidents, sex and age susceptibility, etc., found in this research were confirmed by the later reports cited. In addition it was determined "...that three sets of factors underlie most accidents: (1) environmental hazards; (2) temporary or prolonged personal impairment or maladjustment; and, (3) faulty behavior under stress. The first set of factors is of primary importance to sociologists, while the latter two sets are more the concern of psychologists. The three factors listed above are analogous to the three factors cited in the conceptual model of this research.

In the Bertrand study, it was theorized that the differences in accident rates of occupation is a function


25 Ibid., p. 29.
of environment, or situation. Under this theoretical approach it was found that farm workers experienced a higher accident rate than workers on nonfarm jobs, and that the number of days lost and disability days (viewed as a social cost) are much higher for those individuals involved in agriculture as an occupation. Two other situational factors were noted—farmers tend not to follow certain precautions, and are inclined to view accidents in a resigned manner. These situational factors were considered to structure farming as an occupation that encourages accidents. The researcher proposes that three sets of situational factors are involved in this structuring: (1) labor force factors; (2) socio-psychological factors; and, (3) social control factors.

The labor force factor is involved in that agricultural work tends to attract sub-standard labor. There is usually little concern shown for a worker's mental, physical, or educational shortcomings— as compared to industrial worker standards.

The socio-psychological factors involve an attitude found to be prevalent among farmers that dangerous practices, followed in the interest of getting work done quickly, are considered honorable. Suffering an injury

\[26\text{Ibid., p. 29.}\]
under these circumstances provides the individual with a favorable image of a "go-getter", rather than an unfavorable one such as foolish or stupid. Acts of bravado are distinguished, by the farmer, from acts of simple stupidity.

Social control factors discussed in this study point out that formal control mechanisms, involving prescribed procedures and practices, are few in number compared to other occupations. There is no mechanism in the farm social system that provides assurance that even basic safety practices will be followed.\(^{27}\)

As stated in the beginning of this chapter, the general safety studies and the farm safety studies reviewed do not comprise the sum total of all the writings offered in the field. Rather, the selected studies were chosen to present a short historical profile of the field and to characterize the types of research that are prevalent. From the standpoint of the present research some of the works cited have limited utility; others are readily applicable to the research presented in this report. All of them have contributed, to a greater or lesser extent, to the present endeavor, particularly in the development of our conceptual model.

\(^{27}\)Ibid., pp. 29-32.
In the next chapter, the methodology of this study is presented. It includes a discussion of the sample and sampling methods, the questionnaire design, the acquisition and training of interviewers, the coding process and, the analytical design under which the data is examined.
CHAPTER III

THE RESEARCH METHODOLOGY

The Sample

Twenty-five of Louisiana's sixty-four parishes comprised the sample frame for this survey. These parishes were chosen at random subsequent to the stratification of the state into six types of farming areas. The division of the state into farming areas was accomplished by using political boundaries (parishes). While this procedure may raise questions regarding homogeneity it is still an effective method of reflecting the gross characteristics of land type and land use in the state.

The sampling unit was the individual farm, represented by the head of the farm household. Through information supplied by the National Safety Council's Farm Division, an advance estimate of the accident rate was determined. This advance estimate indicated that for every 600

---

1 Appendix A contains a listing of the sample areas, and a list of the sample parishes in each area.

farms contacted 100 accidents (of any type) would be reported. Cochran's suggestion for determining sample size, when the N is expected to be large, was followed. The notation used in the sample size determination equation is as follows:

\[ n = \text{needed sample size} \]
\[ t = \text{students t value at .02 level of significance} \]
\[ p = \text{estimated proportion of accidents} \]
\[ q = \text{estimated proportion of non-accidents} \]
\[ d = \text{per cent of error tolerated} \]

Thus,

\[ t = 2.33 \ (\text{.02 significance level}) \]
\[ p = \frac{1}{6} \]
\[ q = \frac{5}{6} \]
\[ d = 2 \frac{1}{2}\% = .025 \]

the equation is:

\[ n_0 = \frac{t^2 pq}{d^2} \]

\[ = \frac{(2.33)^2 \left(\frac{1}{6}\right) \left(\frac{5}{6}\right)}{(0.025)^2} \]

\[ = 1,046 \]

It can be seen that the approximation of the needed sample size was 1046 farms. This method of sample-size determi-
nation allows a 98 per cent confidence level, that is it indicates that the true percentage of farm accidents in the total population would be within 2.5 per cent either way of the value obtained in the study made. While there is no one "best" way of determining sample size, the approximation method utilized allows the setting of a reasonable estimate of needed sample size. It is common practice, for instance, to increase sample size by 10 per cent to allow for incomplete information, various types of errors and, in the case of a longitudinal panel study, dropouts. It is felt therefore, that a sample of approximately 1,100 is adequate for our purposes, although the actual sample size of the study was somewhat larger.

The selection of parishes randomly and the determining of the number of farms needed to legitimate data analysis was a rather straightforward process. However, the selection of the actual farms for the survey presented some problems. The ideal method would have been to do a complete enumeration of all farms in the sample parishes, assign them numbers, and then randomly select the appropriate number of farms. This method was unfeasible for several reasons. First, the time needed to achieve a complete enumeration was prohibitive. Second, and this reason is closely allied with the first, the
cost of such an operation would have been great enough to severely limit other necessary survey functions. Finally, the nature of our interviewing corps necessitated deviation from a strict random sampling. Although the first two reasons require no further comment, the third reason calls for some elaboration.

Members of various parish Home Demonstration Clubs throughout the state volunteered to serve as interviewers for the study. If the random selection method had been rigidly adhered to, many of the interviewers would have been required to travel great distances in, and in some cases to unfamiliar territory. Therefore, each interviewer was assigned a "beat"—usually a parish road—and instructed to interview every third dwelling on either the right or left of her "beat". In sparsely settled areas, for instance Cameron Parish, this was modified to every other dwelling. The interviewers were instructed to continue this procedure until they had secured their assigned number of farms. This method provided a satisfactory "spread" in keeping with the objective of maximum randomness, and still provided a measure of feasibility for the interviewers. Parish maps from the Louisiana Department of Highways, which included the location of dwellings in the parish, were utilized to provide the maxi-
mum amount of dwelling location information in the sample parishes.

After the individual farm operator had been contacted, and information on accidents occurring during December, January, and February, 1969 had been recorded, the interviewers were instructed to reinterview these operators every three months, for a total of four interviews. The time span of this survey was from January 1, 1970 to December 31, 1970. A final sample of 1,561 farms in the selected parishes was derived.

Schedule Design—Interviewer Training

The survey questionnaire utilized was designed in such a way as to enable non-professional interviewers to use it successfully. The results obtained with it were considered good and in keeping with the research objectives. 4

Four separate interview forms were employed. The individual forms were color-coded for the benefit of the interviewers. The first form was designed to produce demographic, economic, and attitudinal data on the farm owner, his family, and his employees. It was administered

4A complete copy of the survey schedule may be found in Appendix B.
only once— at the beginning of the survey. Subsequent interview sessions were concerned only with accident data. The next most-used form, the accident report form, was used to gather data on all accidents regardless of type. As can be seen in Appendix B this form is quite detailed and provides a wealth of accident information. In addition to the general accident form two supplemental accident forms were made available. Both are quite short and were designed to collect information on two specific types of accidents—those involving either tractors or one of seven types of chemicals. The data resulting from these supplemental forms is of specific interest to the Agricultural Engineering Department of LSU— one of several co-sponsors of this research project.

The item format in all four forms was predominantly of the forced-choice or check-block type. Open-end questions were used only where absolutely necessary in an attempt to keep the information reporting as uniform as possible throughout the state. Few of the more than 250 interviewers involved in the study reported any difficulty in administering the research instruments.

Interviewer training was accomplished by a team, composed of members of the on-campus co-sponsors of this research. This research was jointly sponsored by:
The actual training sessions held by the several teams took place in central locations in sample-frame parishes. In at least half of these training sessions two or more Home Demonstration Clubs were represented. The training period lasted approximately six weeks beginning in early March, 1970.

Analysis Design and Statistical Techniques

The following discussion deals with the general data analysis format and the various statistical techniques employed to determine empirical relationships within and between the several variables. Because of the wealth of data available, the analytical design was divided into two general types.

The first type, which could be characterized as a descriptive analysis, is composed primarily of frequency distributions. It is hoped that this method of data presentation will enable the reader to obtain the over-
all farm accident picture in the state of Louisiana. Although such statistical techniques are of the simplest variety, they can serve to promote an understanding of the broad aspects of the study. For example, a simple frequency distribution table showing the frequency of farm accidents by age, sex, education, marital status, etc. can aid in presenting a clear picture of who has the most accidents on Louisiana farms. From this type of table the "average" age of person involved in accidents can be determined, as well as their "average" level of education, etc.

The second type of analysis is more complex. Hypotheses, derived from the conceptual model, were tested. While causality-inference is not dealt with in the first type of data analysis, it is the basic purpose of the second type.

In the conceptual model used, three factor-types (or variables) were presented along with their posited indicators. They were: (1) differential exposure to hazard; (2) ability to cope with hazard; and (3) attitude toward possible hazard. These three variables were presented as being composed of most, if not all, of the salient factors in an accident situation. That is, it was posited that either singly, or in combination, they could
explain the phenomena of farm accidents. The empirical form of our conceptual model then consists of a dependent variable (number of farm accidents), and three independent variables—differential exposure to hazard, ability to cope with hazard, and attitude toward possible hazard. The measurement of the independent variables is covered in the chapter devoted to the actual analysis of the data.

**Statistical Measure**

The primary statistical measure employed in the analysis of the data is chi-square. The chi-square statistic is particularly useful when the data to be analyzed is cross-tabulated into polytomous classifications.

*Chi-square* is designed to measure discrepancies between observed and expected frequencies. Although it is more correct to view this statistic as a measure of association, it can also be viewed as a rough measure of correlation.\(^5\) It cannot qualify, however, as a standard measure of correlation because its upper limit varies directly with the number of observations tabulated, as can be seen by examining the general *chi-square* formula:

---

\[ \text{chi-square} = \sum \frac{(0-E)^2}{E} \]

where:

0 = observed frequency

E = expected frequency

The more specific computational formula of \text{chi-square} is:

\[ \text{chi-square} = \sum_{i=1}^{r} \sum_{j=1}^{k} \frac{(0_{ij} - E_{ij})^2}{E_{ij}} \]

where:

0_{ij} = the number of cases observed in the ith row of the jth column

E_{ij} = the number of cases expected to occur in the ith row of the jth column

\[ \sum_{i=1}^{r} \sum_{j=1}^{k} \] instructs one to sum over all rows \( r \) and all columns \( k \), in other words, sum over all cells.

Because the upper limit of the \text{chi-square} statistic varies with the number of observations involved, successive \text{chi-squares} are lacking in comparability. Raw \text{chi-square} values do not range from zero to unity, that is, they are not normed. Therefore, the Coefficient of Contingency (C), which provides a standard range of scores, is used in conjunction with \text{chi-square}. This measure of association is derived from the manipulation of the \text{chi-square} statistic.
thusly:

\[
C = \sqrt{\frac{\chi^2}{\chi^2 + N}}
\]

The Coefficient of Contingency is limited, however, in the fact that it cannot achieve unity. In cases where the chi-square tables are square, this deficiency can be corrected. In other cases C provides a close approximation of the degree of association.

Implicit in the use of chi-square is the testing of the general null hypothesis that there is no statistically significant difference between the frequencies expected and the frequencies observed.

The degree of association between the research variables was measured by the statistical procedures outlined here, as can be seen in Chapter V. In the next chapter, a general overview of the farm accident situation in Louisiana is presented through the use of frequency distributions.
CHAPTER IV

A DESCRIPTION OF THE FARM ACCIDENT SITUATION
IN SELECTED AREAS OF LOUISIANA

Introduction

Earlier in this work it was pointed out that one of the primary objectives of the research done was to provide a description of the farm accident situation in selected areas of Louisiana. This chapter is devoted to that purpose. It contains various frequency distributions of accidents and frequency distributions of accidents as modified by other factors. This type of presentation is employed to utilize as much of the data as possible, and to present a broad overview of farm accidents in Louisiana. While no causal inferences are drawn from the data at this point (the next chapter is devoted to that type of analysis), some tentative comments are offered.

Selected Accident Frequency Distributions

The first display of accident frequencies provides a profile of the over-all spread of accidents throughout the six sample areas of the State of Louisiana.
During the period from January 1, 1970 to December 31, 1970 one-hundred and eighty-two accidents were reported to have occurred in our sample population. Of these one-hundred and eighty-two farm accidents, thirty-one percent were reported in Area 4 (Louisiana Rice Area). Area 2 (Red River Cotton and Mississippi Delta Area) had the next highest rate, accounting for twenty-three percent of all the farm accidents. The Louisiana Sugar Cane Area (Area 5)
accounted for seventeen percent of all the farm accidents in our sample population. Thus, the combination of the rice, cotton, and sugar cane growing areas of the state accounted for sixty-one percent of all the accidents reported during the twelve month survey.

The same three areas (Areas 4, 2, and 5) also experienced the highest rates of farm accidents in all severity categories, as can be seen in Table I below.

**TABLE I**

NUMBER OF FARM ACCIDENTS IN THE SIX LAND-TYPE CROP-USAGE AREAS, BY SEVERITY CATEGORIES*

<table>
<thead>
<tr>
<th></th>
<th>Fatal</th>
<th>%</th>
<th>Permanent</th>
<th>%</th>
<th>Severe</th>
<th>%</th>
<th>Slight</th>
<th>%</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 1</td>
<td>0</td>
<td>(0)</td>
<td>1</td>
<td>(33)</td>
<td>4</td>
<td>(9)</td>
<td>15</td>
<td>(12)</td>
<td>20</td>
</tr>
<tr>
<td>Area 2</td>
<td>1</td>
<td>(50)</td>
<td>0</td>
<td>(0)</td>
<td>11</td>
<td>(24)</td>
<td>31</td>
<td>(24)</td>
<td>43</td>
</tr>
<tr>
<td>Area 3</td>
<td>0</td>
<td>(0)</td>
<td>0</td>
<td>(0)</td>
<td>6</td>
<td>(14)</td>
<td>12</td>
<td>(9)</td>
<td>18</td>
</tr>
<tr>
<td>Area 4</td>
<td>1</td>
<td>(50)</td>
<td>1</td>
<td>(33)</td>
<td>16</td>
<td>(34)</td>
<td>40</td>
<td>(31)</td>
<td>58</td>
</tr>
<tr>
<td>Area 5</td>
<td>0</td>
<td>(0)</td>
<td>0</td>
<td>(0)</td>
<td>7</td>
<td>(12)</td>
<td>25</td>
<td>(19)</td>
<td>32</td>
</tr>
<tr>
<td>Area 6</td>
<td>0</td>
<td>(0)</td>
<td>1</td>
<td>(33)</td>
<td>3</td>
<td>(7)</td>
<td>7</td>
<td>(5)</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>(100)</td>
<td>3</td>
<td>(100)</td>
<td>47</td>
<td>(100)</td>
<td>130</td>
<td>(100)</td>
<td>182</td>
</tr>
</tbody>
</table>

*Expressed by per cent of occurrence within categories.
The only exception to this statement is in the "Fatal" category. Only two fatalities were reported— one in Area 4, and one in Area 2.

The great preponderance of all reported farm accidents fell into the "Slight" category, comprised of such injuries as minor cuts, bruises, abrasions, etc.. These slight injuries accounted for just over seventy-one percent of all injuries reported. It should be remembered however that for an accident to be reported at all it must have required professional medical assistance, or caused the loss of at least one-half day of normal activity. Under these criteria even "slight" injuries have considerable impact from a personal discomfort and suffering standpoint as well as from an economic standpoint.

The distribution of accidents by severity class was not unanticipated. In the previously cited Michigan study the percentage distribution of farm accidents by seriousness of injury was similar, as can be seen in Table II.
### TABLE II

**COMPARISON OF MICHIGAN AND LOUISIANA FARM ACCIDENT SEVERITY RATES IN PERCENTAGES**

<table>
<thead>
<tr>
<th>Seriousness of Injury</th>
<th>Michigan Study (N=280)</th>
<th>Louisiana Study (N=182)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Slight</td>
<td>182</td>
<td>(65.5)</td>
</tr>
<tr>
<td>Severe</td>
<td>82</td>
<td>(29.5)</td>
</tr>
<tr>
<td>Permanent</td>
<td>12</td>
<td>(4.3 )</td>
</tr>
<tr>
<td>Fatal</td>
<td>2</td>
<td>(0.7 )</td>
</tr>
<tr>
<td>Totals</td>
<td>280</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>


Both studies employed the same definitions of farm and accident, and, in general, are similar in their methodological approaches. Although the Louisiana sample is smaller in numbers than the Michigan sample, Louisiana experienced two fatalities during the twelve month time span of the study—the same number of fatalities reported in the Michigan study.

Approximately fifty-nine percent of all farm accidents reported occurred while the individual involved was
performing farm work (tilling, plowing, harvesting, etc.). However, this particular percentage is derived from the total number of farm work accidents without reference to any additional factors. As can be seen in Table III below, when the variable of sex is introduced a drastically different picture emerges.

**TABLE III**

NUMBER OF FARM WORK AND NON-FARM WORK ACCIDENT

<table>
<thead>
<tr>
<th></th>
<th>Male %</th>
<th>Female %</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Work</td>
<td>95 (65)</td>
<td>12 (31)</td>
<td>107</td>
</tr>
<tr>
<td>Non-Farm Work</td>
<td>51 (35)</td>
<td>24 (69)</td>
<td>75</td>
</tr>
<tr>
<td>Totals</td>
<td>146 (100)</td>
<td>36 (100)</td>
<td>182</td>
</tr>
</tbody>
</table>

Males and females evince an almost diametrically opposed distribution of accidents on the farm work, non-farm work dimension. Sixty-five percent of all accidents involving males occurred while the involved individual was performing farm work; sixty-nine percent of all accidents involving females occurred while the individual was engaged in non-farm work. The negative relationship of these two
distributions can most probably be accounted for in terms of exposure to hazard, reinforcing the belief that exposure to hazard is of prime importance in an accident situation.

The effects of exposure on specific hazards is also evidenced in the distribution of accidents for males and females by the type of agency involved. As can be seen in Table IV, the percentage of men suffering farm machinery accidents was nearly twice as high as that for females for that type of machinery.

TABLE IV
AGENT INVOLVED IN FARM ACCIDENT, BY SEX*

<table>
<thead>
<tr>
<th>AGENT</th>
<th>Male %</th>
<th>Female %</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Tool</td>
<td>11 (8)</td>
<td>5 (14)</td>
<td>16</td>
</tr>
<tr>
<td>Hand Tool</td>
<td>11 (8)</td>
<td>0 (0)</td>
<td>11</td>
</tr>
<tr>
<td>Farm Machinery</td>
<td>48 (33)</td>
<td>6 (17)</td>
<td>54</td>
</tr>
<tr>
<td>General Item</td>
<td>59 (40)</td>
<td>21 (58)</td>
<td>80</td>
</tr>
<tr>
<td>Animal</td>
<td>17 (11)</td>
<td>4 (11)</td>
<td>21</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>146 (100)</td>
<td>36 (100)</td>
<td>182</td>
</tr>
</tbody>
</table>

* Percentages are within sex categories.

Men and women both were susceptible to "general item" accidents—forty percent of the accidents for males and fifty-eight percent of the accidents for females were of
this type. The classification of "General Item" is a broad one and as such doubtlessly accounts, at least in part, for the high incident rate in that category. Within this classification are the majority of slips and falls accidents, along with accidents occurring in the farm home building that did not involve any of the other four agency classifications. Approximately forty per cent of all incidents in the "General Item" classification were slips and falls.

Farm fields, homeyards, and barnyards proved to be the most dangerous physical areas in the farm complex. Nearly sixty per cent (59.8%) of all farm accidents recorded in our sample occurred in one of these three locations. Figure 5 is a display of the distribution of accidents in actual numbers over the various areas of the farm complex.

The high number of field accidents (fifty-five) is in concordance with the high number of farm machinery accidents presented in Table IV. Accidents in farm fields and barnyards, where most farm machinery is operated, account for forty-four per cent of all reported accidents.
In the course of this research project it was found that the parts of the body most frequently injured were the
leg, the head, and the foot. Figure 6 is a display of the distribution of accidents by the part of the body injured.

Eighty of the one-hundred and eighty-two accidents reported involved an injury to either the leg, the head, or the foot. The "Other" category in Figure 6 is composed primarily of accidents that affected two or more parts of the body, and/or could not readily be considered as belonging in one of the other nine classifications.
The histogram, designated as Figure 7 below, represents the distribution of farm accidents by four age categories and facilitates a comparison between each age category's percentage of the sample population and the percentage of the total farm accidents accounted for by each age category.

The low accident rates for age groups 1, 2, and 3 are most likely attributable to their correspondingly low representation in the sample population. Figure 7 portrays
the demographic shift in the farm population. Fewer young men and women seem to be choosing farming as an occupation now than in the past. Thus, the sample population is heavily weighted toward the older ages (41 years and older). This older age group is also the only one in our study that has a percentage of accidents that is higher than its percentage representation in the population. This higher accident rate may be due to the sheer numbers involved, or it may be an indication that advancing age directly affects the probability of accidents, as suggested in other studies.*

The variable of sex has already been dealt with in Tables III and IV, in which the incidence of farm work and non-farm work accidents, and the type of agent involved in accidents respectively, as modified by the sex variable was presented. Table V shows the distribution of accidents by sex, as modified by the variable of age.

Across all age categories males account for more farm accidents than females and are involved in eight of every ten accidents reported. There seems to be a slight downward trend in both the actual numbers of accidents.

---

*The previously cited Michigan, Ohio, and Bertrand studies, as well as others, make this point.
TABLE V

NUMBER AND PERCENT OF FARM ACCIDENTS
BY AGE AND SEX

<table>
<thead>
<tr>
<th>Age</th>
<th>0-12 Age 1 %</th>
<th>13-20 Age 2 %</th>
<th>21-40 Age 3 %</th>
<th>41-up Age 4 %</th>
<th>Totals %</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>18 (10)</td>
<td>15 (8)</td>
<td>10 (5)</td>
<td>103 (57)</td>
<td>146 (80)</td>
</tr>
<tr>
<td>F</td>
<td>11 (6)</td>
<td>9 (5)</td>
<td>5 (3)</td>
<td>11 (6)</td>
<td>36 (20)</td>
</tr>
<tr>
<td>Totals</td>
<td>29 (16)</td>
<td>24 (13)</td>
<td>15 (8)</td>
<td>114 (63)</td>
<td>182 (100)</td>
</tr>
</tbody>
</table>

(Percentages given are percent of total accidents)

and in the percentage of the total accidents each age group is responsible for, in age groups one to three.

The downward trend noted is probably due to the progressively lower population representation noted in Figure 7. Sixty-three percent of all reported accidents are attributed to age group four which contains all accident-involved persons of forty-one years and older. Females at both ends of the age scale, those who are in the 0-12 years category and those who are in the 41 years and older category, have identical accident records. However, most of the females in age group one were involved in non-farm work accidents; most of those in age group four were involved in farm work accidents.
In most sociological research the variable of education, measured in different ways at different times, is emphasized as being important--in some research it is the single most valuable indicator used. Experience in accident research has provided a mixture of results pertaining to the importance of formal education. In this

**TABLE VI**

**NUMBER AND PERCENT OF FARM ACCIDENTS BY AGE AND EDUCATION**

<table>
<thead>
<tr>
<th>Education Level</th>
<th>0-12 Age 1 %</th>
<th>13-20 Age 2 %</th>
<th>21-40 Age 3 %</th>
<th>41-up Age 4 %</th>
<th>Totals %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 yrs.</td>
<td>15 (8)</td>
<td>6 (3)</td>
<td>3 (2)</td>
<td>26 (15)</td>
<td>50 (27)</td>
</tr>
<tr>
<td>6-10 yrs.</td>
<td>14 (8)</td>
<td>8 (4)</td>
<td>4 (2)</td>
<td>37 (19)</td>
<td>63 (35)</td>
</tr>
<tr>
<td>11 yrs. &amp; up</td>
<td>0 (0)</td>
<td>10 (6)</td>
<td>8 (4)</td>
<td>51 (28)</td>
<td>69 (38)</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>29 (16)</td>
<td>24 (13)</td>
<td>15 (8)</td>
<td>114 (63)</td>
<td>182 (100)</td>
</tr>
</tbody>
</table>

(Percentages given are percent of total accidents)

survey educational level was determined by the number of years of schooling completed. When cross-tabulated with age categories, the educational attainment data collected on individuals who suffered accidents produced the accident distribution presented in Table VI.
The results of this distribution are mixed and uncertain. The first three age categories display a modified version of the downward trend noted in Table V. However, it appears that as educational level goes up so does the probability of experiencing an accident. In all age categories, except age group one, this process is evident. In age group one the number of accidents are split rather evenly between the 0-5 years and the 6-10 years education categories. Obviously, since the upper age limit of this age group is twelve years, the tabular cell representing the 11 years and up education group is vacant.

The marginal totals for education categories show that the highest education group experienced nineteen percent more accidents than the lowest education group. Further, the middle education group was three percent lower than the highest education group, and eight percent higher than the lowest education group. A plausible explanation for this distribution may lie in the fact that the 0-5 years education group represented twenty-three percent of the total sample population; the 6-10 years education group represented thirty-one percent of the sample population; and, the 11 years and up education group was a full forty-six percent of the total sample population. Thus,
the degree of representation in the sample, sheer numbers, may account for the negative relationship between education and accident occurrence.

The actual time an individual spends in an activity, in this case farming, can affect the probability of his becoming involved in an accident. Figure 8 suggests two of the ways actual exposure to hazard can influence accident probability.

Number of Accidents

Average hours per week spent farming

FIGURE 8.
DISTRIBUTION OF FARM ACCIDENTS BY AVERAGE NUMBER OF HOURS PER WEEK SPENT FARMING
Figure 8 represents the range of the average numbers of hours spent in farming of those who were involved in an accident. The four categories are utilized to represent different types of farming involvement. While they are not perfect types, they do illustrate that exposure to hazard can have negative effects, from the standpoint of accident liability, at both ends of the exposure dimension. The combination of both extreme categories (0-10 hours, and 41 hours and up) account for sixty-six percent of all reported accidents. The 0-10 hours category accounts for thirty-six percent; the 41 hours and up category accounts for thirty percent.

A plausible explanation of the number of accidents reported in the 0-10 hours category is the lack of experience usually found in the "weekend" farmer. Because so little time is spent in farm activity those who fall in this category are usually unsophisticated, or at a minimum out of practice, in their use of farm implements and machinery. Thus, they are liable to make mistakes, either in judgment or in operating procedures, that increase their probability of having an accident.

At the opposite end of the exposure dimension are those individuals who spend more than forty hours per week in farm activity. One point is clear—those in this cate-
gory spend more consecutive hours farming than those in the first classification. Thus, fatigue may be the cause of the high accident rate of those who farm more than forty hours per week. The two middle classifications

Number of Accidents

<table>
<thead>
<tr>
<th>Number of Accidents</th>
<th>0-7 yrs.</th>
<th>8-15 yrs.</th>
<th>16-30 yrs.</th>
<th>30 yrs. &amp; up</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>15</td>
<td>37</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

Average number of years farm work experience

FIGURE 9.
DISTRIBUTION OF FARM ACCIDENTS BY AVERAGE YEARS OF FARM WORK EXPERIENCE

(11-20 hours and 21-40 hours) have a moderate accident rate and at this time do not warrant extensive consideration.
The distribution of farm accidents by the average number of years of farm work experience is depicted in Figure 9.

According to the data presented in Figure 9, those individuals with the least farm work experience suffered the highest number of accidents. Those in the next category (8-15 years experience) experienced the least number.

FIGURE 10.
DISTRIBUTION OF FARM ACCIDENTS BY SIZE OF FARM
However, the two succeeding groups show a rise in the number of accident involvements. One possible explanation for the higher accident rates for the last two categories may be that a certain laxness sets in, as far as safety precautions and procedures are concerned, after many years of experience and familiarity with farming techniques. The routine nature of farming activity, after many years of experience, may have a lulling effect, thereby causing mental lapses that end in an accident situation.

The final accident distribution presented in this chapter is the number of accidents recorded by the size of farm on which they occurred.

As can be seen upon examination of Figure 10, more accidents occurred on farms that were two-hundred and fifty-one acres or more in size than on any other size of farm. It is unclear, at this point, why this distribution assumed the configuration it did, particularly in view of the fact that those farms of fifty-one to one-hundred and fifty acres had the next highest accident rate of the remaining three categories.

This chapter has served the purpose of presenting a broad over-view of the farm accident situation in the State of Louisiana. Through the use of frequency distributions and cross-tabulation tables it is hoped that the
reader has acquired a general knowledge of the farm accident profile in this state.

All of the factors presented in this chapter are utilized as indicators of two components of the conceptual model employed in this research: the "exposure to hazard" component; and, the "ability to cope with hazard" component. In the next chapter these indicators are employed in a more extensive analysis of farm accidents in Louisiana, and are studied in conjunction with the third and final component or the conceptual model which is "attitude toward possible hazard".
CHAPTER V

ANALYSIS OF THE DATA

Introduction

The preceding chapter has served to provide a general description of the types, frequency, and severity of farm accidents in the State of Louisiana. The graphic presentations of farm accident data made possible some brief, tentative comments on possible relationships and associations between the various indicators. The purpose of this chapter is to examine these relationships and associations in a more formal, disciplined manner.

In chapter I of this dissertation an extensive discussion and explication of the research conceptual model was presented. In that discussion it was pointed out that the research model employed was an epidemiological model, composed of three factor types: differential exposure to hazard; ability to cope with hazard; and, attitude toward possible hazard. These factor types were conceptualized as being composed of several indicators. Some of these indicators were presented in the frequency distributions found in chapter IV. It has been necessary to eliminate two of the original indicators from the analytical design of this research. The indicators eliminated were, "number
and types of equipment used in farming" and, "safety training in other occupations". Both were eliminated because of insufficient specification in the data. All other indicators, eight in number, are presented in this chapter, and their relationship to the phenomena of farm accidents examined.

Bivariate Analysis

In this section the statistic known as chi-square is used to determine whether or not there is any relationship or association between the eight independent variables (conceptual model indicators), and the dependent variable (number of farm accidents). The coefficient of contingency (C) is used in conjunction with the chi-square tests. It is, according to Mueller,"...an approximation of the product-moment correlation coefficient for continuous variables."¹ This measure has two limitations: (1) only square tables are capable of yielding a perfect correlation (unity); and, indexes from unlike tables (different row and column arrangements) are not directly comparable. Therefore, C can only approximate prediction.

The tabular presentations in this section are followed by a chi-square value, the associated degrees of freedom, a C value, and, where applicable, a C adjusted value.

Each chi-square test is an implicit test of the general null hypothesis that there is no statistically significant difference between the observed frequencies and the frequencies expected. If a given chi-square value exceeds the tabular value at the .05 level, the difference is considered statistically significant, and, by convention, the null hypothesis is rejected. In all cases the chi-square tests have been corrected for continuity. This operation provides a more conservative value, and, in effect, makes the rejection of the null hypothesis more difficult.³

²The level of statistical significance for the chi-square values is indicated by the following notations: *=significant at the .05 level; **=significant at the .02 level; ***=significant at the .01 level; ****=significant at the .001 level; and, n.s.=non-significant.

As pointed out in chapter I, the primary orientation of this research is descriptive. As such, its primary objective is not the testing of hypotheses. Hopefully, the research contained herein will suggest hypotheses for testing in future studies in this area.

Although hypothesis-testing is not the primary goal of this work, the research was guided by a general working hypothesis involving the posited conceptual model. That general working hypothesis is that all three factor-types in the conceptual model, as measured by the indicators assigned them, are significantly associated with farm accidents, and, that certain of these indicator(s), or combinations of indicators, display a stronger association than others. As mentioned earlier, each chi-square test run is an implicit testing of the null hypothesis that the independent variable(s) under consideration are not significantly related to the dependent variable. This discussion of hypotheses and hypotheses testing is offered to obviate the necessity of stylistic, repetitious statements outlining the research hypothesis and the null hypothesis for each test run. With that in mind, we can now examine the relationship of our first indicator to the number of farm accidents recorded in our survey.
### TABLE VII

**ACCIDENT, NON-ACCIDENT COMPARISON, BY AGE CATEGORIES**

<table>
<thead>
<tr>
<th>Age</th>
<th>Accident</th>
<th>Non-Accident</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>0-12 yrs.</td>
<td>29</td>
<td>(15.9)(1.8)</td>
<td>262</td>
</tr>
<tr>
<td>13-20 yrs.</td>
<td>24</td>
<td>(13.2)(1.6)</td>
<td>224</td>
</tr>
<tr>
<td>21-40 yrs.</td>
<td>15</td>
<td>(8.3)(.9)</td>
<td>194</td>
</tr>
<tr>
<td>41 yrs. &amp; up</td>
<td>114</td>
<td>(62.6)(7.3)</td>
<td>699</td>
</tr>
</tbody>
</table>

| Totals     | 182      | (100.0)(11.6)| 1379   | (100.0)(88.3) |

Chi-Square = 9.20*  
C = .090  
d.f. = 3

The data in Table VII indicate that almost sixty-three percent of all accidents were experienced by individuals forty-one years old and older. As can be seen in Table VII, this age group--both accident and non-accident categories, account for just over fifty-two percent (52.3%) of the sample population. Of even greater
import is the fact that the individuals in this age group, who account for almost sixty-three percent of the farm accidents, represent just over seven percent (7.3%) of the total sample population.

One-hundred and fourteen people, out of a total of one-thousand five-hundred and sixty-one, were involved in nearly two-thirds of all accidents. On the basis of pure chance it was expected that this group would be involved in eighty-three accidents. In a comparable study, the previously cited Michigan report, individuals of forty-five years and up accounted for slightly over fifty percent of all accidents reported. Both studies lend credence to the idea that older farm workers are more accident prone than young farm workers. However, all other age categories display accident frequency percentages disproportionate to their individual degree of representation in the entire sample.

In contrast to the disparity between the percent of accidents versus percent of total sample in the accident group, the non-accident percentages for category representation and total representation are near-perfect matches in each age group. The widest gap is in the forty-one years and up group, and is a nearly-negligible; one and three-tenths percent. The conclusion pointed
to in this study, and nearly all other farm accident studies, is that age is a significant factor in the farm accident situation.

It has also been found in most studies of farm accidents that males, by and large, are more often involved than females. The Michigan study, for example, reported that males accounted for over eighty-six percent of the farm accidents reported. The present research indicated a similar sex dispersion of farm accidents, as can be seen in Table VIII.

**TABLE VIII**

ACCIDENT, NON-ACCIDENT COMPARISON, BY SEX

<table>
<thead>
<tr>
<th>Sex</th>
<th>Accident</th>
<th>Non-Accident</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Male</td>
<td>146</td>
<td>(80.3) (9.3)</td>
<td>706</td>
</tr>
<tr>
<td>Female</td>
<td>36</td>
<td>(19.7) (2.3)</td>
<td>673</td>
</tr>
<tr>
<td>Totals</td>
<td>182</td>
<td>(100.0) (11.6)</td>
<td>1379</td>
</tr>
</tbody>
</table>

Chi-Square = 53.44 ****  \[C = .182\]

\[d.f. = 1\]

Adjusted C = .263

\[Q = .59\]
Just over eighty percent of Louisiana farm accidents were reported to have happened to males. This group, males who have had accidents, comprises just over nine percent of the entire sample population.

Table VIII is the only table in this section that takes the form of a two-by-two contingency display. As such, it has general properties that allow the use of an additional measure of association, Yule's Q. Blalock points out that Q, "...is most useful...in those situations where the cases fall predominantly in three of the four cells."^4 It can be seen, in Table VIII, that this is the precise situation that exists. This particular type of case dispersion is an indication of a one-way association. As the data indicate the significance of the relationship of sex to the frequency of farm accidents is primarily based on the attribute of "maleness", rather than sex. We can say with some degree of conviction then that the probability of suffering a farm accident is closely associated with the variable of sex and that, more precisely, it is associated with men. The use of Q, in this instance, has the general effect of "controlling" for the individual sexes.

^4Ibid., Blalock, pp. 248-249.
The relationship between education and frequency of farm accidents, displayed in Table IX, may not be all that it seems.

**TABLE IX**

ACCIDENT, NON-ACCIDENT COMPARISON,
BY EDUCATION LEVEL

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Accident</th>
<th></th>
<th></th>
<th>Non-Accident</th>
<th></th>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>PerCent Category N</td>
<td></td>
<td>Number</td>
<td>PerCent Category N</td>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>0-5 years</td>
<td>50</td>
<td>(27.4) (3.2)</td>
<td></td>
<td>339</td>
<td>(24.5) (21.7)</td>
<td></td>
<td>389</td>
</tr>
<tr>
<td>6-10 years</td>
<td>63</td>
<td>(34.6) (4.0)</td>
<td></td>
<td>429</td>
<td>(31.1) (27.4)</td>
<td></td>
<td>492</td>
</tr>
<tr>
<td>11 years &amp; up</td>
<td>69</td>
<td>(37.9) (4.4)</td>
<td></td>
<td>611</td>
<td>(44.3) (39.1)</td>
<td></td>
<td>680</td>
</tr>
<tr>
<td>Totals</td>
<td>182</td>
<td>(100.0) (11.6)</td>
<td></td>
<td>1379</td>
<td>(100.0) (88.3)</td>
<td></td>
<td>1561</td>
</tr>
</tbody>
</table>

Chi-Square = 8.70**  
C = .091  
d.f. = 2

A cursory examination of the table indicates that as education goes up, the probability of having a farm accident also rises. It will be recalled that educational level is, under the conceptual model employed, one of the indicators of the factor-type "ability to cope with haz-
ard". The implication is of course that as education level goes up, the ability to cope with accidents should also rise, and thereby serve to depress the frequency of accident involvement. On the surface, the data in Table IX would seem to reject that hypothesis and, in fact, suggest that the reverse is true.

In chapter IV, Table VI, age and education were cross-tabulated for the accident group (N=182) alone. The data, as arranged in that table, clearly suggest that the frequency of accidents across the several education levels is strongly influenced by the age categories. In other words, age has "confounded" the education level accident frequency. It is possible, perhaps likely, that the frequency distribution, as presented in Table IX, has similarly been confounded by the uncontrolled variable of age. This possible contamination is examined in the next section of this chapter.

The number of hours per week spent in farming, an indicator of the factor-type "differential exposure to hazard" was found to be highly significant in relation to the number of farm accidents recorded.
In Table X three cells produced over eighty-five percent of the resultant *chi-square* value. The first cell, at the intersection of the "Accident" category and the "11-20 hours" work classification, contains an observed frequency (36) that is almost twice the theoretical frequency (19). This work classification, 11-20 hours, accounts for nearly twenty percent of all accidents, but
comprises approximately ten-percent of the population. The high representation of the 11-20 hour and the 0-10 hour classification in the accident category suggest that while the occasional or "weekend" farmer's exposure is low, the probability of accident-involvement for these classes is high. Those individuals with the highest rate of exposure, the 41 hours and up classification, were, as expected, involved in a large number of accidents (55). However, their percentage representation in the accident category (30.2%) is not out of line with their representation in the total population (33.3%). In sum, both ends of the exposure dimension had the highest accident involvements recorded. The low-exposure class (0-10 hours) may be the victims of inexperience or unfamiliarity with methods and/or equipment, while the high-exposure class (41 hours and up) evinced an accident rate that was expected in view of their increased exposure. Both classes however, had the highest exposure probability, with the 0-10 hour class comprising forty-two percent of the population, and the 41 hours and up class representing approximately thirty-three percent.

Another indicator of the ability to cope with hazard, in this research, is the number of years of farm work experience, expressed in four categories, as presented in Table XI.
### TABLE XI

ACCIDENT, NON-ACCIDENT COMPARISON, BY YEARS OF FARM WORK EXPERIENCE

<table>
<thead>
<tr>
<th>Years of Farm Work</th>
<th>Accident</th>
<th></th>
<th>Non-Accident</th>
<th></th>
<th>Totals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>PerCent Category N</td>
<td>Number</td>
<td>Category N</td>
<td>Number</td>
<td>PerCent</td>
</tr>
<tr>
<td>0-7 years</td>
<td>85</td>
<td>(46.7) (5.4)</td>
<td>711</td>
<td>(51.5) (45.5)</td>
<td>796</td>
<td>(50.9)</td>
</tr>
<tr>
<td>8-15 years</td>
<td>15</td>
<td>(8.2) (.9)</td>
<td>142</td>
<td>(10.2) (9.1)</td>
<td>157</td>
<td>(10.0)</td>
</tr>
<tr>
<td>16-30 years</td>
<td>37</td>
<td>(20.3) (2.3)</td>
<td>432</td>
<td>(31.3) (27.6)</td>
<td>469</td>
<td>(30.0)</td>
</tr>
<tr>
<td>30 years &amp; up</td>
<td>45</td>
<td>(24.7) (2.8)</td>
<td>94</td>
<td>(6.8) (6.1)</td>
<td>139</td>
<td>(8.9)</td>
</tr>
<tr>
<td>Totals</td>
<td>182</td>
<td>(100.0) (11.6)</td>
<td>1379</td>
<td>(100.0) (88.3)</td>
<td>1561</td>
<td>(100.0)</td>
</tr>
</tbody>
</table>

Chi-Square = 59.16 ****  
C = .192  
d.f. = 3

Although the highest number of cases recorded were in the 0-7 years experience category, this high incident rate is actually lower than the theoretically expected frequency. This experience classification, as can be seen in its far right marginal total, contained over half of the respondents in the sample. The cell in which respondents with 16-30 years experience are represented con-
tains eighteen fewer accidents than expected. Finally, those individuals in the most-experienced category (30 years and up) registered almost three times the number of accidents theoretically expected.

A great deal of care must be exercised in interpreting the meaning of the dispersion presented in Table XI. Obviously, in a classification based on years of experience, the actual ages of respondents set the upper limits of possible experience. To use an extreme example, a twenty-one year old person is automatically excluded from the highest experience class (30 years and up). Therefore, the possibility of this dispersion being confounded by age is very high. To some extent it is certain. However, under bivariate analysis it is impossible to state with any certainty the extent of the confounding effects, or the actual degree of relationship between age and experience. Thus, although the chi-square test value of the association between years of experience and the number of farm accidents is significant, at the .001 level of significance, the origin of that significance is not certain.

Under the conceptual frame of reference of this research the numbers of acres farmed, or size of farm, was considered to be an indicator of the factor-type "differ-
ential exposure to hazard". As the data in Table XII indicate, there is no association between this indicator and the number of farm accidents recorded.

TABLE XII

ACCIDENT, NON-ACCIDENT COMPARISON, BY SIZE OF FARM

<table>
<thead>
<tr>
<th>Size of Farm</th>
<th>Accident</th>
<th>Non-Accident</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent Category N</td>
<td>Number</td>
</tr>
<tr>
<td>10-50 acres</td>
<td>25 (13.7)</td>
<td>1.6</td>
<td>285 (20.6)</td>
</tr>
<tr>
<td>51-150 acres</td>
<td>53 (29.1)</td>
<td>3.3</td>
<td>362 (26.2)</td>
</tr>
<tr>
<td>151-250 acres</td>
<td>22 (12.0)</td>
<td>1.4</td>
<td>153 (11.0)</td>
</tr>
<tr>
<td>251 acres &amp; over</td>
<td>82 (45.0)</td>
<td>5.2</td>
<td>579 (41.9)</td>
</tr>
<tr>
<td>Totals</td>
<td>182 (100.0)</td>
<td>11.6</td>
<td>1379 (100.0)</td>
</tr>
</tbody>
</table>

Chi-Square = 4.25 n.s.  
C = .000  
d.f. 3

An examination of Table XII clearly indicates that actual frequencies for all cells are extremely close to the theoretical frequencies. The individual "category" percentages for both "accident" and "non-accident" groups
fall very close to the overall or "N" percentage representation for each category. For example, the second category (51-150) acres has an accident category percent-

TABLE XIII
ACCIDENT, NON-ACCIDENT COMPARISON, BY LAND-TYPE, CROP-USAGE AREA

<table>
<thead>
<tr>
<th>Land-Type Crop-Usage</th>
<th>Accident</th>
<th></th>
<th>Non-Accident</th>
<th></th>
<th>Totals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Category N</td>
<td>Number</td>
<td>Category N</td>
<td>Number</td>
<td>Per Cent</td>
</tr>
<tr>
<td>Area 1</td>
<td>20</td>
<td>(10.9) (1.2)</td>
<td>158</td>
<td>(11.4) (10.1)</td>
<td>178</td>
<td>(11.4)</td>
</tr>
<tr>
<td>Area 2</td>
<td>43</td>
<td>(23.6) (2.7)</td>
<td>371</td>
<td>(26.9) (23.7)</td>
<td>414</td>
<td>(26.5)</td>
</tr>
<tr>
<td>Area 3</td>
<td>18</td>
<td>(9.8) (1.1)</td>
<td>124</td>
<td>(8.9) (7.9)</td>
<td>142</td>
<td>(9.0)</td>
</tr>
<tr>
<td>Area 4</td>
<td>58</td>
<td>(31.8) (3.7)</td>
<td>363</td>
<td>(26.3) (23.2)</td>
<td>421</td>
<td>(26.9)</td>
</tr>
<tr>
<td>Area 5</td>
<td>32</td>
<td>(17.5) (2.0)</td>
<td>289</td>
<td>(20.9) (18.5)</td>
<td>321</td>
<td>(20.5)</td>
</tr>
<tr>
<td>Area 6</td>
<td>11</td>
<td>(6.0) (7)</td>
<td>74</td>
<td>(5.3) (4.7)</td>
<td>85</td>
<td>(5.4)</td>
</tr>
<tr>
<td>Totals</td>
<td>182</td>
<td>(100.0) (11.6)</td>
<td>1379</td>
<td>(100.0) (88.3)</td>
<td>1561</td>
<td>(100.0)</td>
</tr>
</tbody>
</table>

Chi-Square = 2.95 n.s.  
C = .000  
d.f. = 5

age of just over twenty-nine; a non-accident percentage of approximately twenty-six; and an N percentage of twenty-six and one-half. The largest discrepancy between theo-
retical and actual frequencies occurred in the cell representing those who had accidents on farms of 10-50 acres in size. This particular classification had eight accidents less than were expected. It is logically doubtful that this particular lack of association, between farm size and number of accidents, was caused by any of the other indicators acting as a "suppressor" variable. Much the same condition obtains for the degree of association between accidents and land-type, crop-usage areas of the State of Louisiana.

Once again the category percentages (accident and non-accident) are similar to the "N" percentages, for a given area. In this case, only one cell, that which represents Area 4's accident frequency, shows any deviation between theoretical and observed cases. Nine more accidents than were expected were recorded in this classification. As in the case of farm-size and accidents, it is doubtful that this variable is a viable indicator of differential exposure to hazard, as originally theorized.

Table XIV is a display of the data dispersion concerning the attitudes shown toward possible hazard and the number of farm accidents recorded.
TABLE XIV
ACCIDENT, NON-ACCIDENT COMPARISON, BY
ATTITUDE TOWARD POSSIBLE HAZARD

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Accident</th>
<th></th>
<th>Non-Accident</th>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Positive</td>
<td>41 (22.6)</td>
<td>(2.6)</td>
<td>580 (42.0)</td>
<td>(37.1)</td>
<td>621 (39.7)</td>
</tr>
<tr>
<td>Neutral</td>
<td>54 (29.6)</td>
<td>(3.4)</td>
<td>302 (21.8)</td>
<td>(19.4)</td>
<td>356 (22.8)</td>
</tr>
<tr>
<td>Negative</td>
<td>87 (47.8)</td>
<td>(5.5)</td>
<td>497 (36.0)</td>
<td>(31.8)</td>
<td>584 (37.4)</td>
</tr>
<tr>
<td>Totals</td>
<td>182 (100.0)</td>
<td>(11.6)</td>
<td>1379 (100.0)</td>
<td>(88.3)</td>
<td>1561 (100.0)</td>
</tr>
</tbody>
</table>

Chi-Square = 24.46 **** C = .142
d.f. = 2

The measurement of attitudes is, at best, precarious. As in other measurement problems in sociology, a best approximation method must be devised, or found, and then used. The attitudes referred to in Table XIV were measured by a simplified summated rating. Ten attitude-oriented questions form the basis of the attitude measurement. Three answers were possible in the forced-choice series of questions: usually; sometimes; never. The questions themselves concerned the enforcement of standard safety precautions, equipment operating procedures,
etc. The answers were then scored thusly: usually = 1; sometimes = 2; never = 3. The scores on all ten questions were then summed, and the individual was categorized as possessing either a positive, neutral, or negative attitude toward possible hazard. Further information on that index can be found in Appendix C.

The relationship between attitude toward possible hazard and farm accidents was found to be significant at the .001 level of statistical significance, with a chi-square value of 24.46. Most of the significant difference in Table XIV is in the "Accident" half of the table. A comparison of the individual category percentages versus the total "N" percentages of each attitude class highlight the significant differences. The "Positive" class represents approximately twenty-three percent (22.6%) of all recorded accidents, but that same class comprises nearly forty percent (39.7%) of the total sample population. Similar discrepancies are evidenced in the other two remaining attitude classes—"Neutral" and "Negative". Generally, the data indicate that "negatively" typed individuals are over-represented in the accident category; "positively" typed individuals are under-represented; those typed as "neutral" are slightly over-represented.
The category percentage versus "N" percentage comparison, for the "Accident" group, showed little deviation between expected and observed frequencies. The data suggest therefore that a negative attitude toward possible hazard is associated, in a positive direction, with the probability of suffering an accident, while a positive attitude is inversely associated with the probability of suffering an accident. Both of these statements can be considered sound, barring the possible confounding effects of other variables.

In the next section of this chapter the salient indicators examined in this section are re-examined under a type of multivariate analysis.

Multivariate Analysis

In the previous section the factor-type indicators employed in this research were analyzed on a bivariate basis. This method of analysis was employed as a "sorting out" procedure, used to decide what indicators merited further analysis. The results of that analysis point out that little would be gained by further examination of the indicators "size of farm" and "land-type, crop-usage areas". It is logically doubtful that these indicators were confounded to any great extent by the other indicators in the
conceptual model. While the possibility of contamination by extraneous (outside the model) variables is always present, it is believed that, if present, their effect is minimal. Therefore, these two indicators are eliminated from the multivariate analytical procedure.

The multivariate method of analysis followed here has gone under different names—depending upon what sociologist one happens to be reading. Hyman calls the process "elaboration" which is as appropriate a name as any. Anderson and Zelditch devote a chapter to this method, and it is their design that is generally followed here. The method involves the use of partial tables, incorporating a control variable (theoretically held constant) as well as one other independent variable, and the dependent variable.

Although it is theoretically possible to employ simultaneous controls as well as unlimited independent


variables, in actual practice the type of data and the number of cases involved are limiting considerations. Due to the results obtained under bivariate analysis in this research, two control variables will be used in the multivariate analysis process. It should be noted that these results have also been obtained in previous farm accident research, which adds weight to the appropriateness of the controls selected. The two variables selected as controls in this analysis are sex and age.

Sex was selected primarily because of the disparity of accident rates between males and females. Because males are involved in eight out of ten accidents, it seemed logical to hold sex constant to eliminate, or isolate, its effect on the other indicators.

The second control, age, was also selected, in part, for the same reason. Once again, it seemed logical that the variable of age would confound the accident frequency dispersion, particularly when other indicators were, to some extent, intimately connected with age—for instance education and years of farm work experience, as well as others. Because the number of age categories posited would produce tables with a high number of cells, and therefore make analysis difficult, if not impossible to follow, this control variable has been dichotomized. This dichotomi-
zation is theoretically sound since the accident frequency distribution is polarized between the youngest and the oldest age categories. Therefore, little if any informational value is sacrificed by considering age as a two-category variable. The attenuation of cases that would have resulted had this control remained as a four-category variable was also an important consideration.

The tables employed in this section are actually composed of two partial tables, as can be seen in Table XV. With this method, the relationship between independent variables and the dependent variable can be examined in each partial table, and the relationships between the two partial tables can also be compared.
### TABLE XV

ASSOCIATION BETWEEN EDUCATION AND ACCIDENTS, AGE CONTROLLED

#### Age 1 (0-40 years)

<table>
<thead>
<tr>
<th></th>
<th>Educ.1 (0-5 years)</th>
<th>Educ.2 (6-10 years)</th>
<th>Educ.3 (11 years+)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>13 (7)</td>
<td>25 (10)</td>
<td>30 (11)</td>
<td>68 (10)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>187 (93)</td>
<td>249 (90)</td>
<td>244 (89)</td>
<td>680 (90)</td>
</tr>
<tr>
<td>Totals</td>
<td>200 (100)</td>
<td>274 (100)</td>
<td>274 (100)</td>
<td>748 (100)</td>
</tr>
</tbody>
</table>

**Chi-Square = 3.06 n.s.**  
**d.f. = 2**  
**C = .000**

#### Age 2 (41 years and up)

<table>
<thead>
<tr>
<th></th>
<th>Educ.1 (0-5 years)</th>
<th>Educ.2 (6-10 years)</th>
<th>Educ.3 (11 years+)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>37 (20)</td>
<td>38 (22)</td>
<td>39 (16)</td>
<td>114 (15)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>152 (80)</td>
<td>180 (78)</td>
<td>367 (84)</td>
<td>699 (85)</td>
</tr>
<tr>
<td>Totals</td>
<td>189 (100)</td>
<td>218 (100)</td>
<td>406 (100)</td>
<td>813 (100)</td>
</tr>
</tbody>
</table>

**Chi-Square = 12.40 ******  
**d.f. = 2**  
**C = .122**

Bivariate analysis of the relationship between education and accidents was found to be significant at the .02 level (Table IX). As the data in Table XV indicate,
the association is most pronounced for those in Age group one. Originally, it seemed that as education increased, so did the probability of becoming involved in a farm accident. Even under control for age no clear-cut pattern of association has emerged. However, it can be seen in the lower partial table that the positive relationship originally thought to exist between education and accidents, is no longer evident. Examination of the category percent figures for each education level in this partial table indicate that of the three levels, the highest (11 years and up) actually has the lowest rate. The results of this dispersion however, must still be considered as mixed. The single cell with the widest discrepancy between observed and expected frequencies was the cell representing education level three in the accident category. Fifty-seven accidents were theoretically expected, but only thirty-nine occurred. Age then, had confounded the original relationship between education and accidents. Consideration is now given to the relationship between education and accidents with the control of sex introduced.
### TABLE XVI

**ASSOCIATION BETWEEN EDUCATION AND ACCIDENTS, SEX CONTROLLED**

#### Male

<table>
<thead>
<tr>
<th></th>
<th>Educ.1 (0-5 years)</th>
<th>Educ.2 (6-10 years)</th>
<th>Educ.3 (11 years &amp; up)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
</tr>
<tr>
<td></td>
<td>39 (16)</td>
<td>47 (22)</td>
<td>60 (16)</td>
<td>146 (18)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>216 (84)</td>
<td>169 (78)</td>
<td>321 (84)</td>
<td>706 (82)</td>
</tr>
<tr>
<td>Totals</td>
<td>255 (100)</td>
<td>216 (100)</td>
<td>381 (100)</td>
<td>852 (100)</td>
</tr>
</tbody>
</table>

Chi-Square = 3.87 n.s.  d.f. = 2  C = 0.010

#### Female

<table>
<thead>
<tr>
<th></th>
<th>Educ.1 (0-5 years)</th>
<th>Educ.2 (6-10 years)</th>
<th>Educ.3 (11 years &amp; up)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
<td>Number Per-Cent</td>
</tr>
<tr>
<td></td>
<td>11 (9)</td>
<td>16 (6)</td>
<td>9 (4)</td>
<td>36 (6)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>123 (91)</td>
<td>260 (94)</td>
<td>290 (96)</td>
<td>673 (94)</td>
</tr>
<tr>
<td>Totals</td>
<td>134 (100)</td>
<td>276 (100)</td>
<td>299 (100)</td>
<td>709 (100)</td>
</tr>
</tbody>
</table>

Chi-Square = 4.88 n.s.  d.f. = 2  C = 0.077

The relationship between education and accidents completely "washed out" when the control for sex was introduced. Both chi-square values are well below the
accepted significance level. Under this method of analysis it is methodologically permissible to add the two chi-square values and enter the chi-square distribution table with the sum of the two degrees of freedom. In this case the combined chi-square is 8.75 at 4 degrees of freedom. Even this cumulative score is not significant at the .05 level. Under these circumstances we can theorize that the original relationships between education and accidents was, to some degree, bolstered by the uncontrolled variable of sex.

It seems logical then that the mixed results concerning education and farm accidents, obtained in this research as well as those studies reviewed previously, have been caused by the uncontrolled presence of both age and sex. Under a control for age the accident-education dispersion changed markedly from its original form. There is reason to believe that this dispersion could be even more well defined in subsequent research.

The data in Table XVII indicate that there is no significant association between farm accidents and the number of hours of farm work performed each week, for individuals in the "youngest" age group (0-40 years). However, a highly significant relationship exists between these variables for those in the "older" group (41 years and up).
TABLE XVII
ASSOCIATION BETWEEN HOURS OF FARM WORK PER WEEK AND ACCIDENTS, AGE CONTROLLED

Age 1 (0-40 years)

<table>
<thead>
<tr>
<th>Age 1 (0-40 years)</th>
<th>0-10 hrs.</th>
<th>11-20 hrs.</th>
<th>21-40 hrs.</th>
<th>41 years &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
</tr>
<tr>
<td></td>
<td>24(11)</td>
<td></td>
<td>8(9)</td>
<td></td>
<td>16(12)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>211(89)</td>
<td></td>
<td>86(91)</td>
<td></td>
<td>120(88)</td>
</tr>
<tr>
<td>Totals</td>
<td>235(100)</td>
<td></td>
<td>94(100)</td>
<td></td>
<td>136(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 2.13 n.s. d.f. = 3 C = .000

Age 2 (41 years & up)

<table>
<thead>
<tr>
<th>Age 2 (41 years &amp; up)</th>
<th>0-10 hrs.</th>
<th>11-20 hrs.</th>
<th>21-40 hrs.</th>
<th>41 hrs. &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
<td>Percentage</td>
<td>Number</td>
</tr>
<tr>
<td></td>
<td>41(10)</td>
<td></td>
<td>28(41)</td>
<td></td>
<td>10(12)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>81(90)</td>
<td></td>
<td>41(59)</td>
<td></td>
<td>74(88)</td>
</tr>
<tr>
<td>Totals</td>
<td>422(100)</td>
<td></td>
<td>69(100)</td>
<td></td>
<td>84(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 44.53 **** d.f. = 3 C = .238
The difference between theoretical and expected frequencies are greatest for the two cells in the Age 2 partial table that represent those who have had accidents and work between 0-10 hours, and 11-20 hours, respectively. Each cell contains nineteen more accidents than would be expected through chance alone. The original bivariate analysis of the relationship between the number of hours of farm work per week and accidents (Table X) also indicated that these limited-time, or "weekend" farmers were involved in a greater proportion of farm accidents than their actual numbers would suggest.

The relationship between hours of farm work per week and accidents generally holds controlling for sex, as can be seen in Table XVIII. The relationship is strongest for males in the 0-10 hours and 11-20 hours work classifications; for females it is strongest in the 21-40 hours classification.
TABLE XVIII
ASSOCIATION BETWEEN HOURS OF FARM WORK PER WEEK AND ACCIDENTS, SEX CONTROLLED

Male

<table>
<thead>
<tr>
<th></th>
<th>0-10 hrs.</th>
<th>11-20 hrs.</th>
<th>21-40 hrs.</th>
<th>41 hrs. &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Accident</td>
<td>225(100)</td>
<td>124(100)</td>
<td>186(100)</td>
<td>317(100)</td>
<td>852(100)</td>
</tr>
<tr>
<td>Accident</td>
<td>169(75)</td>
<td>95(76)</td>
<td>170(91)</td>
<td>272(85)</td>
<td>706(82)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>56(25)</td>
<td>29(24)</td>
<td>16(9)</td>
<td>45(15)</td>
<td>146(18)</td>
</tr>
<tr>
<td>Totals</td>
<td>225(100)</td>
<td>124(100)</td>
<td>186(100)</td>
<td>317(100)</td>
<td>852(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 23.50 **** d.f. = 3 C = .164

Female

<table>
<thead>
<tr>
<th></th>
<th>0-10 hrs.</th>
<th>11-20 hrs.</th>
<th>21-40 hrs.</th>
<th>41 hrs. &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Accident</td>
<td>432(100)</td>
<td>39(100)</td>
<td>34(100)</td>
<td>204(100)</td>
<td>709(100)</td>
</tr>
<tr>
<td>Accident</td>
<td>423(97)</td>
<td>32(82)</td>
<td>24(70)</td>
<td>194(95)</td>
<td>673(94)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>9(3)</td>
<td>7(18)</td>
<td>10(30)</td>
<td>10(5)</td>
<td>36(6)</td>
</tr>
<tr>
<td>Totals</td>
<td>432(100)</td>
<td>39(100)</td>
<td>34(100)</td>
<td>204(100)</td>
<td>709(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 55.31 **** d.f. = 3 C = .270
It can be seen in tables XVII and XVIII that the hours of farm work performed each week have a strong association with the probability of suffering an accident. This is particularly true of individuals aged forty-one years or more and of either sex. Further, this relationship is strongest for those individuals who farm for twenty hours or less per week. In substance, the data indicate that farm accidents are inversely related to the number of hours of farm work performed each week.

It was originally theorized that the number of years of farm experience, an indicator of the conceptual model factor-type of "ability to cope with hazard", would display a negative relationship with the number of farm accidents reported. That is, the more experience gained, the fewer accidents suffered.
TABLE XIX
ASSOCIATION BETWEEN YEARS OF FARM WORK EXPERIENCE AND ACCIDENTS, AGE CONTROLLED

**Age 1 (0-40 years)**

<table>
<thead>
<tr>
<th></th>
<th>0-7 yrs.</th>
<th>8-15 yrs.</th>
<th>16-30 yrs.</th>
<th>30 yrs. &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accident</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Accident</td>
<td>42(11)</td>
<td>13(17)</td>
<td>8(4)</td>
<td>5(7)</td>
<td>68(10)</td>
</tr>
<tr>
<td>Totals</td>
<td>383(100)</td>
<td>80(100)</td>
<td>211(100)</td>
<td>74(100)</td>
<td>748(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 12.30 *** d.f. = 3  C = .127

**Age 2 (41 years & up)**

<table>
<thead>
<tr>
<th></th>
<th>0-7 yrs.</th>
<th>8-15 yrs.</th>
<th>16-30 yrs.</th>
<th>30 yrs. &amp; up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accident</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Accident</td>
<td>43(11)</td>
<td>2(3)</td>
<td>29(12)</td>
<td>40(62)</td>
<td>114(15)</td>
</tr>
<tr>
<td>Totals</td>
<td>413(100)</td>
<td>77(100)</td>
<td>258(100)</td>
<td>65(100)</td>
<td>813(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 30.62 **** d.f. = 3  C = .191
### TABLE XX

**ASSOCIATION BETWEEN YEARS OF FARM WORK EXPERIENCE AND ACCIDENTS, SEX CONTROLLED**

#### Male

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Accident</th>
<th>0-7 yrs.</th>
<th>8-15 yrs.</th>
<th>16-30 yrs.</th>
<th>30 yrs. up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>62(17)</td>
<td>11(12)</td>
<td>30(11)</td>
<td>43(46)</td>
<td>146(18)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>Number</td>
<td>309(83)</td>
<td>85(88)</td>
<td>260(89)</td>
<td>52(54)</td>
<td>706(82)</td>
</tr>
<tr>
<td>Totals</td>
<td>Number</td>
<td>371(100)</td>
<td>96(100)</td>
<td>290(100)</td>
<td>95(100)</td>
<td>852(100)</td>
</tr>
</tbody>
</table>

Chi-Square = 61.74 **** d.f. = 3 C = .260

#### Female

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Accident</th>
<th>0-7 yrs.</th>
<th>8-15 yrs.</th>
<th>16-30 yrs.</th>
<th>30 yrs. up</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>23(6)</td>
<td>4(7)</td>
<td>7(4)</td>
<td>2(4)</td>
<td>36(6)</td>
</tr>
<tr>
<td>Non-Accident</td>
<td>Number</td>
<td>402(94)</td>
<td>57(93)</td>
<td>172(96)</td>
<td>42(96)</td>
<td>673(94)</td>
</tr>
<tr>
<td>Totals</td>
<td>Number</td>
<td>425(100)</td>
<td>61(100)</td>
<td>179(100)</td>
<td>44(100)</td>
<td>709(100)</td>
</tr>
</tbody>
</table>

Chi-Square = .39 n.s. d.f. = 3 C = .000
The nature of the variable of years of farm work experience make the control of age tenuous. This variable, particularly at its highest category (30 years and up) is connected with chronological age, by definition. Therefore, with the exceptions of the distribution for females (Table XX), and the distribution for Age 1 (Table XIX), no substantive determination of the effect of experience on older farmer's accident probability can be made. Because of the intimate relationship between years of experience and age, the one valid observation that can be made is that under multivariate analysis the accident rate for the most-experienced group, found in Table XI, increased.

Under bivariate analysis it was determined that there was a distinct relationship between attitudes toward possible hazard and farm accident frequency (Table XIV). Those individuals classified as possessing negative attitudes accounted for nearly forty-eight percent (47.8%) of all accidents recorded. Under the more rigid specification of multivariate analysis the various dimensions of that relationship are more apparent.
### TABLE XXI

**ASSOCIATION BETWEEN ATTITUDE TOWARD POSSIBLE HAZARD AND ACCIDENTS, AGE CONTROLLED**

#### Age 1 (0-40 years)

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>19(5)</td>
<td>146(87)</td>
</tr>
<tr>
<td></td>
<td>21(13)</td>
<td>158(84)</td>
</tr>
<tr>
<td>Totals</td>
<td>58(10)</td>
<td>68(10)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Accident</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>376(95)</td>
<td>146(87)</td>
</tr>
<tr>
<td>Totals</td>
<td>395(100)</td>
<td>167(100)</td>
</tr>
</tbody>
</table>

**Chi-Square = 17.56 **** d.f. = 2 C = .151**

#### Age 2 (41 years & up)

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident</td>
<td>22(10)</td>
<td>156(82)</td>
</tr>
<tr>
<td></td>
<td>33(18)</td>
<td>339(85)</td>
</tr>
<tr>
<td>Totals</td>
<td>226(100)</td>
<td>189(100)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-Accident</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>204(90)</td>
<td>156(82)</td>
</tr>
<tr>
<td>Totals</td>
<td>226(100)</td>
<td>189(100)</td>
</tr>
</tbody>
</table>

**Chi-Square = 4.81 n.s. d.f. = 2 C = .077**
The relationship noted in Table XIV is still apparent in Table XXI, particularly the upper partial table. In both partial tables the number of accidents recorded for each attitude classification is higher reading from left to right, or positive to negative. In the upper partial table both the absolute numbers increase as well as the percentage of accidents by attitude classification. A definite association exists between attitude toward possible hazard and farm accidents for those in the Age 1 group (0-40 years). The marginal totals for both age categories indicate that of those in Age 1, ten percent had accidents; of those of Age 2, fifteen percent had accidents. Although there is some disparity in category size between the age categories it can be seen that, numerically, Age 1 respondents were dispersed in the opposite direction from Age 2 respondents. Three-hundred and ninety-five Age 1 respondents were classified as having a "positive" attitude toward possible hazard; three-hundred and ninety-eight Age 2 respondents were classified as possessing a "negative" attitude. The data indicate that more Age 1 respondents possess a positive attitude toward hazard, and that there is a definite association between attitudes and accidents, when age is held constant.
### TABLE XXII

**ASSOCIATION BETWEEN ATTITUDE TOWARD POSSIBLE HAZARD AND ACCIDENTS, SEX CONTROLLED**

#### Male

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accident</strong></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td></td>
<td>33(9)</td>
<td></td>
<td>44(23)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>69(25)</td>
<td></td>
<td>146(18)</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Accident</strong></td>
<td>335(91)</td>
<td></td>
<td>153(77)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>218(75)</td>
<td></td>
<td>706(82)</td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>368(100)</td>
<td>197(100)</td>
<td>287(100)</td>
<td>852(100)</td>
</tr>
</tbody>
</table>

**Chi-Square** = 29.24 ****  d.f. = 2  C = .182

#### Female

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Neutral</th>
<th>Negative</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accident</strong></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td></td>
<td>8(4)</td>
<td></td>
<td>10(7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18(7)</td>
<td></td>
<td>36(6)</td>
<td></td>
</tr>
<tr>
<td><strong>Non-Accident</strong></td>
<td>245(96)</td>
<td></td>
<td>149(93)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>279(93)</td>
<td></td>
<td>673(94)</td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>253(100)</td>
<td>159(100)</td>
<td>297(100)</td>
<td>709(100)</td>
</tr>
</tbody>
</table>

**Chi-Square** = 2.19 n.s.  d.f. = 2  C = .055
The upper partial table in Table XXII reaffirms the conclusion that attitudes and farm accidents are closely associated. Although more males are found in the positive attitude class (368), only thirty-three, or nine percent suffered accidents. At the opposite end of the attitude dimension, two-hundred and eighty-seven males are found, with an accident rate of twenty-five percent. For females, there was no association evident between attitudes and accidents. It should be remembered, however, that over eighty percent of all accidents reported (80.3%), involved males.

It would seem then that a positive attitude toward possible hazard is associated with a reduced accident frequency—especially for "young" males. This point could favorably affect the farm accident rate in future years.

In this chapter it has been shown that some of the originally posited indicators of the conceptual model factor-types were, in effect, non-discriminating. Some of the indicators examined were found to be effective measures of the factor-type under which they were subsumed. At least one of the indicators was shown to produce uncertain results, and should be used with caution in future research. In the final chapter these indicators are discussed more fully, along with some of the conclusions.
drawn from this study that suggest viable hypotheses for subsequent research in this area.
CHAPTER VI

SUMMARY AND INTERPRETATION: THE RESEARCH FINDINGS, CONCLUSIONS, LIMITATIONS, AND IMPLICATIONS

The process of interpretation can include the reconciliation, explanation, and expansion of the relationship between conceptual models and data. As Riley indicates, the researcher usually chooses to go one of two ways in interpretation. He can interpret from model to data, or from data to model. Interpretation from model to data is usually employed in research designed to test specific hypotheses; the reverse method is more prevalent in research designed to develop hypotheses for future testing. Realistically, these two methods should be considered as ideal types - most sociological research contains characteristics of each. Whether or not they can or should exist in pure form is a moot point.

The researcher has attempted to conceptualize the problem of farm accidents through the use of an epidemiological model, describe the farm accident situation in Louisiana, and develop suggestive hypotheses for future research.

---

research in the selected problem area. The emphasis of
the research has been on the description of the farm
accident situation in Louisiana, and the refinement of the
model employed.

The basic conceptual model was envisaged as being
composed of three components: agent; host; and environment.
Between these three components and farm accidents it was
posited that three factor-types intervened. They were:
differential exposure to hazard; ability to cope with
hazard; and, attitude toward possible hazard. Nine indi­
cators were theorized to be viable measures of the first
two factor-types. The third factor-type was measured by
a summated attitude index, derived from direct attitude-
oriented questions in the research instrument. The
indicators employed as measures of the factor-types were
categorized and subjected to statistical testing, to
determine their efficacy. After the data had been
collected two of the original nine indicators were elimi­
nated, due to insufficient information. The remaining
indicators were all subjected to bivariate analysis.
Those that proved viable were then re-examined under
multi-variate analysis (see Chapter V).

From the results of the bivariate analysis it was
evident that two of the indicators, or variables, were
operating in a manner that tended to confound the relation-
ships of the other independent variables to the dependent variable. These two indicators, sex and age, were logically sound choices to serve as control variables. The relationship of each of the four remaining indicators to farm accidents was then examined, controlling for age and then for sex. The following discussion relates and interprets the research findings to the conceptual model.

**Differential Exposure to Hazard**

Five indicators were originally theorized to be effective measures of this factor-type. They were: (1) hours per week spent in actual farm work; (2) the number of acres farmed (size of farm); (3) the number and types of equipment used in farming; (4) the geographical location of the farm (6 areas in the state); and, (5) sex.

Number three was found to be unusable in the analysis, due to incomplete and inadequate data. The possibility of future studies utilizing this indicator successfully should not, however, be discounted. Under bivariate analysis numbers 2 and 4 were found to bear no statistically significant relationship to the frequency of farm accidents, in the State of Louisiana. Studies conducted in other states, however, have enjoyed success with these indicators which suggests that their lack of discriminating power may be idiosyncratic to this study.
Both of the remaining indicators, sex, and hours per week spent in actual farming were found to be significantly associated with farm accidents.

As indicated by the data presented in Chapter IV and V, sex was a very effective indicator of differential exposure to hazard. The results of this research coincide with those of previous studies in under-scoring the fact that farm accidents are highly selective of males.

The rural female's role in family life probably more closely approximates the idealistic portrayal of the "woman of the house" than that of her urban counterpart. Although rural life styles are rapidly being replaced by the more cosmopolitan activities and interests found in typical urban or suburban areas, vestiges of the older order are still present. Due, in part, to this fact farm wife's activities are confined; to some extent, to household work and light farm chores. The social milieu in which they exist precludes heavy involvement with physically difficult farm tasks. And, while the home contains many opportunities for accidents, they are generally of a less serious nature than actual farm work accidents. Therefore, it is not surprising that women are repeatedly found to be "safer" in farm accident research. In fact, it may be advisable to suggest that farm accident research be conducted on a sex basis. That is, when the objective
of the research is to analyze farm-work accidents, women should be excluded from the sample. One obvious advantage in this approach would be that smaller samples would yield more accidents for analysis if only males were sampled. Because women possess, by nature of their social roles, a lower degree of exposure to farm accidents, their exclusion from this type of research seems advisable.

The number of hours per week spent in farming was found to be inversely related to the frequency of farm accidents. Discrepancies between theoretical and observed frequencies were the greatest for the two categories representing the least time spent farming (0-10 and 11-20 hours). As mentioned briefly in Chapter V, these part-time farmers are probably over-represented in accident statistics due to unfamiliarity with the machinery and methods of farming. It is believed that the majority of this type of farm operation stems from two sources.

Firstly, it is likely that a large number of currently part-time operations were, at one time, full-time farms that became incapable of producing enough profit to sustain the family unit. In these circumstances outside part-time employment is usually sought, with the result that farming becomes, essentially, an after-work or weekend occupation, used to supplement family income. As such, factors of fatigue, unfamiliarity, and hurried
work are common—all of which increase the probability of having an accident.

The second type of weekend farmer could be characterized as an individual who successfully derives his income from other sources, and has advanced his economic position to such a point that he can afford to become involved in farming as an avocation. It is possible that most accidents caused by incorrect procedures and/or faulty machinery operation come from this group. In any case, the individual who farms less than twenty hours per week is a chief source of all farm accidents. An intensive study of this type of farming operation is called for. Any proposed ameliorative program that does not take into account the number of hours spent in farming each week, would ignore an extremely effective measure of differential exposure to hazard.

To recapitulate, it is suggested that some of the indicators of the conceptual model factor-type of differential exposure to hazard should be modified. Geographical location, which was originally designed to denote the major crop of the sample farms, along with its areal location proved to be unsatisfactory for both purposes. The utilization of a definitive crop-type indicator, separate from geographical location should prove more helpful.
As mentioned above, sex could be removed from the model by treating it as an invariant through the use of male respondents only. The number of acres farmed and the numbers and types of equipment used should be retained on a tentative basis to ascertain their discriminatory power in other studies. The results of this research indicate that the hours per week spent in farming should be retained as an indicator of differential exposure to hazard.

**Ability to Cope With Hazard**

Three of the four posited indicators of this factor-type were tested; number of years of farm work experience; educational attainment; and, age. It was shown, under multivariate analysis, that age confounded, in varying degrees, the other two indicators. The indicator of number of years of farm work experience proved particularly susceptible to this contamination. Because of the intimate relationship between age and years of experience, and the high discriminatory power of the age variable it seems logical to eliminate years of experience from the model. In essence, the two variables could be considered as two measures of the same characteristic. This is particularly true at the higher levels of experience. Since experience is usually measured in numbers of years some contamination is unavoidable.
From the data it appears that educational attainment suffers from the same shortcoming, but to a lesser degree. For most people formal education usually ends between the ages of sixteen and twenty-one years. Therefore the close, positive link that was evident between age and experience was not evident between age and education. It is believed that the effectiveness of education as an indicator of this factor-type would be enhanced by the elimination of education categories, and the treatment of education as interval data—utilizing one year intervals.

**Attitude Toward Possible Hazard**

This factor-type consisted of a summated rating index, derived from ten safety attitude-oriented questions in the research instrument. The quantification of a subjective concept such as attitude is a problem that to date has not been conquered by sociologists. As it is true of so much of sociological data, a best approximation must, for the time being, suffice. Added to the difficulty of deciding on where demarcation lines between kinds or degrees of attitudes should be drawn, is the fact that however such lines are drawn the data to which they are eventually applied represent verbal behavior. Verbal behavior and actual behavior are seldom found to be identical, often
they are contradictory. No matter what scheme is used to quantify this qualitative property the likelihood of at least some error is always present. Thus, the method of attitude measurement used in this research may be faulty. It is a simple method, designed to be conservative, or narrow, at both ends of the attitude dimension. Because of the results obtained with this method, it is tempting to view it as faultless. In this research attitude toward possible hazard, as measured, was found to be significantly associated with the frequency of farm accidents. Further, the kind of attitude toward possible hazard found to be most common among those who suffered accidents was of the negative variety.

An encouraging finding of this research, for those who are involved in farm safety problems, is that young males were found to have the highest rate of positive attitudes toward hazard and the lowest rate of negative attitudes. The reason or reasons for these encouraging results are not directly deducible from the data. However several interesting inferences can be drawn, all of which are somewhat inter-connected.

Indications are that the educational achievement level of Louisiana is increasing. This point, substantiated in part by the data gathered in this research, may be
responsible for a more intelligent and mature concern for safety on the part of the younger farm people in this state.

Education is only one facet of the complex socialization process in a given society. It serves to inculcate societal mores and norms in the individual exposed to it. Apart from its societal indoctrination functions it serves the important function of increasing the awareness, or at least the possibility of increased awareness, among those who are exposed to it. This awareness is, of course, necessary to the success of accident prevention programs. At a basic level, an increase in the numbers of people who have the ability to read and write can further the cause of accident prevention. Suggestions, information on better procedures, danger warnings, operational instructions, and public safety campaigns, all rely, to some extent, on the existence of a literate target public. This does not necessarily infer that the older farmer group contains more illiterates than the younger group. But, given Louisiana's educational history, it is a possibility.

The foregoing analysis is conjectural, which does not necessarily negate its accuracy. If it is accurate, it is logical to assume that present accident prevention
programs, disseminated by increasingly effective communication media reaching larger and more literate audiences, will become more successful in attaining their goals.

Scientific and popular studies of the aging process have usually called attention to the increased inflexibility that seems to accompany the aging process. In farming, the distrust or disdain for new, safer methods of operating potentially dangerous equipment can be inferred to be more prevalent in the "older" farmer. Perhaps, as far as farm safety is concerned, these individuals are a "lost cause". In any event, the younger farmer, all things being equal, has more years of farming ahead of him. It is suggested that future safety programs would be more successful if oriented toward this group. If the socialization patterns of this group can be altered favorably, as they pertain to safety procedures, future farm accident statistics should be less gloomy.

At present farming is one of the more individualistic occupations in this country. As such, it is singularly lacking in strong social controls. This lack of social controls or sanctions concerning the use of extremely powerful and/or dangerous equipment works to the detriment of the farmer. It has been suggested, in fact, that the normative structure found on United State's
farms, not only is lacking in sanctions concerning dangerous work habits, it (the normative structure) actually encourages such habits.\textsuperscript{2} This \textit{machismo} complex evolves from the socialization processes at work in rural-farm America. It is that socialization process that must be altered if there are to be any positive changes in the farm accident incident rate.

\textbf{Suggestions for Future Research}

Although it is dangerous to draw specific profiles from generalized data—the well-known individualistic fallacy—this method of presentation can be an effective heuristic device. From the data analyzed in the course of this research and from the inferential analysis employed, the development of a simple profile of the individual involved in most accidents on the farm is possible. The involved individual is usually a male, forty-one years or older, has ten years, or less, of formal education, works twenty hours per week or less at farming, has less than fifteen years of farm work experience, and can be classified as an "individualist" who has a manly

\textsuperscript{2}Alvin L. Bertrand, "Farm Accidents--Number, Types, Social Costs and Causes," Louisiana State University Agricultural Experiment Station Bulletin, No. 581
disdain for doing things the safe way. While this profile is a short succinct sketch of the conclusions drawn from this research, it may serve to recall some of the more specific conclusions reached.

A general suggestion for future research is that it concern itself with intensive, rather than extensive surveys. This research has been of the extensive genre in order to accomplish its general purpose of description. The following are suggested hypotheses for future intensive research:

- Individuals who engage in farming on a part-time basis are more apt to suffer accidents. Further, this increased accident probability is caused by a lack of familiarity with proper equipment handling and recommended safety procedures.

- As the educational level of farmers increases, the rate of accident involvement decreases.

- Farmers who hold negative attitudes concerning the importance of accepted safety procedures and precautions have a higher rate of accidents than those who hold positive attitudes toward those safety precautions and procedures.

- Safety campaigns oriented to younger farm members produce more positive results than those containing no age-group identification.

- Farm-work accidents are more extensive and more costly than non-farm work accidents that occur on farms.

The preceding suggested hypotheses are a sampling of the intensive study areas suggested by this research. Doubtlessly, they can be modified and added to as
particular circumstances dictate. Unforeseen difficulties may arise, as they have in the present endeavor.

Limitations of the Study

Two major limitations of the study were evident after its inception. Both involve the type of interviewers employed in the survey.

As detailed in Chapter III, the interviewing corp for this study was composed of members of Home Demonstration Clubs in Louisiana. While most of the 250 women involved performed admirably, the problem of control was a vital one. Due to the extensive nature of this survey—both in time and physical area—more time was spent in simply keeping the data coming than was desirable. Also, the fact that most interviewers were untrained for the tasks at hand increased the amount of missing data that had to be literally "hunted down". With a survey of this scope it is doubtful that any better method could be employed. For the intensive studies suggested herein the utilization of fewer, but well trained interviewers should eliminate this problem.

The second limitation of this study is connected to the first. The reader has doubtlessly wondered why, in a state where the population is approximately one-third black, no race differentials were employed.

The interviewing corp employed was, almost without
exception, composed of white female members of Home Demonstration Clubs. No lengthy discussion of the race attitudes of southern rural females will be offered here. But, the writer found it extremely difficult to convince the interviewers, both individuals and groups, to contact black farmers. Therefore, in order to implement the cooperative participation needed, no race differentials were employed. However, it is known that some black farmers were included in the final sample.

This problem suggest that another hypothesis, concerning race differentials in farm accidents would be efficacious, given a trained, professional interviewer corp.

It is felt that future research in the problem area of farm accidents be performed in an intensive manner, in the areas suggested. More research is needed, particularly research concerning the social situations that, in some cases promote accidents, and the social costs of those accidents.
BIBLIOGRAPHY

A. BOOKS


B. PERIODICALS


C. PUBLIC DOCUMENTS


D. ACADEMIC REPORTS


E. NEWSPAPERS


F. MISCELLANEOUS


G. UNPUBLISHED MATERIAL

APPENDIX A
Louisiana Parishes in the Sample Frame

Area #

1. Timber, hill, cutover pine and flatwood area:
   Beauregard
   Bienville
   Sabine
   Vernon

2. Red River cotton and Mississippi Delta area:
   Caddo
   Caldwell
   Madison
   Rapides
   Red River
   West Carroll

3. Central Louisiana mixed farming area:
   Evangeline
   Lafayette
   St. Landry

4. Louisiana rice area:
   Acadia
   Allen
   Cameron
   Calcasieu
   Vermillion

5. Louisiana sugar cane area:
   Iberia
   Lafourche
   St. John
   St. James
   St. Mary

6. Louisiana dairy, poultry and truck area, and, New Orleans truck and fruit area:
   Livingston
   Washington
GENERAL INFORMATION FORM

Parish_________________________ Farm Owner's Name__________________________

Interviewer's Name____________________ Phone______________________________

Address____________________________________________________________________

1. Does this place sell $250 or more agricultural products? Yes [ ] No [ ]

If Yes, continue with interview, skip to question #2.

If No, ask -- "Does it sell $50 or more?" Yes [ ] No [ ]

If No, Discontinue Interview.

If Yes, ask -- "Is it 10 or more acres in size?" Yes [ ] No [ ]

If Yes, Continue.

If No, Stop, select another family.

2. a. What do you think is the main reason for accidents on the farm?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

b. What other reasons do you think are important?

________________________________________________________________________

________________________________________________________________________

3. a. Do you have a job other than farming? Yes [ ] No [ ]

b. If yes, what is that job?___________________________________________________

c. How many hours per week on the average do you work at it?____
d. How many weeks per year on the average do you work at it? _____

e. How many hours per week on the average do you work at farming? _____

f. How many weeks per year on the average do you work at farming? _____

4. The following questions are about people living and/or working on this farm:

<table>
<thead>
<tr>
<th>Name</th>
<th>Head &amp; Relation to Head of House</th>
<th>Age</th>
<th>Sex</th>
<th>Does Person Live on This Farm</th>
<th>Average Number of Hours Per Week Worked on Farm</th>
<th>Number of Years Worked on Farm</th>
<th>Years of Schooling Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. What crops and products are grown on this farm? What percent of your annual sales is in each product?

Do you grow:

<table>
<thead>
<tr>
<th>Crops</th>
<th>Yes</th>
<th>No</th>
<th>Sales %</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. cotton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. rice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. soybeans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. sugar cane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. truck crops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. grain crops</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. beef cattle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. dairy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. poultry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. hogs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. all other crops or animals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. How many total acres does this farm have? ________________

7. How many of the following pieces of equipment in running order do you have on your farm? (Put "0" if one, "1" if one, "2" if two, etc.)

<table>
<thead>
<tr>
<th>Equipment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractors</td>
<td>Disk Harrows</td>
</tr>
<tr>
<td>Wagons</td>
<td>Elevators</td>
</tr>
<tr>
<td>Combines</td>
<td>Harvestors</td>
</tr>
<tr>
<td>Hay Balers</td>
<td>(fruit or vegetables)</td>
</tr>
<tr>
<td>Mowers</td>
<td>Sprayers</td>
</tr>
<tr>
<td></td>
<td>Forage Harvesters</td>
</tr>
</tbody>
</table>
Manure Spreaders_________________ Feed Grinder or Mixer_________________
Plows_________________________ Stalk Rotary Cutters________
Corn Pickers____________________

8. These are questions about your home.
   a. Does it have electricity? 
      Yes [ ] No [ ]
   b. Does it have gas? 
      Yes [ ] No [ ]
   c. How many rooms does it have? Number of rooms .............
   d. How many "stories" or levels does it have 
      Single Level [ ]
      Two or More [ ]
   e. How many outside entrances does it have? Number [ ]
   f. Which outside entrance do you use most? 
      Front [ ] Rear [ ] Side [ ]
   g. How many steps does it have? 
      Number [ ]

9. Do you have the following buildings or structures on your farm? (Interviewer read list and record number of each type, then go back and get distance and type of construction).
<table>
<thead>
<tr>
<th>Location</th>
<th>Bldg. 1</th>
<th>Bldg. 2</th>
<th>Bldg. 3</th>
<th>Bldg. 1</th>
<th>Bldg. 2</th>
<th>Bldg. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barn (s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool Shed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment Shed (s) (Tractors)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Storage Shed (s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Storage Shed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Storage Tanks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. The following question concerns safety precautions you may or may not have taken on your farm or in your home.

   a. Do you allow smoking in your barn(s)?

   b. Are the printed instructions and warnings on new machinery carefully studied by those who will work with them?

   c. Are only experienced and competent operators allowed to operate machinery?

   d. Are safety guards, etc. installed on all your machinery?

   e. Are workers who use machinery for the first time instructed in its use and care?

   f. Are the antidotes for each toxic chemical you use known?

   g. Are these antidotes (non-prescription) on the place and quickly available?
h. Are all dangerous chemicals stored out of reach of children?  

i. Do you check your home for fire hazards, such as defective flues, inflammable materials, etc.?  

j. Are members of the family aware of the safety precautions necessary when using electrical devices?  

k. Do you keep a first aid kit or first aid supplies where they are readily available in case of need?  

11. In the following questions, would you please indicate your answer by saying "all," "some," or "None."

a. Is the electric wiring in your home done according to approved safety codes?  

b. Is the electric wiring in your farm buildings done according to approved safety codes?  

c. Is gasoline and liquified petroleum stored in approved safety containers?  

d. With whom in your family have you discussed a fire plan (what each person should do in case of a fire)?  

12. During the past three months, has any person living, working, or visiting on this farm had an accident? By an accident we mean: An injury to any person living or working on a farm, or a visitor who is injured while visiting the farm, that required professional medical care or loss of one-half day or more from usual activities (work, school, play, etc.). Include any accident involving chemicals/pesticides.  

Yes  

No
If Yes, how many accidents? Number
If Yes, how many people involved? Number

(Interviewer -- Prepare a separate accident report form for each accident and for each individual injured. Do the same with any applicable accident supplements).
ACCIDENT REPORT

Date of Interview_________________________ Parish_________________________

Interviewer's Name_________________________ Address______________________ Phone____

Injured person lives or works on the____________________farm (Name of head of household.)

DIRECTIONS: IF MORE THAN ONE PERSON IS INJURED IN AN ACCIDENT, USE A SEPARATE ACCIDENT REPORT FOR EACH. INDICATE THE NUMBER OF FORMS USED FOR THIS ACCIDENT. IF THE PERSON HAD MORE THAN ONE ACCIDENT, USE A SEPARATE FORM FOR EACH. IN EACH CATEGORY, CHECK THE WORD OR FILL IN THE WORDS THAT BEST DESCRIBE THE ACCIDENT.

1. WHEN injury occurred:
   a. Month______ Day______ Year_______
   b. Day of week______ Hour of Day_______ a.m. p.m.

2. WHO was injured? (Check all that apply)
   Family resident member------------------------------------------
   Permanent resident worker---------------------------------------
   Permanent non-resident worker-----------------------------------
   Temporary resident worker--------------------------------------
   Temporary non-resident worker-----------------------------------
   Other (specify)------------------------------------------------
   Age of injured-------------------------------------
   Sex of injured-------------------------------------

3. When the injury occurred was the injured person actually engaged in farm work or not?
   a. doing farm work-----------
   b. not doing farm work-------

(if injury occurred while not doing farm work skip to question #6.)
4. What was the total number of hours the injured person worked that day prior to injury? ---------------------------------------  

5. What was the number of consecutive hours the injured person worked that day prior to injury without a break of at least 1/2 hour? ---------------------------------------  

6. WHERE did the accident occur? (Check all that apply)  
- In home  
- Field  
- Farm Building  
- Barnyard  
- Woods  
- Other (Specify)  
- Homeyard  
- Lane  
- Highway  

7. WHAT TYPE of injury? (Check all that apply)  
- Cut  
- Crushed  
- Sprain  
- Drowning  
- Bruise  
- Puncture  
- Burn  
- Gunshot  
- Fracture  
- Severed  
- Bite  
- Other (Specify)  

8. WHAT PART of the body was injured? (Check all that apply)  
- Finger  
- Trunk  
- Leg  
- Other (Specify)  
- Hand  
- Toe  
- Eye  
- Arm  
- Foot  
- Head (Specify)  

9. Person WAS TREATED? (Check all that apply)  

   a. At:  
   - Home  
   - Doctor's Office  
   - Hospital  
   - Other (Specify)  

   b. By:  
   - Family Member  
   - Doctor  
   - Nurse  
   - Other (Specify)  

   c. If the injured person was treated by someone other than a doctor, was the doctor contacted:  
   - Yes  
   - No  

10. HOW SERIOUS was this accident?  
    - Fatal  
    - Permanent (lost finger, hand, eye, will never be able to work again, others)  
    - Severe (broken leg, cut ligament, sprained back other)
Slight (minor cuts, sprains, burns, other)

11. Did this injury result in an amputation? __________Yes_________No

12. What thing was involved in the accident
   
   was it a power tool?  Yes---------------------- No----------------------
   
   (If yes, explain what kind, for example, power drill, power saw, grinder, blender, vacuum cleaner, etc.)

   was it a hand tool?  Yes---------------------- No----------------------
   
   (If yes, explain what kind, for example, an axe, knife, chisel, wrench, etc.)

   was it farm machinery?  Yes---------------------- No----------------------
   
   (If yes, explain what kind, for example, a tractor, truck, cotton picker, loader, etc.)

   was it a general item?  Yes---------------------- No----------------------
   
   (If yes, explain what kind, for example, broken glass, nail, water, firearm, etc.)

   was it an animal?  Yes---------------------- No----------------------
(If yes, explain what kind, for example, a pig, horse, cow, bull, dog, insect, etc.)

14. How many days were lost because of this accident?
   Days lost while in hospital----------
   Days lost while home-----------------

15. What was the approximate total of medical expenses incurred by this accident? (if any)---------------------- $ ____________

16. What was the approximate total of property damage? (if any)------------------------------------------ $ ____________

17. What was the approximate total cost of extra hired help needed? (if any)------------------------------- $ ____________

18. Was a liability suit involved in this accident? Yes------ □  No------ □

19. A description of the accident will be of great value. Please describe it as well as you can. You may use the other side of this page to complete it. Include the activity the person was engaged in all all things (machinery, tools, etc.) involved. Make a rough sketch of the accident on the back of this page if it will help.

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
MAKE SURE ALL INFORMATION IN 1 TO 19 IS COMPLETE AND CORRECT

20. WERE THERE ANY OTHER ACCIDENTS? IF SO, COMPLETE AN ACCIDENT REPORT FOR EACH.

21. COMPLETE ANY SUPPLEMENTAL FORMS THAT APPLY.
Identification No. _____________

SUPPLEMENTAL ACCIDENT REPORT
FOR
TRACTOR ACCIDENTS

Date of Interview ________________
Parish ___________________________ Head of Household ____________

Interviewer ______________________

1. Age of person involved in the accident? ________ yrs.
2. Sex of person involved in the accident? Male □ Female □
3. Was the person involved in the accident driving the tractor or riding on it? driving □ riding □
4. What type of tractor was it? tricycle □ wide front axle □ Other □
5. Who manufactured the tractor? ______________________
6. What year was it manufactured? _________________
7. How many horsepower did it have? _____________
8. What type of fuel did it use? diesel □ gasoline □ L-P □
9. Was the tractor equipped with over turn protection? Yes □ No □
10. Did the tractor have a protective frame?  
   Yes □  
   No □

11. Did the tractor have seat belts?  
   Yes □  
   No □

12. Did the tractor have power steering?  
   Yes □  
   No □

13. Did the tractor have a slow moving vehicle (SMV) emblem displayed?  
   Yes □  
   No □
Identification No. __________

SUPPLEMENTAL ACCIDENT REPORT
FOR
PESTICIDE ACCIDENTS

Date of Interview__________________ Head of Household_______

Parish____________________________ Interviewer__________________

1. Age of person involved in accident:_____

2. Sex of person involved in accident: Male [ ] Female [ ]

3. Did the accident happen:
   a. While person was applying pesticides?  
      Yes [ ] No [ ] Don't know [ ]
   b. While person was disposing of pesticides?  
      [ ] [ ] [ ]
   c. While person was mixing pesticides?  
      [ ] [ ] [ ]

4. Did the accident occur in a storage area?  
   If no, where did it occur___________________________

5. What pesticide(s) was/were involved?
   DDT____________________________ Methyl Parathion__________________
   Toxaphene________________________ 24D____________________________
   Sevin____________________________ Arsenicals_____________________
   Malathion________________________ Other_________________________
      (Specify)

6. Was the pesticide being used recommended by LSU?  
   Yes [ ] No [ ] Don't know [ ]

7. Was the person involved wearing safety equipment such as gloves, hat, etc.?  
   [ ] [ ] [ ]
8. Are pesticides kept in a separate storage area?
   If yes, is it locked?
9. Was the accident fatal?
Attitude Toward Possible Hazard Score

This score is a simple summated rating of respondents answers to questions 10 b. through 10 k., found in Appendix B. Each question was scored on the following basis:

- Never = 3
- Sometimes = 2
- Usually = 1

Scores for each respondent were then summed and one individual total score derived on the following categorization:

- Score Ranges
  - Positive = 10-15
  - Neutral = 16-25
  - Negative = 26-30

Both positive and negative categories were deliberately narrowed to ensure the appropriateness of the categorization.
VITA

The author was born in Superior, Wisconsin, April 23, 1937. He attended public schools in that city and graduated from Superior East High School in 1955. He attended Wisconsin State University at Superior from January, 1956 to June, 1956, after which he enlisted in the United States Navy for a period of four years. Following completion of his naval service he reentered Wisconsin State University at Superior and graduated with a Bachelor of Science in January, 1964. From January, 1964, to July, 1967 he was employed as a sales representative and an insurance underwriter. In September, 1967 he entered Louisiana State University as a graduate assistant in the Department of Sociology. In August, 1969 he was awarded the Master of Arts, and is presently a candidate for the Doctorate of Philosophy.
EXAMINATION AND THESIS REPORT

Candidate: Joseph Anthony Novack

Major Field: Sociology

Title of Thesis: Sociological Perspective on Farm Accidents in Louisiana: An Epidemiological Approach

Approved:

[Signature]
Major Professor and Chairman

[Signature]
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signature]
William F. Haag

[Signature]
Perry H. Howard

[Signature]
Wendell H. Fester

Date of Examination:

7-3-71