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Harvest of hazards the farm safety movement, 1940-1975

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Harvest of hazards
the farm safety movement, 1940-1975

by

Derek S. Oden

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Agricultural History and Rural Studies

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2006

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DEDICATION

This work is dedicated to my parents who have nurtured me since birth and to my ancestors who braved southern Iowa farms and coal mines, some of whom were killed or injured while attempting to provide for their families. Most importantly, this work is dedicated to my wife, Jennifer, and to my son, Luke, to whom all my labors are devoted.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS		iv
CHAPTER 1	The Farm Safety Movement: The History of Transforming Tragedy into a Network of Collective Action	1
CHAPTER 2	Igniting the Movement: The Farm Safety Network Emerges Amidst the National Emergency of the Second World War	11
CHAPTER 3	The Uniqueness of Farmstead Safety: Old Hazards and New Dangers Converge in the Countryside	54
CHAPTER 4	Safety and Mechanization: New Machines, New Buildings, and New Hazards	90
CHAPTER 5	The Chemical Revolution and Safety: Fertilizers, Pesticides, Livestock Treatments, and Herbicides	130
CHAPTER 6	Raising Safety Awareness: Farm Safety Advocates Educate in Response to a Complex and Ever-Evolving Issue	171
CHAPTER 7	An Ideal Fit: 4-H, FFA, and the Farm Safety Movement	210
CHAPTER 8	Lawsuits, Institutional Struggles, and Legislation: A More Contentious Environment Characterized the Farm Safety Movement	243
CHAPTER 9	Conclusion	275
REFERENCES CITED		285

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CHAPTER ONE

The Farm Safety Movement: The History of Transforming Tragedy into a Network of Collective Action

Darrel and Marilyn Adams' family expected October 15, 1986 to be a typical fall day on their farm near Earlham, Iowa; however, it proved to be one that would change their lives forever. They had decided to allow their son, Keith, to miss school so he could assist his step-father with the corn harvest. In her book, *Rhythm of the Seasons: A Journey Beyond Loss*, Marilyn recalled the incident. She stated that her son had operated the auger that day, a device which dumps the harvested corn into the grain bin's top, while her husband drove the combine and emptied the grain into the wagon. Following this process, Keith "would shut off the power, and stand on the wagon's ladder, watching and waiting for the next load."¹ Tragically while Darrell was harvesting more corn, the youth fell inside the wagon. Adams described the accident and her husband's futile attempt to save their son. She stated, "Darrell had turned into the barnyard and sensed trouble immediately. Keith wasn't standing on the ladder rung waiting. The auger was running but corn was only trickling out of the wagon's side door. Something was blocking the flow. Even before he saw Keith's leg in the side door, Darrell knew." Keith had fallen into the wagon and was pulled to the bottom where he suffocated beneath thousands of pounds of grain.²

During the months that followed, Marilyn was almost overwhelmed by her despair. This personal trial involved the numbness of the funeral service and the tortuous

¹ Marilyn Adams with Mary Kay Shanley, *Rhythm of the Seasons: A Journey Beyond Loss*, Marshalltown, Iowa: Sta-Kris, Inc., 1997):12-13.

² Ibid., 12-13.

months of mourning with its many agonizing and unpredictable turns. Marilyn's depression became so severe that at times she even considered ending her own life as a way to escape her pain. However, even these feelings brought little relief, resulting in only more grief. She stated, "I'd stop the car on the railroad tracks and wait for the train. But what if I only got injured? They'd say I was insane and take my kids away. I'd leave the car running in the garage. But what if the girls found me? I couldn't do that to them." Adams also summarized that "[i]t would be a long time, many seasons, before the pieces of my life would come back together, before I would feel whole again."³ Nevertheless, she did find the inner strength; sadly, others who have encountered such heartbreak have been less fortunate. Decades prior to the Adams' personal loss, Elmer G. Power, an Iowa farmer, described an incident in which a young man was unable to survive his brother's accidental death. In his diary, Power commented, "Another tragedy. Two brothers working together about their farm work and one accidentally backing a tractor over and killing the other, then the next day the one who had driven the tractor shot and killed himself." Powers prophetically added that, "[t]he greatly increased use of tractors will result in more injuries I am afraid."⁴ Such stories reveal both the farm accident problem's seriousness as well as its persistence throughout the twentieth century.

Fortunately, Marilyn was not overtaken by her despair, but eventually transformed her sadness into a personal crusade to raise farm safety awareness by establishing the Farm Safety 4 Just Kids organization. By 2003, Marilyn Adams and thousands of other dedicated individuals had created a national organization with an

³ Ibid., 33.

⁴ H. Roger Grant and L. Edward Purcell ed., *Years of Struggle: The Farm Diary of Elmer G. Powers, 1931-1936*, Ames, Iowa: Iowa State University Press, 1976, 100.

annual budget of approximately \$800,000. The organization's membership reaches around 50,000 children annually by conducting a variety of creative educational programs. Farm Safety 4 Just Kids' chapters instruct farm youth throughout the nation about the importance of safety, publish a wide variety of safety materials, and continually evaluate the effectiveness of their efforts. The rapid rise of this organization represents one of the more recent developments in a farm safety movement which has existed for over sixty years. An intra-organizational effort, the movement focused more on education than legislation or engineering improvements, particularly in its early decades.

Farm Safety 4 Just Kids shares much with the previous efforts of other non-profit organizations which attempted to prevent farm accidents. Such organizations as the National Safety Council, 4-H, Future Farmers of America, as well as many other groups cooperated in mounting a vigorous and cooperative educational effort to inform farm families about the many dangers of the agricultural lifestyle. Farm safety activists enthusiastically joined such efforts and passionately labored to improve farm families' living and working conditions. Similar to Farm Safety 4 Just Kids, its predecessors depended upon the private sector's financial contributions to fund their educational effort. Thus, the organization symbolizes how voluntary education efforts played a crucial role in meeting the challenge of improving farm safety throughout the twentieth century.⁵

I will explore this aspect of the story by investigating and analyzing the educational efforts of safety activists between 1940 and 1970. The nation's safety leaders have labored diligently for decades to educate farmers concerning the proper precautions one should take in a rapidly changing and ever challenging living and working environment. Thus, I will include considerable discussion of how such educators

⁵ "Farm Safety 4 Just Kids: 2003 Annual Report," by Farm Safety 4 Just Kids, Earlham, Iowa 2003, 2, 6.

informed rural residents regarding such practices. Such precautions included the proper methods of avoiding tractor rollovers, correct ways of installing electrical equipment, and the donning of safety gear while applying pesticides and fertilizers. Farm safety advocates have continually tried to “sell” such safety precautions to the nation’s rural populations who have routinely engaged in dangerous work practices. I will devote particular attention to how such educational efforts arose, how safety educators responded to the introduction of new technologies, and how changing political and social conditions shaped their efforts.

The work will also explore the unique conditions found in agricultural settings, as well as how farm families’ technological acquisitions influenced safety conditions. Farming has consistently ranked as an especially dangerous profession, placing amongst the most hazardous industries since the late 1950s and into the present. This should not be surprising as such a categorization has been consistent throughout the last sixty years. Farms also possess other distinctive characteristics including their rural setting, the dizzying variety of technologies which have been continually introduced over the last half-century, as well as its regional diversity, which includes differences in crops, environmental conditions, and required physical demands. Small operators have also dominated the industry, making intensive safety legislation, company measures, and state inspection systems impractical.

Agricultural safety lagged far behind that found in other industries for a variety of other reasons. These factors included the fact that other sectors of the economy received greater governmental regulation, farming’s entrepreneurial nature, and the lack of unions to advocate on their behalf. Such regulatory institutions including the state railroad commissions, the federal Bureau of Mines, and the Department of Labor provided many

workers with safety improvements. Unfortunately, farm families were self-employed and labored outside protection of such bureaucratic entities. Additionally, family farms did not benefit from workers' compensation which lawmakers in forty-four states had passed by 1921. This safety net provided employees and their families with a guaranteed amount of financial compensation in case of injury or death. Such policies also provided employers with additional motivation to initiate accident prevention measures. Farm families were also a non-unionized labor force; therefore, they had few organizations to work on their behalf to improve working conditions.⁶

A brief discussion of accident prevention efforts in the railroad, mining, manufacturing sectors provides a useful comparison for understanding the farm safety story. Although farmers were not alone in laboring in a potentially dangerous environment, they were slow to experience accident prevention improvements. Workers in most other industries experienced reductions in work-related hazards long before farmers. Governmental regulation, the pressure of organized labor and voluntary corporate efforts combined to drastically improve workplace safety. Furthermore, larger numbers of individuals left comparatively dangerous occupations due to dramatic increases in productivity. Such changes in the American economy contributed to the funneling of workers into safer occupations. The rural exodus, which accelerated during the era, provides a particularly vivid example regarding how new technologies meant that fewer people were needed in agriculture, various extractive industries, and other relatively dangerous professions. However, those farm families who remained experienced little improvement in their working conditions.⁷

⁶ Price V. Fishback and Shawn Everett Kantor, *A Prelude to the Welfare State: The Origins of Workers' Compensation* (Chicago: The University of Chicago Press, 2000), 103-104.

Railroad laborers were some of the first employees to witness workplace safety improvements. In the late nineteenth century, railroad workers were exposed to a variety of hazards, including boiler explosions, crashes, as well as in rail-car coupling accidents. The collective efforts of the federal and state governments as well as the voluntary efforts of railroad companies improved the safety record. In fact, railroad workers received federal protection decades prior to legislative safeguards for farm workers. In 1893, Congress enacted the Federal Safety Appliance Act which required railroads to install features such as “air brakes, automatic couplers, and handholds on freight cars.”⁸

Unfortunately, the severity and frequency of railroad accidents persisted despite new regulations and technical improvements. Interstate Commerce Commission (ICC) officials responded by researching the issue, proposing innovative solutions, and supporting governmental regulation. The Hours of Service Act represented one piece of legislation aimed to reduce worker fatigue and consequently decrease accidents. In 1908, Congress also enacted of the Ash Pan Law to improve safety by reducing railroad worker’s exposure to hot steam engine ash. Furthermore, ICC representatives devoted more resources to railroad inspections to check for safety law compliance. Industry leaders also improved rail quality and communication technologies, both of which reduced derailments and collisions.⁹

⁷ Mark Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety 1870-1939*, (Baltimore: The John Hopkins University Press, 1997), 262-263, 280.

⁸ Ibid., 11- 23, 169, 23; a coupling accident refers to the many injuries or deaths resulting when workers died while attempting to manually attach rail cars to each other, see, Ibid., 22-23; for an older but nonetheless informative discussion of the railroad accident problem limited to a specific region of the United States, see, Edward Chase Kirkland, *Men, Cities, and Transportation: A Study in New England History 1820-1900* (Cambridge, Massachusetts: Harvard University Press, 1948), 235-236, 352-361.

⁹ Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety 1870-1939*, 178, 184, 181, 188.

The men who labored to feed the nation's insatiable appetite for coal were also injured and killed in a myriad of ways. Some of the more prominent incidents involved death from explosions, roof cave-ins, or coal-car accidents. A particularly well-known mine catastrophe occurred at Monongah, West Virginia and left 361 miners dead, which testifies to mining's extreme dangers. Furthermore, safety advocates were unable to reduce mine fatalities to the degree they had been reduced in the railroad and manufacturing sectors. Nevertheless, a combination of governmental intervention, union activities, and employer contributions eventually improved working conditions. State governments were some of the first to enact laws requiring basic safety provisions and hiring individuals who made compliance investigations. Unfortunately, state regulations were often not sufficiently comprehensive in covering the spectrum of potential hazards including the widespread issue of roof collapse. Issues such as confused wording of the laws and uneven enforcement slowed progress further. The effectiveness of state law was also reduced by the fact that employers often received small fines for lack of compliance.¹⁰

Although the movement to improve mine safety was paltry in comparison to other industrial sectors, miners benefited from a much greater degree of safety intervention than farmers. Miners were the benefactors of federal and state institutions, as well as the efforts the United Mine Workers (UMW) union. Bureau of Mine officials researched mine accidents, established safety equipment standards, and disseminated safety information. UMW representatives often alerted state mine inspectors of hazards at particularly dangerous mines and recommended that their members use safety equipment.

¹⁰ Keith Dix, *What's a Miner to Do? The Mechanization of Coal Mining* (Pittsburg, Pennsylvania: The University of Pittsburg Press, 1988), 101-104; William Graebner, *Coal-Mining Safety in the Progressive Period* (The University of Kentucky Press), 15, 1-10.

Mine owners also became aware of the advantages of reducing accidents and instituted a variety of safety measures. Company efforts included restructuring mine layouts with a greater degree of safety awareness, publishing safety manuals, and reprimanding miners who worked unsafely.¹¹ Farm families worked throughout the early twentieth century without the benefit of such corporate safety activities.

Factory laborers also similarly benefited from a mixture of safety legislation, union activity, and manufacturers' voluntary efforts. Although the nation's manufacturing companies' greatly expanded their productive capabilities, industrialization also came at a cost. The factory environment contained a myriad of potential hazards including pressurized boilers, fast moving belts, and presses, all of which could potentially kill or maim. Workers nevertheless experienced dramatic reductions regarding the hazards they faced in the workplace during the twentieth century's first decades due to collective efforts of unions, reformers, and factory owners. Samuel Gompers, legendary leader of the American Federation of Labor, vigorously supported the enactment of state worker compensation laws. State legislators also created industrial commissions to investigate work safety issues and establish codes. By 1923, over half of the nation's states possessed such commissions which worked to reduce hazards.¹²

Furthermore, manufacturers instigated a significant amount of resources to the effort as well. In 1908, leaders of U.S. steel companies established a safety committee to plan and implement safety improvement measures. The companies' leaders instigated

¹¹ Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety 1870-1939*, 216-220, 72, 227, 233-336.

¹² *Ibid.*, 80-82, 94, 101.

activities such as periodic plant inspections, the prompt implementation of safety measures, and a continued re-evaluation of accident prevention measures. They soon discovered that improving safety actually enhanced the companies' profitability. Moreover, major manufacturers such as Ford Motor Company, John Deere, and Joseph Bancroft & Sons Textile Mills implemented similarly vigorous safety programs.¹³

Thus, as a consequence of agriculture's unique attributes, farm families were ill-prepared to meet the safety challenges of the mid-twentieth century. As late as the Second World War's outbreak, government agencies, non-profit organizations such as the National Safety Council, and farm equipment manufacturers had done little to improve agricultural safety. Furthermore, agriculture's distinctiveness meant that accident prevention education would take on an even larger role than it had in other sectors of the economy. Although this work will briefly address such regulatory issues, much greater attention will be devoted to describing and analyzing the diverse variety of hazards farm families directly encountered in their daily lives. Thus, I will include a detailed discussion regarding how accidents involving such diverse agents as livestock, machinery, and chemicals injured or killed farmers.¹⁴

¹³ Ibid., 123, 91-92, 129.

¹⁴ For further discussion and analysis of farm accident statistics, see, John D. Rush, *Fatal Accidents in Farm Work: An analysis of 12,141 Fatal Accidents 1940-1945 in the United States* (Washington D.C. Bureau of Agricultural Economics, USDA, 1949), 1-12; Conrad F. Fritch, "Occupational and Non-Occupational Fatalities on U.S. Farms," *Agricultural Economics Report #356* (Agricultural Economics Research Service, USDA 1976) 2-9; Arnold B. Skromme, "A Farm Safety Program Sponsored By Farmers," paper presented at the annual meeting of the American Society of Agricultural Engineers, Chicago, Illinois, 18-21 December 1990), 1-3; many of these preceding studies and others rank farming near the top of the nation's most hazardous occupations. Such non-profit organizations and governmental agencies as the Occupational Safety and Health Administration and the National Safety Council have produced a variety of documents which reveal agriculture's persistently high ranking. Such electronic documents can be accessed by consulting online resources at www.osha.gov and www.nsc.org.

Thus, this work analyzes the vibrant story of the farm safety movement in the United States from the 1930s to the early 1970s. My aim is to fulfill this need of a history of the farm safety movement which will include such issues as its emergence during the Second World War, the vigorous safety educational efforts which occurred in subsequent decades, and the many controversies which arose in the 1970s. The story reveals how individuals and non-profit organizations involved in the farm safety movement established a cooperative network to research rural safety issues and hired experts to improve safety and disseminate the safety message throughout the countryside. An investigation of the dynamic relationships amongst farm safety specialists, agricultural educators, and extension workers represents much of the story. Since both the National Safety Council and the USDA cooperated in a national educational movement to reduce dangers, their role will be fully examined. The contributions of such groups as state and local level FFA and 4-H organizations which participated in a multitude of campaigns to increase safety will also be thoroughly evaluated. I will analyze how these organizations attempted to reduce the farm hazards on the national, state, and local level which will provide a composite picture of the movement. The aim is to provide an historical account of an issue which, until now, has been relegated to the background. The fact that every individual is dependent on agriculture for his or her sustenance supports the topic's importance. In a time when the majority of Americans are disconnected from the origins of their food, it is important to comprehend the human price which has been paid to secure a cheap and dependable food supply. The fact that the thousands of adults and children have died or been maimed in farm accidents also signifies the topic's importance. We should also understand the story of the many individuals who have

dedicated themselves to reducing agricultural dangers as a case study in how collective action and volunteerism can address a serious public issue.

Finally, I hope to fill a void in the rural historical literature since scholars have generally neglected the farm accident problem as well as the story of the dedicated individuals who labored to prevent such tragedies. This work seeks to remedy scholars' general neglect of the issue. The lack of an historical perspective of the topic is immediately apparent upon a brief literary survey. Although authors such as Louis Hunter, Andrew Prouty, and Roy Lubove have investigated the history of work place safety by focusing on a single industry or specific piece of legislation, farming is rarely mentioned. William Graebner's *Coal-Mining Safety in the Progressive Period* represents a particularly noteworthy treatment of a larger industry. Nevertheless, inclusive treatments which encompass a variety of industries over a long period of time are rare. Mark Aldrich's *Safety First: Technology, Labor, and Business in the Building of American Work Safety* is the most recent and comprehensive work on occupational safety. Although his monograph discusses safety concerns in industries such as mining, the railroad industry, and manufacturing, he completely neglects the agricultural sector. Aldrich also admits that currently a history of the National Safety Council (NSC) does not exist, which is particularly surprising since the NSC fulfilled a leading role in improving occupational safety, including farming. Such recent articles as Jonathan Rees' "I Did Not Know....Any Danger Was Attached: Safety Consciousness in the Early American Ice and Refrigeration Industries" reveals that scholars continue to add to our collective understanding of safety issues across a wide swath of industries. Nevertheless, although agriculture is an especially hazardous occupation, it represents a crucially important sector of the economy that has been persistently ignored.

CHAPTER TWO

Igniting the Movement: The Farm Safety Network Emerges Amidst the National Emergency of the Second World War

The farm safety movement relied upon a network of non-profit organizations which collectively mounted a voluntarily effort to reduce farm accidents. Institutions such as the National Safety Council (NSC) and the United States Department of Agriculture (USDA) contributed farm accident research activities, created and distributed farm safety information, and assisted in the organization of regional safety programs. State extension employees and farm safety specialists supported and advised the leaders of state and local safety campaigns. 4-H chapters, FFA clubs, and a diverse number of other local groups provided a large pool of youth who participated in and initiated local safety activities. As the farm safety effort accelerated, new groups and professions emerged including state farm safety committees, which were instrumental in supporting ever-diversifying state-level activities. Farm safety specialists also came forward representing a new cadre of professionals who were uniquely qualified to meet the various challenges of improving safety in agriculture.¹⁵

Although little attention was given to the farm accident problem prior to the early 1940s, the onset of the Second World War witnessed a rapid intensification of farm safety education activity. A number of trends emerged which favored the movement's development. These factors included the maturation of the necessary institutional tools that could nationally coordinate such an effort, concerns regarding an agricultural labor

¹⁵ Despite the importance of the aforementioned organization in delivering safety awareness and educational programming, the farm safety movement also involved numerous agents, including the Farm Bureau. For an early example of the safety activities of a Farm Bureau Chapter, in this case, one located in Olmstead, County, Minnesota, see, "There's a Prize for Everyone," *Farm Safety Review*, July/August 1945, 5.

shortage, and the trend towards professionalization and bureaucratization of American life. Although such organizations as the NSC, state extension services, and rural youth groups were in existence prior to the 1940s, the organizations had gained considerable influence by the eve of the Second World War. Wartime labor concerns also contributed to a concerted effort to reduce farm accidents since the nation's leaders believed that conserving labor would contribute to victory over the Axis powers. The farm safety specialist profession also emerged during the era. These professionals, along with extension workers, sought to establish new realms with which to market their expertise, which also contributed to the movement's development.

Finally, some contemporary observers insisted that the switch from horsepower farming to petroleum-powered machines increased farm-related hazards. In 1983, Frederick R. Schneider, a retired Farm Security Administration official, indicated that although "specific data" was not available in the early 1940s, he believed that "there was a noticeable increase in the number of farm accidents," particularly those involving machinery. He indicated that the perception that farm accidents were increasing raised the concern amongst many leaders of the agricultural community that something needed to be done.¹⁶ Mark Aldrich, an expert on the history of industrial safety recently concluded that, "manufacturing risks almost certainly declined more than risks in most sectors, at least after the mid-1920s, while agriculture may have become increasingly dangerous as it mechanized." Although there is little statistical support for these claims, it

¹⁶ Herb Plambeck, ed., *Iowa Farm Safety in the 20th Century: A History of Contributions by Rural Safety Volunteers*, (Des Moines: R.E. Hays & Associates, INC, 1983), 32.

is reasonable to assume that the perception that more accidents were occurring helped to accelerate the farm safety movement.¹⁷

A brief review of the history of the major organizations involved in the farm safety movement provides a useful context regarding the beginnings of the movement, particularly since the development of such an effort required a vigorous group of rural-oriented organizations. An observer might have predicted that both the NSC and the USDA would assume major roles in the farm safety effort. By the 1940s, the leaders of the NSC had already become leading advocates for conducting accident research, establishing local safety committees, and promoting efforts to raise the public's awareness regarding working and living safely. The USDA, land-grant colleges, and state extension had become the primary means by which the nation's policy-makers attempted to shape agricultural and rural life. In addition, such youth organizations as 4-H and FFA maintained close ties to these organizations and assumed key educational roles for the nation's rural youth by the onset of WWII.

Although little had been done to reduce farm accidents, Americans had already taken significant measures to reduce accidents in many other economic sectors. The NSC's establishment represents one of many actions taken to improve safety in a newly industrialized nation. Similar to the agriculture field, manufacturing witnessed tremendous technological changes and as a consequence new safety issues emerged. In 1913, the members of the Association of Iron and Steel Electrical Engineers established

¹⁷ Mark Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety, 1870-1939* (Baltimore: John Hopkins University Press, 1997), 262; although both Mark Aldrich and contemporary observers believed that the mid-twentieth century witnessed an increase in farm accidents, there is little farm accident data from the decades prior to the 1940s available to support the contention. Allan B. Kline, president of the American Farm Bureau Federation, stated that, "the increased mechanization of the farm operations, plus the speed at which we operate, has vastly increased the hazards to which all farm people are exposed every day, see, "Agricultural Leaders Endorse Farm Safety Week's Objective," *Farm Safety Review*, July/August 1948, 3.

the NSC after recognizing the need for an entity devoted exclusively to industrial safety. They divided the organization into sections devoted to improving conditions across a wide swath of industries and occupations. By 1925, the number of the organizations' divisions had grown steadily, totaling twenty-six separate sections. NSC members devoted themselves to improving safety in their own particular domain, which included such diverse realms as refrigeration, cement, and taxicab sections.¹⁸

The NSC emphasized a cooperative and inclusive approach to improving safety. This made the NSC well-suited to fulfilling a crucial role in improving farm safety during a time when very little legislation mandated a safe working environment. The paucity of legislative measures in many ways determined the movement's structure and form. Individuals, businesses, and organizations, which were involved in the movement, routinely expressed a cooperative attitude since coercive measures were non-existent. Thus intra-organizational coordination was crucial to mounting a successful farm safety program. Agricultural safety advocates often referred to their activities as representing an effort to "sell safety." This slogan also symbolizes the reality that farm families had to be convinced and could not be forced to observe safer work practices. In 1913, the NSC's founding members stressed these principles stating their desire "to initiate, promote, cooperate with, and obtain the assistance of any and all activities or agencies calculated to conserve human life." Thus, the NSC expressed this approach a full thirty years prior to the farm safety movement's emergence and demonstrated this philosophy in their cooperation with numerous organizations throughout its history.¹⁹

¹⁸ *Transactions-National Safety Council*, (Chicago: National Safety Council, 1913), 69, 72; *Transactions-National Safety Council*, (Chicago: National Safety Council, 1925), 6. For a discussion of the many work hazards in the nation's manufacturing sectors during late nineteenth and early twentieth centuries, see, Mark Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety, 1870-1939*, 79-89.

The NSC staff fulfilled a variety of roles which were instrumental in addressing the nation's safety issues. Such functions included conducting accident surveys, establishing local safety councils, and publishing and disseminating educational materials. Royal Meeker, who was the organization's "first chair of the Council Committee on accident statistics" in 1914, became the US commissioner of labor statistics just two years later. By 1914, the council also had established fourteen local chapters in such cities as Chicago, Detroit, and New York, each of which carried out safety campaigns on a local level. By the First World War's conclusion, the number of local councils rose to forty-seven. The NSC also developed the necessary publication services to disseminate safety information. Members repeatedly emphasized that educating both workers and the entire public represented a cornerstone to improving safety. NSC staff members dispersed information through yearly Congress Transactions, pamphlets, and periodicals such as the *National Safety News*. By 1919, the NSC was also assisting in the development and distribution of industrial and public safety films.²⁰

Historian Mark Aldrich has indicated that its latter role represented one of the NSC's more important responsibilities. He stated that throughout much of its history, "The National Safety Council was most valuable for the service it provided as an information clearinghouse." He indicated that during the early twentieth century, it was difficult for individuals interested in obtaining accident prevention information to collect

¹⁹ *Transactions-National Safety Council*, (Chicago: National Safety Council, 1913), 69; in 1944, Ned H. Dearborn, NSC vice president, stated that a Chicago headquarters' staff member, "compiles information, prepares and publishes educational materials, and stimulates and acts as a clearinghouse for the work of state and community councils and outside agencies," see, Ned H. Dearborn, "What is the National Safety Council?," *Farm Safety Review*, September/October 1944, 3.

²⁰ Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety, 1870-1939*, 106; *Transactions-National Safety Council*, (Chicago: National Safety Council, 1914), 18; *Transactions-National Safety Council*, (Chicago: National Safety Council, 1918), 68; *Transactions-National Safety Council*, (Chicago: National Safety Council, 1919), 212.

reliable statistics. However, the NSC's leadership acted quickly to fulfill this void by creating a "Safe Practices Committee" whose members "issued pamphlets on ladders, scaffolds, and other devices, while a bureau of information provided a blizzard of bulletins, posters, movies, speakers, and up-to-date information on changing state regulations." The NSC would also assume this role in the farm safety movement by providing the extension staff, farm safety specialists, and youth club leaders with a large amount of literature, research, and programming ideas.²¹

During the 1920s and 1930s, the NSC's prominence and influence continued to increase. The organization's annual meeting attracted prominent industrial leaders from a variety of economic sectors including railroads, mining, and steel. The involvement of such high-ranking businessmen represented the organization's national prominence as a leading safety organization. National leaders in the field of safety also regularly attended the organization's annual meeting. Such safety advocates included David Beyer, an early authority on textile safety, who attended the 1917 Congress. These meetings also attracted government officials from a variety of agencies including the Bureau of Mines, state factory inspection departments, and a host of other government agencies. By 1920, the organization boasted over 4,000 members, representing approximately 6 million workers and, by the end of the 1930s, also added a significant number of members from Canada and Great Britain. By the entry of the United States into the Second World War, the organization had become one of the nation's chief advocates for both public and workplace safety.²²

²¹ Aldrich, *Safety First: Technology, Labor and Business in the Building of American Work Safety, 1870-1939*, 109-110.

²² *Ibid.*, 108-110, 114, 103; *Transactions-National Safety Council*, (Chicago: National Safety Council, 1938), 9; NSC power and influence would continue to expand throughout the era studied. By 1972, Jack Burke, editor for the organization's periodical *Farm Safety Review*, indicated that, "the organization has

The NSC would not be alone in its effort to meet the challenge of the farm accident problem. Federal agencies such as the USDA, state institutions such as land-grant colleges and extension agencies fulfilled key roles in the farm safety movement. All of these organizations had been in existence decades prior to the emergence of farm safety efforts; however, by the eve of World War II, they had become even more able to assist in mounting a farm safety effort. The USDA had developed from its modest beginning into a potent tool for federal agricultural policy-making. Land-grant colleges, state extension programs, and rural youth organizations had also evolved from their embryonic beginnings into powerful tools for state and local level agricultural education.

By the early twentieth century, the USDA had demonstrated that it was the primary instrument by which the federal government shaped agricultural policy. The USDA had grown from a small organization during the Civil War to one wielding considerable power. The legislation which formed the USDA delineated functions that led to increased involvement in farm safety efforts. Such institutional aims as providing agricultural education to the American public, conducting and disseminating the results of crop and animal research, as well as instigating statistical studies increased the likelihood that the organization would play an important role in the safety movement. Initially, the USDA limited its responsibilities to increasing farmers' productive capacities. However, as the decades progressed, the USDA's roles extended significantly including efforts to improve the healthfulness of the American food supply, expanding

grown from small potatoes to one of 400-plus employees and a \$11 million budget," see, Jack Burke, "NSC's Sixtieth Year," *Farm Safety Review*, November/December 1972, 2.

the nation's rural transportation infrastructure, and administering a diverse array of farm subsidy programs²³

By the early 1940s, land-grant colleges had also developed considerably from their humble nineteenth century origins. Late in the nineteenth century, leaders of these institutions had initially struggled to establish a set curriculum. However, they had greatly clarified both their missions and course offerings by the early twentieth century. By 1940, there were sixty-seven land grant institutions training hundreds of individuals who would have a profound impact on agriculture. Willard W. Cochrane has indicated that, "the colleges of agriculture trained the high school vocational teachers and the extension workers, as well as the research workers who went to work in private and government research agencies." These colleges also housed the nation's agricultural education training programs as well as expanding agricultural engineering programs.²⁴ These same individuals directed rural youth organizations, filled the ranks of the state extension services, and consequently assumed leadership positions in the farm safety movement.²⁵

²³ R. Douglas Hurt, *American Agriculture: A Brief History*, (Ames: Iowa State University Press, 1994), 189-192. Hurt reveals that the USDA's size and scope continued to expand throughout the twentieth century, indicating that by the 1990s it had become the fourth largest government spender and the sixth largest government employer with more assets than all but three US corporations, see, Hurt, *Brief History*, 385.

²⁴ Willard W. Cochrane, *The Development of American Agriculture: A Historical Analysis* (Minneapolis: The Development of American Agriculture, 1993), 105-107; Jim Hightower, *Hard Tomatoes, Hard Times: A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex*, Cambridge, Massachusetts: Schenkman Publishing Company, 1973)152-155.

²⁵ Early pioneers of Iowa Extension such as Ralph Bliss and farm safety specialists such Norval Wardle were both educated at Iowa State College. Land-grant colleges were instrumental in trainings such specialists in other states. For a discussion of Ralph Bliss's background and education, see, Dorothy Schwieder, "The Iowa State College Cooperative Extension Service through Two World Wars," *Agricultural History* 64, no. 2 (1990): 225.

Cooperative Extension represented the primary means by which both land-grant colleges' expertise and agricultural knowledge were dispersed into the countryside. Land-grant college staff trained hundreds of extension workers who spent their careers attempting to address rural problems. By the late 1940s, extension had become an increasingly popular career option for students attending the nation's land-grant colleges. In 1948, faculty members at Kansas State College established the nation's first "college extension club west of the Mississippi." Students could gain further information regarding the nature of extension work through this organization. An *Extension Service Review* writer stated, "Monthly meetings of the club are also held with prominent professional extension workers invited to speak." The organization boasted a membership of 86 students, many of whom expressed an interest in employment within the extension service upon graduation.²⁶ Such agents, armed with the tools of modern agriculture, were poised to disseminate its tenets into rural America upon their graduation.

State extension and rural youth organizations had been in existence for decades prior to the Second World War II. In 1914, state extensions had received federal support with the passage of the Smith and Lever Act. Agricultural scholar, Willard Cochrane, grasped extension's significance stressing that its creation, "institutionalized the outreach programs of the state agricultural college." He also emphasized the interconnectedness of land-grant colleges and extension, stating that extension personnel were basically "off-campus instructors of the colleges of agriculture."²⁷ By the early 1940s, the citizens of almost every county in the nation had access to a county agent, who delivered educational programming to the residents of the nation's countryside. Nevertheless, it

²⁶ "Future Agents Train," *Extension Service Review*, April 1949, 66.

²⁷ Cochrane, *The Development of American Agriculture: A Historical Analysis*, 6.

would take several decades before extension would be fully able to convey agricultural teaching into the nation's countryside.

Historian Dorothy Schwieder reflected upon the fact that early agents lacked both an institutional support structure and in some cases faced a skeptical audience.²⁸ Nevertheless, state extension programs continued to expand and gain strength throughout the early twentieth century. During the First World War, extension's importance increased since it was enlisted as the primary institutional tool to mobilize the nation's agricultural sector. Extension officials assisted in efforts aimed at meeting labor shortages, overcoming agricultural supply shortages, and increasing food production. Historian Wayne Rasmussen indicated that this national emergency represented the first time extension had been used to meet the needs brought about by a nationwide emergency.²⁹

The nation's extension programs expanded markedly between the 1920s and the 1950s. The demands of the Great Depression, environmental stress, and war-time emergency produced a need for larger staff, expanded publication services, and new communication tools, including radio.³⁰ Thus, by the onset of the Second World War, such programs had been transformed from their nascent beginnings into a vigorous rural education network. State extension leaders recognized the potential power that the extension service offered and worked to increase its communication capabilities. Ralph K. Bliss, Iowa's Director of Extension, stated that with more work "it is possible to supply information to nearly every resident in Iowa within a week from the time it is

²⁸ Dorothy Schwieder, "The Iowa State College Cooperative Extension Service through Two World Wars," 220.

²⁹ Ibid., 221.

³⁰ Ibid., 221.

started from the administration at Washington.” Bliss’s comments are especially important since once the communicative and bureaucratic infrastructure of extensions had developed a myriad of agricultural education efforts and wartime mobilization activities could be initiated. This observation is also clearly validated by the extension service’s effectiveness at meeting the wartime agricultural labor shortage.³¹

The rural educational infrastructure was further enhanced by the expansion of 4-H. Although the youth organization had modest beginnings as locally-organized youth agricultural clubs in states such as Ohio, Illinois, and Iowa, the support of both the USDA and land-grant colleges greatly assisted its growth. The leaders of these institutions quickly recognized its capacity to disseminate the latest agricultural information to farm families. Such legislation as the Smith-Lever Act also formalized the close affiliation between the nation’s extension officials and its 4-H Clubs. The legislation also made available a continual stream of funds from the national government to support 4-H club development.³²

The continued expansion of 4-H during the inter-war years was due not only to the organization’s close affiliation with extension, but also growing private sector support. In 1921, the creation of the National Committee on Boys and Club Work greatly assisted the organization in obtaining such financial backing. Committee members included representatives of large food processing companies, various agricultural

³¹ Ibid., 219. For examples of the many ways Extension employees assisted in the nation’s mobilization efforts, particularly regarding wartime agricultural labor shortages in states such as Maryland, California, and Kentucky, see, T.B. Symons, “To Meet Labor Shortage,” *Extension Service Review*, May 1942, 77; “Training New Hired Men,” *Extension Service Review*, May, 1943, 69; B.H. Crocheron, “How Many Workers,” *Extension Service Review*, July, 1944, 100; Extension’s influence increased in the following decade. In 1954, Ezra Taft, U.S. Secretary of Agriculture, indicated that, “Extension now reaches about 85 percent of all farm families in the nation, see, Ezra Taft Benson, “The Role of Extension,” *Extension Service Review*, January 1954, 3.

³² Hurt, *American Agriculture: A Brief History*, 258-259.

concerns, and even department stores. 4-H Historians Thomas Wessel and Marilyn Wessel stressed the importance of the National Committee on Boys and Club Work, stating that its development “resulted in the institutionalization of private support, which helped to expand the project areas that had attracted young people to 4-H clubs.” The committee not only worked to provide funds for 4-H work, but also established an annual 4-H club congress, which served as a national meeting place for the 4-H leadership and youths. Youth Club Farm Safety activities would also benefit greatly from such support.³³

4-H growth accelerated during the war and continued well beyond the conflict’s conclusion. The organization’s increasing profile was reflected in the growing numbers of rural youth enrolled in 4-H club chapters, the diversification of educational programming, and its interconnectedness with other national organizations. The nation’s growing 4-H club membership had expanded from approximately 800,000 in 1929 to 1,500,000 by 1940 and approximately 2,000,000 by 1950. Thus, the group reached thousands of young people providing a variety of educational opportunities. Events such as 4-H’s annual National Congress and National 4-H Club Week also assisted in increasing the organization’s prominence. By the mid-1950s, 4-H chapters had expanded across the United States and were even represented in 45 foreign countries.³⁴

The interest of the nation’s agricultural leaders and sustained governmental support aided the expansion of the Future Farmers organization. Although state and local lawmakers expanded vocational agriculture programs in the nation’s high schools, the federal authorities accelerated their development through legislative means. In 1917, the

³³ Thomas Wessel and Marilyn Wessel, *4-H: An American Idea 1900-1980* (Chevy Chase, Maryland: National 4-H Council, 1982), 36, 37, 76, 88.

³⁴ Gertrude L. Warren, “A Brief Review-The 4-H Story,” *Extension Service Review*, May 1955, 93.

Smith-Hughes Act hastened such expansion, devoting federal funds to vocational agricultural programs. Such financial support consequently assisted local Vo-Ag clubs due to their connection to vocational agricultural educational programs. In 1926, national Vo-Ag leaders met in Kansas City, Missouri for a National Congress of Vo-Ag students. In the fall 1928, leaders of agricultural education, students, and Vo-Ag instructors moved to establish a national FFA organization at the meeting.³⁵

The Future Farmers of America also achieved greater prominence and influence prior to the farm safety movement's emergence. FFA leaders established a national headquarters, gained advocacy groups, and initiated national publications. In 1939, FFA leaders instigated the construction a national headquarters on the former grounds of George Washington's estate. In 1944, the establishment of the National FFA foundation represented the organization's success in gaining the financial support of both corporate and individual supporters. Such donations were crucial in providing the funds for an every-growing array of FFA programs including those associated with farm safety.³⁶ In 1979, Ralph E. Bender, a professor of agricultural education at the Ohio State University reflected upon the importance of the foundation. He stated that it continually served as "an opportunity for business and industrial concerns and individuals to make contributions to support the activities of FFA at the national, state or local level."³⁷ FFA membership also continually expanded throughout the mid-twentieth century. For instance, in Iowa alone, FFA membership grew from 3,664 in 1930 to 7,900 in 1940.³⁸

³⁵ Bender, Ralph E, Robert E. Taylor, Chester K. Hansen and L.H. Newcomb, *The FFA and You* (Danville, Illinois: The Interstate Printers and Publishers, Inc., 1979), 7; *The Iowa FFA: For 50 Years*; (Des Moines: Iowa Association FFA, Career Education Division, Department of Public Instruction, 1978), vi, 1.

³⁶ *The Iowa FFA: For 50 Years*, vi.

³⁷ Bender, Taylor, Hansen, and Newcomb, *The FFA And You*, 620.

Thus, by the early 1940s, groups concerned with both agriculture and safety had successfully developed an intricate institutional network capable of delivering a diverse range of educational programming. The strength of the USDA, land-grant college staff, and extension in administering federal policies had been demonstrated both during the national emergencies of the First World War and the Great Depression. In the first case, government agents assisted farmers in meeting food production needs while they administered the myriad of programs associated with the farm subsidy programs. Although the USDA, land-grant college faculty, and extension leaders were primarily concerned with improving farmers' production capacities, they were nonetheless able to deliver a wide variety of programming. Thus, extension's educational efforts would eventually encompass a myriad of areas, including youth-oriented activities, home economics, and farm management.³⁹

However, the farm safety movement's emergence should not only be understood in terms of the appearance of national organizations capable of launching a collective movement, but also with an understanding of the political context of the Second World War. The nation's political leadership responded to the Japanese attack on Pearl Harbor by initiating a mobilization effort which involved many areas of American life. Franklin Roosevelt and others concluded the Axis powers' considerable military might, dramatic territorial acquisitions, and totalitarian political systems threatened the nation's very

³⁸ *The Iowa FFA: For 50 Years*, vi, 2.

³⁹ Scholars with markedly different viewpoints have collectively demonstrated that the members of government institutions such as the USDA, land-grant colleges, and the Extension Service have all possessed the primary aim of increasing the farmer's productivity and operational efficiency, see, Wayne D. Rasmussen, *Taking the University to the People: Seventy-Five Years of Cooperative Extension* (Ames: Iowa State University Press, 1989), 14, 118-21; Jim Hightower, *Hard Tomatoes, Hard Times: A Report of the Agribusiness Accountability Project on the Failure of America's Land Grant College Complex* (Cambridge, Mass: Schenkman Publishing Company, 1973), 2, 4 for some notable examples.

existence. The federal government expressed this zealousness for victory by creating new organizations, which organized American society and economy to meet the Axis threat. Congress passed the War Powers Act, providing the president with the tremendous power and giving rise to such agencies as the War Production Board (WPB), the War Manpower Commission (WMC), and the Office of Scientific Research and Development (ORSD). These institutions provided the nation with the bureaucratic apparatus necessary to defeat the Axis powers.⁴⁰

The nation's leaders also recognized the importance of marshalling food producers to achieve sufficient production to meet the demands of a global conflict. In January 1943, President Roosevelt emphasized the significance of food production while delivering a speech to encourage Americans to continue their wartime sacrifices. He stated that, "food is the life line of the forces that fight for freedom. Free people everywhere can be grateful to the farm families that are making victory possible."⁴¹ His Secretary of Agriculture Claude Wickard also emphasized agriculture's vital role by stating, "Food will win the war and write the peace."⁴² Both Roosevelt's and Wickard's comments reveal the importance of concerted efforts to increase production to feed American troops, supply allied armies, and sustain the populations of liberated countries. These measures included a vigorous publicity campaign to ensure an adequate food supply. The Office of War Information and the War Food Administration saturated

⁴⁰ John Morton Blum, *V was for Victory*, (New York: Harcourt Brace Jovanovich, 1976), 102, 197, 144. For a brief discussion of wartime mobilization, see, Paul S. Boyer, *Promises To Keep: The United States Since World War II* (New York: Houghton Mifflin Company, 2005), 7-16.

⁴¹ Judy Barrett Litoff and David C. Smith, "To the Rescue of the Crops: The Women's Land Army during World War II" *Prologue* 25 (Winter 1993): 347.

⁴² Dorothy Schwieder, "The Iowa State College Cooperative Extension Service through Two World Wars," 220.

Americans with continual stream of posters, pamphlets, and film clips stressing the need to meet production goals.⁴³

Americans displayed patriotism and cooperation in many ways including the effort to increase food production capacities. The president echoed these nationalistic sentiments when addressing the nation's 4-H clubs. In 1943, President Roosevelt congratulated the approximately one and a half million youth who had participated in the 4-H Victory Program. This plan included an entire range of activities aimed at enlisting rural youth to aid in the mobilization effort. Roosevelt encouraged 4-H members to continue their efforts in a letter sent to 4-H clubs. He stated "Let your head, heart, hands, and health, truly be dedicated to your country, which needs them now as never before."⁴⁴ In 1943, a United States army representative congratulated Michigan farmers for greatly increasing bean and sugar beet production. This appreciation culminated in a week-long event which included various exhibits of military equipment and speeches encouraging farmers to continue their productivity drive.⁴⁵

Government officials and agricultural leaders informed farm workers, rural youth, and even agricultural engineers that their efforts were equally important as those of soldiers in the military theater. Agricultural officials often stressed the importance of their responsibilities in winning the production battle. The very names given to rural mobilization campaigns symbolize the nationalism infused into the agricultural work.

⁴³ Judy Barrett Litoff and David C. Smith, "To the Rescue of the Crops: The Women's Land Army during World War II," 348. In the early summer of 1943, Francis Flood, a high-ranking War Food Administration official, indicated that obtaining enough workers to supply the nation's agricultural sector was, "One of the biggest single assignments Extension has ever had in its history of big assignments," see, Francis Flood, "The Challenge of the 99 percent," *Extension Service Review*, June 1943, 81.

⁴⁴ "A Letter From the President of the United States: To the 4-H Club members of the United States," *National 4-H Club News*, April 1942, 5.

⁴⁵ Alan Clive, "The Michigan Farmer in World War II," *Michigan History*, 60 (Winter 1976): 296.

The titles of programs such as the “Women’s Land Army,” “Food for Freedom Campaign,” and the “4-H Victory Program” all signified the view that food production represented a battle requiring organization, national loyalty, and cooperation.⁴⁶ H.B. Walker, president of the American Society of Agricultural engineers, stated that “one year ago today a treacherous enemy plunged our nation into a war. We choose now to call it a global war in which we have two distinct fronts. One is a military front and the other is a food front.” He went on to say that agricultural engineers would do their “utmost to hold our lines on the food front.”⁴⁷

However, the nation’s leaders quickly discovered potentially serious obstacles in achieving victory in the production battle. These challenges included the problem of labor scarcity as farm workers migrated to cities and men enlisted into military service. A Bureau of Agricultural Economics study highlighted the dilemma by indicating that approximately two million men had been diverted from agricultural work to other employment or military service. In 1944, a USDA report revealed that approximately 800,000 women and 1.2 million young people would be required to meet food production goals. The national press, including both *Time* and the *Washington Post*, featured articles which stressed the need to solve this predicament. The awareness also contributed greatly to the recognition of the need for increased safety since accidents wasted precious human resources.⁴⁸

⁴⁶ “Rural Youth are Aid to Defense in 5 Ways,” *Better Iowa*, December 15, 1941, 1; “Mobilization Week FEB. 60-14 Wanted –Two Million or more Rural Boys and Girls to Enroll in the 4-H Victory Program,” *National 4-H Club News*, January 1943, 4.

⁴⁷ H.B. Walker, “Agricultural Engineers on the Food Front,” *Agricultural Engineering* 24 (January 1943): 5, 7.

⁴⁸ Judy Barrett Litoff and David C. Smith, “To the Rescue of the Crops: The Women’s Land Army during World War II,” 349-355.

The public successfully responded to the problem by participating in a host of programs including the Victory Farm Volunteers and the Women's Land Army. During the war, roughly 2.5 million young people joined the Victory Farm Volunteers and over 1.5 million women participated in the WLA. Nevertheless, solving the labor issue required persistent effort. John R. Fitzsimons, Iowa supervisor of farm labor, stated that his state had "scraped the bottom of the hired man field" in order to fill the jobs in such shortage areas as canning facilities, small grain harvest, and corn de-tasseling. Nevertheless, during the summer of 1945, Iowa's farm labor offices had successfully placed approximately 70,000 workers.⁴⁹

Agricultural leaders also provided convincing reasons why efforts to reduce farm accidents should be intensified during the war. Such rationales included the fact that accidents represented a waste of human resources, labor shortages meant the enlistment of inexperienced workers in the agricultural workforce, and reducing accidents represented a moral cause. In the spring of 1944, Maynard Coe, Director of the NSC's Farm Division, offered such justifications stating that "an estimated four million extra farm workers will be needed this year. Many of these workers will be inexperienced in farming, so they will present an unusual safety problem. Farm labor leaders recognize this fact and are working hard to provide adequate training, good supervision, and safe working conditions. They know that the efforts of many workers are nullified by the property and time lost due to accidents."⁵⁰

⁴⁹ Ibid., 349, 356; "70,000 Workers Placed By Farm Labor Offices," *Better Iowa*, October 1, 1945, 1; for more on the activities of Iowa's Extension Service to ensure adequate labor supplies, see, "Farmers Can't Lose More Labor," *Wallaces' Farmer and Iowa Homestead*, July 3, 1943, 4.

⁵⁰ "Maynard Coe, "Boom in Farm Safety," *Farm Safety Review*, March/April, 1944, 2. See also Arnold P. Yerkes, "Engineering in Wartime Agriculture," *Agricultural Engineering* 23 (April 1942), 117-125 as an example of the effort to improve the overall efficiency of the agricultural sector as part of the nation's aim for victory.

The members of the emerging agricultural safety movement also stressed a sense of national duty, patriotism, and cooperation, believing that reducing accidents should be a national priority. A variety of groups including agricultural engineers, members of the National Safety Council, and a host of other individuals stressed that safety in farm work was a patriotic duty. E.W. Lehman, a University of Illinois Faculty member, and H.P. Bateman, member of the American Society of Agricultural Engineers, emphasized the importance of establishing a safety program as part of the mobilization effort. They indicated that rural and fire safety programs were essential, citing both the scarcity of skilled labor and machines. H.L. Miner, chairman of the National Safety Council's Farm Safety Committee, stressed that everyone should work to eliminate farm hazards with the same tenacity with which American soldiers were fighting overseas.⁵¹ Some concerned individuals even considered workplace negligence to be an unpatriotic act. J.E. Long, superintendent of safety for the Delaware and Hudson railroad, stated that "farmers who are careless in 1943 will be sabotaging food production."⁵² Harold H. Beaty, a member of the Iowa State College faculty, echoed Long's comments, stating that "the careless farmer who gets injured in an accident this year not only hurts himself and his family but curtails the nation's food for freedom campaign."⁵³ However, George M. Gehant, an extension agent from Yellow Medicine County, Minnesota, articulated this feeling most effectively. He indicated that the energy and resources lost and used to treat injuries could be "used to good advantage producing food, fiber and fats and other materials

⁵¹ E.W. Lehmann and H.P. Bateman, "Improving Agricultural Efficiency of Farm Labor to Meet Wartime Demands," *Agricultural Engineering* 23 (September, 1942): 280; H.L. Miner "Food is a Weapon of War" *Farm Safety Review*, January, 1943, 3.

⁵² "Don't Sabotage Food Production Efforts," *Farm Safety Review*, March/April, 1943, 10.

⁵³ *Better Iowa*, March 23, 1942, 1.

needed by the boys in our fighting forces. So safety practices on the farm can contribute materially to the war effort in many ways.”⁵⁴

The nation’s political leaders and those directly involved with solving the labor problem emphasized the importance of wartime farm safety efforts, believing thousands of inexperienced farm workers needed safety education. President Roosevelt expressed the need for reducing farm hazards while issuing a National Farm Safety Week proclamation. He indicated that safety was especially important due to the presence of “many young and inexperienced persons now being employed on farms in all parts of the country.”⁵⁵ Claude R. Wickard, Secretary of Agriculture, also indicated that the increase of urban workers entering the farm labor force represented a potential hazard. Florence L. Hall, chief of the Women’s Land Army (WLA), noted that thousands of unseasoned female agricultural workers were entering the ranks of the farm labor force. In the spring of 1943, the nation’s agricultural leaders had cooperatively created the WLA in an attempt to remedy labor shortages in the food production sector. However, individuals responsible for the thousands of untested workers who entered the farm fields quickly encountered an abundance of farm work hazards from machinery dangers to difficulties in securing a safe water supply.⁵⁶

⁵⁴ George M. Gehant, “A County Agent Discusses Farm Safety,” *Farm Safety Review*, September/October 1943, 2; in 1943, WHO radio located in Des Moines, Iowa featured an announcement they had received from the NSC’s Farm Division staff. The message summarized a key reason why the farm safety movement had emerged with the narrator proclaiming that safety conscious farmers were “saving farm manpower for war power,” see, Elmer Lotstrom and Jim Chapman, “Farm Safety on the Air Waves,” *Farm Safety Review*, March/April, 1943, 8.

⁵⁵ “D’ Day on the Farm Front,” *Farm Safety Review*, July/August, 1944, 15.

⁵⁶ Claude R. Wickard, “Safety in Wartime Farming,” *Farm Safety Review*, July/August, 1943, 4-5; “Florence L. Hall, “Safety Tips For Women’s Land Army,” *Farm Safety Review*, May/June 1945, 12; “Improve Farm Drinking Facilities,” *Farm Safety Review*, September/October 1943, 13.

Although the nation's political and agricultural leaders were first recognizing the need to reduce the numbers of accidents, other organizations had already recognized the need to improve safety. Agricultural equipment manufacturers and state-level youth groups had already demonstrated an interest in improving farm safety. In 1934, T.A. Erickson, Minnesota's 4-H club leader, believed that farm accidents represented a very real problem; thus, he successfully encouraged 4-H clubs to integrate safety into their programming. These activities included "safety contests" and other efforts to promote safer farm practices.⁵⁷ In 1938, the members of the Farm Equipment Institute, which was an association of the nation's agricultural equipment manufacturers, established a safety committee to advise its associates regarding the problem. Frank H. Harrison, a high ranking International Harvester Company official and safety committee member, summarized the group's initial activities. He indicated that progress had been made in developing standards for safety devices, improving equipment instruction handbooks, and other ways to promote operator safety. Despite such pioneering efforts, concerns regarding the need for sufficient agricultural laborers coupled with the desire to use these resources efficiently greatly intensified safety efforts.⁵⁸

The National Safety Council assumed a leading role in mounting an educational effort to reduce the number of farm accidents. In 1938, the NSC leadership called for a meeting of agricultural leaders to discuss and initiate efforts to improve safety on the farm. C.M. Segreaves, an Illinois Safety Director for the Illinois Agricultural Association, underlined the importance of the division's first gathering, believing that the issue had

⁵⁷ "Minnesota Model for Safety," *Farm Safety Review*, January/February 1946, 7; for the discussion of pioneering work regarding farm safety in other states, see, J.H. Mohler, "150 Lives Saved: The Story of the Famous Kansas Farm Safety Program," *Farm Safety Review*, May/June 1944, 3.

⁵⁸ "Farm Equipment Institute Convention," *Farm Implement News*, November 3, 1938, 3.

been ignored for much too long. Segreaves stated that “although material on almost every conceivable phase of rural life has been carefully compiled by the United States Department of Agriculture, taught in our agricultural colleges and disseminated to farmers through the extension service, we find little or nothing on safety. Control of grasshoppers, clinch bugs, Bangs disease and noxious weeds...yes! Control and prevention of farm accidents no!”⁵⁹ Segreaves and other initial meeting attendees hoped to bring attention to the long-neglected problem of farm safety. By 1944, the NSC leadership had transformed the annual farm safety conference meeting into a separate division. Members of the division dedicated themselves exclusively to reducing accidents for farm families and agricultural laborers.⁶⁰

The division assumed an important coordinating role in assisting the farm safety movement’s development by helping to unify the efforts of other organizations. The committee members also disseminated farm safety materials, assisted in the establishment of state farm safety councils, and engaged in numerous other activities to increase safety awareness. However, the most important of the NSC’s many contributions was providing the necessary synchronization of farm safety efforts. This role was crucial since as late as 1940, individual states conducted much of their farm safety awareness activities without inter-state cooperation. The NSC leaders recognized this coordinating role of their organization to enlist the help of a variety of government organizations, rural youth organizations, and members of the business community. In 1945, C.L. Hamilton, an NSC agricultural engineer, summarized this role stating that, “the council functions as

⁵⁹ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1938), 33.

⁶⁰ Dennis Murphy, “President’s Message to the Summer Meeting of the National Institute For Farm Safety, INC” (speech given at the Summer Meeting of the National Institute For Farm Safety, Orlando, Florida 16 June 1986), 7, Special Collections, Iowa State University Library, Iowa State University, Ames, Iowa.

a planning, stimulating and coordinating agency. It acts as a clearinghouse for improved techniques and methods. It assists in the collection, preparation, and distribution of educational materials such as literature, posters, statistics, exhibits and visual aids.”⁶¹

The NSC’s efforts to enlist a network of organizations in the farm safety movement also received private sector financial support; the organization’s adeptness in this area is demonstrated in the *Farm Safety Review* benefactor lists. The numbers of companies providing monetary support, as well as the diversity of such firms, expanded throughout the era. In 1946, a *Review* writer mentioned ten companies and organizations, primarily agricultural in nature, which provided funding for the NSC’s farm division. They included John Deere Company, International Harvester Company, and the Illinois Agricultural Association. During the 1950s, such sponsors continued to grow as demonstrated by the 196 supporters disclosed in a 1960 *Farm Safety Review* article. Thus by the 1960s, a more varied group of businesses were providing funding, including insurance companies, steel companies, and chemical firms. In 1963, Howard Pyle, President of the NSC, acknowledged the importance of these private contributions. He stated, “We salute the individuals and organizations whose direct financial support provides convincing proof of their interest in the advancement of farm safety efforts.”⁶²

⁶¹ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1938), 33; *Transactions-National Safety Congress* (Chicago: National Safety Council, 1940), 31; C.L. Hamilton, “Agriculture’s Safety Challenge,” *Agricultural Engineering* 46 (April 1945):145; Hamilton’s description of the NSC roles is echoed by other members of the NSC, see, “Farm Safety Horizons,” *Farm Safety Review*, July/August, 1946, 13; the NSC also labored to remedy the paucity of a statistical understanding of the issue by mounting their own research projects or cooperating with other agricultural organizations in mounting such studies, see, “Plan Accident Surveys,” *Farm Safety Review*, March/April 1946, 1 and “Organization Brings Action,” *Farm Safety Review*, March/April, 1948, 6.

⁶² G.L. Noble, “Agriculture’s Safety Movement,” *Farm Safety Review*, November/December 1946 15; “We Couldn’t Do It Without Investors,” *Farm Safety Review*, March/April, 1960 14-15. For similar listings of benefactors, see, “Investors in Farm Safety,” *Farm Safety Review*, May/June 1952, 15; “Investors in Farm Safety,” *Farm Safety Review*, July/ August 1953, 15; “Investors in Farm Safety,” *Farm Safety Review*, May 1955, 15; Howard Pyle “NSC Salutes You,” *Farm Safety Review*, September 1963, 3.

Such support provided the funding necessary for the educational materials development, research activities, and administrative leadership. The NSC even depended upon private contributions to fund *Farm Safety Review's* publication and distribution. The *Review* represented the only periodical, exclusively aimed towards serving a mouthpiece for the movement.⁶³

A highly competent staff, including individuals who had previously held respected positions in agricultural organizations, also bolstered NSC activities. Such institutions included the USDA, the farm press, land-grant colleges, and the state extension. In the winter of 1944, Maynard Coe's appointment as director of the division is representative of the NSC's wise selection practices. Coe possessed impressive agricultural credentials, including having been Kansas's 4-H club state leader. C.L. Hamilton, the division's assistant director and editor of the *Farm Safety Review*, possessed a master's degree in Agricultural Engineering from Iowa State College. He had held a faculty position at the University of Saskatchewan prior to his NSC appointment. The Soil Conservation Service had also employed him as a "Field Inspector" throughout the 1930s. Individuals with agricultural engineering backgrounds would continue to dominate NSC's farm division leadership and staff positions.⁶⁴

NSC personnel also worked to encourage the intensification and coordination of youth group safety activities. Their hosting of an annual youth farm safety sectional

⁶³ "M.S.A. Sponsors Review," *Farm Safety Review*, January/February 1951, 13; "M.S.A. Renews Review Sponsorship," *Farm Safety Review*, March/April 1952, 3; "A.S.A.E. Gets Review," *Farm Safety Review*, July-August 1953, 4; the *Review* attracted wide readership from those in the agricultural business community. For instance, as early as 1947 "14,000 implement dealers" and "9,000 extension leaders" were receiving the periodical, see, "How You Get This Magazine," *Farm Safety Review*, March/April 1953, 4.

⁶⁴ "New Farm Safety Leaders," *Farm Safety Review*, January/February 1944, 2; "Staff Changes," *Farm Safety Review*, July-August 1954, 15, see, "NSC appoints L.H. Hodges Vice President for Farms," *Farm Safety Review*, November/December 1971, 3; "Pfister Heads NSC Farm Conference," *Farm Safety Review*, November/December 1974, 3.

meeting demonstrated the organization's commitment to expanding the involvement of FFA, 4-H, and other youth-oriented organizations. In 1952, NSC leaders inaugurated the annual youth meeting as part of the yearly National Safety Congress convention. In 1955, 130 "advisors and delegates" represented organizations such as 4-H, FFA, and the Farm Bureau Young People.⁶⁵ The number "young people and adult leaders" present at the meeting expanded to 200 the following year.⁶⁶ By 1959, "more than 200 youth and 75 adults attended the Rural Young People and Farm Adult Sessions," held at Chicago's Palmer House Hotel. The conference consistently provided a venue for concerned leaders and youth involved in safety efforts. Participants gained the latest safety training, received recognition for their achievements, and met other youth involved in safety promotion.⁶⁷

The NSC adopted an inclusive approach both in terms of planning the youth sectional meeting and encouraging the participation of a diverse group of organizations. Representatives from 4-H, FFA, the American Farm Bureau Young People, Grange Young People, as well as many other groups attended the youth sectional meeting. The national FFA, Farm Bureau, and 4-H adult advisors assisted NSC staff members in planning the conference activities, with the youth. For instance, NSC employees, several outstanding youth club members, and their adult leaders planned the 1955 meeting. A *Farm Safety Review* writer reflected on preparation for the event. The author stated, "Plans for this year's program include presentation of exhibits and demonstrations, reports on outstanding local youth safety programs and specific safety projects,

⁶⁵ "Farm Safety at the Congress," *Farm Safety Review*, December 1955, 4.

⁶⁶ "Committee Plans Youth Sessions," *Farm Safety Review*, March 1957, 3.

⁶⁷ "Youth Looks to the 60s," *Farm Safety Review*, November/December 1959, 3.

outstanding youth highway safety programs, workshop sessions on power tool safety in home farm shop, and ‘buzz’ (informal discussion) sessions.”⁶⁸ Organizers of the event also adopted a yearly theme; in 1956, they adopted the motif of “Let’s plant, cultivate and harvest safety;” the following year, organizers of the meeting proclaimed “Youth Backs the Attack.”⁶⁹

Rural youth attested to the fact that the annual youth gathering was a real benefit to the promotion of safety in their communities. Participants indicated that they gained valuable safety information, received recognition for their achievements, and also socialized with others concerned about accidents. They benefited from safety speeches delivered by national 4-H and FFA leaders, tractor safety demonstrations, and a host of other educational experiences. Attendees also enjoyed formal dinners, dances, and other entertainments. Speakers included members of prominent safety organizations, corporate officials, and safety experts. In 1956, sessions titles included “Fire Drills for Farm Families, Fire Demonstrations, Visual Aids or Gadgets that can Teach Safety, First Aid, Water Safety, Corn Picker and Tractor, Gun Safety, and Falls.” The annual Farm Safety Youth Section usually also included award ceremonies and tours of local attractions.⁷⁰ In 1961, Raymond Powell, an FFA club member from Blairstown, New Jersey reflected upon his experience at the gathering. He stated, “Using the new ideas that I have brought back from the Congress, I have already started my work for this year. As I am president of the Newton Chapter of the Future Farmers of America, it is my duty to impress the

⁶⁸ “Farm Safety at the Congress,” *Farm Safety Review*, December 1955, 4.

⁶⁹ “For 1956 Safety Congress,” *Farm Safety Review*, March 1956, 15; “Committee Plans Youth Sessions,” *Farm Safety Review*, March 1957, 3.

⁷⁰ “Farm Safety at the Congress,” *Farm Safety Review*, December 1955, 5; “For 1956 Safety Congress,” *Farm Safety Review*, March 1956, 15.

other chapter members with safety ideas so that they may also go out and teach safety to the public.”⁷¹ This is but one relationship the NSC fostered while creating an interdependent web of relationships connecting a variety of government agencies, farm organizations, and other agricultural interests. This network worked cooperatively to decrease the dangers present on the American farms, but NSC officials also cooperated extensively with the members of the USDA.

The USDA fulfilled a role similar to the NSC in the farm safety movement by assuming intra-organizational coordination, information dissemination, and research. In 1944, USDA officials had established their “safety council” whose members initiated activities to improve both safety of the agency’s own employees and the larger public. Stanley H. Gaines, an official for the agency’s office of information, stated that the council was established to “coordinate existing safety programs within the department and foster closer working relations with other safety organizations.” The council consisted of numerous smaller committees each dedicated to researching and working to improve safety in such specific areas as “fire prevention,” “automotive safety” and “farm work.”⁷² USDA staff also published farm safety tracts concerning agricultural chemical safety, machine safety, and various other safety subjects throughout the movement’s early decades and made them available to the farm public.⁷³

⁷¹ Raymond Powell, “My Trip to Congress,” *Farm Safety Review*, March/April, 1961, 10-11.

⁷² Stanley H. Gaines, “The USDA and Farm Safety,” *Farm Safety Review*, July/August 1947, 5-6. For additional information regarding the origins of the USDA safety activities, see, John H. Wetzel, “Co-ordination Pays Off,” *Farm Safety Review*, November/ December 1945, 3-15; Wetzel indicated that much of the USDA’s early safety work designed to improve the safety of the agency’s own employees; however, by the early 1940s, the department’s safety council was working to improve safety for families as evidenced by their employees’ contributions in such national campaigns as “Farm Safety Week,” “National Fire Prevention Week,” and “Spring Clean-up Week.”

⁷³ “Safe Use of Insecticides Theme of U.S.D.A Bulletin,” *Farm Safety Review*, July/August 1945, 15.

Although the USDA did not initially play a large role in the farm safety movement, the agency appears to have intensified its safety-related work in the early 1970s. For instance, in the early 1970s, the organization established a more activist Farm Safety Committee. The USDA's Task Force on Safety in Agriculture symbolized a renewed commitment to reducing farm accidents. The department's enlarged role was prompted by the Occupational Safety and Health Act's enactment, which issued several standards related to agriculture. In 1971, Lloyd H. Davis, a high-ranking USDA official, summarized the reasons behind the department's enlarged role. He indicated that although USDA employees had studied and provided educational material regarding safety for decades, new legislation justified an enlarged approach. He stated, "The new safety law adds to the significance of our role. As new mandatory standards applying to farmers and agribusiness are adopted, we have the responsibility to help apply the knowledge and competency of the USDA and land-grant system to the development of new standards."⁷⁴ The USDA also began providing funds to assist state farm safety programs, including the hiring of farm safety specialists.⁷⁵

State Extension also played an important part in farm safety by providing another important constituent in the network of cooperating organizations. Extension leaders, like those of other agencies involved in the farm safety effort, believed that cooperation was crucial in the effort. In 1946, M.L. Wilson, the national director of cooperative extension,

⁷⁴ Lloyd H. Davis, "USDA's Safety Program," *Farm Safety Review*, November/December 1971, 5-6. Davis specified that the task force was publishing material informing the farm public regarding OSHA standards, intensifying cooperative work with the NSC and other organizations, and improving farm accident data collection methods; for additional details regarding both the structure and functions of the task force, see, United States Department of Agriculture, Office of the Secretary, *Safety in American Agriculture*, by Clifford Hardin. Secretary's Memorandum No. 1723, Washington, D.C, 1971.

⁷⁵ Herb Plambeck, ed., *Iowa Farm Safety in the 20th Century: A History of Contributions by Rural Safety Volunteers*, 156, 140.

emphasized the need for various state extension workers to assist other organizations in a common effort to achieve improved rural life. Wilson stated, “We need to work closer with, not shy away from, farm organizations and other cooperating groups in those activities directed to attainment of higher living standards and community welfare.”⁷⁶

This cooperative approach was consistently demonstrated concerning the ways in which extension agents assisted youth clubs in safety activities, worked with other safety specialists, and provided leadership for a variety of safety programs.

State extension organizations supported educational efforts to improve safety. Extension assisted in the development of state and local safety programs, created and distributed safety tracts, and employed a large number of farm safety specialists. Extension agents in Kentucky and West Virginia demonstrated how these state agencies were instrumental in the outset of the movement. In 1943, Kentucky extension established training programs for farm laborers who had previously not been employed in an agricultural setting. In 1945, West Virginia’s extension agents mounted a unified effort to contact the distributors of agricultural chemicals and provided them with the latest information regarding the proper use of these potentially dangerous chemicals. Extension’s role in promoting safety was exhibited all across the nation and included the distribution of safety education materials and farm accident reports. Such tracts as “Safety in the home,” published by the Alabama extension service, provided rural Americans with sound accident prevention advice. In addition, extension employees published papers, which investigated various facets of the problem.⁷⁷ Finally, state

⁷⁶ M.L. Wilson, “A New Chapter Begins,” *Extension Service Review*, January 1946, 1.

⁷⁷ “Training New Hired Men,” *Extension Service Review*, May 1943, 69; “West Virginia Contact Dealers in Fungicides and Insecticides,” *Extension Service Review*, September 1945; Stella Lou Mitchell and Elta Majors. *Safety in the Home* (Auburn, Alabama.: Alabama Polytechnic Institute, 1944), 1-8; B.A. Wallace

extension provided employment opportunities for the growing numbers of farm safety experts in states such as Indiana, Iowa, and Minnesota.⁷⁸

Home demonstration agents employed by extension also proved to be important assets for the cause. Such dedicated women instigated a variety of safety programs and campaigns regarding a variety of issues including the rural auto accident problem, farm home safety, and children's well being on the farm. They initiated and participated in farm safety efforts in Indiana, Iowa, and a number of other states. However, by as early as the 1940s, some had already integrated safety in all their activities. Gladys Kendall, a home demonstration agent employed in Volusia County, Florida stated, "We emphasize safety not as a single project but as part of all our programs. For instance, in our work in good housekeeping and general clean-up, all families are urged to dispose of fire and accident hazards, to provide simple and necessary equipment and first aid supplies at home, and to have a place for everything and everything to have its place."⁷⁹ Home demonstration leaders also encouraged agents to integrate safety into their other activities. In 1959, the National Home Demonstration Council, an association for such professionals, outlined an effort, which directed its members to reduce accidents in their communities. The plan called for home demonstration agents to educate themselves

and H.R. Moore. *Farm Accidents Costly* (Columbus, Ohio: Ohio State University Agricultural Extension Service, 1943), 1-4.

⁷⁸ "New State Leaders," *Farm Safety Review*, March/April 1946, 16; "Farm Safety Roundup," *Farm Safety Review*, November/December, 1949, 14; "Farm Safety Clinics," *Farm Safety Review*, May/June 1950, 16; Farm Safety specialists also found employment state Farm Bureau organizations, agricultural associations, and by a variety of other groups, see, "Illinois Gets Specialist," *Farm Safety Review*, September/October 1946, 6; "Ohio Employs Farm Safety Specialist," *Farm Safety Review*, November/December 1944, 15.

⁷⁹ "Farm Home gets Safety Treatment," *Extension Service Review*, August/September 1947, 104.

regarding local issues, instigate safety programs, and work with other organizations already involved in the movement.⁸⁰

Members of the 4-H and FFA, working closely with local county extension agents also took up the safety cause. Youth group leaders enlisted thousands of the nation's youths into safety activities aimed at reducing accidents of almost every conceivable type. Representative of these organizations fully articulated their justifications for working to improve safety and "selling" the idea of safety in the residents of their communities. In 1953, while speaking at the NSC's Farm Division meeting, Bill Sorem, the FFA's National Vice president stated that "[s]ince we the farmers of tomorrow's America, will be intimately concerned with the conditions of our farms, rural safety is of primary importance to us."⁸¹ In 1955, Buddy Joe Smith, a West Virginia FFA club member, while speaking at the NSC's annual meeting, indicated that selling was important in almost every endeavor including safety.⁸² In 1959, Gary Noble, an FFA chapter leader from Newton, New Jersey, affirmed, "We as a chapter feel that this useless waste of life is unnecessary, that is why we are backing an attack on accidents." He also expressed a confidence in the role of education in reducing farm accidents stating, "Simply put, we believe that where education exists, farm life accidents decrease or cease to be."⁸³ Thus, the collective enthusiasm of thousands of such individuals inspired wide-

⁸⁰ Martha Kohl, "County in Virginia wins Highway Safety Contest," *Farm Safety Review*, December 1956, 5; "Hoosier Women Win Lane Award," *Farm Safety Review*, March/April 1959, 7; *Transactions-National Safety Congress* (Chicago: National Safety Council, 1951), 25; "Women at Work," *Farm Safety Review*, July/August 1959, 13.

⁸¹ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1953), 24.

⁸² *Transactions-National Safety Congress* (Chicago: National Safety Council, 1955), 25.

⁸³ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1959), 17.

spread youth participation. Such youth involvement proved to be a crucial element in the farm safety organizational network.

A new group of professionals exclusively dedicated to the rural accident problem also arose during the era. In 1945, the NSC and USDA also launched the first annual Institute of Farm Safety meeting, which promoted information exchange and acquisition among farm safety activists. The institute attracted a small but growing number of farm safety experts as well as agricultural engineers, USDA officials, and agricultural implement manufacturers. Representatives from other organizations who possessed an interest in making farming less dangerous also attended. Attendance at the institute eventually contributed to the development of a distinct professional identity of the farm safety specialists by the early 1960s.

The annual meeting provided participants with the latest information regarding an entire range of rural safety issues. By the mid-50s, it had evolved into a three-day long event featuring a growing number of informative sessions including fire hazards, proper use of farm chemicals, and proper electric fence installation. Farm safety leaders also gained insights regarding methods to improve both safety campaigns and methods of identifying the accident problem. These included sessions for sharing ideas on increasing media participation and proper ways of conducting farm accident surveys. Farm safety specialists also benefited from the opportunity to exchange information and form relationships with their colleagues. Farm manufacturers discussed design improvements to improve overall equipment safety. For instance, in 1955, Ford Motor Company's tractor division sent a delegation of company employees to lead a panel discussion regarding technical considerations in manufacturing safer tractors.⁸⁴

⁸⁴ "Farm Safety Institute," *Farm Safety Review*, August 1955, 5.

The farm safety institute's prominence also symbolizes the growing importance of farm safety experts in the farm safety movement. These professionals provided administrative leadership by initiating various research programs and assisting state farm safety councils. The experts specifically aided the growing number of state farm safety councils by helping to establish them, providing them with technical advice, and offering their administrative leadership. They also continually emphasized safety's importance to both their own institutions and as well as to the larger public. Farm safety experts were also among the growing ranks of specialists who were employed by land-grant colleges and extension agencies to provide a variety of services to their state's agricultural sectors. In 1958, John J. McEldroy accurately described the role of the extension specialist in the context of both the USDA and the nation's land-grant colleges, stating that "the cooperative extension service is like a highway, running from the U.S. Department of Agriculture and state land-grant colleges and universities to the nation's farms and homes. The traffic consists of extension specialists carrying technological facts from campuses to counties and returning with information and local reaction which help guide future programs." Such a description provides an accurate assessment of the role of the farm safety specialist during the era.⁸⁵

As a farm safety expert at Iowa State University, Norval Wardle's background experiences are representative of contributions and achievements of a farm safety

⁸⁵ John J. McElroy, "Specialists-The Connecting Links," *Extension Service Review*, April, 1958, 77; the contributions farm safety specialists made to state farm safety efforts is evident throughout the historical record. For instance, Norval Wardle, an Iowa state farm safety specialist served the Iowa Farm Safety Council's Secretary from 1947 to 1971, assisted in the council research activities and supervised many farm safety events held to raise the public's awareness see, Plambeck, ed., *Iowa Farm Safety in the 20th Century: A History of Contributions by Rural Safety Volunteers* 16, 20-21; also, by 1951, Farm Safety Specialists developed safety courses as part of the agricultural engineering curricula in states such as Iowa and Ohio, see, *Transactions-National Safety Congress* (Chicago: National Safety Council, 1951), 7.

specialist. Wardle spent his youth on an Idaho farm, but his outstanding academic accomplishments provided him with unique opportunities for a person of his humble origins. Prior to receiving his appointment at Iowa State, he taught vocational agriculture at an Idaho high school, receiving a master's degree at the University of Idaho. In 1947, he was appointed to the newly created position of agricultural safety engineer at Iowa State University just before completing his doctorate in vocational agricultural education. He also had a minor in agricultural engineering. During the 1940s and 1950s, he received various public health awards, published hundreds of farm safety articles, and served as the Secretary of the Iowa Farm Safety Council. He also assisted other Iowa Farm Safety Council members with both the creation and implementation of a variety of its programs. Wardle and his contemporaries did much to assist in the formation of a concerted effort to address an issue of national importance.⁸⁶

Wardle's contemporaries also fulfilled a similar role in other states by providing leadership, expertise, and encouragement for the inter-organization cooperation in the realm of safety. In 1949, Paul E. Miller, Minnesota's Director of Extension, announced the appointment of Glenn I. Prickett as the state's extension farm safety specialist. An anonymous *Farm Safety Review* writer described the important role that Prickett would play in improving safety for the state's farm families. The author stated, "Mr. Prickett will provide leadership for all state extension activities in safety" and also "work with county extension agents, farm and civic organizations, and individuals to 'eliminate suffering and save lives by bringing more safety into the field of agriculture.'" The

⁸⁶ Norval Wardle's resume. Norval Wardle papers. Special Collections, Iowa State University Library, Iowa State University, Ames, Iowa; Plambeck, ed., *Iowa Farm Safety in the 20th Century*, 20; for a brief but useful description revealing how he was representative of the background and contributions of the state's other farm safety specialists, see, "News Round-up," *Farm Safety Review*, August 1955, 14-15; "News Round-up," *Farm Safety Review*, March/April 1955, 13-14.

Review writer also identified a diverse group of other organizations with whom Prickett would be cooperating to promote safety in Minnesota. The job descriptions of farm safety specialists in other states also emphasized their role in fostering intra-organizational cooperation in their states.⁸⁷

Although the evidence is not overwhelming, it is also reasonable to assume that safety careerists contributed to the movement's expansion. This is supported by their desire to develop their field and market their expertise. In 1959, Harold M. Pontius, a private industry safety consultant, stressed that farm safety represented an emerging field for talented rural youth. Pontius addressed a group of young people attending the NSC youth sectional meeting. He indicated that the farm safety field was growing, similar to auto, industrial, and public accident prevention. He also stated that individuals who possessed an agricultural background might consider it as a possible career choice stating, "Farm Safety is a broad field of opportunity. Only 18 of our states have farm safety specialists. This is a growing movement and will offer opportunity for many, both at the state and national levels." He also emphasized that "FFA and 4-H boys with an understanding of farm problems are good prospects for training in this field."⁸⁸

Thus, farm safety represented yet another policy domain in which experts could market their talents. Historian Catherine McNicol Stock has examined the increasing influence of such individuals on the lives of rural Americans during the Great Depression. She stated that professionals such as sociologists, engineers, extension

⁸⁷ "Farm Safety Roundup," *Farm Safety Review*, November/December 1949, 14; "Illinois Gets Specialist," *Farm Safety Review*, September/October 1946, 6; "Farm Safety Roundup," *Farm Safety Review*, July/August 1949, 14.

⁸⁸ Harry M. Pontius, "A Career in Safety?," *Farm Safety Review*, March/April 1959, 3.

experts, and others represented a “new middle class” with far different backgrounds from the “old middle class.” She stated, “They owned not a piece of land nor a store of goods but a body of knowledge and skill; they acted not to produce a product but to reproduce a set of relationships. They held nothing to pass on to their children but a passion for education and for certain intangible skills.”⁸⁹ Historian Roy Lubove has also observed that experts gained considerable influence in many aspects of American life. Lubove’s observations regarding social work’s professionalization are equally true of the differentiation of specialties in other aspects of American life. Lubove commented that “typical features of urban-industrial society,” such as “idealization of expertise, the growth of an occupational subculture, and bureaucratization” were powerful trends in twentieth century America.⁹⁰ Thus, farm safety experts joined the ranks of other specialists who arose to address almost every conceivable agricultural problem. Such professionals included entomologists, agronomists, and agricultural engineers all of whom labored to improve the efficiency on the nation’s farmsteads.

State farm safety committees were also crucial for the development and implementation efforts to reduce accidents at the state level. They fulfilled a variety of purposes including cooperating with other agricultural organizations to raise safety awareness and hosting meetings, which provided a setting to exchange ideas and formulate plans. They also tailored programs to suit the unique needs of different agricultural regions. Thus, they were indispensable in furthering the involvement of state government agencies, local 4-H clubs, and Farm Bureaus in the safety cause. For

⁸⁹ Catherine McNicol Stock, *Main Street in Crisis: The Great Depression and the Old Middle Class on the Northern Plains* (Chapel Hill: The University of North Carolina Press, 1992), 99.

⁹⁰ Roy Lubove, *The Professional Altruist: The Emergence of Social Work as a Career* (New York: Atheneum, 1983), 220.

instance, in 1983, a long-time member of the Iowa Farm Safety Council listed 49 accomplishments that his committee had achieved over its forty-year existence. These accomplishments included continually cooperating with both the NSC and the USDA, enthusiastically participating in Farm Safety Week, and conducting farm accident studies. Plambeck also listed numerous programs the council had supported in conjunction with the state farm safety specialist, various extension staff, as well as various youth groups. Farm safety councils and committees in other states fulfilled a similar role and made comparable contributions.⁹¹

The NSC played an important advisory role in the creation of committees in states such as Indiana, Oregon, and Washington. For example, in 1942, members of both the Indianapolis Safety Council and the NSC's Farm Safety Division cooperated in organizing a meeting of many of the state's prominent rural organizations. Individuals representing such groups as the Grange, Purdue University, and the Indiana Farm Bureau met to establish a state farm committee. A *Farm Safety Review* writer stated that all attendants were "deeply concerned at the appalling loss of life and limb and property as the nation faced the terrific impact of World War II" and that "there was general agreement that a coordinated attack on farm accidents in Indiana was long overdue." The attendees responded by creating the Indiana Farm Safety committee to provide leadership and coordinate efforts to reduce the numbers of farm accidents in the state.⁹² The NSC provided similar assistance with both Oregon's and Washington state's farm safety committees. In 1960, an anonymous *Farm Safety Review* writer stated that one of the

⁹¹ Herb Plambeck, ed., *Iowa Farm Safety in the 20th Century: A History of Contributions by Rural Safety Volunteers*, 26-28. For brief but useful discussion of the activities of farm safety councils and committees in other states, see, "Illinois Committee Meets," *Farm Safety Review*, January/February 1944, 13.

⁹² Maynard Coe, "A Decade of Farm Safety," *Farm Safety Review*, March/April 1954, 12-15; "State Organization Farm Safety," *Farm Safety Review*, January/February 1947, 6.

major duties of the organization's farm division was to provide "assistance to the 45 permanently organized State Farm Safety Committees" and continue the work of "organizing new State Farm Safety Committees."⁹³

The numbers of farm safety committees expanded quickly during the movement's first two decades, from a mere 3 in 1944 to 31 by 1955. By 1960, safety advocates in 45 states had formed such committees.⁹⁴ Individuals who formed such committees included members of the farm press, insurance companies, government and agricultural-related agencies. For instance, in 1943, Iowa farm safety advocates formed one of the nation's first farm safety councils. In 1983, while commemorating the accomplishments of his Iowa's farm safety council. Herb Plambeck, a long-time agricultural broadcaster for WHO radio station in Des Moines, stated, "Four men are commonly recognized as the earliest pioneers in organized farm safety work in Iowa. They are the late Kirk Fox, editor for *Successful Farming*; the late J.S. Russell, farm editor for the *Des Moines Register*; B.W. Lodwick, a long-time leader in Iowa; the National Farmer's Home Administration; and L.J. Long Keeny, president of the Grinnell Mutual Reinsurance Companies."⁹⁵ Agricultural engineers and others employed at the nation's land-grant colleges were also heavily represented on these committees. The farm safety committees in other states were founded by individuals with comparable backgrounds and interests.⁹⁶

⁹³ "Farm Safety Roundup," *Farm Safety Review*, July/August 1947 13, "The Farm Safety Story" *Farm Safety Review*, May/June 1960, 8.

⁹⁴ *Ibid.*, 12-15; "The Farm Safety Story," *Farm Safety Review*, May/June 1960, 7.

⁹⁵ Herb Plambeck, ed., *Iowa Farm Safety in the 20th Century: A History of Contributions by Rural Safety Volunteers*, 9.

⁹⁶ "Indiana Officers Change," *Farm Safety Review*, March/April 1948, 13.

By 1960, almost every state in the nation possessed a farm safety committee, which reveals that the issue was no longer ignored as it had been prior to the Second World War. In addition, once the members of this network of organizations had recognized the problem and enlisted a commitment amongst its members, it proved to be a potent educational force. Safety advocates demonstrated their power to mount safety education on the national, state, and local level. Farm safety participants exhibited high-levels of cooperation throughout the era by pooling by their collective resources to raise safety awareness regarding almost every conceivable farm-related health risk that threatened the farm family.

Farm Safety Week's development and persistence is illustrative of the many ways these organizations were effective in mounting cooperative farm safety programs and campaigns. In 1944, NSC's farm division members appointed a five-man board to develop the first Farm Safety Week. These administrators received advice from USDA officials who also provided assistance in the program's implementation. In addition, both organizations cooperated in the development, distribution, and preparation of safety educational materials. President Roosevelt underscored its importance both for experienced farmers and the thousands of new workers engaged in agricultural work. Farm Safety Week consisted of devoting each day to a particular farm hazard. Farm safety specialists, extension agents, and rural youth club leaders directed efforts such as tractor-tipping demonstrations, farm hazard inspections, and a variety of other activities aimed at increasing safety awareness.⁹⁷

⁹⁷ Maynard Coe, "The Reasons for National Farm Safety Week," *Farm Safety Review*, July/August 1944, 3. The USDA also had expressed the importance of the farm accident issue by creating its own safety council consisting of representatives from the agency's many branches. The USDA Safety Council met once per month and augmented the NSC publication of safety materials. It also aided the National Safety Week effort by distributing safety information to state extension offices. For a brief discussion of this committee and its activities, see *Farm Safety Review*, November/December 1951, 13.

The initial Farm Safety Week's success represented the communicative powers inherent in utilizing the farm safety movement's organizational network. The NSC appointed a chairman in forty-five states who directed that state's Farm Safety Week activities. These state leaders included representatives from the farm press, extension service directors, and state Farm Bureau leadership. The National Safety Council and the USDA sent educational materials and program guides to these leaders who then distributed them to their agricultural organization members. E.W. Lehman, chairman of the NSC Safety Week Committee, highlighted the event's intra-organizational collaboration, indicating that "three hundred organizations had cooperated with the National Farm Safety Week Campaign" and that the NSC had distributed "6500 news releases to 450 magazines." He also revealed that 374 radio stations had featured Farm Safety Week programming.⁹⁸ Throughout the late 1940s, the leaders of such organizations as the NSC, USDA, Farm Bureau, National Farmers' Union, and the National Grange repeatedly emphasized the need to assist each other in observing Farm Safety Week as an expression of the collective will to reduce farm accidents.⁹⁹

Farm Safety Week continued to be an important tool for raising rural safety awareness, which gained increased participation and support throughout the era. The NSC gained even more corporate and media backing for National Farm Safety Week. In 1951, Coca-Cola incorporated the farm safety message in their national advertising campaigns. Both NBC and ABC addressed safety concerns in their rural-oriented programming, which included shows such as NBC's "National Farm and Home Hour"

⁹⁸ "Lehman Reports on National Farm Safety Week," *Farm Safety Review*, September/October 1944, 4.

⁹⁹ "Agricultural Leaders Endorse Farm Safety Week, July 21-27," *Farm Safety Review*, May/June 1947, 5; Agricultural Leaders Endorse Farm Safety Week's Objective, *Farm Safety Review*, July/August 1948, 3.

and ABC's show, "American Farmer." The NSC also distributed ever-growing amounts of safety material to rural educators in addition to increasing associated local activities. In 1955, state extension leaders received 10,000 Farm Safety Week information packets and local safety leaders led 5,000 local safety meetings.¹⁰⁰ In 1962, a *Farm Safety Review* writer stated that, "More than a million pieces of material will go to every county and to the rural press and radio this year. Every state and its farm organizations will participate in farm safety week in an effort to make every farm family safety conscious 52 weeks of the year."¹⁰¹ In 1965, Jack Burke indicated that for safety advocates across the nation farm safety week signifies a "high point" in their yearly calendar of events.¹⁰²

Thus, the leaders of organizations with both a safety and agricultural focus devoted themselves to cooperatively providing safety education for the nation's farm families. Although a concerted effort began decades after the industrial sector had first made intensive efforts to improve safety, by the 1950s, a diverse group of organizations and individuals were pooling their resources to provide safety education to the nation's farm families. The fact that leaders of the nation's agricultural sector were devoting increased attention as demonstrated by the Farm Safety Week's success, the establishment of state farm safety committees, and the emergence of farm safety professionals all reveals that the movement had fully emerged. The theme of intra-organizational cooperation was demonstrated at the national, state, and even local level. For instance, local business such as implement dealers, banks, and newspapers often supported youth clubs and a variety of other organizations in their safety activities. In

¹⁰⁰ "National Farm Safety Week on the Air," *Farm Safety Review*, July/August 1951, 3; Maynard H. Coe "Farm Division Meeting," *Farm Safety Review*, January/February 1955, 12.

¹⁰¹ "The Week for Rural America," *Farm Safety Review*, May 1962, 4.

¹⁰² Jack Burke, "Farm Safety Week, 1965" *Farm Safety Review*, May/June 1965, 2.

1956, Philip Tichener, an extension information specialist from Minnesota, highlighted the high levels of collaboration that had made a “safety campaign” in Olmsted County, Minnesota possible. He stated, “County extension workers, in cooperation with 51 local organizations are leading safety demonstrations, hunting down hazards on individual farms, putting reflectorized tape on farm machinery and putting up safety posters so that rural people there won’t lose time, money, limbs and lives from accidents.”¹⁰³

Therefore, a farm safety movement had fully emerged by the close of the 1940s. Factors such as the growing influence of expertise in American life, the political context of the Second World War, as well as the view that farming was becoming increasingly dangerous all contributed to the movement’s emergence. The efforts of safety advocates were also bolstered by the generous pocketbooks of corporate benefactors who provided much of the funding for the movement and helped expand state funding to extension programs. The enthusiastic participation from a diverse group of organizations aided to mount a vigorous educational effort. However, despite the emergence of this dynamic inter-organizational effort, safety advocates and specialists were attempting to solve a difficult and unique problem.

¹⁰³ “Benton County’s Success Story,” *Farm Safety Review*, November/December 1959, 8; see, “First Radio Farm Accident Survey,” *Farm Safety Review*, September/October 1950, 4-5; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1952) 14-15; Philip Tichener, “Olmsted County, Minn. Organizes A Hazard Hunt,” *Extension Service Review*, November 1956, 207.

CHAPTER THREE

The Uniqueness of Farmstead Safety: Old Hazards and New Dangers Converge in the Countryside

The farm family of the mid-twentieth century existed in an environment that differed greatly from an urban setting. A particularly significant distinction concerned the reality that the farmstead functioned both as a home and a workplace. While urbanites resided in surroundings in which the home and workplace were usually clearly delineated, farm families existed in an environment in which these domains intersected. As a result, farm families encountered a dizzying array of hazards that affected rural individuals regardless of age, meaning that both the very young and the very old were more exposed to potentially dangerous situations. Many other unique accident agents, including livestock, affected farm residents.

Although both rural and urban residents sometimes encountered dangers stemming from the same sources, such as falls, weather, and fires, the rural environment shaped even these long-standing causes of injuries and deaths. A farmer was more likely to fall from a wagon or into the moving parts of an agricultural machine than an urbanite. A barn also presented a more diverse variety of fire hazards than a city dwelling. In addition, farm families' outdoor lifestyles and relative isolation also influenced the nature of weather and recreational related dangers. Similarly, the period's technologies such as electricity and automobiles were also influenced by a rural context. Farm families used electricity for home conveniences, as well as for a variety of other work-related uses, all without the supervision often experienced in other employment settings. Rural drivers also encountered distinct dangers related to the nature of rural roadways and the distance

from emergency services. The isolated nature of the homestead affected the timely arrival of assistance in an emergency. In 1954, Raymond C. Johnson, a prominent 4-H leader elaborated on this point stating that fire prevention and reaction efforts were hampered by countryside's dispersed population and the impractical nature of installing water hydrants.¹⁰⁴

The farmstead's dual function as a home and workplace particularly reflected itself in the unique dangers posed to both the very young and the aged. Unlike urban areas, both demographic groups in rural locales continued to be exposed to a highly hazardous working environment. In 1946, Maynard H. Coe, director of the National Safety Council's (NSC) Farm Safety Division, recognized the point stressing that this meant that the farm accident problem differed from safety issues in other occupational contexts because farming presented dangers to the very young and the very old.¹⁰⁵ The elderly were susceptible to accidents because unlike other work settings many farmers never fully retired, meaning they continued to encounter agricultural hazards as they became less able to adapt to them. Children were also exposed to many safety threats since they both worked and played on the farmstead. The nation's agricultural leadership repeatedly acknowledged this dimension to the problem. In 1959, Ezra Taft Benson, the United States Secretary of Agriculture, encouraged the NSC to continue to focus its farm safety programs towards the farm family.¹⁰⁶

In 1954, Rosemary Schaefer, a home economist for the NSC's Farm Division, offered a heartbreaking example that illustrated such complexities. She provided the case

¹⁰⁴ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1954), 24.

¹⁰⁵ Maynard H. Coe, "Why a Farm Safety Week?" *Farm Safety Review*, July/August 1946, 14.

¹⁰⁶ Maynard H. Coe, "A Family Affair," *Farm Safety Review*, March/April 1959, 1.

of a woman whose spouse was forced to go on a trip at the same time that much fieldwork needed to be completed. She was excited by the prospect of plowing a field for her husband, which he had wanted to till prior to his departure. Unfortunately, the woman had never driven the tractor by herself and also had no one to watch her four-year-old boy, so she took the child with her. While attempting to till the field, she misjudged the severity of a steep hillside and overturned the tractor. The husband returned home and immediately began looking for his family. He found them lifeless under the tractor's crushing weight.¹⁰⁷ The incident powerfully demonstrated how agricultural families worked together, were often inadequately trained or unsuited for a particular job. Schaefer's example also reveals how people of all ages could easily be exposed to unsafe situations.

Farm children were particularly vulnerable because little legislation had been introduced to protect them. This was especially the case for those who worked on their own parents' farms. The laws enacted during the period prohibited youths under the age of sixteen from engaging in highly hazardous activities, such as operating agricultural equipment and applying pesticides or fertilizers. Unfortunately these legal safeguards applied only to individuals who worked as farm employees and did not protect the thousands of children who worked on their own families' farms.¹⁰⁸ Thus, parents were ultimately responsible for the children's welfare and for assigning them age appropriate work duties. In 1955, Harold Heldreth, an NSC official, echoed this reality, stating that "A child's safety is his parent's responsibility. If it were possible to purchase an ounce of

¹⁰⁷ Rosemary Schaefer, "Safety for Farm Children," *Farm Safety Review*, July/August 1954, 12.

¹⁰⁸ U.S. Department of Labor. Employment Standards Administration. Wage and Labor Division. 1984. *Child Labor Requirements in Agriculture Under The Fair Labor Standards Act, Child Labor Bulletin No. 105*. U.S. Department of Labor, 1-5 (Washington, 1984).

magic guaranteed to protect children from accidents, parents would rush out to buy it, of course. But there is no such magic formula on the market.”¹⁰⁹ In 1963, Ray Fuson, a high-ranking official for the Indiana Farm Bureau revealed how farm work’s stressful demands could easily expose youths to dangerous situations. He stated, “It is real easy for Dad to pull a 15-year-old boy off a \$6,000 self-propelled combine, put him into a \$175 truck and send him a few miles into town for supplies. In busy times, a farmer must depend upon those working with him.”¹¹⁰

A child’s natural inexperience and curiosity combined with the farmstead’s complexity also posed special problems. In 1955, a *Farm Safety Review* writer stressed that a child’s natural inquisitiveness needed to be tempered with safety awareness. Another safety advocate expanded on the point stating, “Consider your children. Does your toddler go unwatched as he explores his constantly expanding world? He needs your constant attention except when he is in a play pen or fenced area where his activities are limited.”¹¹¹ In 1954, Rosemary Schaefer, an NSC home economist, offered safety advice, which illustrated the challenge of keeping farm kids safe. She suggested the implementation of practices such as establishing specific play areas, giving children age appropriate work, and consistently instructing kids in safety.¹¹² Although such advice was clearly warranted, adults probably found it difficult to implement such recommendations, considering farming’s hectic and demanding responsibilities.

¹⁰⁹ Harold Heldreth, “Safety for Farm Children,” *Farm Safety Review*, March/April 1955, 12.

¹¹⁰ *Transactions- National Safety Congress*, (Chicago: National Safety Council, 1963), 25.

¹¹¹ “Could This Be Your Child?,” *Farm Safety Review*, September 1955, 8.

¹¹² Schaefer, “Safety for Farm Children,” 13.

Children's innate inquisitiveness made them especially susceptible to livestock mishaps. Rosemary Schaefer stated, "Children, with their natural love of animals, are often victims of these accidents. If there are draft horses or riding horses on the farm, keep small children away from them unless the child is with an adult."¹¹³ Harold Heldreth also emphasized the special concerns related to children and animals, particularly horses, by writing "thousands of farm boys and girls are in the saddle daily to carry out certain farm chores more quickly. Many young people ride horse for recreation."¹¹⁴ He suggested that interactions with animals should be supervised, age appropriate, and that all farm youth should be trained in proper livestock handling.¹¹⁵

Both the diversity and severity of childhood farm accidents suggest that parents were sometimes unable to keep their children safe. Youths became accident victims as a consequence of exposure to a wide variety of hazards. Fatalities and injuries from farm machinery, electric fences, and even from blasting caps used for stump removal illustrated the great number of health risks. The fact that farm children had access to blasting caps confirmed the challenge that parents faced in keeping their kids safe. In 1944, a *Farm Safety Review* writer stated, "Children hammer or pick at them, throw them in bonfires or against walls, and the resulting explosion throws particles of metal in all directions. Fingers are blown off, hands are often crippled, eyes destroyed."¹¹⁶ Although blasting caps represented a rather serious and less common hazard, the example

¹¹³ Ibid., 13.

¹¹⁴ Harold Heldreth, "Safety for Children," *Farm Safety Review*, March/April 1955, 11.

¹¹⁵ Ibid., 11.

¹¹⁶ "Practice Safety with Machinery," *Hoard's Dairyman*, August 10, 1943, 7. C.L. Hamilton, "Is Your Electric Fence Safe?," *Farm Safety Review*, March/April 1945, 7; "Move to Curtail Accidents with Blasting Caps," *Farm Safety Review*, March/April 1944, 14.

nonetheless signified the great diversity of farm dangers. Agricultural literature contains numerous examples of the children who were injured or killed in more common types of accidents, such as those involving machines. In 1955, Harold Heldreth, an NSC writer, indicated that farm accident researchers in 1952 discovered that out of 45 youths injured in mechanical accidents, 35 of them were involved in tractor mishaps. He also specified that the greatest proportion of fatal accidents involved children between the ages of one and four. Youths between the years of fifteen to nineteen years old were close behind.¹¹⁷

Exposure to potentially dangerous technologies and parental negligence contributed to the problem of childhood fatalities involving tractors. Children were most usually killed as a result of being a second rider, getting caught in a tractor's power take-off shaft or playing around a moving tractor. In 1962, the FFA members of Ellsworth, Kansas spoke at the National Safety Congress, and stressed how unwise it was to give children tractor rides. The Ellsworth FFA speakers indicated that a farmer who allowed a second rider "doesn't value the life of his children very much, or he wouldn't let them ride on the tractor." Although such comments may have been harsh, having a second rider was indeed very hazardous. A small bump in the road could throw a child from a tractor and result in serious consequences.¹¹⁸

Safety writers also elaborated upon the growing problem farm dangers posed to elderly. In 1953, Harold Heldreth, an NSC agricultural representative, stated, "Being self employed or a member of the farm family, there is no question of out-and-out retirement at any specific age." Heldreth also pointed to the reality that the nation's agricultural production would be increasingly dependent upon older workers. He also

¹¹⁷ Harold Heldreth, "Safety for Farm Children," *Farm Safety Review*, March/April 1955, 10.

¹¹⁸ *Transactions- National Safety Congress* (Chicago: National Safety Council, 1962), 2.

commented that “today, 50 percent of our workers are over 30 years old and 22 percent are over 50 years old.” He correctly ascertained that this meant the nation’s food needs would be increasingly met by aged farmers. The aged also possessed characteristics that made them particularly vulnerable, including decreasing physical abilities and much slower recovery from injuries. Heldreth indicated that there were certain jobs and practices that venerable farm workers should avoid. His suggestions included not overworking themselves, avoiding the use of equipment in difficult conditions, or engaging in other highly strenuous activities. Despite Heldreth’s prudent advice, it is easy to imagine that many farmers might ignore such counsel.¹¹⁹

Farm families, like their urban counterparts, also faced the risk of being injured in falls; however, the unique nature of the farm as both a workplace and home also affected this hazard. An individual could suffer a fall in a variety of contexts including in the home, on the farmstead’s grounds, or while using farm equipment. In 1961, 18,400 Americans perished in falls, a majority of which occurred in the home. In 1973, the results an NSC farm accident survey provided more specific information regarding falls on the farm. The study revealed that falls represented a third of all farm accidents, signifying a serious problem. The investigation also showed that factors such as emotional state, improper footwear, or adverse weather conditions contributed to falls.¹²⁰

Safety writers also revealed that older people, due to their physical frailty, and children, owing to their inexperience, were especially inclined to serious falls. Elderly Americans were particularly prone to death or serious injury in a fall since they suffered

¹¹⁹ Harold Heldreth, “Providing Safe Farms for the Older People in Agriculture,” *Farm Safety Review*, January/February 1953, 12-14.

¹²⁰ “Facts about Falls,” *Farm Safety Review*, September 1962, 4-5. “Falls...leading causes of farm accidents,” *Farm Safety Review*, July/August 1973, 3-5.

from poor balance. In 1954, Rosemary Schaefer, a home economist for the NSC's Farm Division, insisted that farm children were particularly susceptible to falling into open wells because of their inattentiveness. In a *Farm Safety Review* piece, Schaefer told the story of a Colorado toddler who inadvertently came across a well and fell 40 feet to its bottom. Despite the valiant efforts of a man who bravely recovered her from three feet of water, the child was tragically brought to the surface lifeless.¹²¹

People also suffered painful plunges in their farm homes because of careless storage practices, improper step construction, or poor lighting. Gladys T. Olson, an NSC Home Economist, identified the problem of basement steps being used as shelves for boots, fruit jars, and mops. Olson recommended that organizational aids such as wood storage boxes, baskets, or other appropriate containers be used as safe alternatives. Other safety writers stressed factors such as poor step design involving improper step width, an absence of hand rails, or a lack of tread also contributed to falls. The author also stressed that appropriate levels of light represented another preventative measure. Safety advocates disclosed a variety of other causes including loose area rugs, neglecting to promptly clean up spills, and attempting to carry overly heavy objects up stairs.¹²²

Farm families also differed from their metropolitan counterparts since it was much more likely that animals would harm them. Although cities were inhabited by pets, exposing urbanites to dangers such as dog attacks, those residing in rural areas faced much more substantial animal-related hazards. In 1945, Marvin Nichol, an NSC farm

¹²¹ "Facts about Falls," 5. Rosemary Schaefer, "Safety for Farm Children," *Farm Safety Review*, July/August 1954, 12.

¹²² Gladys T. Olson, "One Step at a Time," *Farm Safety Review*, July/August 1944, 4-5. "Good Design: Can Make Steps Safer," *Farm Safety Review*, November 1956, 14. "Take Positive Steps," *Farm Safety Review*, September 1962, 6.

safety expert, emphasized the problem's significant magnitude. He stated, "Second in number only to accidents from machinery are the farm fatalities caused by animals."¹²³ Horses could inflict injury by unexpectedly biting, bolting, kicking, or stomping. Although cattle did not bite, they might kick with their back legs, gore with their horns, or step on their owners' feet. Pigs could inflict wounds with their tusks and even a male sheep could ram with its horns. In 1956, Harold Heldreth commented on the problem stating, "In recent years, accidents involving farm animals decreased, reaching the lowest total on record in 1950, but they were still the second most important source of farm work accidents, and stockman who deviate from proven safe methods of handling farm animals have the most accidents." Although farm accident statistics confirm Heldreth's observations regarding the declining numbers of livestock related injury, the issue nevertheless persisted.¹²⁴

Although the numbers of horses were decreasing, rural families continued use them for fieldwork and leisure. Harold Heldreth commented on this dual, multi-generational use stating, "Thousands of farm people—boys, girls and adults—are in the saddle daily, carrying out farm jobs that can be done more efficiently on a mount. Many farm people also seek recreation in the saddle."¹²⁵ Unfortunately, rural Americans continued to experience substantial numbers of horse-related accidents. For example, in Kansas between 1930 and 1945 over ninety people had been killed in runaway horse accidents. In 1944, 20 people died in horse-related mishaps in Wisconsin.¹²⁶

¹²³ Marvin J. Nichol, "How's Your Horse Sense?," *Farm Safety Review*, May/June 1945, 8.

¹²⁴ Harold E. Heldreth, "Safe Practices Can Mean Bigger Profits," *Farm Safety Review*, August 1956, 9.

¹²⁵ Harold E. Heldreth, "Safe in the Saddle," *Farm Safety Review*, January/February 1955, 5.

¹²⁶ Nichol, "How's Your Horse Sense?," 8.

Such unfortunate events occurred for a variety of reasons including runaway horse incidents, incorrect use of equipment, and lack of training. Runaway horses were particular dangers because they created chaotic circumstances, which often resulted in grave personal wounds, wrecked equipment, and an injured horse. Some of the more serious or fatal accidents occurred when the rider was thrown from a mount. *Farm Safety Review* writer Marvin Nichol emphasized the importance of properly securing “stirrups, cinches, and saddles” and indicated that many accidents were caused by faulty or improperly used equipment. Nichols also highlighted the importance of proper training, stressing that all newcomers should be given knowledgeable instruction. He emphasized that skills such as “mounting, sitting in the saddle, handling reins, and riding in regard to speed, rest periods and walking” should all be included in the training.¹²⁷

Although bovines warranted caution regardless of their temperament, bulls demanded special respect. Harold Heldreth pointed to milking hazards associated with cows, stressing that such mishaps were often disregarded because they were rarely deadly. Yet a startled dairy cow might stomp a person’s foot, causing both suffering and lost work time. Bulls presented the greatest hazards due to their large size, strength, instinctual protectiveness, and aggressiveness. They also possessed horns, which could inflict serious injury. Safety advocates believed bulls to be one of the most dangerous of all farm animals since they could cause wounds by “goring, butting, hooking with horns, and trampling.”¹²⁸ In 1944, prominent veterinarian C.F. Schlotthauer stated, “The most

¹²⁷ Marvin J. Nicol, “Safe in the Saddle,” *Farm Safety Review*, May/June 1947, 12-13.

¹²⁸ Harold E. Heldreth, “Safe Practices Can Mean Bigger Profits,” *Farm Safety Review*, August 1956, 8.

severe injuries received from cattle are due to being bumped or gored by bulls. Only the automobile kills more farm people than bulls.”¹²⁹

Although Schlotthauer’s comments were probably overstated, these big and aggressive beasts were undoubtedly hazardous. In 1943, E.S. Bayard, editor of the *Pennsylvania Farmer*, revealed that the twenty years he had been studying the issue had revealed a problem of significant scope. He had recorded 579 bull attacks, of which 214 had resulted in death. He emphasized that often bull injuries were never disclosed and sometimes even local newspapers did not cover them. Bayard concluded, “The total for the whole country must be much larger than most of us suspect, justifying the statement that the bull is the most dangerous animal on earth. Not that it is the most vicious but that it has the most opportunities to kill.”¹³⁰ In 1944, Randall Swanson, a Wisconsin farm safety specialist, revealed that in the first half of that year alone, a half dozen farmer were killed and another 25 severely injured in accidents involving bulls in his home state.¹³¹

Bulls were highly unpredictable and even seemingly docile bulls could present significant danger since farmers were sometimes more careless in handling them. In 1944, C.F. Schlotthauer articulated this point stressing that those bulls that were known to be aggressive were treated with great caution, but even bulls that appeared compliant could turn on their owners. Randall Swanson supported this view stating that “farmers are crippled and lives are lost because suddenly the quiet dairy bull changes and his disposition suddenly becomes a ferocious, roaring killer.”¹³²

¹²⁹ C.F. Schlotthauer, “No Kick Coming,” *Farm Safety Review*, September/October 1944, 5.

¹³⁰ E.S. Bayard, “Put The Bull in His Place,” *Farm Safety Review*, September/October 1943,

¹³¹ Randall C. Swanson, “The Dairy Bull—Dr. Jekyll and Mr. Hyde,” *Hoard’s Dairyman*, November 10 1944, 598.

¹³² Schlotthauer, “No Kick Coming,” 5. Swanson, “The Dairy Bull—Dr. Jekyll and Mr. Hyde,” 598.

The literature confirmed such warnings since it contained many harrowing bull accident stories involving family members being attacked while another attempted a rescue. In 1943, a *Farm Safety Review* writer related the case of a farm wife who had bravely protected her husband from a rampaging bull. In this particular case, Mr. Kuntz of East Hickory, Pennsylvania, had been inside a pen with a pitchfork believing it was sufficient to ward off an attack. Unfortunately, the bull had “disarmed him” and his wife “seized a pole or club and beat the bull over the head, so distracting him that the victim had a chance to escape.” Her quick thinking probably had saved her husband’s life. Unfortunately, other attacks resulted in tragic consequences. The death of Richard Fehr, a thirteen-year-old youth from Algona, Iowa illustrates such a fatal encounter. The boy drove a group of cattle from a meadow and was putting them into a fenced enclosure, when the bull turned on him. Despite his mother’s valiant efforts to dissuade the angry bull by beating it with a club, the bull trampled her son to death. The author described the attack’s tragic consequences stating, “The mother beat off the animal and carried Richard into the house but he had been injured fatally. He was able to speak to his mother before dying. A doctor said the boy’s chest and back had been crushed.”¹³³

Safety writers advocated a number of proper handling suggestions aimed at preventing attacks. In 1944, Randall Swanson stressed that careless management techniques represented one of the leading causes of bull accidents. He also disclosed that most bull assaults occurred in open settings such as farm fields and the barnyards where little control could be exercised. Swanson also indicated that some had occurred while the farmers were making bull pen repairs with the bull still inside the enclosure. He also stressed that this was a dangerous practice because the bull could easily attack and

¹³³ “Two Lucky Accidents,” *Farm Safety Review*, May/June 1943, 3.

surprise the farmer. He also revealed that many encounters occurred while the farmer attempted to herd the bull back into a stall, place a rope through the bull's "nose ring," or attempt to use a "rope halter." Swanson also suggested that livestock owners should herd the bulls a "with leading staffs at all times."¹³⁴ Further, Bayard cautioned farmers against using rope to handle bulls, stating "the most common careless act is to lead the bull by rope or strap." Bayard stated that accidents often occurred when "the bull 'turns on' its leader and kills him or cripples him before he can escape or anybody can rescue him."¹³⁵

Farm accident specialists also suggested that building "safety bull pens" represented an effective method of preventing such violent encounters. A "safety bull pen" usually included a shelter, a breeding stall, and a large exercise enclosure surrounded by a sturdy, high fence. This bull-handling system was highly beneficial to the entire family's safety since it greatly reduced any contact with a bull. In 1944, C.L. Hamilton, a prominent agricultural engineer, expressed this point, stating that the enclosure allowed farmers to conduct many necessary interactions with the bull while lessening vulnerability to attack. E.S. Bayard also believed that the "safety bull pen" was the best protection against bull accidents. Despite such praise, it appears that few farmers erected such structures. In 1944, Randall Swanson stated, "We can't talk too much about the safety bull pen since we still have to recognize that 95% of Wisconsin farmers do not have these facilities for handling bulls."¹³⁶

Nevertheless, farmers' exposure to bulls was also reduced due to other innovations. By the mid-1950s, scientists had discovered new solutions for bull hazards

¹³⁴ Swanson, "The Dairy Bull—Dr. Jekyll and Mr. Hyde," 598.

¹³⁵ Bayard, "Put the Bull in His Place," 9.

¹³⁶ C.L. Hamilton, "The Safety Bull Pen," *Farm Safety Review* November/December 1944, 7. Bayard, "Put the Bull in His Place," 9. Swanson, "The Dairy Bull—Dr. Jekyll and Mr. Hyde," 598.

since some farmers no longer required a bull's reproductive services. In 1956, Harold E. Heldreth stressed that farmers' growing interest in artificial insemination and the possibility that this reproductive method would enjoy increasing popularity might mean that fewer farmers needed bulls. He emphasized its benefits stating, "Besides eliminating a serious farm accident hazard and the expense of keeping individual bulls, the plan also extends or multiplies the services from valuable bulls many fold."¹³⁷

Farm families' greater contact with livestock also potentially exposed them to diseases which could be transferred from animals to humans, especially such rather common maladies such as Rabies and Brucellosis (Bangs Disease). Rabies probably presented the most significant threat. Although cattle and cats were capable of spreading the sickness, dog bites presented the most common transmission method. Brucellosis, which also garnered attention, could be transferred to humans through consumption of infected milk, an open wound, or the air. People suffering from the disease might experience fever, fatigue, and weight loss.¹³⁸ W.A. Aitken, a veterinarian and member of the American Veterinary Association, stated that agriculturalists "are more exposed to these diseases than other groups because they are in closer contact with animals; they consume more animal products in the raw state; and it is they who must first give first aid and serve as nurses to ailing animals." He also indicated that farm families faced health risks from as many as nine diseases that were commonly present on farmsteads. Safety writers advised precautions such as having livestock tested, wearing rubber gloves while handling animals, and thoroughly cooking meat.¹³⁹

¹³⁷ Harold E. Heldreth, "Safe Practices Can Mean Bigger Profits," *Farm Safety Review*, August 1956, 9.

¹³⁸ "Animal disease and Human Health," *Farm Safety Review*, March/ April 1965, 12. *Transactions-National Safety Congress* (Chicago: National Safety Council, 1953) 35.

¹³⁹ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1953), 34.

Health officials also warned farm families about less common illnesses including as Leptospirosis, Trichinosis, and Tularemia. Leptospirosis affected a variety of animals including cattle, pigs, and even dogs and could be transferred through a diverse number of mediums including soil, urine, and water. An individual became infected while swimming in a pond which contained infected animal wastes. Symptoms include yellow skin, fever, and diarrhea. People usually caught Trichinosis by consuming insufficiently cooked and infected pork. The animals themselves usually acquired the disease from the unwise practice of feeding garbage to pigs. The parasite that caused the disease resided in the infected animal's tissues and entered the human digestive system upon consumption. An individual suffered symptoms such as severe stomach ache, fever, and coughing upon contracting Trichinosis. Tularemia, a bacterial infection, also included symptoms such as stomach ache, fever, and cough. However, wild game, not domestic pigs, were usually the culprit for those who consumed infected animals or insufficiently cooked meat. In 1965, a *Farm Safety Review* contributor stated that, "Tularemia is a preventable disease if people would avoid all contact with wild rabbits, 90 percent of the disease would be eliminated."¹⁴⁰

Although all Americans faced dangers such as fires, weather, and various recreational hazards, even these universal safety issues were also deeply shaped by the rural context. In 1944, Burton Williams, a *Farm Safety Review* contributor, emphasized the fire problem's magnitude indicating that approximately 3,500 people died annually in such accidents and that financial losses amounted yearly to almost \$1,000,000,000. He stated that the money lost due to such conflagrations was sufficient to provide housing for the entire population of Kansas City, Kansas. Writers also continually reminded farm

¹⁴⁰ "Animal Disease and Human Health," 15.

families of the threat they faced. In 1962, annual farm property losses amounted to approximately \$165 million. In 1948, North Carolina's State College agricultural engineering staff members estimated that almost six of every thousand of the state's tobacco barns were ruined by conflagrations. Fires often shared many of the same causes regardless of location, including highly flammable construction materials, poor chimney design, and careless smoking habits. All Americans were encouraged to adopt many of the same fire prevention practices including identifying two emergency exits, continually rehearsing drills, and purchasing fire extinguishers.¹⁴¹

Nevertheless, farm families also faced fire challenges distinctive to the farm. In 1944, Burton Williams highlighted unique hazards associated with the barn including improper straw and manure storage, which could combust spontaneously. He also stressed that ever-growing amounts of petroleum products presented dangers, making the careless disposal of cigarette butts or matches especially hazardous. Burton's identification of petroleum products as a culprit for many fires reveals farmers' increasing dependence on it as a fuel and machinery lubricant. Farmers could easily multiply hazards if they did not store gasoline in suitable containers, which featured flexible spouts, flash arresting screens, and seal-tight caps. In 1949, A.M. Sowder, Chairman of the USDA's Fire Prevention committee also warned farmers to properly dispose of "oily rags" since they could easily ignite. Safety advocates advised farmers to place them into "self-closing metal containers" instead of leaving such material strewn on floors. Such containers could be opened by the foot and closed automatically.¹⁴²

¹⁴¹ Burton Williams, "Going to Blazes," *Farm Safety Review*, March/April 1944, 8. "Fire Prevention Week," *Farm Safety Review*, July 1962, 8. H.M. Ellis and N.C. Teter, "Smoking Tobacco Barns," *Farm Safety Review* November/December 1948, 4. Williams, "Going to Blazes," 8-9. "Fire Prevention Week," *Farm Safety Review*, July 1962, 10-11.

Liquefied Petroleum, one of the era's emergent energy source innovations, also presented fire hazards if proper safety practices were ignored. By 1951, more than 7.5 million Americans had acquired butane gas tanks. However, farm families were especially inclined to use L.P. gas since many did not have access to "gas mains" and consequently used it for heating homes, food refrigeration, and clothes drying. The farmstead applications of L.P. included warming livestock buildings, heating water tanks, and running pumps. In 1955, Art Henderson, Director of Safety for the Illinois Agricultural Association, alerted farm families to L.P. dangers, stating that building codes required that the tank should be positioned no less than five feet from the closest basement windowpane. He said that "the gas is heavier than air, and, if it should escape, it goes down and creeps around the house. If the window should be open to the basement, it creeps into the basement. If the mixture becomes right for that particular mixture of gas to air, a very small spark can cause a terrific explosion." Farmers were also warned against installing their own L.P. gas systems, making repairs, or modifying tanks for new purposes. Rural Americans were advised to mount butane tanks away from buildings, promptly repair leaks, and keep flammable materials away from the tank. Farmers were also advised to keep all gas conduits properly protected and all L.P. tanks on concrete slabs.¹⁴³

Farm families also encountered potential fire hazards from the growing repertoire of heating equipment. Raymond C. Johnson, a prominent 4-H leader, revealed the dangers associated with heating equipment including grain dryers used to treat moist

¹⁴² Williams, "Going to Blazes," 8-9; *Farm Safety Review*, May/June 1959, 9; A.M. Sowder, "Clean for Safety's Sake," *Farm Safety Review*, March/April, 1949, 4; "Safe Cans," *Farm Safety Review*, May/June 1953, 9.

¹⁴³ "Tank Gas Farms," *Farm Safety Review*, July/August 1951, 8-9; *Transactions- National Safety Congress* (Chicago: National Safety Council, 1953), 30; "Tank Gas Farms," 8.

crops and heat lamps to keep animals warm. If used improperly, such devices could easily ignite a farm's gamut of highly combustible materials. Such a precarious mixture sometimes occurred in Southern tobacco barns where drying was employed during the harvest. Midwestern farmers also had to be aware of such dangers when drying their grain. In 1962, a *Farm Safety Review* writer suggested that a farmer's grain dryer should have a "thermostatic control to shut off the blower or the dampers when the temperature in the heat transfer chamber gets too high." The author also warned that the dryer should be vented ensuring that "all gases and smoke is directed outdoors."¹⁴⁴

Farmers also needed to operate their machinery with an attitude of fire prevention awareness. Observers suggested that fire extinguishers should be within easy reach of an operator of tractors, corn-pickers, and combines. In the mid 1960s, David T. McFarland, an NSC staff member, advised that farmers should always turn off their equipment prior to replenishing their gas tanks, clear debris from the components of a hot engine, and promptly fix leaks. In the early 1970s, Joseph Gerling warned farmers that the combination of a combine, a desiccated field, and hot weather could create the dangerous conditions. He advised farmers to "periodically check for overheated bearings that could burn or start a fire in dry chaff. Be particularly careful to keep the exhaust manifold and other parts of the exhaust system clean and free of dirt and chaff. Be alert for constantly slipping belts which could heat up and catch fire."¹⁴⁵

¹⁴⁴ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1954), 24; Ellis and Teter, "Smoking Tobacco Barns," 4; "Fires: Why They Happen," *Farm Safety Review*, July/August 1962, 9.

¹⁴⁵ David McFarland, "Eight Steps to Combine Safety," *Farm Safety Review*, May/June 1965, 4; Joseph Gerling, *Extension Facts: Safe Combine Operation* (Stillwater, Oklahoma: Oklahoma State University, 1974), 4. Farm safety experts also provided additional suggestions to avoid a machinery-related fire, including never smoke while pumping fuel and check consistently for gas or diesel leaks on the machines. These specific suggestions and others can be found in National Safety Council, *Bulletin: Grain Harvest Safety* (Chicago: National Safety Council, 1979), 3.

Farm families' outdoor lifestyle also exposed them to severe climatic conditions including oppressive summer heat, lightning, and freezing temperatures. A farm family's work had to be completed regardless of seasonal extremes. Thus, they were probably more prone to suffer from weather-related illness such as heat stroke or hypothermia. Climate-related dangers such as tornadoes and lightning hazards were also shaped by the countryside's special conditions. Farmers often worked very hard in some of the hottest weather, which exposed them to heat-related injuries. The rural context also influenced their exposure to lightning hazards. In 1960, a *Farm Safety Review* writer stated that "sprawling farms, unprotected by high city buildings, are excellent lightning targets; the loss in farm property from lightning fires is estimated at \$56 million."¹⁴⁶

Although farm families often faced some of the most extreme weather, they were prone to ignore proper preventative weather-related measures since completing farm work took priority. In 1960, Purdue researchers stressed that farmers could avoid heat-related injury by slowly acclimating themselves to hot weather, taking short but frequent work breaks, and wearing loose-fitting and brightly colored clothing. Farmers were also advised to adequately hydrate themselves. An NSC staff writer provided similar advice while adding that taking salt tablets compensated for the minerals lost through perspiration. Although such advice was prudent, overburdened farmers sometimes did not fully implement such precautions. Winter not only increased the discomfort associated with farm chores, but icy conditions could also contribute to falls. In 1973, a National Safety Council investigation of falls determined that almost 25 percent of the falls

¹⁴⁶ "Beware: It's Lightning Season," *Farm Safety Review*, May/June 1960, 11. Farm families had long known the dangers posed by lightning hazards. For an account of the tragic death by lightning of one Minnesota farmer in the late nineteenth century, see, Steven R. Hoffbeck, *The Haymakers: A Chronicle of Five Farm Families* (St. Paul: Minnesota Historical Society Press), 79.

investigated involved a “slippery substance” which often was ice. The researchers’ report provided an example of an older farmwoman who, after milking her cows, slipped on an icy porch. She then fell through a glass doorway, which resulted in severe lacerating injuries. Safety advocates advised that such incidents could be reduced if farm residents used treaded footwear and promptly removed ice from porches and paths.¹⁴⁷

Tornadoes represented one of the most ominous weather-related threats and were particularly frequent in the nation’s agricultural heartland. These whirling funnel-shaped clouds wrought devastation upon farmsteads and small town residences alike. Although cyclones still presented dangers to farm families, by the late 1960s, early warning systems were being established throughout rural America. Wisconsin residents enjoyed the benefits of such a system due to the cooperative efforts of the United States Weather Bureau, the State Motor Vehicle Department, and the State Bureau of Civil Defense. In 1969, Jack Burke praised its advantages by stating “weather information has greatly improved in the last few years. Conditions favorable for tornadoes are carefully watched, and, if something develops, the information is quickly relayed to concerned areas by phone, teletype, radio and television.”¹⁴⁸

In 1952, C.L. Hamilton, an NSC agricultural engineer, revealed that of the lightning strikes that claimed the lives of 400 individuals yearly and injured another 1,000, only ten percent occurred in urban locales. He revealed that “lightning is also a major cause of farm fires, destroying about \$20,000,000 worth of property annually.”¹⁴⁹

¹⁴⁷ “Heat: Hard on the Heart,” *Farm Safety Review* May/June 1960, 12; “Falls..Leading Causes of Farm Accidents,” 4.

¹⁴⁸ Jack Burke, “Spring Clean-up and Tornado Tips,” *Farm Safety Review*, March/April 1969, 15.

¹⁴⁹ C.L. Hamilton, “Lightning Protection,” *Farm Safety Review*, May/June 1952, 4.

In 1960, a Lightning Protection Institute researcher further highlighted the problem's scale revealing that "lightning this year will kill more than 600 Americans (including those who die in fires kindled by lightning), injure 1,500, and damage property at a cost of \$130 million."¹⁵⁰

Safety advocates encouraged farmers to seek professional advice to reduce dangers from lightning. Harry L. Garver, a USDA agricultural engineer, stressed that preventing lightning damage required much more than the attachment of a lightning rod. He stated that "many farmers live under a false sense of security as they look with confidence to their roof tops and see rods pointing towards the sky, thinking that makes up the entire lightning protection system; they fail to check their conductors and ground connections." He emphasized that the problem required considerable electrical understanding since protection equipment not only included rods, but also a system of conductors, fasteners and air terminals.¹⁵¹ Hamilton also stressed that farmers procure professionally installed lightning protection equipment. He stated that "when installing a lightning rod system, secure the counsel and assistance of an experienced lightning-protection man. Get bids and deal with a well-established, reputable firm. Poorly installed or maintained systems lead to a sense of false security."¹⁵² In 1960, a *Farm Safety Review* writer echoed such sentiments stating that "be sure to get a reliable company to install your lightning protection system. It is no 'do it yourself' job."¹⁵³

¹⁵⁰ "Beware: It's Lightning Season," 11.

¹⁵¹ Harry L. Garver, "When Lightning Strikes...Let Rods Take the Job," *Farm Safety Review*, July/August 1949, 6.

¹⁵² Hamilton, "Lightning Protection," 5.

¹⁵³ "Beware: It's Lightning Season," 12.

Farm families also faced a variety of recreational hazards including most notably those associated with swimming and hunting. In 1959, a *Farm Safety Review* piece indicated that leisure pursuits were responsible for a significant number of rural fatalities; thus, fourteen percent of accidental fatalities were caused by drowning and twelve percent occurred due to unintentional gunshot wounds. The dangers associated with leisure water use not only included drowning but also other hazards such as the possibility of boating accidents or even getting hurt with fishing hooks. Rural Americans were exposed to water-related risks largely due to numerous farm ponds that dotted the nation's countryside. The USDA had encouraged the construction of these small bodies of water as part of their soil conservation efforts. However, farmers used ponds for a variety of uses including watering livestock, irrigation, and as a fire fighting resource. Farm ponds also provided recreational opportunities such as swimming, fishing, and boating. The dangers of drowning represented the most serious safety issue regarding farm ponds, particularly among youth. In 1966, a study provided a composite picture regarding the various factors contributing to rural drowning accidents. Jack Burke commented on one of the most distinguishing features of these small bodies of water, stating that they were "unsupervised and usually have no lifesaving devices available. The 'old swimming hole' may be fun for the kids, but it can be mighty dangerous too." The investigation also confirmed that pond-drowning deaths were a leading cause of accidental farm fatalities involving young people. The occurrence of such deaths should not be a surprise since farm ponds sometimes contained rusting farm implements, cables, or barbed wire all of which created unsafe conditions.¹⁵⁴

¹⁵⁴ "Recreation: Facts," *Farm Safety Review*, November/December 1959, 10; "Farm Pond and Irrigation Safety," *Farm Safety Review*, March/April 1960, 2; Jack Burke, "How to Make Your Farm Pond Safe," *Farm Safety Review*, July/August 1966, 11.

Although there were clear differences relating to the farmstead environment, some of the same technologies were transforming both urban and rural life. The farm home was undergoing tremendous change as rural Americans adopted the same technologies as their urban counterparts, including electricity. In 1938, less than half of the nation's farms were electrified; however, in the following two decades a majority of rural families adopted it. These conveniences included hot running water, lighting, refrigeration, and a variety of other amenities. During the 1950s, the greater availability of phones also represented the shrinking of the technological gulf between the city and the countryside. In 1962, Judy Styles, a member of a South Dakota 4-H, celebrated the consequences of the electrical access stating that "If we were living in the days when our grandparents were our age, we probably wouldn't be here today. We might be possibly taking our turn the family washboard or some other laborsome device and wouldn't have so much time to do the things we enjoy. What made this possible? Electricity!"¹⁵⁵ In 1964, D.E. Lindstrom, a rural sociology professor, from the University of Illinois echoed such remarks indicating that most farm families enjoyed "a good modern home with electricity, hot and cold running water, television, radio, telephone and many of the labor saving-devices such as a sewing machine, refrigerator, deep freeze, and other home conveniences."¹⁵⁶

Electricity also improved safety since better lighting helped farmers navigate their crowded environments. In 1944, Myrtle Fahsbender, Director of Residential Lighting for

¹⁵⁵ R. Douglas Hurt, *American Agriculture: A Brief History* (Ames: Iowa State University Press, 1994), 326; for both a more complete and recent discussion of the rate of dissemination and effect of electricity in the countryside, see, Bruce L. Gardner, *American Agriculture in the Twentieth Century: How it Flourished and What it Cost* (Cambridge, Massachusetts: Harvard University Press 2002), 15; *Transactions- National Safety Congress* (Chicago: National Safety Council, 1962), 22.

¹⁵⁶ *Transactions- National Safety Congress* (Chicago: National Safety Council, 1964), 22.

Westinghouse, credited electrical lighting for reducing instances of tripping, falling, or running into hidden objects. He encouraged farmers to adopt electrical lighting quickly since it improved visibility during periods of low light such as evening or early morning. In 1952, Earl L. Arnold, of the Rural Electrification Administration, also believed that “a well-lighted farm had reduced common night time and early morning accidents such as banging one’s shin into farm equipment, twisting ankles in holes, and a host of other mishaps partially caused by darkness.”¹⁵⁷ In addition, electric lighting was probably safer than earlier sources of illumination.¹⁵⁸

Despite such benefits, careless electrical practices still produced serious consequences. In a speech given at the 1962 National Safety Conference, South Dakota 4-H club member Judy Styles cautioned her listeners against irresponsible habits. She told the story of a rural Tacoma, Washington, couple who lost seven children in a blaze caused by an over-heated refrigerator motor. Styles stressed that electrical mishaps had become a leading cause of house fires. In 1975, William J. Fletcher, a Farm Safety Specialist, also emphasized the dangers associated with careless electrical use, stated that [e]lectricity has become one of our most essential services to our farms and ranches, but few things we use from day to day in our homes and in agricultural work have greater potential to do us harm than electricity.” He also indicated that approximately 100 farmstead electrocutions occurred annually and electrical mishaps were the principal cause of farm fires.¹⁵⁹

¹⁵⁷ Myrtle Fahsbender, “Light: For Greater Farm Safety,” *Farm Safety Review*, September/October 1944, 7; Earl L. Arnold, “Lighting for Safety,” *Farm Safety Review*, January/February 1952, 6.

¹⁵⁸ Evidence exists supporting the contention that electric lights were safer than earlier sources of light; for example, Burton Williams, a farm safety advocate, stated, “Electric lights reduce the farm fire hazards because they replace hazardous lamps and candles.” The preceding quote can be found in Williams, “Going to Blazes,” 9.

In addition, the rural setting also shaped electrical dangers. Because farms represented both a residence and a workplace, the rural electrical users utilized the technology more diversely and often in greater amounts. Farm families not only lighted their homes but many other buildings including barns, livestock sheds, as well as storage facilities. In 1956, William Peterson, a South Dakota Extension electrification specialist, recognized the farmer's ever-growing electrical dependence. He stated that "[e]very winter, traditionally in December, the Great Plains farmer hooks on a record electrical load to his farm wiring system. This extra load increases from 10 to 20 percent each year." Peterson's observation confirms electricity's many uses for lighting, heating, pumping water, and a host of other purposes.¹⁶⁰

Observers also believed that increasing electrical use could strain outdated wiring systems. Judy Styles stated that, "our real trouble is not with short circuits but with overloaded circuits. The basic problem is this: We have quadrupled our home consumption of electricity in the last 25 years, largely on wiring designed to handle 1933's load." She continued, "A generation ago, there were only about 15 types of electrical appliances in use. Now there are more than 50."¹⁶¹ In 1956, William H. Peterson recognized this problem and recommended that farmers update their electrical systems just as they replaced worn-out and obsolete agricultural equipment. Another *Farm Safety Review* author commented that, "older installations often are not up to

¹⁵⁹ *Transactions: National Safety Congress* (Chicago: National Safety Council, 1962), 22; William Fletcher, *Rural Accident Bulletin: Electrical Safety on the Farm and Ranch* (Chicago: National Safety Council, 1975), 1.

¹⁶⁰ William Peterson, "Farmstead Wiring: A Production Tool," *Farm Safety Review*, January 1956, 1; William H. Knight and Owen K. Brown, "Wire Your Farm for Tomorrow's Load," *Farm Safety Review*, July/August 1949, 13.

¹⁶¹ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1962) 22-23;

present power demands. Wires get hot circuits and are over loaded. Age and weathering increase the possibility of failure.”¹⁶² In 1975, William J. Fletcher also stressed the problem of outmoded electrical systems revealing that the problem continued well into the 1970s. Farmers faced dangers not only from overloaded systems, but from the expanding repertoire of devices that utilized the new power source including heat lamps, electrical fences, and even the electric lines which delivered power to their farmsteads.¹⁶³

Both the heat lamp and electrical fence could be dangerous if used or installed improperly. The heat lamp, unlike traditional incandescent lights, provided the benefit of “radiant heat rays” which could keep brooding chickens warm, prevent drinking water from freezing, and dry newly birthed livestock. However, careless use could result in destructive fires that could kill livestock and destroy buildings. In 1954, a *Farm Safety Review* writer stressed such proper installation practices as using moisture resistant cords, securely suspending the lights, and placing the lights at a proper distance from the animal bedding. An improperly installed electric fence was also hazardous for adults, children, and even livestock. C.L. Hamilton cautioned farmers against using “home-made installations, direct hook-ups, make-shift current regulators, or unsafe commercial products when installing electric fences.” He also warned that electric fences could present dangers if the fence was placed “near stock tanks, ponds, irrigation ditches or damp ground.” He provided a particularly heart-breaking example illustrating both points stating that, “[i]n the fall of 1944, the merriment of three little boys sailing sticks and splashing water from a farm stock tank in Northern Illinois was suddenly stopped when

¹⁶² Peterson, “Farmstead Wiring: A Production Tool,” 1; Jack Burke, “Farmstead Fix-up,” *Farm Safety Review*, May/June 1968, 5.

¹⁶³ Fletcher, *Electrical Safety on the Farm and Ranch*, 2.

one of them was electrocuted by an unsafe electric fence which ran by the tank.” He added that, “this fence was connected directly to a 115 volt lighting circuit with nothing but an ordinary fuse to limit the current.” Electric fences were also involved in livestock deaths as supported by the experience of employees at a single corn-belt rendering plant which annually collected over 40 farm animals killed from fatal electric fence encounters.¹⁶⁴

The increasing scale of farming, expanded electrical use, and the introduction of new communication equipment combined to produce a rather unexpected hazard. In 1977, the members of the North Dakota extension staff authored a pamphlet entitled “Look Up” which revealed the problem’s dimensions. They stressed that the growing size of farm buildings, the increased height of equipment, combined with more elaborate and powerful electrical systems increased farmers’ odds of accidentally contacting electrical cables. Although safety leaders had been warning farmers for decades, the problem appears to have become more acute by the 1970s. The growing dimensions of auger-elevators, disking equipment with fold up wings, haymaking machines, and other agricultural implements could all potentially contact overhead electrical wires. The increasing size of farm buildings, the growing use of antennas for CB radios, and television along with the presence of over-head wires introduced additional hazardous elements. In addition, Ohio safety leaders had long identified the dangers of overhead power lines cautioning farmers to reduce the elevator’s height prior to moving and looking for obstructions prior to raising your elevator.¹⁶⁵

¹⁶⁴ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1952), 20-21; “Heat Lamp Safety,” *Farm Safety Review*, July/August 1954, 20; C.L. Hamilton, “Electric Fence Problems,” *Farm Safety Review*, November/ December 1953, 6; C.L. Hamilton, “Is Your Electric Fence Safe?,” *Farm Safety Review*, March/April 1945, 7.

The circumstances by which farm dwellers could contact overhead wires were numerous. Even if equipment normally made clearance, a rut might cause the machinery to bounce and then contact a wire. Although tractor cabs protected farmers from rollovers, they also might isolate a driver from the outside environment making the operator unaware of overhead hazards. The North Dakota Extension writers warned individuals against standing on haystacks since people easily contacted overhead electrical wires. The addition of CB and radio antennas increased the likelihood of becoming entangled in an electrical cable. If a farmer did become caught in a wire they were advised that “if you must leave the equipment, jump. If you step down and touch the ground while touching the equipment you may be burned or killed, so jump clear! Shut off the power if you can or call the power supplier.” They also cautioned against building grain bins and placing hay or stationary antennas under wires since all could pose dangers from falling electrical cords. An individual who carelessly used a ladder could also contact a wire and cause an electrocution. Safety advocates stressed that even children should be taught how to shut off electrical power in case their parent became involved in an accident. They ought to also be instructed of the dangers of flying kites and model airplanes into overhead wires.¹⁶⁶

Farmers not only faced safety challenges from various electrical devices but also used electricity in conditions that differed greatly from urban settings. In 1975, William J. Fletcher remarked that, “corrosion from manure in livestock pens will make quick work

¹⁶⁵ Harvey Hirning, Robert Woell and David Swenson, *Electric Farm Power: Look Up!* (Fargo, North Dakota: prepared cooperatively by the North Dakota State Agricultural Engineering Department, Cooperative Extension Service and the North Dakota Power Use Council, 1977), 1; for a discussion of the problem in a much earlier era, see, C.L. Hamilton, “Shocking Conditions,” *Farm Safety Review* November/December 1949, 8-9. W.E. Stuckey and B.J. Stamp, *Bulletin: 367: Live Longer with Portable Elevators* (Columbus, Ohio State University: Agricultural Extension Service, 1957), 3.

¹⁶⁶ Ohio State Extension Service, *Electric Farm Power: Look Up*, 2-3.

of thin wall galvanized conduit. In such areas coating the conduit or otherwise protecting it from manure is a must. Plastic conduit might be used if not subjected to extra physical abuse.” He also stressed that a spark originating from a switch or broken light bulb might be benign in most settings, but could prove disastrous on the farm. He advised that safety devices such as “explosion proof switches” and “fixture guards” should be installed since farm buildings contained fuel, hay, and livestock feed, all of which were highly flammable. Fletcher contended that such devices kept sparks from reaching combustible materials and prevented fires.¹⁶⁷

Electricity also posed dangers when users lacked the knowledge of its basic properties. In 1949, a *Farm Safety Review* contributor emphasized just how little power was required to cause a fatal accident. The author stated that, “few people realize how small an electric current is needed to cause death. The ordinary 115-volt lighting circuit can be as deadly as 40,000 volts. It is current amperage that kills, not voltage.”¹⁶⁸ C.L. Hamilton, an agricultural engineer, expressed alarm at the public’s ignorance of the power source since its dissemination necessitated the need for people to know the basics of electrical safety. He provided examples illustrating hasty behaviors rooted in electrical carelessness, including improperly installing electrical motors, placing appliances near water, and hitting highline wires with farm equipment.¹⁶⁹

Farmers’ electrical dependence also required that they perform regular electrical maintenance by repairing worn and frayed cords, as well as other broken components to prevent fires. Safety advocates alerted farmers to a lengthy list of repair that needed to be

¹⁶⁷ Fletcher, *Rural Accident Bulletin: Electrical Safety on the Farm and Ranch*, 2-3.

¹⁶⁸ “It’s the Current that Kills: Electricity can be deadly-when safety is neglected,” *Farm Safety Review*, November/December 1949, 10.

¹⁶⁹ Hamilton, “Shocking Conditions,” 8-9.

performed regularly. In 1968, Jack Burke indicated that such upkeep included problems such as “worn-out or malfunctioning equipment, electrical materials that have deteriorated from years of service or unusual stresses (flexing, weathering etc), short circuited wires or equipment, loose electrical connections, no grounds or poor grounds, overloaded motors, equipment, poor placement of equipment that creates fire, shock, or tripping hazards.”¹⁷⁰ In 1968, Jack Burke indicated that electrical components sometimes needed to be replaced since time and continued use increased the chances of a malfunction. Such comments reveal that the problem of farmers neglecting such responsibilities appears to have persisted throughout the era.¹⁷¹

As early as the late 1940s, observers were realizing that the sophisticated nature of electric wiring might exceed the farmer’s skill level; this concern became heightened as rural electrification expanded. Farmers were also required to upkeep electrical systems that were larger in scale and more complicated than those in residential areas. H.H. Beaty, an Iowa State College agricultural engineer, encouraged farmers to utilize professionals, stating that, “wiring installed by trained electricians helps prevent fires.” He also recommended using products that conformed to industry standards, while warning against the use of “homemade or unimproved transformers on electrified fences.”¹⁷² Almost a quarter century later, William J. Fletcher, revealed that some farmers were still maintaining their own electrical systems. He cautioned farmers against allowing novices to perform maintenance and instead advised that qualified individuals

¹⁷⁰ “Trained Electrician Should Do All Wiring,” *Better Iowa*, 23 July 1945, 2; *Farm Safety Review*, May/June 1968, 5.

¹⁷¹ Burke, “Farmstead Fix-up,” 5.

¹⁷² “Electricity Can Be Fire Hazard,” *Better Iowa*, 24 July 1944, 2; “Trained Electrician,” *Better Iowa*, 23 July 1945, 2.

be consulted. Regardless of income level, farmers hesitated to take such advice since most valued saving money.¹⁷³

Farm dwellers were also willing to expose themselves unnecessarily to electrical dangers. In 1952, G.E. Henderson of the Southern Association of Agricultural and Vocational Engineering stated that, “most farmers have been quick to see that electricity saves labor and cuts production costs. It is much harder for them to realize that proper wiring also cuts costs and saves lives.” He went on to indicate that farmers often did not possess sufficient knowledge and were overzealous in their attempts to save money at the expense of safety. He also related a story regarding one Mississippi farmer who installed a pump by using a damaged lamp cord to attach a socket. The author indicated that the Mississippi man expressed great satisfaction when the pump functioned without him having to consult professional advice. Unfortunately the farmer’s solution presented serious safety hazards for both himself and family members.¹⁷⁴

Rural Americans, like the greater population, were also vulnerable to automobile collisions; however, just as in the case of electricity, the rural automobile accident problem contained its own unique features. By the end of the 1960s, automobile accidents were a leading cause of fatalities, resulting in over 50,000 annual deaths nationally and representing one of the twentieth century’s most serious accident problems. This is not surprising, since farm families, like their urban counterparts, had enthusiastically purchased autos. Historian Hal S. Barron has commented upon how rural Americans’ initial dislike of the automobile had turned into widespread enthusiasm early

¹⁷³ Fletcher, *Rural Accident Bulletin: Electrical Safety on the Farm and Ranch*, 2; see, Richard Rhodes, *Farm: A Year in the Life of an American Farmer*, (New York: Simon and Schuster), 1-336. Rhodes’ investigation of farmers in northern Missouri in the late 1980s provides many examples in which farmers adopted an economical approach to their agricultural operations.

¹⁷⁴ G.E. Henderson, “Explaining Electrical Safety,” *Farm Safety Review*, November/December 1952, 4-5.

in the century. He stated that antagonism vanished, “After the development of the Model T in 1908, rural inhabitants embraced the new technology in record numbers. The number of automobiles on U.S farms shot up from 85,000 in 1911 to 2,146,512 in 1920. In 1930, 58 percent of American farms had at least one car.” Following the Second World War, both urban and rural Americans continued to fervently acquire cars. This trend is evidenced by the fact that vehicle registrations had doubled just ten years after the conflict’s conclusion.¹⁷⁵

Despite such enthusiastic car purchases, by the mid 1950s, the rural auto accident problem was growing in severity. Vehicle-related deaths represented approximately one-half of all non-urban accident fatalities. In 1956, Ray Ashworth, director of Northwestern University’s Traffic Institute, stated that while urban fatality rates were decreasing, rural accidents were increasing. Auto accident statistics appear to confirm his dismal appraisal. In 1962, a *Farm Safety Review* piece indicated that, “three out of four traffic deaths occur on rural roads and highways.”¹⁷⁶ Ashworth believed that traffic problems were persisting in urban centers, but rural areas were being neglected. He stated that, “the rural accident and congestion problem is fast growing out of reach of current attempts to check it.

Present trends point to an even more acute problem in the future, as vehicle registration and mileage rates keep rising.”¹⁷⁷

¹⁷⁵ Jack Burke, “DDC: A New Way To Drive,” *Farm Safety Review*, May/June 1969, 4; Hal S. Barron, *Mixed Harvest: The Second Great Transformation in the Rural North, 1870-1930* (Chapel Hill: The University of North Carolina Press, 1997), 195. *Transactions- National Safety Congress* (Chicago: National Safety Council, 1956), 10.

¹⁷⁶ Ibid., 11; “Your Programming Aids in Rural Highway Safety: Emphasis Guide-1962,” *Farm Safety Review*, January 1962, 5. For more complete information regarding the disproportionately large number of rural auto accidents, see, Jim Messerschmitt, “Our Rural Road Challenge,” *Farm Safety Review*, March 1963, 2, and “Safety’s Silent Guides” *Farm Safety Review*, July 1962, 2.

¹⁷⁷ *Transactions- National Safety Congress* (Chicago: National Safety Council, 1956), 10-11. Ashworth’s appraisal of the rural car accident problem would prove prophetic. In 1996, after analyzing car accident

Although all drivers faced such dangers as poor weather conditions, intoxicated travelers, as well as their own careless driving habits, rural drivers faced distinct challenges. These included more excessive driving speeds and trains that also tended to travel across railroad crossings at higher speeds in the country. In 1970, Jack Burke speculated that problems associated with alcohol consumption might also be different. He stated that, “[f]arm people who visit taverns, dance halls, and other establishments usually must drive to and from these places because of the distances and the lack of public transportation.” He also stressed that farmers worked without supervision, making it easier to drink while working.¹⁷⁸ Although winter driving posed special hazards for everyone, country roads often deteriorated more rapidly in poor weather conditions and were cleared from snow and ice less often than the town roads.¹⁷⁹

Other features of the automobile problem including extra risks associated with railroad crossings and the antiquated condition of many farmstead entrances. Although specialists in the early 1960s believed that police officers should be responsible for no more than 50 miles, daily research indicated that 120 miles were standard. In 1966, while

data from 1975 to 1993, Joseph M. Tessmer summarized, “There are approximately 40 percent more crashes, vehicles involved, and deaths in rural areas than in urban areas.” For further discussion of Tessmer’s findings, see, U.S. Department of Transportation, National Highway Traffic Safety Administration, *Rural and Urban Crashes: A Comparative Analysis*, by Joseph Tessmer, (Washington, D.C., 1996), ES-1.

¹⁷⁸ Harry Porter and Harold Heldreth, “Safe Farm Driveways,” *Farm Safety Review*, May/June 1951, 14. Jack Burke, “Wreck on the Highway,” *Farm Safety Review*, September/October 1970, 7; for additional comments regarding the distinctiveness of the rural accident problem, see Jack Burke, “More and Better Traffic Safety Now,” *Farm Safety Review*, March/April 1966, 14. He mentions other distinctions, such as rural roads are much more challenging to drive than urban streets or major highways.

¹⁷⁹ “Safe Winter Driving,” *Farm Safety Review*, January/February 1946, 4-5; “Rural Driving Hazards,” *Hoard’s Dairyman*, 10 December 1943, 691. Evidence suggests that extreme speed contributed to rural accidents more than those in cities. A *Farm Safety Review* writer stated, “Speed violations were a factor in 38 percent of the fatal accidents. City accidents summary showed only 21 percent of the drivers in fatal accidents violating speed laws compared with rural summaries which showed 38 percent; see, “Rural Traffic Facts,” *Farm Safety Review*, July/August 1958, 10.

speaking at the National Conference for Rural Health in Colorado, Julian A. Waller, MD, an official for California Bureau of Occupational Health, stated that “that there were four times as many deaths for every hundred people injured in rural traffic accidents as in urban accidents.” He stressed that the meager level of emergency response resources in rural areas explained the higher fatality levels. The increased time it took family or friends to begin their search for victims, as well as the greater distance to emergency facilities, contributed to higher death rates. He supported his point by stating that “rural accident victims may be dying of less complicated injuries than those in the city, where first aid is more often readily available.”¹⁸⁰

Railroad crossings might also have presented distinct safety considerations in the countryside. Railroad warning signs in rural areas were sometimes not posted or they could be blocked by dense vegetation. However, Jim Trimble, who served as the NSC Secretary for the Committee on Motor Vehicle Traffic Safety at Railroad Grade Crossings, downplayed the view that rural Americans were more susceptible to rail-road crossing accidents. He supported this view by stressing that many rural train-crossing accidents also involved urban dwellers; it is also reasonable to assume that the larger number of crossings in rural areas also produced higher numbers. Thus, although such accidents were twice as likely to occur in the countryside, both urban and rural residents were vulnerable.¹⁸¹

¹⁸⁰ *Transactions- National Safety Congress* (Chicago: National Safety Council, 1956), 12; “Enforcement for Safety,” *Farm Safety Review*, January 1962, 10; “Research Probes Frequency, Severity of Rural Motor Vehicle Accidents,” *Farm Safety Review*, May/June 1966, 9-11; the Tessmer study substantiates Waller’s view regarding the problem of belated medical treatment. Although the research covers a later period, it still strengthens Waller’s point. For a more complete discussion, see, U.S. Department of Transportation 1996, ES-1.

¹⁸¹ Jack Trimble, “Anytime is Train Time,” *Farm Safety Review*, March 1963, 5.

Observers also stressed that rural driveways and gated entrances were sometimes either obscured by vegetation or not suited for automobile traffic. In 1944, Harry Porter, Jr., a NSC traffic engineer, stressed that rural driveway were particularly unsafe because all types of foliage could obscure a driver's vision. Antiquated design features also could compound the problem. In 1962, a *Farm Safety Review* writer stated that, "Many farm driveways, laid out in the more leisurely horse and buggy day's era" presented significant dangers.¹⁸² Ray Fuson, a Farm Bureau official, also stressed that many farm gates were constructed for horse-drawn implements and were poorly suited for tractors. He estimated that "probably 60 to 70 percent of all mechanized equipment had to pull across the center of the road to make turns into or out of obsolete gateways."¹⁸³

The fact that farmers also drove slow-moving tractors with a variety of implements attached also posed special hazards. In 1958, officials for the United States Bureau of Roads believed that farmers might have possessed as much as "37,000,000 pieces of insufficiently lighted farm equipment."¹⁸⁴ The lack of proper visibility devices presented hazards both for the farmer and oncoming motorists. In 1961, a *Farm Safety Review* writer stressed that farmers needed to take extra precautions including the use of flags, night lighting, or proper safety procedures, such as staying on the shoulder of the road in order to avoid accidents. In 1969, Norval Wardle, an Iowa farm safety expert, provided a more complete picture of the tractor accident problem. His study confirmed that the vast majority of highway tractor accidents involved automobile collisions. He

¹⁸² Harry Porter, "Planning a Safe Farm Driveway Entrance," *Farm Safety Review*, May/June 1944, 5; for further discussion of the problem of vegetation which lessened visibility, see "Safety's Silent Guides," *Farm Safety Review*, July 1962, 6. *Ibid.*, 7.

¹⁸³ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1963), 25.

¹⁸⁴ "Rural Traffic Facts," 10.

stressed that farmers were often unaware of approaching cars since tractors usually lacked rear-view mirrors. Operators were also vulnerable since many tractors had not yet been fitted with protective rollover structures.¹⁸⁵

The preceding discussion reveals that farm families existed in a complex and, in many ways, distinctive work and living environment. Although such age-old hazards as livestock handling and the potential for fires have always presented dangers, new technologies such as electricity and automobiles were deeply altering both the lifestyles and possible risks associated with farm living. The farm's dual functionality as both a home and a workplace was particularly significant in exposing people of diverse age and skill levels to an entire host of potentially dangerous situations with agricultural machinery and livestock. The farm's relative isolation in comparison to urban residences and worksites also hampered the speed with which agricultural worker or rural accident victim could receive treatment. Such aspects of the farm safety problem both deeply shaped the farm safety educational movement, as well as contributed to the problem's persistence. Although the aforementioned dangers represented a significant challenge for farm safety advocates, the dramatic mid-twentieth century revolution in farm machinery also deeply altered the nature of farm hazards.

¹⁸⁵ "The Man Behind the Wheel," *Farm Safety Review*, May/June 1961, 7; Norval J. Wardle, "Half Blind or Full Vision," *Farm Safety Review*, March/April 1969, 12-13. The Wardle piece also indicated that other factors contributed to the occurrence and severity of highway tractor accidents including the tractor engine's considerable noise, poorly designed rural roads, and lack of reflective or lighting equipment.

CHAPTER FOUR

Safety and Mechanization: New Machines, New Buildings, and New Hazards

During the mid-twentieth century, farmers adopted a dizzying variety of technological improvements that transformed their work. This mechanical revolution arrived in the form of more powerful tractors, more efficient planting implements, as well as more effective harvesting equipment. In 1964, D.E. Lindstrom, a rural sociologist, said that mechanization had increased farmers' comfort, added to their prosperity, and liberated them from many burdensome tasks. Jack Burke, editor of the *Farm Safety Review* believed technology held the potential to free farmers from barriers, such as worn-out soil, insect pests, and even poor weather conditions. He stated that "a modern farmer seldom experiences production failures because he can plan for success. He has tools—chemicals, horsepower, and productive crop varieties—to triumph over scarcity. He has access to information and technical knowledge, and he can now stretch his management skills even further by use of the computer. Very little is left to luck or fate."¹⁸⁶ Although Burke and Lindstrom's wholehearted endorsements of new agricultural technologies do not universally reflect the views of everyone in the agricultural community; farmers' rapid acquisition of new technologies in the era suggest their recognition of their potential to save them both time and labor costs.¹⁸⁷

Despite such benefits, changes had greatly transformed the farmer's work environment into an unfamiliar place. Farmers of an earlier era depended mostly on

¹⁸⁶ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1964), 22; Jack Burke, "Go Modern-Think Safety!," *Farm Safety Review*, March/April, 1968, 1.

¹⁸⁷ For an impressively researched and exhaustive discussion regarding farmers' acquisition of agricultural technology in the Midwest, see, Joseph Leslie Anderson, "Industrializing the Corn Belt: Iowa Farmers, Technology and the Midwestern Landscape, 1945-1972," (unpublished Ph.D. dissertation, Iowa State University, 2005), 1-352.

animal power for their work, grain for their fuel, and manure for fertilizer; however, such farming methods changed dramatically by the mid-twentieth century. In 1953, L.E. Shingledecker, a Farm Bureau official, commented on the transformation stating that “the farm used to be known as a dwelling classification. This consisted of a house, a barn, and a chicken house. Today if you visit a modern farm you would have to classify it as a small industry. Because of need you find 500 gallons of gasoline stored on the property, heating units using propane and butane gas, welding installations, machine shops, machine storage building, large electrical motors, and large electrical installations.” Shingledecker’s comments illustrate the fact that the farmer-occupied work setting had been altered considerably since the turn of the century. Although the farmer who purchased these new technologies enjoyed a reduction in drudgery, using such equipment unwisely could result in devastating consequences.¹⁸⁸

The tractor’s introduction illustrates how mechanical innovations, while possessing benefits, also entailed health risks. The tractor’s greater horsepower allowed it to pull larger implements, tire improvements enhanced efficiency, and the power take-off provided the flexibility to run a wide array of implements. Between 1940 and 1950, the number of tractors on farms rose from 1.6 million to 3.4 million, signaling the decline of the horse and mule as a power source. In 1919, American farms boasted 26 million horses and mules. This number fell to 4 million approximately twenty years later.¹⁸⁹ The rapid dissemination of tractors into the countryside also freed land, which previously had been used to raise forage crops for horses. All of these factors contributed to rising levels

¹⁸⁸ *Transactions- National Safety Congress*, (Chicago: National Safety Council, 1953), 8.

¹⁸⁹ Don Paarlberg and Phillip Paarlberg, *The Agricultural Revolution of the Twentieth Century* (Ames: Iowa State University Press, 2000), 24.

of productivity in the mid-twentieth century. Nevertheless, tractor accidents proved to be one of the leading causes of deaths and injuries on the farmstead.¹⁹⁰ Rural people died or were seriously injured in tractor roll-overs, highway collisions, and power take-off accidents. In 1962, FFA delegates from Ellsworth, Kansas speaking at the National Safety Council Congress alerted attendees to the magnitude of the problem in their state. They indicated that “[d]uring 1961 there were 27 persons who were careless in Kansas, and were killed. Tractors caused over half of the 47 farm fatalities in our state last year.”¹⁹¹

Unfortunately, the tractors were just one of the many types of farm machinery which warranted a healthy respect from their operators. An Extension Service Author conducted an Iowa Cooperative Extension Service study from 1947 to 1971 which helps place new technologies and farm injuries into a broader perspective. The Iowa extension writer concluded that “the rapid rise in the use of machinery on farms has increased the exposure of farm persons to hazards of machine operation. The problem of exposure is compounded because the total farm population was decreasing while the number of machines per farm has been increasing. The result is that fewer persons were operating more machinery.” The author revealed the machinery farm fatality toll stating that “a total of 1,773 Iowans have died as a result of accidents with tractors and farm-related machinery.” The researcher also indicated that “over two-thirds of the total accidents have taken place on the farm, with an additional 25 percent occurring on highways and roads”¹⁹²

¹⁹⁰ Willard W. Cochrane, *The Development of American Agriculture: A Historical Analysis* (Minneapolis: University of Minnesota Press, 1993), 108-109.

¹⁹¹ *Transactions-National Safety Congress* (Chicago: National Safety Council 1962), 27.

Safety advocates also believed that many farmers lacked the proper safety awareness to accompany this increasingly mechanized environment. Jack Burke indicated that “many farmers are still ‘old timers’ when it comes to safety. They trust in luck or don’t plan ahead to stop accidents that could wipe them out. They’ll lie awake nights thinking of how to wring that last bushel out of the ground, but they’re too rushed or impatient or preoccupied to try a safer way of working or to outwit a simple hazard that might kill, injure, or destroy all they had hoped for.”¹⁹³ Joe Slaymaker, an Illinois farmer, also revealed that many farmers were much more preoccupied with getting the job done than working carefully. Instead, he stated that many farmers are “thinking about something else. Get that job done-its going to rain-hurry- pressure- pressure- pressure.”¹⁹⁴ Such attitudes could result in death or severe injury since a machine could be unforgiving if a farmer did not observe prudent safety practices.

Farmers were also exposed to risks for long periods of time, resulting in fatigue. In 1946, a *Farm Safety Review* writer recognized this tendency highlighting farmers’ propensity to decrease their alertness since “on the farm that is especially bad, for the farmer lives on his place of work, so is exposed hazards of his occupation for longer periods than most workers—even in normal times for 12 hours a day and 7 days a week.”¹⁹⁵ Robert Westpfahl, an Illinois farmer, commented that some farmers were

¹⁹² Iowa State University, Cooperative Extension Service, *Fatal Accidents of Iowa Farm People, 1947-1971* (Ames: Cooperative Extension Service, 1971), 8-9.

¹⁹³ Burke, “Go Modern-Think Safety!,” 1.

¹⁹⁴ Joe Slaymaker, “One Farmer’s View of Safety” (speech given at the National Institute of Farm Safety meeting in Rock Island, Illinois on June 17, 1981), Norval Wardle Collection, Iowa State University Archives, Iowa State University, Ames.

¹⁹⁵ Arthur W. Turner, “Let’s be Sensible about Farm Safety,” *Farm Safety Review*, November/December 1946, 9.

willing to work incredibly long hours during the harvest. He stated that, “[s]ome farmers just run these machines into the ground and there is no machine safer than the man running it. If a man has been running the machine for 16 or 18 hours a day for seven days a week, he is getting dangerous.” Westpfahl’s comments reveal that farmers experienced operator fatigue to a degree that was probably unusual in other professions.¹⁹⁶

Thus, safety advocates recognized that farmers’ adoption of new machines required a greater commitment to safety. In 1942, Bob Clark, a *Successful Farming* contributor from Illinois, stated that “[w]ith knowledge and common sense directing them, the tank and the airplane can win battles, and the tractor, the combine, and the dozens of other farm machines can win the battle for food. But the tractor can kill, too”. He then identified some common pieces of machinery that were involved in accidents including the tractor, corn pickers, and elevators.¹⁹⁷ The following year, Wellington Brink, a member of the USDA’s Committee on Agricultural Safety, stressed that the farmer’s increasingly mechanized environment should be accompanied by a greater attention to safety. He stressed that “tractors, specialized plows, new implements and tools, a varied assortment of gadgets and instruments” all combined to create the need for heightened safety awareness.¹⁹⁸

Safety advocates and some farmers believed that there were a variety of challenges that needed to be surmounted in order for farmers to use new agricultural

¹⁹⁶ Robert Westpfahl, “Another Farmer’s View of Safety,” (speech given at the National Institute of Farm Safety meeting in Rock Island, Illinois on June 17, 1981), Norval Wardle Collection, Iowa State University Archives, Iowa State University, Ames.

¹⁹⁷ Bob Clark, “Are You a Shut-Eye Farmer?,” December 1942, 23, 31.

¹⁹⁸ United States Department of Agriculture, The Committee on Agricultural Safety, 1942. *Watch Your Step: Farm Safety for National Defense*, by Wellington Brink, 5. Washington: United States Government Printing Office.

machines in a safer manner. Such obstacles included the rapid rate of mechanization, the great number and types of machines, and the lack of formal training opportunities. Bruce L. Gardner, a prominent agricultural economist employed at the University of Maryland, revealed the rapidity of farm mechanization stating, “In the forty-five year period from 1915 to 1960 the transition from animal to mechanical power was completed.” Farm families who lived during this period of change were required to quickly adapt to new types of mechanical innovations. The diversity of such equipment was also impressive including new types of tractors, harvesting equipment, hay baling equipment and a host of other machines that transformed almost every conceivable aspect of farm work.¹⁹⁹

Some farmers who lived through this transitional era found it challenging, especially those who previously had used horses. In 1981, Robert Westpfahl, an Illinois farmer, reflected on the difficult transition his family had experienced going from horse-powered machinery to tractor-powered implements. He stated that farmers of an earlier era, “ had been walking behind horses for 40 years and all of a sudden they give him this machine, and he knew that before all he had to was tell the horse to stop and the machine stopped whatever he was working. Well, after he got the tractor, he would stop the tractor, but sometimes the machine wouldn’t stop. Well, that is just plain suicide because those guys have never been around a machine and mechanical things.”²⁰⁰

Some safety writers believed that the rate of mechanical innovations out-paced farmers’ capacity to adapt to new machines. Other observers also commented on the rapid rate of change. In 1953, Robert Howey, a vocational agriculture instructor at

¹⁹⁹ Gardner, *American Agriculture in the Twentieth Century*, 13. For a brief but useful summary of major mechanical innovations that were instrumental in farming, see, Gardner, *American Agriculture in the Twentieth Century*, 9.

²⁰⁰ Westpfahl, “Another Farmer’s View of Safety,” Ames, 1.

Sycamore High School, indicated that agriculture's rapid mechanization demanded that farmers be trained to run their machinery efficiently and safely. He stressed that farmers had enthusiastically embraced new technologies, but they had been less excited about adopting proper safety practices. He stated, "They are working with machines which are new to them as well as their sons. They do not have the knowledge to teach their sons rules of safety that apply to this machine age."²⁰¹

The problems associated with switching from tractors to horses provide a useful example of the demands such rapid change had engendered. In 1952, a *Wallace's Farmer* author stated that "[s]ome farmers drive tractors the same way they drove horses. The horses did the part of the thinking for the driver. Tractors don't think for you. It doesn't make any difference to a tractor whether it plows up the corn or the weeds. Tractors depend on you to make the right decisions. You can tell a tractor 'whoa,' but it won't stop unless you take it out of gear and put on the brakes."²⁰² Robert Westpfahl reflected upon his grandfather's experience one day when he was pulling a harrow behind a tractor. He stated, "One time when he was out harrowing with a tractor, the harrow came unhooked from the tractor and he didn't know it came unhooked until he drove it completely around the field and ran over it the next time. And that is the truth. He was to me one of the smartest and most intelligent men that I have ever met. I mean I really respected him. But he never grew up with anything that was behind him or running around him. He had always been around a horse."²⁰³

²⁰¹ *Transactions: National Safety Congress* (Chicago: National Safety Council, 1953), 32.

²⁰² "Gear Your Farm for Safe Living," *Wallace's Farmer and Homestead*, July 19, 1952, 10.

²⁰³ Westpfahl, "Another Farmer's View of Safety," Ames, 1.

The sheer diversity of farm equipment also posed challenges since in-depth knowledge was often required for proper operation and maintenance. Farmers were often not experts regarding any individual piece of equipment. Instead, they were generalists who operated and maintained many different kinds of machinery. Farmers had to master many mechanical devices in order to complete their daily chores. Some writers emphasized that farmers existed in more mechanically diverse environment than many other occupations. Instead of the repetitive and limited number of skills required of factory workers, farmers and their families were called upon to learn to use a variety of kinds of equipment. This meant that they often never developed the level of proficiency for their larger number of machines that a factory worker acquired from laboring with a fewer number of devices.²⁰⁴

Agricultural writers also commented on the lack of training opportunities and how this amplified safety risks. In 1942, Frank Zink, the Director of the Farm Equipment Institute's Research Department, pondered, "Who trains the operator of a machine? Who trains the new or young operator of a farm machine? The probable answers to these two questions are—the older persons, either fathers or farm hands, neither class of which may have had any safety training. In some cases, dealers instruct new operators in safety precautions; however, during the life of a farm machine, it may have had many operators and the dealer has only been able to instruct the first one of them."²⁰⁵ In 1968, NSC Staff

²⁰⁴ "Practice Safety with Machinery," *Hoard's Dairyman*, August 10 1943, 466; "Farm Accidents are Made," *Hoard's Dairyman*, July 20 1943, 412.

²⁰⁵ Frank J. Zink, "Farm Equipment can be Operated Safely," (paper presented at the Nebraska Conference on Home and Farm Safety, Lincoln, Nebraska, 2 October 1942), 5. Zink also revealed the war had only exacerbated the problem, indicating that millions of inexperienced laborers were entering the agricultural workforce with insufficient training, particularly large numbers of women and children who were replacing many males serving in the armed services. For a detailed discussion, see, Zink, "Farm Equipment Can Be Operated Safely," 6.

Member Jack Burke in an article entitled “The Lonesome Plowman,” writes that unlike many other workers farmers were exclusively responsible for their safety. He stressed that airline pilots, cab drivers, and a host of others individuals were forced to take formal training prior to flying a plane or driving a car or truck. However, most farmers enjoyed very little training before using their equipment. He indicated that most farmers had very little tractor training except for that given by older family members, implement dealers, or another farmer. Burke stated, “What help does he have? He needs neither license nor physical exam. He may be almost any age, from a green fledging eight year old straining to reach controls to a doddering, half blind octogenarian with reaction time approaching that of a drowsy mule.”²⁰⁶

Farmers also were burdened with significant maintenance responsibilities, which if neglected, could also influence the chance of an accident. This aspect of farm life appeared to be accelerating as agricultural equipment became more sophisticated. Maynard Coe, director of the National Safety Council’s Farm Division, also recognized this issues stating that their “mechanic” role alone might involve welding, electrical wiring, and even proper lightning rod installation. He also stated that “[t]oday’s successful farmer must also be mechanic, accountant, chemist, scientist, and veterinarian.”²⁰⁷ In September of 1970, Charlie Nettles’ article, entitled “Farmers Tell Machinery Gripes” appeared in the *Des Moines Register*. Nettles’ piece revealed farmers’ frustrations with machinery, particularly when it malfunctioned during planting and harvesting. The item also revealed that farmers frequently made equipment “modifications,” such as adding gas tanks and balancing weights to combines. Such

²⁰⁶ Jack Burke, “The Lonesome Plowman,” *Farm Safety Review*, March/April 1968, 14.

²⁰⁷ Maynard Coe, “Why Farm Safety Week?,” *Farm Safety Review*, July/August 1946, 14.

alterations reveal the independence farmers exerted in their workplace and how much their safety depended upon their own mechanical proficiency.²⁰⁸

A farmer's maintenance role was particularly crucial in regards to proper machinery upkeep. Farmers were advised to read operation instructions since installing the wrong parts for a machine could be dangerous. In 1943, a writer for *Hoard's Dairyman* also cautioned farmers about being too zealous in their improvisation, stressing that only approved parts should be used for equipment and that hasty 'bailing wire repairs' could result in dangerous mishaps. In 1952, Charles Scranton warned farmers against operating their corn pickers without thoroughly consulting their equipment manuals since the booklet contained a wealth of information essential for proper operation.²⁰⁹

Such activities were not only necessary in order to maintain the machinery's operational efficiency, but neglecting them could also affect one's well being. Safety advocates cautioned farmers to check their tractor brakes regularly since brake failure could result in accidents. Even comparatively simple machines such as wagons required regular maintenance since hauling equipment evolved into complicated machinery as the decades progressed. This meant that farmers needed to check wagons to make sure they could withstand heavy loads, guard moving parts with shielding, and perform regular lubrication, all of which assisted in proper functioning as well as overall safety.²¹⁰

²⁰⁸ Charlie Nettles, "Farmers Tell Machinery Gripes," *Des Moines Sunday Register*, 27 September 1970, sec. F, 2.

²⁰⁹ "Practice Safety with Machinery," 466; Charles J. Scranton, "Safety and the Mechanical Corn Picker," *Agricultural Engineering* 33, no. 3 (1952): 140.

²¹⁰ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1962), 27; National Safety Council, Farm Department, *Rural Accident Bulletin: Wagon Safety* (Chicago: National Safety Council, 1978), 3.

A farmer's maintenance role was also evident in regards to proper barn upkeep. In 1946, C.L. Hamilton, a National Safety Council agricultural engineer, indicated that many of the nation's barns were in desperate need of repair. He indicated that farmers should always include safety in planning barn improvements since such buildings represented a central location for farm work and neglecting safety only multiplied the chances of accidents. He stressed that improper barn maintenance could result in accidents such as falls, as well as injuries from falling objects and fires. Another *Farm Safety Review* piece stressed a variety of poor practices including: "unprotected light bulbs near hay, no safety hooks for lanterns and broken grounding for lightning rods," all which could result in barn fires.²¹¹

Farmers and those who worked to reduce the hazards associated with agricultural machines had to learn about the dangers associated with many different types of equipment used to perform a variety of farm tasks. The mid-twentieth century industrialization of agriculture brought with it the possibility of death and serious injury in a myriad of forms. A farmer could be trapped under a tractor as a result of a roll over, a child could be caught in a power-take-off or fall and be crushed underneath a tractor's wheel. During the harvesting of grain, agricultural laborers needed to be aware of a corn picker's swiftly moving parts. Processing square bales of hay was also hazardous because the bales could ignite in haylofts. Large round bales of hay could easily tip over a tractor. Farmers also adopted new material handling and storage devices for both moving and storing grain. However, devices such as elevators and augers also possessed quickly moving parts and could even collapse if improperly transported. Farmers who procured

²¹¹ C.L. Hamilton, "Make Barn Chores Easy," January/February 1946," 8-9; "How Many of These are in Your House and in Your Barn?," *Farm Safety Review*, November/December 1952, 9.

grain bins or incorporated new waste management systems needed to be aware of dangerous gases that could damage lungs or cause asphyxiation.

Tractor operators needed to be aware of a variety of potentially dangerous situations, such as excessive speeds, going up severe slopes, or pulling heavy loads downhill, all of which could result in close calls, severe injury, or even death in turnovers. Tractor capsizes were particularly dangerous prior to the widespread use of roll-over protective structures which protected the driver. In April 1952, Paul Murphy, a Marion County, Iowa farmer, experienced a frightful incident. His tractor overturned on a hill while working his fields, but fortunately he was able to quickly leap off his tractor and escape without injury. Murphy stated, “No doubt about it, I was lucky...I have always tried to be careful with a tractor, but this accident really scared me.” He also added that the accident clearly showed him how quickly a situation could deteriorate.²¹²

In 1955, Jeff Bouma, a Michigan FFA youth, identified a particularly widespread problem stressing the farmers’ practice of driving their tractors on highways resulted in many accidents. An Iowa Farm Safety committee study confirmed Bouma’s findings. The researchers discovered that despite the fact that tractors spent less than five percent of their total operational time on roadways, approximately half of the accidents in a single year occurred on the state’s highways. In 1955, Daniel Kitchen, an NSC agricultural engineer, indicated that “one third of all fatal tractor accidents occur on public roads.” He also stressed the importance of lights and reflective equipment as aids in preventing such tragedies. He warned that farmers who neglected to stay on highway shoulders, watch for other drivers, or reduce their speed were courting disaster.²¹³

²¹² “Next Time...This Might be You!,” *Wallace’s Farmer and Iowa Homestead*, June 7, 1952, 8.

The tractor's power take-off represented another aspect of the tractor that benefited farmers, but disaster could result from careless use. At the 1962 National Safety Congress, an FFA delegate from Ellsworth, Kansas stressed the dangers associated with the power take-off, acknowledging that it had greatly contributed to agricultural efficiency but that it had become a leading agent in farm accidents. Farmers could become entangled in a power take-off by accidentally falling on the whirling shaft, hastily stepping over it, or wearing loose clothing that could be caught in it. All of these unwise practices could result in a serious injury or even death. A farmer's removal of the PTO guard also multiplied hazards. In 1950, E.W. Tanquary, Chairman of the Farm Equipment Institute's Advisory Engineering Committee, stressed the importance of farmers using such shields, stating that "[t]he best designed and most expensive shield ever provided is worthless if left in the implement shed and the implement operated without it, yet accidents are reported where ample shields were provided with the implement and left off through carelessness."²¹⁴

A farmer could suffer severe burns or even death if he unwisely smoked while refueling, started their tractors around a large gasoline spill, or carelessly opened a radiator cap. Some situations revealed that farmers lacked basic knowledge regarding basic tractor mechanics. For instance, something as simple as removing a radiator cap could result in a terrible injury due to the high temperature and pressure of water which could spew hot liquid over the operator and cause serious burns. In 1946, C.L. Hamilton

²¹³ Jeff Bouma, "Safety on the American Farm," *Farm Safety Review*, July 1955, 9; "Next Time This Might Be You," 8; Daniel A. Kitchen, "Avoid Tractor Upsets," *Farm Safety Review*, August 1955, 7.

²¹⁴ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1962), 27; E.W. Tanquary, "Safe Guarding Power Driven Farm Machinery," a paper prepared for the members of the Farm Equipment Institute's Advisory Engineering Committee, Chicago, Illinois 1950, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

revealed how one farmer had paid an extraordinarily high price for careless tractor operation. Hamilton stated John Cummings, a thirty-four year-old farmer who had unwisely continued driving a tractor with a leaky gas line, which exploded in flames and burned him to death as he attempted to contain the fire. He stated the careless act had “robbed a home of a father and the community of a model farm citizen. The farm is now being abandoned.”²¹⁵

The introduction of the era’s new harvesting technologies also illustrates farm technology’s benefits and hazards. Midwestern corn-belt farmers witnessed rapid harvesting improvements, first with the mechanical corn-picker and later with the combine fitted corn-head. Farmers adopted both devices rapidly once these machines became reliable and economically feasible. In the decade between 1941 and 1951, the number of corn pickers farmers were using grew from approximately 120,000 to 502,000. The majority of these machines could be found in Midwestern states such as Iowa, Illinois, and Indiana. By 1951, Iowa farmers led the nation in their use of corn pickers having procured 95,000 machines, followed by their Indiana and Illinois counterparts who had purchased 48,000 and 80,000 machines respectively. The introduction of the combine corn-head resulted in a similarly rapid adoption by farmers who sought greater ease and efficiency in the corn-harvest.²¹⁶

The corn picker relieved farmers of the physically demanding task of hand harvesting. Charles Scranton, an agricultural engineer, celebrated their introduction stating, “These pickers have ended the backbreaking and time consuming job of hand

²¹⁵ “Steel-Cored Tractor Radiator,” *Farm Safety Review*, March/April 1943, 10; C.L. Hamilton, “Accidents Can Happen,” *Farm Safety Review*, May/June 1946, 9.

²¹⁶ Scranton, “Safety and the Mechanical Corn Picker,” 140.

harvesting, and the day of the horse and wagon in corn picking is pretty well on the way out.” Nevertheless, he also acknowledged that, “with the growth in the number of mechanical pickers has come an unwholesome record of farm accidents.”²¹⁷ In 1952, C.L. Hamilton concurred with Scranton’s assessment stating, “[e]ach year’s corn harvest brings with it hundreds of horribly mangled fingers, hands, arms and legs—not to mention deaths.”²¹⁸ Lee Thompson, a *Wallace’s Farmer* contributor, highlighted the corn picker accident problem, believing it to be one the most potentially hazardous pieces of agricultural equipment. Such assessments were amplified by gruesome stories that included disturbing accounts of farmers who were forced to cut through their own fingers or arm in order to free themselves from a corn-picker.²¹⁹

Researchers who studied the corn picker situation revealed the magnitude of problem and identified factors which contributed to such accidents. In the 1940s, the Illinois Agricultural Association conducted a study, which revealed that in Illinois there were approximately two hundred corn-picking accidents per year in the early to mid 1940s. Another *Wallace’s Farmer* piece authored by Ray Franklin revealed that Iowa farmers had paid a gruesome price. In 1951, the grisly toll included “299 fingers, 32 thumbs and 32 hands.”²²⁰ In 1951, Norval Wardle, an Iowa State farm safety specialist, made a systematic investigation of 418 corn picker accidents in his state. He believed that the accidents could be attributed to factors including operator fatigue, employing careless

²¹⁷ Ibid., 140.

²¹⁸ C.L. Hamilton, “Adjust Corn Picker: For Safety and Efficiency,” *Farm Safety Review*, September/October 1952, 8.

²¹⁹ Lee Thompson, “Haste Costs Arms,” *Wallace’s Farmer and Iowa Homestead*, 6 October 1951, 5; C.L. Hamilton, “Live to Pick another Year,” September/October 1948, 4.

²²⁰ Hamilton, “Live to Pick another Year,” 4; Ray Franklin, “Don’t Lose an Arm,” *Farm Safety Review*, 18 October 1952, *Wallace’s Farmer and Iowa Homestead*, 8.

work practices, and not using safety shields. The parts involved in corn picker accidents were listed in the following order according to their frequency: “Husker rolls, snapper rolls, chains, elevators, and stalk ejectors.”²²¹

Farmers were particularly vulnerable if they attempted to unclog a picker or make repairs with the power on while in a rush to complete the harvest. In 1952, the wife of a Wapello County farmer commented on this aspect of the problem stating that “I think that the men just try to get in a hurry when they are tired.”²²² An exhausted farmer could get caught in the picker’s rollers or chains in a variety of ways. In 1955, Daniel Kitchen stated, “Many accident victims have dismounted with the power take-off running with no intention of approaching the picker. Then they saw an ear crossway in the elevator, saw a stalk of corn laying across the picker points—or they stumbled or lost balance. And another hand was added to the list. More victims, of course, were entrapped while deliberately trying to clean, adjust, or lubricate the picker with the rolls running.” Regardless of the situation, Kitchen reinforced the idea that farmers could prevent many accidents by turning off machines prior to fixing them.²²³

A farmer could also prevent accidents and experience a more efficient harvest if he attended to the maintenance needs of their corn pickers. Owners needed to be aware of a number of considerations if a corn picker was to be used properly. Such upkeep included duties such as repeatedly checking for damaged components, making adjustments, and avoiding excessive speeds. These procedures also included greasing the

²²¹ Franklin, “Don’t Lose an Arm,” 8.

²²² “Pick More Corn-Safely,” *Farm Safety Review*, September/October 1958, 8-9; Franklin, “Don’t Lose an Arm,” 8.

²²³ Dan Kitchen, “Stop That Picker...Before you Leave the Tractor Seat,” *Farm Safety Review*, September 1955, 5.

machine's parts and making clutch modifications. Safety advocates recommended that such practices should be continued even after the harvest. In 1958 a *Farm Safety Review* writer stated that “[a]t the end of the picking season check your machinery over for worn parts. Fix it now! Next year you may be too late. The dealer will be busy. Use paint, grease, and oil, for proper storage and protection of your investment.”²²⁴ In 1955, Dan Kitchen, an NSC agricultural engineer stressed the importance of safety practices stating that, “[a] well-adjusted machine in good repair gives less trouble, is less likely to tempt the operator to take chances.”²²⁵

Farmers also needed to be attentive to adjusting speed, the rollers, and other operational variables for the specific field conditions. A *Farm Safety Review* writer indicated that “[a]s a general rule, the tougher the ear is to snap off the stock, the closer the setting of the snapping rolls required; the drier the corn, the wider the roll setting.”²²⁶ Proper maintenance practices were particularly important due to the diverse and sometimes harsh cornfield conditions. Charles J. Scranton stressed that even in a single field corn plants could present much diversity due to variances in moisture and soil. He said that the plant height and density alone could present much variety, indicating that some corn plants stood over 12 feet tall while others might not be much more than half that size, and one field could have both sparse and thick patches. A weedy field could also affect the corn picker's likelihood of being clogged and hence require that a farmer adjust his picker to compensate. Daniel Kitchen, an NSC agricultural engineer, stressed one aspect of proper corn picker maintenance, stating that, “[l]ast and most important, the

²²⁴ Hamilton, “Adjust Corn Picker: For Safety and Efficiency,” 8-9; “Pick More Corn Safely,” 10.

²²⁵ “Stop that Picker...Before you Leave the Tractor Seat!,” 6.

²²⁶ “Pick More Corn Safely,” 9.

most effective way to reduce corn losses and plugging of snapping rolls is careful driving at reasonable speeds. Being off the row an inch or two will increase substantially both corn losses and chances of plugging the snapping rolls.”²²⁷

The invention of the combine increased both the safety and speed of harvesting since they clogged less and gathered corn more quickly than corn pickers. In the mid-1960s, an *Implement and Tractor* contributor praised the continued improvement of the machine, stating that they “have more horsepower, larger grain tanks, more efficient drives, more hydraulic applications, larger fuel tanks, more diesel engines, bigger elevators and unloading augers, improved operator platforms, and larger headers—they are bigger and better than ever.”²²⁸ New safety features also augmented such performance improvements. In 1965, Daniel McFarland, an NSC staff writer, indicated that a number of modifications made harvesting safer, including better shielding over moving parts and headers that congested less frequently while harvesting corn more quickly.²²⁹

Nevertheless, safety advocates reminded farmers that healthy respect was still required. In 1979, an NSC writer stated that, “National Safety Council surveys indicate that combines rank fourth in the total number of disabling injuries involving farm machinery. Although combines are used for considerably fewer hours each year than tractors, they have twice the number of reportable injuries per thousand units.”²³⁰ Farm safety specialists professed similar advice as they had previously with the corn pickers advising farmers to read and follow the owner’s manual instructions, perform regular

²²⁷ Scranton, “Safety and the Mechanical Corn-Picker,” 140; “Pick More Corn-Safely,” 10; Kitchen, “Stop That Picker: Before you Leave the Tractor Seat! 6.

²²⁸ Mark Zimmerman, “Scanning the Self-Propelled Combines,” *Implement and Tractor*, 21 June 1965, 20.

²²⁹ T. David McFarland, “Eight Steps to Combine Safety,” *Farm Safety Review*, May/June 1965, 3-4.

²³⁰ National Safety Council, *Bulletin: Grain Harvest Safety* (Chicago: National Safety Council, 1979), 1.

maintenance, and always turn their combines off prior to performing repairs. In 1965, Daniel McFarland instructed farmers to “[k]eep machinery in good operation condition.” He also suggested that they should “operate equipment as specified in the operator’s manual. Shut off power before cleaning, adjusting, or servicing.” In addition, McFarland emphasized the importance of keeping safety guards in place.²³¹

Safety writers also pointed to field conditions as a factor in preventing combine related accidents. In the early 1970s, Joseph F. Gering, an Oklahoma extension safety specialist, stated that “[g]ood weed control is an important factor in safe combine operation. Heavy weed infestations in the mature crop can result in machine plugging and problems with weed entanglement around rotating drives.” He suggested that prior to harvesting farmers should inspect their fields for stones and other debris that could damage equipment. Gerling also advised that heavy spring rains could result in hazardous ditches.²³²

The combine’s new hydraulic systems presented a safety concern that had been absent with the corn picker. Farmers who unwisely accorded too much trust in the machine by working under them put themselves in jeopardy. Gerling cautioned farmers, “Whenever you are required to work on the header or parts beneath it or behind it, be sure to block it securely. Never rely solely on the hydraulic system, as they have been known to fail.” Instead, he suggested that a “stand” or other “blocking” device be used to avoid a crushing injury as a result of a failing hydraulic system. He also warned operators of the dangers associated with the high pressure oil which flowed through the system. He

²³¹ McFarland, “Eight Steps to Combine Safety,” 3-4.

²³² Joseph Gerling, “Extension Facts: Safe Combine Operation” (Stillwater, Oklahoma: Oklahoma State University, 1974, 2.

indicated that an examination for hydraulic leaks could be hazardous with bare hands since oil within the systems is under high pressure and if released could pierce the skin and result in poisoning.²³³

The physically demanding task of haymaking also became easier due to mechanical advances in the form of mowers, rakes, and baling equipment; nevertheless, dangers surfaced. During the 1940s, the safety literature revealed a plethora of injuries that could ensue during haymaking, including cuts from mowers, crushing injuries from rakes, as well as the possibility of becoming entangled in the moving parts of a baler. By the 1960s, safety writers offered a variety of suggestions which could prevent such misfortunes, including keeping PTO guards in place for moving parts in mowers, balers, and forage choppers. Farmers were also directed to turn off their tractor while removing debris from a clogged rake or balers or while performing any maintenance. Such miscellaneous jobs might include extracting twine from a baler or performing maintenance on a forage harvester.²³⁴

Although haymaking continued to advance, as evidenced by the introduction of improved equipment, one of the more revolutionary changes in haymaking was the advent of the “big round baler.” By the mid-1970s, such devices produced hay bales as large as 1000 to 1,500 pounds. Sam Brungardt, an *Implement and Tractor* contributor, stressed that farmers were sometimes unwisely adapting older front-end loaders for moving large round bales. He stressed that the considerable weight of the bales could create great instability in the farmer’s efforts to transport them. He stated that, “[a]

²³³ Ibid., 2.

²³⁴ “Haytime Hazards,” *Farm Safety Review*, May/June 1944, 6; “Safe Hay Harvest,” *Farm Safety Review*, March/April, 1967, 4.

Kentucky man was fatally crushed when a round bale rolled down the arms of his tractor's modified front end loader to its upper limit."²³⁵

Although safe large bale-handling equipment was rapidly entering the marketplace, it did not mean that farmers would immediately purchase safer transportation devices. Dr. Richard L. Jepsen, a farm safety specialist from Kansas State University, believed the "three-point-hitch bale handling devices to be safer than the modified front end loaders." He also thought farmers would persist in using adapted front-end loaders even though they offered less stability.²³⁶ Rollin Schnieder, a farm safety expert employed at the University of Nebraska, echoed Jepsen's opinions. Schnieder stated "that some of the front end loaders which are modified in farm shops may be poorly engineered and put excess stress on a tractor's hydraulic system."²³⁷ Such comments confirm that farm innovations did not proceed uniformly and that the willingness of agriculturalists to modify old equipment for new uses often multiplied risks.

Farmers faced hazards associated with hay harvesting that were not directly related to operating gasoline-powered hay equipment. Workers could also injure themselves by falling off a hayrack while bringing the bales to the barn. Even after the hay was ready for storage, laborers had to still be cautious. In 1944, a *Farm Safety Review* author indicated that, "[t]he man who attaches the slings or sets the fork must not stand under the load while it is being hoisted into the barn. If the rope should break he would be crushed. The same rule applies to the man working in the mow. He must stand

²³⁵ Sam Brungardt, "Safe Handling of Big Bales," *Implement and Tractor*, March 1976, 12.

²³⁶ *Ibid.*, 13.

²³⁷ *Ibid.*, 13.

clear when a load is tripped.”²³⁸ The fact that haymaking was often done in very hot weather also meant that an overworked farmer was susceptible to heat stroke or exhaustion. Thus, farmers were also advised to include work breaks especially during periods of excessive heat and to lift in a safe manner to avoid back injuries.²³⁹

The most basic tool involved in hay processing, the pitchfork, could inflict severe damage if used unwisely. Such injuries were often ghastly and revealed the many ways a pitchfork user could become injured. In 1943, Claire Swisher, editor of the *Hammermill Bond*, indicated that although the pitchfork was indispensable for farm work, they were sometimes involved in fatal accidents. He stressed that its sharp points could easily puncture the flesh and that some farmers had inadvertently fallen off their hayrack and impaled themselves on their pitchforks. Such accidents usually resulted in grotesque deaths. In 1943, a *Farm Safety Review* writer stated that Mr. Hedge, a farmer from Leavenworth, Kansas, “climbed onto the hay loft, threw food down for the cattle, and tossed the fork into it. As he started down the ladder, he missed the top rung. The additional impact broke the second rung and he fell. The fork handle pierced deeply into his abdomen, and he died a few days later.”²⁴⁰ Safety writers provided abundant advice regarding how to avoid pitchfork accidents. Such suggestions included owning several of them and locating them in convenient places, limiting the need to carry them. They also

²³⁸ “Haytime Hazards,” 6-7.

²³⁹ *Ibid.*, 7; “Heat: Hard on the Heart,” *Farm Safety Review*, May/June 1960, 13-14; “Safe Hay Harvest,” 6.

²⁴⁰ Claire Swisher, “An Editor Talks about Pitchforks,” *Farm Safety Review*, September/October, 1943, 7, *The Hammermill Bond* was a publication printed exclusively for the employees of the Hammermill paper company of which Claire Swisher was the editor; “Pitch Forks are Dangerous,” *Farm Safety Review*, November/December 1945, 9.

advised that under no circumstances should a pitchfork be tossed, and to always place it firmly in the earth instead of placing it flat on the ground.²⁴¹

Farmers also had to be aware that hay with too much moisture might combust. In 1953, C.L. Hamilton, an agricultural engineer employed by the NSC, warned farmers to avoid placing hay in the mow with a moisture above 25 percent. He suggested that farmers should use hay probes and thermometers to ensure that unsafe temperatures had not been reached and to keep such devices in the hay for at least 15 minutes to obtain an accurate reading. Hamilton stressed that danger was present when temperatures of the hay reached 160 degrees Fahrenheit, while 180 degrees represented a situation for emergency action. He also suggested that fans could be installed to decrease the hay's temperature. However, such fans needed to be installed properly, especially concerning guards on the fan's blades and also on any belts or pulley that powered them.²⁴²

Farmers also acquired more efficient tools in the form of augers and elevators for moving their hay, grain, and other materials. In 1959, Benson J. Lamp and Kenneth A. Harkness, Ohio State University agricultural engineers, commented on the elevator's widespread adoption indicating that between the beginning of the 1940s and the close of the 1950s their numbers had increased twofold for each two-year interval for the entire period. William J. Fletcher, a *Farm Safety Review* contributor, summarized their benefits stating that “[t]hey quickly move material into bins, cribs, mows or other storage facilities, relegating the scoop shovel to the museum and saving long hours of back-

²⁴¹ Ibid., 10.

²⁴² “Haytime Hazards,” 14; C.L. Hamilton, “Hay Time,” *Farm Safety Review*, July/August 1953, 14; National Safety Council, *Hay Harvest Safety* (Chicago: National Safety Council, 1965), 4.

breaking labor.”²⁴³ By the end of the 1960s, approximately one and half million elevators on the nation’s farmsteads testified to the farmers’ acceptance of such machines.²⁴⁴

Farmers enthusiastically purchased such equipment and consequently benefited from the automation of their material handling work. In 1972, Norval Wardle stressed that such transport devices (auger-conveyors) had become so popular that some farmers might possess as many as “one, two, four or more on his farm, saving time, labor and drudgery every day.”²⁴⁵ Farmers could also combine augers, metal grain bins, and connected tubing to mechanize much of their material handling tasks. In 1968, a Hutchison Royal product brochure celebrated such possibilities. The authors emphasized advantages in regards to their livestock feeding system, stressing such benefits as a more economical use of time, feed, and ease of maintenance. The Hutchison salesman also stressed that farmers would also benefit from his company’s excellent customer service record.²⁴⁶

Despite such advantages, augers and elevators were involved in a large number of accidents. Farmers could hurt themselves if the device collapsed while attempting to

²⁴³ Benson J. Lamp and Kenneth A. Harkness, “Recommendations and Improved Design of Portable Elevators” (Paper presented at the annual meeting of the American Society of Agricultural Engineers, Chicago, Illinois 15-18 December 1959), 1; William Fletcher, “Avoiding Elevator and Auger Accidents,” *Farm Safety Review*, November/December 1969, 5.

²⁴⁴ T. David McFarland and William J. Fletcher, “Analysis of Portable Farm Elevator Accidents to Determine Corrective Measures,” Norval Wardle Collection, Special Collections, Iowa State University Library, Ames; Keith Roe, an authority on the history of grain storage practices indicated that although elevators had been in existence prior to the Great Depression, it was not until the mid-1930s that farmers possessed them in significant numbers, see, Keith E. Roe, *Corncribs: In History, Folklife, and Architecture* (Ames: Iowa State University Press, 1988), 41.

²⁴⁵ Norval Wardle, “Safety Controls and Shielding for Augers,” (Paper presented at the annual meeting of the American Society of Agricultural Engineers, Hot Springs, Arkansas, 28 June 1972), 2.

²⁴⁶ Hutchison Royal Division Industries, “The Standard of Excellence in Equipment For Agriculture and Industry” (Clay Center, Kansas: Hutchison Royal Division Industries, February, 1968), 4; The Hutchison advertisement tract can be found in the Norval Wardle Collection, Special Collections, Iowa State University Library, Ames.

move them. They could also be seriously injured if they caught themselves in the machines moving parts, which included the PTO in some elevators, v-belts responsible for moving the track, and the conveyor itself, which carried material up the trough. Fires could also result from a combination of a hot engine and an abundance of dry matter. In 1959, Benson J. Lamp and Kenneth A. Harkness commented that fourteen people had died in elevator accidents in Iowa between 1947 and 1953. Tractors were the only farm machines involved in more accidents. They also mentioned that in 1956, six people in Ohio had died in such mishaps. A decade later, two NSC engineers David McFarland and William J. Fletcher conducted a study revealing that such devices were near the top of Ohio's and Michigan's farm accident list. Although augers and elevators were implicated in many accidents, farm safety writers devoted little attention toward alerting the rural public about the problem.²⁴⁷

The McFarland and Fletcher investigation also provided a comprehensive picture of the accident victims, types of accidents as well as the overall context of specific incidents. They discovered that the majority of the victims were males, between 30 and 69 years old who hurt themselves while operating the machine. Such mishaps usually occurred in the late afternoon during the harvest season. The researchers also confirmed that the major cause of injuries or fatalities involved getting a body part caught in moving parts. They provided one common scenario in which an operator could become ensnared stating that, "picking up spilled grain exposes the worker to drives and PTO shafts.

Routine unloading brings the operator in contact with flight chains and the drive

²⁴⁷ Lamp and Harkness, "Recommendations for Improved Design of Portable Farm Elevators," 2; McFarland and Fletcher, "Analysis of Portable Farm Elevator and Auger Accidents to Determine Corrective Measures," 34. McFarland and Fletcher had only discovered one slide presentation and two brochures focused on the auger/elevator problem.

sprocket.” They also emphasized that farmers had insufficient reaction time in comparison to the augers’ and elevators’ fast moving parts, meaning that once a person became entangled they had a slim hope of freeing themselves.²⁴⁸

Farmers could also suffer serious injury or even death by being crushed under a collapsing elevator or auger. In late 1950s and early 1960s, Ohio State University safety specialists emphasized such dangers. They stressed that over-turns occurred for a variety of reasons including simply losing control during transportation or unintentionally upending the device while attempting to clear debris from the elevator’s trough. The prospect of accidentally running into another object represented a common hazard. They provided an example for this scenario stating that, “[t]he accidental hitting of the undercarriage by a tractor or other object can quickly topples an elevator which has been set on sloping terrain.”²⁴⁹ Farmers also often further exposed themselves to serious injury in attempting to stop a falling elevator. They stated that all of these situations could result in becoming pinned under the machine causing serious injury or death.²⁵⁰

They also stressed that instability problems could be corrected by installing, “a safety track,” indicating that, “such a track will not permit separation of the trough from the rollers on the upper member of the undercarriage. Also, it can serve to limit travel of the rollers along the trough—restricting discharge height to a safe level, and stopping the

²⁴⁸ McFarland and Fletcher, “Analysis of Portable Farm Elevator and Auger Accidents to Determine Corrective Measures,” 23-24.

²⁴⁹ W.E. Stuckey, B.J. Lamp and K.A. Harkness, *Bulletin: 367 The Portable Farm Elevator... Make it a Helper Only* (Columbus, Ohio State University: Agricultural Extension Service, 1962), 2-3; this is a revised version of the 1957 Ohio state publication regarding elevator precautions; W.E. Stuckey and B.J. Stamp, *Bulletin: 367: Live Longer with Portable Elevators* (Columbus, Ohio State University: Agricultural Extension Service, 1957), 8.

²⁵⁰ *Ibid.*, 5.

trough at a desirable height as it is lowered.”²⁵¹ However, by the end of the 1960s, the dangers associated with collapses appear to have lessened because manufacturers added stabilizing features to their elevators. In 1969, McFarland and Fletcher discussed how Ohio State University researchers had long since identified the problem of failing elevator transport carriages and that manufacturers had responded by installing preventative devices into their latest products. Although this was generally true, such safety features were not universal. McFarland and Fletcher stated that “[s]ome makers of portable elevators and augers are still not providing carriage stops to prevent collapse during moving.”²⁵²

Although fire represented a much less common threat, elevator engines were sometimes located near the machine’s hopper, which meant that dry material sometimes contacted the machine’s hot engine representing a fire risk. In addition, hazards were multiplied if a muffler was absent which meant that heated “carbon particles” could make contact with hay bales, greatly increasing the potential for accidental combustion. Such a scenario was particularly frightening if a smoldering bale entered the haymow, causing a destructive barn fire. Farmers also faced fire hazards if hot exhaust was allowed to blow on straw, dry leaves, or other desiccated matter.²⁵³

Elevators were also involved in accidents when spinning cranks injured machine operators or bystanders. Although such levers provided a means of adjusting the discharge height, if the user prematurely let go, it could easily rotate swiftly and cause physical harm. Ohio State University safety specialists stated, “The natural tendency may

²⁵¹ Stuckey, Lamp, and Harkness, *Bulletin: 367, The Portable Farm Elevator... Make it a Helper Only*, 4.

²⁵² McFarland and Fletcher, “Analysis of Portable Farm Elevator and Auger Accidents to Determine Corrective measures,” 33-34.

²⁵³ Stuckey, Lamp, and Harkness, *Bulletin: 367, The Portable Farm Elevator... Make it a Helper Only*, 5.

be to try to stop the crank- if it hasn't hit you already. Many severe injuries result from freely spinning hoist cranks.” In addition, they indicated that children who had been allowed to stand close to the device or who had been playing with it had sometimes received disfiguring injuries.²⁵⁴ The problem could be reduced by such additions as “worm gears, friction brakes and automatic locks,” all of which were sufficient in stopping cranks.²⁵⁵

Children's natural curiosity and playfulness could also lead to elevator tragedies. Ohio State University farm safety specialists stated that kids in Ohio had been seriously injured or killed in such elevator accidents. They also informed readers of two boys who had fallen to their death from an elevator. One had been running up an elevator when he stumbled, plummeted to the ground, and subsequently died; the other youth had climbed up hoping to enter a barn's hay mow but he also fell to his death. Ohio safety specialists warned adults “to always use the elevator properly. If not in use, remove and lower it to the transport position, so the dangers of falls can be eliminated.”²⁵⁶ In a 1973, an article by B.J.S. Grogono, a surgeon from Halifax, Nova Scotia, revealed a rather gruesome aspect of auger accidents involving children. He indicated that when a child's limb became caught in an auger the damage could be greater since their extremities were smaller. Thus, their arms and legs were consequently pulled farther into the machine and suffered more damage.²⁵⁷

²⁵⁴ Ibid., 6.

²⁵⁵ Lamp and Harkness, “Recommendations for Improved Design of Portable Farm Elevators,” 3.

²⁵⁶ Stuckey and Stamp, *Bulletin: 367: Live Longer with Portable Elevators* 7.

²⁵⁷ B.J.S. Grogono, “Auger Injuries,” *The British Journal of Accident Surgery* 4, no. 3 (February 1973): 243.

Dr. Grogono provided many illustrations of such catastrophic injuries, which resulted from contact with moving parts. Although the victims' identities remained anonymous, he effectively conveyed the appalling nature of the accidents. He described one incident in which a farmer caught his foot in a grain auger's hopper; the terrified man intentionally put his other foot into the hopper in an effort to prevent the machine from pulling his legs into the machine's shaft. Although he successfully held himself with his hands, the injuries to both of his feet were so severe they warranted amputation. Although similar accidents sometimes did not result removal of the limb, they often produced an incurable handicap. For instance, a young man of eighteen caught his arm in an auger and suffered severe injuries to both his hand and his forearm. Although, the doctors were able to save the arm, he suffered permanent lack of movement.²⁵⁸

By the late 1960s, researchers agreed that such incidents represented the most persistent elevator hazard. The fact that manufacturers were slow to install shields on the elevator's moving parts appears to have exacerbated the problem. In 1959, Lamp and Harkness believed that the absence of guards might have been related to the perception that the machine's moving parts rotated slower than those of other farm equipment. However, they argued against this rationalization stating that "contact with an unshielded power shaft rotating at slow speeds definitely is a hazard and can result in severe accidents, as elevator accident reports verify. There is no justification for elevators to be manufactured and sold without properly shielded shafts and gears."²⁵⁹

The lack of guards and augers appears to have continued into the late 1960s and early 1970s. In 1969, McFarland and Fletcher supported this view stating that, "[a]n

²⁵⁸ Ibid., 250-251.

²⁵⁹ Lamp and Harkness, "Recommendations for Improved Design of Portable Farm Elevators," 3.

informal survey of machines on dealer's lots, at agricultural shows, and in sales literature was conducted to measure the 'state of machine' guarding on US Machines. Most V-belt drives were unshielded, even on machines of recent vintage. Auger intake guarding varied from none to the provision of several rods running parallel to the auger shaft at the base end. Most PTO shafts on new machines are shielded, but on many units the stub shaft shield, where the shaft connects to the elevator, is in need of improvement."²⁶⁰ In 1972, Norval Wardle also confirmed such observations after reviewing a number manufacturing brochures; he surmised that such machines were on the whole insufficiently guarded. He believed that the lack of such protection represented a significant threat to farm families and symbolized a lack of safety concern by companies that produced such machines. He further illustrated his point by disclosing that some farmers had crafted guards themselves following accidents. A particularly powerful example involved a Kentucky farmer who added shields to his auger after a girl had lost a foot in the machine. Another situation involved Horace Neu, a farmer from Nevada, Iowa, who after catching his hand in an auger, fashioned a "lattice type guard over the auger's intake."²⁶¹

Nevertheless, some material handling technologies appeared to have reduced the possibility of farm accidents. For instance, the advent of "self-feeding silos" might have lessened the dangers associated with feeding livestock. Dave D. Merrill, an official for the Republic Steel Corporation, stated that farmers now could avoid the potentially dangerous practice of "climbing conventional silo chutes and lugging silage to feed

²⁶⁰ McFarland and Fletcher, "Analysis of Portable Farm Elevator and Auger Accidents to Determine Corrective Measures," 33.

²⁶¹ Norval Wardle, "Safety Controls and Shielding for Augers," 3-4.

bunks.” Such machines did much to automate the process of feeding silage to livestock. Merrill indicated that researchers had been searching for ways to decrease the work associated with feeding livestock silage. He stated, “Mechanical unloaders in the top or bottom of silos looked promising, but they did not deliver the silage to livestock. Silo structural and management adjustments to permit the animals to feed directly from the silos now seem to offer the most promising solution.”²⁶²

Rural families also faced dangers while moving grains, hay, and other materials in their wagons. In 1968, an NSC safety publication entitled “How to Get Your Wagon Rolling Safely” indicated that although wagon-related deaths were rare, injuries were fairly common. Farm accident studies conducted in Michigan and Ohio placed wagons behind tractors and elevators as leading accident agents. Although individuals could be harmed in such mishaps in a number of ways, falls appeared to be a leading reason. The NSC authors indicated that, “falls accounted for about 60 percent of wagon injuries. The remainder resulted from being run over or being caught between the wagon and a building or tool.”²⁶³ In the late 1970s, NSC farm accident researchers confirmed this view of the prevalence of wagon related falls through more comprehensive farm accident studies.²⁶⁴

A person could tumble from a wagon for a variety of reasons including “standing on its tongue, unwisely riding on a wagon, or losing one’s footing on grain or other slippery materials. People who carelessly rode atop wagons were especially susceptible to

²⁶² Earl D. Merrill, “Self-Feeding Silos Aid Safety,” *Farm Safety Review*, March/April 1953, 3.

²⁶³ National Safety Council, *How to Get Your Wagon Rolling Safely* (Chicago: National Safety Council, 1968), 2.

²⁶⁴ National Safety Council, Farm Department, *Rural Accident Prevention Bulletin: Wagon Safety* (Chicago: National Safety Council, 1978), 1.

falls. The likelihood of such an accident increased if the tractor operator started unexpectedly, stopped suddenly, or behaved in other unpredictable ways.” NSC researchers stated that “[m]any injuries happen to wagon riders during loading operations because they fall on or off the wagon.” Children who rode as second tractor riders were sometimes seriously hurt or even killed if they fell off a tractor and then were crushed by wagon wheels.²⁶⁵

Farmers were especially advised to practice safe operations on rural roadways in order to avoid traffic accidents. Farmers needed to use the right kind of tires for their particular wagon, check them regularly for correct pressure or damage, and avoid overloading their wagons. All of these measures helped prevent tire failure and assisted in avoiding roadway collisions. One NSC writer also indicated that over-filling wagon tires placed undue stress on the wagon and multiplied the possibility of “tire or structural failure.” Farmers were also told to correctly place the load inside the wagon to prevent the contents from accidentally being released on the highway.²⁶⁶ Safety writers also advised farmers to adopt preventative measures such as augmenting hitches with “safety chains” to prevent an absconded wagon from colliding with other vehicles.²⁶⁷

The nature of wagon hazards was also connected to agriculture’s ever-increasing scale. In the late 1970s, an NSC writer indicated that wagons had much larger carrying capacities than their predecessors. The author stated that “[l]oad and speed was previously limited to how much a team could pull and how fast they could walk. But today’s high horsepower tractors can move huge loads much faster than horses or earlier

²⁶⁵ National Safety Council, Farm Department, *Rural Accident Prevention Bulletin: Wagon Safety*, 1; National Safety Council, *How to Get your Wagon Rolling Safely*, 3.

²⁶⁶ National Safety Council, Farm Department, *Rural Accident Prevention Bulletin: Wagon Safety*, 2-3.

²⁶⁷ National Safety Council, *How to Get your Wagon Rolling Safely*, 2.

tractors.” Such developments meant that modern farmers pulled much heavier loads at much higher speeds than was previously possible, meaning they required more time to stop and that their wagons were under much greater strain. The NSC staff writer vividly explained the problem stating that “[l]arge tractors can pull one or two fully loaded wagons, each with a 400 bushel capacity, at transport speeds. But the operator must be able to stop the rig within safety limits. If the wagon has no brakes, the whole stopping burden falls on the tractor.” Safety writers advised farmers to purchase wagons with brakes since the job fell entirely upon the tractor if they were absent. A number of problems could ensue if a wagon was not fitted with brakes, including losing control on downhills or rolling backwards on uphills, both of which could result in crashing into other objects or running off into a ditch.²⁶⁸

Farmers also used much more complex wagons than their early twentieth century forerunners, including features such as ensilage, side dump, and stack wagons. In 1978, an NSC author stated that, “farm wagons have come a long way from the simple carts and high-wheeled rack and box conveyance of 50 years ago. No longer are wagons just boxes or flat beads mounted on wheels. They come in many shapes and sizes, often with specialized features, making them suitable for numerous farm hauling and materials-handling jobs.” Although wagons with devices such as power take-offs, hydraulic lifts, and augers added flexibility to a wagon’s usefulness, they also presented additional hazards. The writer indicated that, “[w]agons with unloading and lifting mechanisms using power- take-off (PTO or hydraulic power from a tractor) have contributed to labor efficiency and productivity goals, but they have made this originally “simple device” complex, and have added new safety problems with their power drives and moving

²⁶⁸ National Safety Council, Farm Department, *Rural Accident Prevention Bulletin: Wagon Safety*, 1-2.

parts.” Devices such as “augers” or “beaters” also increased the hazards associated with falls because if an individual fell on them an accident which might have previously resulted in a mild injury could instead result in a catastrophic one. Wagons which could be raised hydraulically also posed their own dangers since if it was lowered accidentally while someone was working on the wagon it could also prove to be fatal.²⁶⁹

Farmers also began storing their agricultural commodities differently by replacing structures such as corn cribs with metal grain bins. These changes represented yet another dimension of mechanization since metal bins were easily adapted to other labor-saving devices such as augers and elevators. Gerald Gutkunst, an engineer for Butler Manufacturing Company, a business which supplied construction materials to bin builders, stressed that bins were a crucial component of the farmer’s total grain handling system. While discussing the process of erecting grain bins, he emphasized their interconnectedness to other conveying machines. He stated that bins needed to be well-built since “a bin not only serves as a container. It must also support overhead augers in many cases. In some installations, it supports spreaders, stirring machines and other handling equipment.”²⁷⁰

Although modern grain handling and storage were both convenient and cost saving, they nevertheless presented hazards. The possibility that farmers might slip off the grain bin created the potential for serious falling injuries. However, the greatest dangers associated with the bin including the possibility of sinking into and drowning under tons of grain, suffering from mold-induced breathing ailments, and encountering

²⁶⁹ National Safety Council, Farm Department, *Rural Accident Prevention Bulletin: Wagon Safety*, 1-2.

²⁷⁰ For a brief discussion regarding the change in farmers’ grain storage practices particularly in regard to the corncrib’s zenith, see, Roe, *Corncribs: In History, Folklife, and Architecture*, 64-90; Gerald Gutkunst, “Safety-Design and Erection of Grain Storage,” (Paper presented at the winter meeting of the American Society of Agricultural Engineers, Chicago, Illinois, 11-15 December), 5.

dangerous gases. The farm accident literature contains instances in which a person fell into a grain bin during the unloading process. The unfortunate individual would often then be pulled to the bottom of the bin with the grain with the possibility being suffocated unless rescuers reached the victim in time. Safety writers warned farmers that if someone was required to be within the bin during the bin's emptying then they should be firmly secured by a rope to avoid a grain bin tragedy.²⁷¹

However, silos presented some of the most serious gas dangers, particularly soon after farmers filled them. Once the fermentation process commenced, the silo could produce surprisingly high levels of noxious gas including carbon dioxide and nitrogen dioxide. Both these gases presented dangers since carbon dioxide acted as an asphyxiant which could "exclude oxygen from the lungs," while nitrogen dioxide severely irritated the lining of the lung. Unfortunately, damage from nitrogen dioxide sometimes was not immediately apparent. Bill Bilderback, a Canadian farmer and silo gas authority, pointed out that a farmer could inhale such vapors during the day without experiencing any symptoms. Some farmers died in their sleep during the night due to the accumulation of fluid in their lungs.²⁷² In 1960, Gerald W. Isaacs, a Purdue University professor, emphasized the dangers stating that "[m]easurements of gas in successful air-tight silos storing high-moisture corn have shown less than 1% oxygen and up to 90% carbon dioxide. A few whiffs of NO₂, produced in ensiling crops high in nitrates, may cause permanent lung injury. A few minutes of exposure may cause instant death." He also

²⁷¹ Ibid., 5-6; William D Hanford, "Grain Bins Can be Dangerous," *Farm Safety Review*, May/June 1970, 3-4. Although grain bin dangers persisted, government regulations reduced fall hazards. The passage of the Occupational Safety and Health Act also resulted in legal provisions that regulated the specifications of grain bins. Gerald Gutkunst commented that, "ladders, safety cages and rails are covered in the 1970 Occupational Safety and Health Act," see, Gerald Gutkunst, "Safety-Design and Erection of Grain Storage," 4.

²⁷² Bill Bilderback, *Killer Gas Inside* (Guelph, Ontario: Farm Safety Association Incorporated, 1976), 6.

stressed that the most hazardous period usually occurred a couple of weeks after filling the silo.²⁷³

As early as the late 1940s, safety specialists became keenly aware of the problem and they also alerted farmers to the threat by using accident victim stories. In 1956, Edmund G. Zimmerer, Commissioner of the Iowa State Department of Health, acknowledged the risks associated with the disease that had become known as “Silo Filler’s Disease.” He indicated that by the late 1940s many agricultural workers began remarking about a gas, which was usually brown or yellow in tint that sometimes “killed livestock and small animals in vicinity of the silo.” Zimmerer also related a number of stories regarding gas-related deaths. In one instance, a Missouri farmer had entered a silo and had been overwhelmed with gas. Although he regained consciousness after being rescued, he died seventeen hours later.²⁷⁴ Delayed fatalities were not unusual; for instance, five silo gas deaths occurred in Iowa from 1959 to 1966. The majority occurred at least three months after inhaling the noxious fumes. However, this was not always the case. In 1966, a pair of Iowa farmers had used rope to lower themselves into a silo. Unfortunately, the rope snapped leaving the two men entrapped in a gas filled silo. They were soon overcome by carbon dioxide and died.²⁷⁵

Farmers could avoid a carbon-dioxide-induced death by employing a variety of preventative measures. They could familiarize themselves with warning signs and using aeration equipment. Safety advocates also suggested that farmers be observant for the

²⁷³ Gerald W. Isaacs, “Your Silo—a Potential Killer,” *Successful Farming* (September 1960): 92.

²⁷⁴ Edmund G. Zimmerer, “Silage Gas Poisoning” (Paper prepared as a result of scientific inquiries regarding the silage gas problem, Institute of Agricultural Medicine, University of Iowa College of Medicine, Iowa City, Iowa, 4 August 1956), 1.

²⁷⁵ Norval Wardle, “Gives Warning on Silo Gas Danger,” *Des Moines Register*, 16 March 1966, 1.

“reddish color” which signaled nitrogen dioxide’s presence. In addition, farmers were instructed to run their blowers, which provided clean air into the silo. Gerald W. Isaacs advised that the blower continue to be run while one man worked inside and another held a rope attached to the person inside the silo. Farm safety experts also suggested that farmers should avoid entering an “air-tight” silo after it had been filled and to never enter if they detected a suspicious odor. Isaacs also stressed that farmers might need to acquire professional assistance. He suggested that farmers call upon silo professionals particularly shortly after the filling of the silo or if the contents were almost to the top the building.²⁷⁶

However, if farmers decided to do such work themselves, they were initially advised to procure breathing protection. In 1956, Wardle elaborated on the importance of such breathing devices, stating that if “you have to go into silo without making sure of the oxygen supply or presence of poisonous nitrogen dioxide, it is a good idea to wear an oxygen mask.” He suggested that farmers might get such devices from their local county extension agent or even use scuba equipment.²⁷⁷ In 1960, Gerald W. Isaacs provided more specific advice emphasizing that farmers should purchase breathing protection equipment from “industrial equipment suppliers.” Isaacs warned farmers not to use military gas masks since they were unsuitable for agricultural use.²⁷⁸ In the mid-1970s, safety advocates continued to stress the importance of proper respiratory protection. Bilderback stated, “A self-contained breathing apparatus is the only device that will protect you from these gases, a simple particle respirator is not.”²⁷⁹ Farmers also were

²⁷⁶ Isaacs, “Your Silo—a Potential Killer, 92.

²⁷⁷ Wardle, “Gives Warning on Silo Gas Danger,” 1

²⁷⁸ Isaacs, “Your Silo—a Potential Killer, 92

warned to wear such equipment if their crops had been chemically treated since they could be heavily exposed while depositing their harvest in the silo.²⁸⁰

Despite their abundant advice, farm safety specialists were still trying to fully understand the silo gas problem. In 1961, C.K. Otis and J.H. Pomeroy, agricultural engineers and authorities on the proper construction of silos, admitted that, “Silage does not act like a liquid or like granular particles. It is a unique material and its properties, some of which are unknown, depend on many factors.”²⁸¹ In 1967, Norval Wardle composed a letter to Beverly P. Miracle, a General Electric executive, in an attempt to acquire more research regarding silo hazards. Wardle listed a variety of gaps regarding the agricultural community’s understanding of the silo conditions that governed the amount of carbon dioxide present. Such areas included the need for a deeper understanding of the effect of temperature and the influence of fertilizer application. Wardle’s letter reveals that as with many farm hazards, farmers were being faced with dangers that the experts had yet to thoroughly understand.²⁸²

Farmers could also encounter hazardous gas as a result of new methods of storing and disposing of animal waste. In 1969, W.J. Fletcher, an NSC writer, revealed that farmers had done away with pitchforks and wagons to move manure. Such drudgery had been reduced with the aid of tractor-mounted manure loaders, automated cleaners, and

²⁷⁹ Bilderback, *Killer Gas Inside*, 6.

²⁸⁰ “Nine Rules for Safety When Filling a Silo,” *Hoard’s Dairyman* (Summer, 1965): 111; the advice offered by safety leaders changed little throughout the period, principally involving proper ventilation procedures, staying out of the silo during the fermentation process, and leaving the silo immediately if high levels of gas are detected.

²⁸¹ C.K. Otis and J.H. Pomroy, “Tower Silo Design,” *Agricultural Engineering*, (July 1961): 1.

²⁸² Norval J. Wardle to Beverly P. Miracle, 28 March 1967, Special Collections, Iowa State University Library, Iowa State University, Ames.

other equipment that mechanized fecal processing. He also pointed to new storage techniques that had arisen as a result of greater population densities, labor shortages, and mechanical improvements. He also commented that farmers were procuring underground tanks to store animal wastes. Fletcher stated that storage advancements such as “slotted floors or scraping directly into submerged tanks has cut labor drastically, but the new methods have also generated new hazards.”²⁸³ These new threats included the presence of dangerous gases such as ammonia, carbon dioxide, methane, and hydrogen sulfide, which could all build up from high waste concentrations. In 1981, James A. Merkel, an authority on livestock waste management, succinctly summarized the waste disposal situation that had emerged since the Second World War. He indicated the ever-growing numbers of livestock along with other “factors taken together, resulted in large concentrations of animals on small land areas which in turn created large quantities of animal wastes.”²⁸⁴

Such gases and the tanks themselves presented a variety of health risks including suffocation, explosion, and injuries associated from falling into the tank. In the late 1970s, Dave Williams, an Iowa State Extension official, indicated that a few of the state’s farmers fell victim to noxious gases while they attempted to wash livestock stalls or drain waste tanks. He also emphasized that “[t]his problem isn’t confined to Iowa—individuals from many other agricultural states have also fallen victim to manure gases.”²⁸⁵

Agricultural writers warned that farmers should always work on tanks in pairs, observe

²⁸³ W.J. Fletcher, “Work Safely Around Manure Pits,” *Farm Safety Review*, July/August 1969, 3.

²⁸⁴ James A. Merkel, *Managing Livestock Waste* (Westport, Connecticut: A.V.I. Publishing, 1981), 8; for additional insights regarding the increasing numbers of animals involved in livestock operations as well as the public’s growing concern regarding the problem, see, Merkel, *Managing Livestock Waste*, 3-17.

²⁸⁵ “Manure Gases Can Be Lethal,” *Agri-Safety News*, Fall 1978, 4.

proper aeration procedures, and use safety equipment. Such gear might include gas-testing equipment, approved breathing devices, and rope to safely lower anyone working within the tank. W.J. Fletcher also suggested that farmers get the appropriate professional assistance in implementing their waste management systems, including their smallest details. He stated that they should “[g]et the help of an engineer in designing a pit or tank cover so that it will strong enough to support equipment that will be driven over the top” since failure of the cover could result in a serious accident.

The mechanical dangers related to the dramatic technological changes that occurred during the mid-twentieth century reveal that the tremendous benefits brought about by such machines was not without a cost in human suffering. Although agricultural historians have discussed the social and environmental consequences of these changes, few have addressed the toll exacted upon the bodies of the agricultural labor force. Diverse technologies such as tractors, wagons, elevators and a host of other devices that emerged during the period presented very real dangers to their operators. Such hazards were amplified by many factors including the farm family’s diverse working environment and relative independence, as well as the dizzying rate of change. The historical evidence also suggests farmers also placed a greater priority on getting their work done promptly than on working safely. The lack of safety features such as adequate guarding and tractor roll bars, for example, appeared to have also amplified the dangers. Thus, the miracle of increasing levels of agricultural productivity owed much to mechanical improvements. Farmers’ mishaps with these machines also resulted in a harvest of human misery, which has largely been ignored by both the urban public and historians.

CHAPTER FIVE

The Chemical Revolution and Safety: Fertilizers, Pesticides, Livestock Treatments, and Herbicides

Farmers were forced to adapt to numerous changes in machinery, as well as to an ever-expanding repertoire of chemicals. Following the Second World War, farmers used pesticides such as DDT, new forms of fertilizers including anhydrous ammonia, and new herbicides, the most notable one being 2, 4-D. Agricultural chemical researchers believed that DDT represented the universal remedy in the ancient battle between humans and insects since it killed an impressively large group of pests. Anhydrous ammonia and other fertilizer innovations became major tools in the skyrocketing increases in crop yields.²⁸⁶ Farmers also enjoyed the weed-killing benefits of 2, 4-D, which essentially caused weeds “to grow themselves to death.” Chemicals augmented the effects of agricultural machinery in that both improved agricultural efficiency and productivity.

Unfortunately, farm chemicals also shared with machines the potential to harm a farm family’s well being if used incorrectly. The combination of factors such as the rapid dissemination of chemicals, farmers’ lack of knowledge, and the unsupervised, isolated nature of rural life could prove disastrous. Additionally, federal and state regulations governing the registration and use of agricultural chemicals were rather lenient throughout the mid-twentieth century. An individual’s uniformed or improper use of chemicals could result in serious consequences, including the injury of themselves or family members, hurting neighbors, or even poisoning the nation’s food supply. Despite the reality that people could be injured with chemicals in a variety of situations, the main

²⁸⁶ David B. Danbom, *Born in the Country: A History of Rural America* (Baltimore: Johns Hopkins University Press, 1995), 237.

poisoning avenues included breathing in the substances, exposure through the skin, and swallowing the chemicals.²⁸⁷ As with other safety issues, safety advocates believed that farmers required education regarding the potential impact of their chemical use on themselves, their neighbors, and their environment.

The latter two points are demonstrated by the fact that chemicals could also pollute water sources or harm the crops of others. In 1963, Arthur A. Muka, a New York state extension entomologist commented on the latter problem. He stated, “Constant attention is being paid to the unique problems created when suburban housing developments build to the edges of farm fields.” He also emphasized that in such cases appropriate types of chemicals and application methods needed to be employed. Such instances not only threatened the human population, and potentially could harm useful organisms and water supplies.²⁸⁸ In 1966, a USDA writer commented on the need to spray during times that would diminish a chemicals’ effect on bees and other helpful insects.²⁸⁹ Farmers were also warned about the dangers of poisoning well water while mixing chemicals. In 1963, Iowa State Extension writers warned farmers that if chemicals were inadvertently released into a well it might make the water source completely unusable even if farmers employed decontamination techniques.

²⁸⁷ N.B. Akesson, J.B. Bailey, W.F. Serat, and W.E. Yates, “Health Hazards to Workers From Application of Pesticides” (paper presented at the Annual Meeting of Agricultural Engineers, Stillwater, Oklahoma, 23-26 June 1974), 1; for a detailed discussion regarding the largely ineffective and lax regulatory structure following World War II, see, Pete Daniel, *Toxic Drift: Pesticides and Health in the Post-World War II South* (Baton Rouge: Louisiana State University Press, 2005), 1-209.

²⁸⁸ Arthur A. Muka, “Improving Public Understanding of Pesticides,” *Extension Service Review* 34, no. 7 (July 1963): 123

²⁸⁹ U.S. Department of Agriculture, *Use Chemicals Safely in the Production of Beef Cattle, Swine, and Sheep*, (Washington, D.C., June 1966), 4.

The post-war chemical revolution was much more expansive in scope than the introduction of the significant triad of DDT, 2, 4-D, and anhydrous ammonia. In 1946, a *Farm Safety Review* writer indicated that farmers had earlier possessed relatively few chemical alternatives. However, he stated that “[t]he picture is changing. In addition to the insecticides and fungicides, there are hormone sprays, weed killers, larvacides, cleanup ground sprays, seed treatment materials, soil disinfectant, livestock sprays, dusts, and defoliant.”²⁹⁰ In 1963, an official for the U.S Department of Health, Education, and Welfare indicated that pre-war era farmers could only chemically treat a handful of insects. However, the author also indicated that chemicals were now being utilized to kill insects, suppress weed growth, treat plant diseases, and even assist in coaxing seedlings from the ground.²⁹¹ Agricultural chemical companies also employed clever advertising campaigns enticing farmers to use their products more intensively. The nation’s extension agents and other government officials also encouraged them to increase their use of such substances as the preferred method of controlling insects and weeds.²⁹²

The growth of livestock pest treatments illustrated the expanding uses of agricultural compounds as well as the risks associated with them. Farmers had always struggled with pests that annoyed beef cattle, dairy cows, and other farm animals. Horn flies were a particularly significant nuisance to cattle since they continually bit them and drained their blood. A USDA writer also indicated that struggling against horn flies interfered with beef cattle’s weight gain and milk production in dairy cows. Dairyman

²⁹⁰ “Spray Safe,” *Farm Safety Review*, March/April 1946, 5.

²⁹¹ U.S. Department of Health, Education, and Welfare, *Facts for Consumers: Pesticide Residues* (Washington, D.C., October 1963), 1.

²⁹² Pete Daniel, *Pesticides and Health In The Post World War II South*, (Baton Rouge: Louisiana State University Press, 2005), 7.

also needed kill these flying pests since they contributed to unsanitary conditions. The cattle grub was also a threat since it damaged the animal's hide, inhibited weight increase, and forced packers to remove the pock marked portions of a carcass. An Iowa State University official revealed that purchasers representing grocery stores rejected meat which displayed grub damage. Harold J. Stockdale indicated that little was known regarding how much these pests lessened milk production in dairy cows, but that they should be eliminated in those operations as well.²⁹³

Farmers adopted a growing array of chemical tools to control these invasive pests. Agricultural writers applauded the expanding chemical options to address the horn fly problem. In 1955, an author of a USDA horn fly pamphlet specified that farmers could chose from “DDT, methoxychlor, TDE or toxaphene” to combat the horn flies.²⁹⁴ The writer indicated that horn fly treatments included sprays, dusts, dips, as well as “insecticide-treated rubbing” devices. The latter technique consisted of employing either a pole covered with a chemically treated cloth or using two poles connected by a wire covered in treated fabric.²⁹⁵ In the mid-1960s, Harold J. Stockdale, an Iowa State Extension Entomologist, identified a total of nine chemicals and seven application methods that could be used to control a variety of fly species. Stockdale also indicated that “electrical misters or foggers” represented yet another treatment option.²⁹⁶ Another Iowa Extension tract revealed the emergence of “dust bags” as an additional alternative.

²⁹³ U.S. Department of Agriculture, *Horn Flies on Cattle...How to Control Them* (Washington D.C., July 1955), 2; Harold Stockdale, *Dairy Cattle Insects and their Control* (Ames, Iowa State University: Cooperative Extension Service, 1966), 1; Iowa State University, Cooperative Extension Service, *Pest Control* (Ames, Iowa, June 1965), 2,1; Stockdale, *Dairy Cattle Insects and their Control*, 3.

²⁹⁴ U.S. Department of Agriculture, *Horn Flies on Cattle...How to Control Them*, 4.

²⁹⁵ *Ibid.*, 5.

²⁹⁶ Harold Stockdale, *Dairy Cattle Insects and their Control*, 1-7.

The writer indicated that such sacks could be situated on livestock building entrances and were especially effective in treating horn flies.²⁹⁷ The methods to chemically treat cattle grubs also expanded. A USDA writer stated that until the late 1950s, farmers could only employ rotenone during the wintertime as a spray to control the pest. However, by the mid-1960s, farmers had a variety of other application methods including “pour-ons and feed additives.”²⁹⁸ Although new treatments added flexibility and reduced the effects of such pests, they also greatly complicated the farmers’ working environment.

The use of livestock pest treatments, like the utilization of labor saving machinery, warranted a cautionary approach, particularly for preventing accidental livestock deaths. In the late 1960s, William B. Buck, a professor of veterinary medicine employed at Iowa State University, documented the destructive consequences of careless use. While treating 600 pigs with a mixture of Toxaphene and Malathion, one Iowa farmer accidentally tainted some the animals’ water and feed. Dr. Buck indicated soon after spraying, four hogs died, and others were found to have suffered from fatal chemical poisoning. He also recounted another incident in which some feedlot cows opened a back-rubber canister filled with a blend of “fuel oil” and “taxaphene.” The cows consumed the mixture, resulting in the death of eighteen cattle while another five experienced serious illness. He stated that an examination of the animals revealed significant amounts of the material in both the rumen and the lungs.²⁹⁹ Such situations

²⁹⁷ *Beef Cattle Insects and their Control* (Ames, Iowa State University: Cooperative Extension, 1972), 6.

²⁹⁸ Iowa State Cooperative Extension Service, *Pest Control*, 2.

²⁹⁹ William B. Buck, Unpublished report regarding livestock poisoning episodes in Iowa during 1969, Special Collections, Iowa State University, Ames, 1-2.

caused extension specialists to continually warn farmers regarding the importance of keeping feed and water covered while applying such chemicals.³⁰⁰

However, the dangers associated with livestock pest treatments extended beyond the farmstead. In 1955, a USDA official warned that beef cattle could be sprayed with DDT, TDE, or Taxophene, but not dairy cattle. The author stated, “Do not use DDT, TDE, or Taxophene on dairy cows that are being milked, if the milk is to be consumed by human beings.” This advice was crucial since such substances could contaminate milk supplies and threaten consumer health. Instead, USDA writers suggested that one should “use a 0.5 percent methoxychlor spray, an activated pyrethrum spray, or a pyrethrum-oil spray.”³⁰¹ In 1966, the author of a USDA pamphlet provided cautionary advice in regards to the danger of meat contamination. The writer indicated that chemicals could potentially collect in animal flesh, making it unfit and illegal for human consumption. The government employee indicated that such tainting of meat could be avoided by applying the chemical within the advised period of time prior to the cow’s processing.³⁰²

The growing number of chemicals used in cultivating crops posed an even larger number of health risks. If farmers incorrectly used herbicides, they could inadvertently harm their crop. Researchers also eventually discovered that pesticides such as DDT could accumulate in living organisms and consequently pose hazards to both animals and people.³⁰³ When farmers accidentally released anhydrous ammonia, it could result in

³⁰⁰ For advice regarding the dangers of inadvertently poisoning livestock, see, Department of Agriculture, *Horn Flies on Cattle... How to Control Them*, 4-6; Harold Stockdale, *Dairy Cattle Insects and their Control*, 4-6.

³⁰¹ U.S. Department of Agriculture, *Horn Flies on Cattle... How to Control Them*, 4-6.

³⁰² U.S. Department of Agriculture, *Use Chemicals Safely in the production of Beef Cattle Swine and Sheep*, 3.

³⁰³ Danbom, *Born in the Country*, 237.

serious injury, resulting in blindness or even death. Farmers who did not wear proper protective equipment and did not label dangerous compounds sometimes suffered serious illness or even inadvertently contributed to the poisoning of family members. In 1951, DDT caused significant health problems as evidenced by 338 people who were poisoned by this pesticide in that year.³⁰⁴

Although fragmentary statistics reveal that the problem was serious, the numerical record does not provide a complete picture. Researchers repeatedly emphasized the challenge in determining the number of chemical-related farm accidents. In 1962, Mary K. Farinholt, a prominent agricultural chemical expert, stated, “ It is impossible to know how many illnesses and deaths have happened and are occurring in the U.S. and agriculture in particular—because of the use of pesticides. Uniform reliable statistics do not exist. Most states have no system for reporting or recording injuries attributable to pesticides.” However, she also indicated that specialists had arrived at approximations including that 166 Americans were killed in pesticide accidents in 1959 alone. She stressed that non-lethal incidents might be as much as 100 times as common as deadly incidents.³⁰⁵ During the same year, Keith Long, the head toxicologist at the University of Iowa’s Institute of Agricultural Medicine, echoed Farinholt’s statements indicating that most research devoted to the issue was considerably insufficient.³⁰⁶

³⁰⁴ “Spray Safe,” 4; Frank Princi, “Toxicology and Hazard Record of the New Pesticides,” 7, no. 1 (January 1952): 47.

³⁰⁵ Mary K. Farinholt, *The New Masked Man in Agriculture* (Cleveland, Ohio: National Consumers Committee for Research and Education, Inc), 3.

³⁰⁶ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1962), 4; Pete Daniels also stressed the poor statistical understanding of the issue, see, Daniels, *Toxic Drift: Pesticides and Health in The Post-World War II South*, 71-72.

The challenge of determining the problem's scope appears to have persisted. In 1972, William Fletcher, an NSC Agricultural Safety Engineer, stated that, "[t]he information available to us as well as to the rest of the industry is woefully inadequate. We have little information that is specific in the area of mortality from agricultural pesticides and is even less on the morbidity that results from worker contact while preparing, mixing, and applying agricultural or household pesticides." He stated that part of the problem lay in the fact that most researchers investigate at the state or local level, which is unsuccessful in providing a national statistical understanding. He stressed that only California health officials had kept accurate records regarding the chemical accident problem. He indicated that between 1951 and 1969 there had been a total of 163 deaths as a result of agricultural chemical accidents.³⁰⁷ Nevertheless, the annual toll of illness caused by agricultural chemicals was much higher in the state. In 1971 alone, there were "1284 reported cases" of illness related to such substances.³⁰⁸ As late as 1976, the author of an NSC rural accident prevention bulletin was still decrying the availability of adequate data and stressing the sparse nature of useful literature on the subject.³⁰⁹

Despite the paucity of reliable statistics, the agricultural chemical safety problem continued to mushroom. Such dangers included the methods farmers used to enrich their soil. Although cultivators of the soil had sought ways to nurture their soil for hundreds of years, during the mid-twentieth century farmers participated in unprecedented changes in

³⁰⁷ William J. Fletcher, "Pesticide Worker Accidents," (paper presented at the National Conference on Protective Clothing and Safety Equipment for Pesticide Workers, Center for Disease Control, Atlanta Georgia, 1-2 May 1972), 1,4.

³⁰⁸ N.B. Akesson, J.B. Bailey, W.F. Serat, and W.E. Yates, "Health Hazards to Workers from Application of Pesticides," 1.

³⁰⁹ National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides* (Chicago: National Safety Council, 1976), 1.

fertilizer practices. The recognition of anhydrous ammonia as an effective fertilizer represented one of the significant changes. Historian David Danbom emphasized that farmers readily incorporated the chemical into their agricultural practices since it greatly lessened the need to abide by traditional soil maintenance practices as crop rotation and use of livestock manure as a fertilizer. By the early 1950s, agricultural writers were celebrating anhydrous ammonia as the solution in meeting farmers' nitrogen needs. In 1953, an anonymous contributor to *Agricultural Chemicals* stated that, "[t]he lack of agricultural nitrogen was accentuated during the war years, due to tremendous government demand for nitrates for munitions. Recent developments making use of anhydrous ammonia have now fortunately provided for a huge new supply of nitrogen for agricultural use." He also added that the substance possessed as much as double the amount of nitrogen per volume as previous nitrogen sources. Farmers throughout the country had also identified it as an excellent fertilizer for a variety of crops including "corn, small grains, potatoes, tomatoes etc."³¹⁰

Indeed, the rate and scale with which farmers adopted anhydrous ammonia reflects the faith they placed in this economical source of fertilizer. In 1953, F.H. Leavitt, an engineer for Shell Chemical Corporation, specified that in California alone the fertilizer aided in the cultivation of over 200 kinds of plants. He believed that the construction of "a five story high sphere at Kernan, California," which could "hold enough NH_2 for 65,000 acres of agricultural land," symbolized how enthusiastically the state's growers had adopted it.³¹¹ Midwestern farmers soon followed their Western counterparts by using anhydrous ammonia in copious amounts. In 1955, Iowa farmers

³¹⁰ "New Business Develops... Anhydrous Ammonia Application," 46, 48.

³¹¹ F.H. Leavitt, "Use and Marketing of Agricultural Ammonia," 35, 37.

deposited 18,000 tons of the fertilizer on their fields rising to 348, 000 tons just twelve years later.³¹² Farmers' pocketbooks as well as faith also contributed to their adoption of anhydrous ammonia since costs continued to decline. Bruce Gardner stated that, "[r]apid expansion in the use of inorganic nitrogen fertilizer in the 1950s and 1960s was not so much a matter of a new, improved input as a large reduction in the cost of manufacturing an old one. The development of economical processes for making NH_4 (ammonia) from natural gas caused the price of anhydrous ammonia fertilizer to fall by about one-half in nominal terms between 1960 and 1970."³¹³

Improvements in delivery and application technologies also contributed to the growing use of the fertilizer. Prior to the Second World War, farmers on the West Coast were already using substantial amounts of anhydrous ammonia by injecting it directly into their water before it entered their irrigated fields. In the late 1940s, researchers at Mississippi State College developed application systems which could be used to inject anhydrous ammonia in the soil. Factories produced and stored Anhydrous in large tanks under high pressure. Semi-trucks or rail cars transported the fertilizer from its points of origin to distributors where farmers purchased it. Fertilizer companies then delivered the fertilizer in nurse tanks that held the ammonia; tubes delivered it to applicators, which possessed "sabre-shaped blades." Tractors pulled this equipment which injected the material "at a depth of four to six inches" into the earth. These innovations increased the practicality of using this particular type of liquid fertilizer and assisted in its ever-increasing use by American farmers.³¹⁴

³¹² Scott R. Helmers, W.H. McConnell, L.W. Knapp, "Ammonia Mishaps in Agriculture," *Agricultural Chemicals* 52, no. 3 (March 1971): 118.

³¹³ Gardner, *American Agriculture in the Twentieth Century: How it Flourished and What it Cost*, 23.

Despite both cost reductions and improvements in delivery systems, farmers' escalating use of the chemical was not without its risks. The fertilizer's characteristics, which included its high storage pressure, sub-zero temperature, and toxicity, made it a potentially dangerous material. In 1972, a writer for an OSHA brochure stressed that mishaps often occurred during transportation of the fertilizer between two storage devices. The author stressed that a user engaged in transferring the substance from one tank to another had to release and shut an onerous number of valves in the correct order and failure to do so correctly could result in serious injury to self and co-workers. Moving a nurse tank without first disengaging the hoses or attempting to fix "couplers," which connected the tubes, were two additional ways that could also result in a leaks. Such accidental emissions could have disastrous consequences since the fertilizer could cause severe burns, blindness, or even asphyxiation if inhaled.³¹⁵

The many accident stories which circulated throughout the agricultural community illustrate potential hazards. Some of these incidents such as an accident in Crete, Nebraska in 1969 were spectacular in nature. This episode involved the accidental release of 33,000 gallons of anhydrous ammonia into the atmosphere from a wrecked railroad car. The discharge of this tremendous volume of ammonia resulted in 6 deaths and over 30 injuries. Such events were rare, since most mishaps were much smaller in scale, but nonetheless destructive. In 1971, James Hall of Keswick, Iowa contacted the fertilizer as the result of a hose leak which sprayed the ammonia across his face and into his eyes. Arlo Jacobsen, the *Des Moines Register's* Agricultural Editor recounted the

³¹⁴ F.H. Leavitt, "Use and Marketing of Agricultural Ammonia," *Agricultural Chemicals*, 8, no. 6 (June 1953): 36; "New Business Develops...Anhydrous Ammonia Application," *Agricultural Chemicals*, 8, no. 2 (February 1953): 46.

³¹⁵ U.S. Department of Labor, Occupational Safety and Health Administration, U.S. Department of Agriculture Committee on Safety, *Safe Use of Anhydrous Ammonia*, (1972), 2, 4.

young farmer's harrowing experience stating, "[w]ith no emergency water tank to flush his eyes, Hall stumbled half a mile to a neighbor's place for water." Although he recovered his eyesight, the incident left a powerful impression, convincing him never to handle the fertilizer again. Jacobsen stated, "He doesn't use anhydrous anymore and doesn't plan to. The memory of blindness is too vivid. He remembers, too, the ammonia burns on his lips and face and loss then of his senses of taste and smell."³¹⁶

In the early 1970s, there were a number of studies that provided a useful synopsis of the problem, especially one investigation conducted by a group of Indiana researchers. The researchers included two Purdue University agricultural engineers, J.B. Liljedahl and F.R. Willsey, who were assisted by Robert C. Rund, an employee of the office of Indiana State Chemist. They examined ammonia accidents occurring in their state in 1971 and 1972. Although many incidents were not serious, a substantial number were significant since the study found that of those who responded, "thirty-three percent classified their injuries as major." They confirmed that failures of hoses, valves, couplers and other transmission devices were responsible for many leaks resulting in "81 percent of the accidents." The researchers also stated that "[a]s expected, all of the accidents occurred between March and July."³¹⁷ The study revealed that a farmer's desire to stay on schedule represented a factor in ammonia injuries, which should not come at a surprise since this point was crucial in understanding many types of farm accidents. In 1974, William J. Fletcher, National Safety Council Agricultural Safety Engineer, also reconfirmed this

³¹⁶ Scott Helmers, W.H. McConnell, L.W. Knapp, "Ammonia Mishaps in Agriculture," 118-119; Arlo Jacobson, "Operation Peach Warns Farmers of Ammonia Dangers," *Des Moines Register*, 9 March 1972, 1, 5-F.

³¹⁷ J.B. Liljedahl, Robert C. Rund, and F.R. Wilsey, "A Survey of Anhydrous Ammonia Accidents in Indiana," (a report prepared for the National Safety Council regarding Anhydrous Ammonia victims in Indiana in 1971 and 1972), 1, Normal Wardle Collection, Iowa State University Library, Ames.

factor in fertilizer accidents in another investigation of Indiana accidents. He stressed that agricultural workers were often so preoccupied to finish the job that they often tolerated potentially hazardous conditions and practices.³¹⁸

Indiana investigations also provided additional insights regarding ammonia accidents, including the significant point that most incidents occurred on the farm and not at manufacturing facilities. Such findings once again revealed that farmers were largely responsible for their own safety in handling a potentially highly dangerous substance. Researchers revealed that a majority of the accidents occurred on farms and not on the premises of the fertilizer distributor. Fletcher elaborated upon the meaning of such findings stating that, “[t]he safety standards used by industry in the manufacture and distribution of ammonia have served well to provide safe facilities. However, these standards fall short of providing an equal degree of safety for those persons handling anhydrous ammonia after it leaves the dealer’s plant.”³¹⁹ Researchers also revealed that farmers were heavily involved in bringing the ammonia to their own farms since the investigators found that “55 percent said they had filled the nurse tank at the dealer’s place by themselves.”³²⁰

Despite the fact that farmers were involved in more mishaps than employees at ammonia factories, they nevertheless did not believe they were poorly prepared to handle fertilizers. Instead, they thought that they were sufficiently educated regarding operating

³¹⁸ William J. Fletcher, “Analysis of Anhydrous Ammonia Accidents to Determine Corrective Measures,” (a report completed by William J. Fletcher in May, 1974 which was supported by an NSC grant), 13, Norval Wardle Collection, Iowa State University Library, Ames.

³¹⁹ J.B. Liljedahl, Robert C. Rund, and F.R. Wilsey, “A Survey of Anhydrous Ammonia Accidents in Indiana,” 3; Fletcher, “Analysis of Anhydrous Ammonia Accidents to Determine Corrective Measures,” 12.

³²⁰ *Ibid.*, 13.

procedures, that they had been informed of potential hazards, and that they had attained sufficient experience with application equipment. Despite such perceived knowledge and know-how, the study also revealed how human error resulted in ammonia-related injuries and fatalities. Such carelessness included improper use of the equipment, neglecting to wear safety apparatus, and ignoring standard application procedures. The investigation showed that in “twenty-seven percent of the hose-end valves on the nurse tank were improperly secured during transport.” The researchers also discovered that although nurse tanks were usually fitted with suggested accident prevent devices, individuals involved in accidents rarely employed the use of eye protective equipment or gloves.³²¹ In addition, “training or failure to follow accepted operating procedures were obvious in 27 out of 64 cases studied.” Farmers were also challenged by the diverse features of anhydrous ammonia equipment, which further added to operational complexities and their occasional modification of equipments sometimes amplified dangers.³²²

Safety activists responded to the problem by providing abundant advice hoping to prevent such tragedies. They advised those who handled the fertilizer to wear safety gear, inspect equipment, use proper operational measures, and understand proper emergency procedures. Goggles and gloves were especially important since the eyes and hands were particularly susceptible to exposure and injury. In 1972, Arlo Jacobsen advised farmers to “always check all hose fittings and connections daily to be sure they are tight and there are no leaks.”³²³ In the same year, the author of an OSHA pamphlet supported Jacobsen’s comments emphasizing that, “worn hoses, loose connections, and other defects can cause

³²¹ J.B. Liljedahl, Robert C. Rund, and F.R. Wilsey, “A Survey of Anhydrous Ammonia Accidents in Indiana,” 1.

³²² Fletcher, “Analysis of Anhydrous Ammonia Accidents to Determine Corrective Measures,” 8-10.

³²³ Jacobson, “Operation Peach Warns Farmers of Ammonia Dangers,” 1.

accidents.”³²⁴ Agricultural writers also stressed that everyone on the farmstead should be knowledgeable in case of an ammonia emergency. In 1974, NSC researchers commented that they had discovered that although the farm owner was usually conversant in emergency procedures, farm laborers, or children often did not possess such information. Professionals advised farmers to seek counsel in unusual circumstances such as the need for make repairs on the nurse tank.³²⁵

The advice offered in case of emergency remained relatively consistent throughout the era; safety writers repeatedly emphasized copious and prolonged use of water as a rinsing agent. The effectiveness of this treatment was related to the fertilizer’s highly water solubility. In 1956, a *Farm Safety Review* writer stated, “In case of an ammonia burn or injury, your best friend is water used liberally.”³²⁶ In 1972, Jacobsen also highlighted the importance having water close at hand due to the importance of flushing the affected area with water. He mentioned that everyone involved in applying ammonia should have a small canister of water since flushing with water was crucial in the first moments after exposure. In 1972, an OSHA official also emphasized that burn creams should not be used for an entire day on an ammonia injury since it caused more severe injury.³²⁷

³²⁴ U.S. Department of Labor, Occupational Safety and Health Administration, U.S. Department of Agriculture Committee on Safety, *Safe Use of Anhydrous Ammonia*, 2.

³²⁵ Fletcher, “Analysis of Anhydrous Ammonia Accidents to Determine Corrective Measures,” 11; “First Aid Rules: In Case of Ammonia Burns or injury,” *Farm Safety Review*, March 1956, 118. The advice to seek professional assistance appears to have included a growing number of issues on the farm reflecting the increasing technical demands placed on the era’s farmers.

³²⁶ Scott Helmers, W.H. McConnell, and L.W. Knapp, “Ammonia Mishaps in Agriculture,” 118.

³²⁷ Jacobson, “Operation Peach Warns Farmers of Ammonia Dangers,” 5; U.S. Department of Labor, Occupational Safety and Health Administration, U.S. Department of Agriculture Committee on Safety, *Safe Use of Anhydrous Ammonia*, 5.

Farmer's utilization of new chemical weed control methods also presented unpleasant complications. Herbicide options were becoming increasingly abundant and required detailed knowledge on their potential dangers to humans, animals, and the larger environment. The Halogenated Organic Acid Compounds represented many of the era's more common herbicides such as 2, 4-D. The list of other major categories of herbicides and fungicides included the Dinitrophenols, Carbamates, and the Organic Mercury Compounds. These various classes of agricultural chemicals and the dizzying number of products included within them each possessed their own properties and their own precautions for proper use.³²⁸

Plant specialists reminded farmers that they had to be careful regarding herbicide residues, especially if the same application equipment was used to dispense different types of chemicals. An Iowa State Extension writer reminded farmers that sprayers that had been used to apply hormone-type weed killers needed to be cleansed as quickly as possible if it was going to be employed for other uses. Experts also told farmers to thoroughly rinse all containers, tubes, and other chemical application components promptly after each use. They warned against the practice of dumping contaminated water in locations near livestock drinking water or crops. Agronomists also reminded operators that even after such intensive cleanings, other chemicals, which counteracted herbicides might be used prior to using the equipment on soybeans, alfalfa, or clover.³²⁹

However, a series of accidents involving sodium chlorate in the late 1940s served as vivid reminders of the dangers associated with some herbicides could be even more

³²⁸ Mary K. Farinholt, *The New Masked Man in Agriculture*, 8-12.

³²⁹ Iowa State University, Cooperative Extension Service, *Suggestions for Safety Spraying: Herbicides, Insecticides, and Fungicides*, 2-3.

serious. In 1944, James Elsberg, prominent safety engineer and former employee in the insurance sector, stressed that farmers' use of sodium chlorate as herbicide had resulted in a number of serious and deadly accidents. He indicated that farmers who failed to promptly rinse the substance from their clothing risked harm because of sodium chlorate combustibility. In a *Farm Safety Review* article aptly entitled, "Human Torches," he provided vivid examples of the disastrous consequences of such carelessness. He indicated that, "[t]he slightest spark can cause this highly combustible substance to ignite into flames. There was a young man who had been spraying weeds and failed to change his clothes after work. That evening he was walking along a sidewalk in town and a nail in his heel struck a spark against the cement, igniting his pants. He was very severely burned." Elsberg suggested that individuals who used the substance should be educated regarding its properties; users should never smoke near it and water should be nearby during its application.³³⁰

Farmers adopted new weapons in their struggle against insect pests that consumed their crops. Although farmers had used such pesticides as arsenic and cyanide for decades, chemical weapons in the struggle against insects expanded greatly following World War II. In 1952, G.L. Seth, an official for the Mine Safety Appliance Company, commented on the ongoing chemical revolution, stressing that farmers previously had only used a few pesticides applied mostly with simple hand pumps. However, he indicated that, "all of a sudden this picture changed" after the war. In 1959, J.M. Magner, an Entomologist employed by Monsanto Corporation, stated that although pesticides had been available since the nineteenth century the emergence of "organic pesticides" during the 1940s greatly multiplied such weaponry. In 1961, Mary K. Farinholt, an agricultural

³³⁰ James A. Ellsberg, "Human Torches," *Farm Safety Review*, May/June 1944, 10, 15.

chemical specialist, provided a numerical understanding of this transformation. She stated that in that year alone there were “approximately 94,000 brand-registered pesticides on the market” and that American growers had purchased around “500 million pounds of pesticides worth 300 million dollars.”³³¹

Many agricultural writers believed pesticides were indispensable in eliminating pests and meeting the food needs of an expanding global population. They also stressed that the tremendous financial resources devoted to modern agriculture made acceptance of reduced yields by pests unacceptable. In 1965, a *Farm Safety Review* writer elaborated on the problem’s scope stressing that in the United States there were “10,000 kinds of insects, 600 weed species, and 1,500 plant diseases,” which could threaten crops and livestock.³³² In 1967, a USDA employee emphasized the likelihood of farmers’ long-term chemical reliance. He believed that there was no effective non-chemical remedy to the pests, which, despite the aid of such substances, still consumed almost “a third of our potential production.” J.M. Magner also justified growing chemical use to meet the challenges of an exploding world population and to compensate for the continued loss of farmland from urban expansion. He also indicated that the “intelligent use of agricultural chemicals alone has contributed to increased yields of 20 percent or more for many crops.”³³³ Perhaps, the strongest evidence regarding the widespread acceptance of

³³¹ Mary K. Farinholt, *The New Masked Man in Agriculture*, 7; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1952), 25; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1959), 13; Mary K. Farinholt, *The New Masked Man in Agriculture*, 1.

³³² *Ibid.*, 1; “Here’s Why You Need a Pesticide Safety Program,” *Farm Safety Review*, November/December 1965, 3.

³³³ United States Department of Agriculture, Agricultural Research Service, *Safe Use of Agricultural and Household Pesticides* (Washington, D.C, 1967), i; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1959), 13.

chemical control methods laid in the fact that in 1962 only two percent of the nation's entomologists were researching alternative insect control methods.³³⁴

Thus, agricultural leaders and most farmers accepted agricultural chemicals as they did new mechanical improvements as necessary tools to increase productivity, increase efficiency, and reduce the drudgery associated with agricultural work. Unfortunately, chemical and machine-related dangers were also similar in a number of respects. Farmers carried much more singular responsibility for safety for themselves, their families, and even their neighbors than those who worked with chemicals in a factory setting. In addition, since the farm represented both a home and work setting, young children were exposed to chemical hazards.

The reality that farmers carried much of the burden in maintaining chemical safety on their operations is strongly verified by the historical record. A *Farm Safety Review* writer expressed that although all chemicals had to pass a governmental approval process, after the purchase of the chemical "it now becomes the moral and legal responsibility of the user himself to exercise care in handling, applying, and storing pesticides, including proper disposal of the empty containers."³³⁵ In 1955, Harold Heldreth also stressed that the important role the farmer filled in maintaining chemical safety awareness. He stated, "The farmer should fully understand and be able to explain to his workers the dangers involved, protective clothing necessary, antidote, first aid

³³⁴ Mary K. Farinholt, *The New Masked Man in Agriculture*, 31; Historian David Danbom has also commented on this point stating, "The very effectiveness of DDT proved to be a curse. For one thing, it led to a de-emphasis of research on biological pest control, a more environmentally benign method." See David Danbom, *Born in the Country*, 237.

³³⁵ "Here's Why You Need a Pesticide Safety Program," *Farm Safety Review*, November/December 1965, 3; A number of writers including, most recently, Pete Daniel have seriously questioned the view that agricultural chemical manufacturers had to undergo an intensive registration process prior to gaining acceptance by government regulatory agencies, see, Pete Daniel, *Pesticides And Health In The Post World War II South* (Baton Rouge: Louisiana State University Press, 2005), 7.

treatment and proper methods of handling pesticides.” Heldreth also indicated that, “[f]armers should contact a local doctor well in advance of work season to make sure he understands what the proper antidote is for the pesticide.”³³⁶

A brief review of federal and state regulations of agri-chemicals reveals that the consumer benefited the most from agricultural chemical regulatory legislation. This was especially the case prior to the early 1970s. This was the situation since most government regulations, although far from optimal, attempted to ensure the overall quality of the chemical and limiting the amount of chemical residues on food products. Such legislation included the Federal Food and Drug Act, the Federal Cosmetic Act of 1938, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947, and the Food Additives Amendment of 1958. The last piece of legislation included the Delaney Amendment that further increased the stringency of tolerance standards. Although state level legislation eventually required formal training for both professional pesticide applicators and farmers, for most of the period, a user’s willingness to follow the label’s instructions was the only instrument to protect him or her from harm.³³⁷

The Federal Food and Drug and Cosmetic Act of 1938 represented one of the first pieces of legislation enacted to provide the American public with increased protection. The act “established procedures for setting safe limits called ‘tolerances’ on the amounts of pesticide residues permitted on crops.” In 1947, Congress also passed the Federal Insecticide, Fungicide, and Rodenticide Act, which empowered the USDA to determine which chemicals were acceptable for use and shipment across state boundaries. The act

³³⁶ Harold Heldreth, “Read the Label- And Poison Only the Pests,” *Farm Safety Review*, June 1955, 11.

³³⁷ For a more detailed discussion of the history of chemical regulation prior to the 1970s, see, Gino J. Marco, Robert M. Hollingsworth, and Jack R. Plimmer, ed., *Regulation of Agrochemicals: A Driving Force in their Evolution*, (Washington: American Chemical Society, 1991), 1-7.

required that companies which produced pesticides to “register their labels with the USDA.”³³⁸ Companies seeking to achieve the USDA’s product standards were required to demonstrate that their chemical could successfully control the targeted insect and that it was safe when users followed the label’s instructions and excessive residue levels were not present. FDA chemists and USDA officials worked cooperatively in the registration procedures.³³⁹

The Federal government provided the public with additional safeguards in the 1950s. In 1954, the Miller Pesticide Amendment further streamlined the process of setting tolerances, as well as decreasing potential dangers associated with eating chemically treated foods. The Miller Amendment enacted procedures, which essentially required companies to submit a rigorous self-investigation as to how chemical traces would be measured and a detailed assessment of the dangerous residue levels. Following this analysis, FDA researchers analyzed the results of the company’s studies to determine safe amounts of residues. Government researchers accepted this amount of residue only “if all reasonable doubt is resolved in favor of consumer safety.” If these scientists reach such a conclusion then a maximum allowable residue is established for the purposes of inter-state commerce.³⁴⁰ In 1955, Dr. Walter T. Reed stressed that one of the most important effects the Miller Bill had upon agricultural chemical companies was that “a much greater amount of detailed research relative to the use of these compounds be

³³⁸ U.S. Department of Health, Education and Welfare, *Facts for Consumers: Pesticide Residues* (Washington, D.C., 1963), 1-2.

³³⁹ U.S. Department of Agriculture, Agricultural Research Service, *Behind the Pesticide Label* (Washington, D.C., 1964), 2.

³⁴⁰ U.S. Department of Health, Education and Welfare, *Facts for Consumers: Pesticide Residues* (Washington, D.C., 1963), 1, 4, 6.

carried out in order that they may be registered, and a tolerance established for all crops.”³⁴¹

In 1958, consumers received additional protection due to the passage of the Food Additives Amendment. This legislation also included the Delaney Amendment. In 1991, Gutave K. Kohn, an authority on pesticide regulation and a contributor to a regulatory history, stated that the Delaney Amendment “expanded protection by setting zero tolerance levels for any chemical in food in which animal meat tested at any level exhibited carcinogenicity.”³⁴² In 1959, J.M. Magner, an entomologist employed by Monsanto, commented on the registration process. He stated that it often took five years and the need for the chemical in fighting a particular insect must be proven. Government requirements mandated chemical companies to compose product labels for their products. The federal involvement also continued after the chemical’s successful registration. Pesticide Regulation Division Inspectors in cooperation with state administrators bought and tested insecticides, ensuring that the chemicals’ properties aligned with the label’s contents and description. If it is determined the manufacturer is negligent by misrepresenting their product, government officials removed the chemical from distributor shelves and/or initiated legal action.³⁴³

State governments also constructed a regulatory apparatus for the burgeoning chemical industry. Such measures were primarily aimed at improving containers and labeling. In the early 1950s, states passed laws which required registration fees for new

³⁴¹ Walter T. Reed, “Some Effects of the Miller Law,” *Agricultural Chemicals* 10 (September 1955): 38.

³⁴² Gino J. Marco, Robert M. Hollingsworth, and Jack R. Plimmer, ed., *Regulation of Agrochemicals: A Driving Force in their Evolution*, 4.

³⁴³ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1959), 13; U.S. Department of Agriculture, Agricultural Research Service, *Behind the Pesticide Label*, 3-4.

chemicals and standards for containers, as well as labeling standards. In 1953, Leo S. Hitchner, a prominent member of National Agricultural Chemicals Association, indicated that this amounted to “more than 250 bills with potential impact upon the production, distribution, and use of agricultural chemicals.”³⁴⁴ By the early 1960s, laws were becoming more robust. In 1964, the Iowa legislature enacted legislation which regulated both chemical registration and a professional applicator certification process. Registration provisions included that the chemical be USDA approved and that the label contain complete and standardized information. In addition, the law indicated “all commercial pesticide applicators must be licensed by the Iowa Department of Agriculture. This includes all public officials or foremen who apply pesticides on public property or supervise such application.” Certified pesticide applicators were required to pass a test, demonstrate the ability to assume financial responsibility in case of unintended chemical damage, and keep detailed work records.³⁴⁵

In the early 1970s, federal agricultural chemical regulatory law became more stringent as an energetic mix of activists, concerned scientists, and ordinary citizens worked to lobby for legal controls over what they believed to be excessive and reckless use of agricultural chemicals. Rachel Carson became a leading figure in this crusade for stronger governmental regulation of agricultural chemicals. Pete Daniel, a highly regarded agricultural historian, emphasized the immense influence of her work indicating that it shifted public opinion towards greater restrictions and precautions regarding chemical use.³⁴⁶ Thus the publication of her book in 1962 represented a turning point in

³⁴⁴ “New Miller Bill Sounds Good-State Legislatures Consider Pesticide and Fertilizer Bills,” *Agricultural Chemicals* 8 (April 1953): 57, 148; Lea S. Hitchner, “Legislative Control in Entomology,” *Agricultural Chemicals* 9 (January 1954): 48.

³⁴⁵ “The Pesticide Act of Iowa,” *Wallace’s Farmer*, 18 January 1964, 26-27.

the federal government's regulation of farm chemicals. In 1972, congress amended the Federal Insecticide, Fungicide, and Rodenticide Act, providing the EPA with greater regulatory powers. The Federal Environmental Control Act (FEPCA) required that "all pesticides must be federally registered and approved by October 21, 1974." Thus, the EPA was given registration powers over all chemicals, including those substances within state boundaries. The legislation affected 18,000 pesticides, which had been registered exclusively at the state level.³⁴⁷ The EPA mandated that after 1976, all agricultural chemical manufacturers must list both their previously registered chemicals as well as their new products.³⁴⁸

The EPA also established two pesticide categories identified as "restricted and general use." The restricted pesticides class included those that presented the most potential danger and required certification of the user, while the general use included those chemicals that were less hazardous to use. This legislation also differentiated between "commercial applicators," who were monetarily compensated for their work, and "private applicators," who applied chemicals on their property. The Iowa State Extension Service offered certification classes and the Iowa Department of Agriculture conferred pesticide licenses. However, such classes were usually short in length, usually lasting only a few hours. Nevertheless, this certification process signified that farmers were required to receive some training regarding chemical application and represented a major change from the era prior to the early 1970s.³⁴⁹

³⁴⁶ Daniel, *Toxic Drift: Pesticides and Health in The Post-World War II South*, 46, 53, 63, 67.

³⁴⁷ "Time Is Running Out for your Crops," *Agri-Fieldman*, March 1974, 58.

³⁴⁸ National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 2.

³⁴⁹ "You must be certified to apply certain pesticides," *Wallace's Farmer*, 8 January 1983, 30.

Thus, for most of the mid-twentieth century, farmers were given the weighty burden of providing their own chemical safety since few possessed formal training for handling the growing number of farm chemicals. In addition, farmers' experiences with chemicals also differed greatly from that of other settings in which chemicals were used. In 1957, Henry Doyle, an official for the U.S. Public Health Service, stated that unlike manufacturing workplaces, which used chemicals in a more controlled setting possessing safety measures, while on the farm "the methods of application are almost as varied as the materials used. Many of these methods present dangers that would not be tolerated in manufacturing establishments."³⁵⁰ In 1960, J.N. Roney, a University of Arizona Extension Entomologist, supported such comments. He indicated that, "large manufacturing plants spend considerable sums of money to maintain a safety record. The farmer, salesman, and applicator should think along these lines too."³⁵¹

Although Roney's comments were valid in respect to the need for greater safety, they were also unrealistic. Farmers often lacked both the financial resources and expertise possessed by large chemical factory owners. This was particularly true for those who operated smaller family-owned operations. The farmers' rural setting also complicated both preventative and emergency measures. Dr. Clyde Berry, the Associate Director of the University of Iowa's Institute of Agricultural medicine, while speaking at the Society of Agricultural Engineers national conference, suggested that many farmers did not have access to the necessary support services. He stressed that some farmers lived in communities where local businesses did not sell respirators. They might also have little

³⁵⁰ Mary K. Farinholt, *The New Masked Man in Agriculture*, 6.

³⁵¹ J.N. Roney, "Insecticides in the Southwest," July/August 1960, 6.

access to water in their isolated fields and if an accident occurred, long distances delayed emergency medical treatment.³⁵²

Farm chemical dangers were deeply influenced by the familial nature of the agricultural lifestyle, evidenced by the dangers they posed to rural children. This is well-illustrated in the large numbers of youths who died or were injured in chemical mishaps. A number of other studies confirm this conclusion, including an investigation of agricultural chemical related deaths in California. The research revealed that between 1951 and 1969, 93 out of a total of 163 deaths involved children. In 1975, similar evidence surfaced in Missouri as 415 children out of 569 poisoning victims treated at the state's poison control centers were youths five years old or younger.³⁵³ Children were almost always killed or injured by chemicals due to adult carelessness. This was particularly true regarding improper storage practices. In 1976, NSC official Jack Burke wrote, "Often the victims are small children exposed because of improper storage or other user oversights."³⁵⁴ Such was the case regarding one six-year-old child. A boy discovered a discarded jug of TEPP while playing in an orchard and accidentally spilled it onto his legs. The boy struggled home and despite the fact that his father promptly took him to the hospital, he died six days later. Children were also poisoned by inadvertently drinking or eating from containers which held chemicals. Researchers stressed that many kids accidentally ingested chemicals because adults had carelessly poured such toxic substances "into a food or drink container," then neglected to place it into a locked

³⁵² Mary K. Farinholt, *The New Masked Man in Agriculture*, 16.

³⁵³ Fletcher, "Pesticide Worker Accidents," 4; University of Missouri, Columbia Extension Division, *First Aid For Pesticide Poisoning* by David E. Baker and David B. Smith (Columbia, Missouri, 1976), 1915.

³⁵⁴ National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 1.

cabinet or other secure location.³⁵⁵ In 1951, Harold Heldreth, provided vivid examples of the dire consequences of careless storage practices. He described an incident in which a four-year-old child fatally poisoned himself with rat poison believing that a tube of toxin was toothpaste. He also related a number of other stories in which children accidentally ingested DDT and other harmful substances from soft drink bottles believing that they contained pop. Although some of the children survived, they only did so after painful and arduous stomach pumping procedures.³⁵⁶

Children's vulnerability to such accidents persisted throughout the twentieth century. A 1983 *Wallace's Farmer* article revealed that youngsters faced particular dangers from granular pesticides. Agricultural chemicals in such highly concentrated forms could be easily swallowed. The writer elaborated, "The lethal dose of these granules, if swallowed by a 20 to 30 lb child is in the range of 1/8 to 1/4 of a level teaspoon." Donald Morgan, a physician employed the University of Iowa's department of preventative medicine vividly explained the potential lethality of such pellets. He stated that a deadly amount could easily "stick to the moist palm of a small child." Such poisoning often occurred when the granules were haphazardly spilled on the ground where children could easily ingest them. Dr. Morgan illustrated his point by describing one poisoning incident involving two sibling toddlers. The kids were playing on their Iowa farm and ingested a very small amount of spilled pellets. Morgan concluded his discussion of the problem by including a number of ways that the problem could be avoided. He stated that children should be kept out of areas where chemical residues may

³⁵⁵ Mary K. Farinholt, *The New Masked Man in Agriculture*, 2; National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 1.

³⁵⁶ Harold Heldreth, "Insecticides are Poisonous!" *Farm Safety Review*, March/April 1951, 10.

remain, and that toxic substances should be transported, mixed, and poured as carefully as possible. He also advised that wise storage practices should be also observed to avoid such tragedies.³⁵⁷

Although risks were especially great for children, careless pouring and mixing of chemicals caused harm to people of all ages. Safety writers had frequently alerted farmers to such problems but the issue persisted throughout the period. In 1969, William Fletcher, a staff member of the NSC's farm department, stressed that farmers must maintain a high level of awareness when mixing or applying chemicals. He stated that operators were especially vulnerable to accidental contact "during the mixing and proportioning. Anyone handling chemicals must be alert to spills, splashes and splatter. Even powders can hit you in the face when trapped air puffs back during the pouring operation." Farmers' observance of correct mixing practices was also required for equipment to function properly. Fletcher also stressed the importance of the correct sequence of dispensing each substance into the tank since incorrect mixing "can result in the clogging of nozzles, frequent clean-out and extra exposure of the operator to chemicals."³⁵⁸

Safety specialists also identified a number of other precautions for using chemicals, which, if neglected, could result in tragic consequences. Agricultural safety writers provided a wealth of advice including the need to develop a healthy respect for chemicals. Safety advocates advised farmers to display a cautionary approach to chemicals by properly disposing of empty canisters and rinsing clothing and skin after chemical applications. Safety writers also advised farmers to wear protective devices, to follow the label's directions carefully, and to be aware of the larger implications of

³⁵⁷ "Insecticide Dangers... Carelessness Can Cause Death," *Wallace's Farmer*, March 12 1983, 84.

³⁵⁸ William J. Fletcher, "Mix Well—with Safety," *Farm Safety Review*, March/April 1969, 11.

improper chemical use. The wider implications could include advertently harming their crops, hurting those of their neighbors, or even polluting the water resources. Such advice reflected the reality that just as machines and chemicals had given farmers the power to produce on an unprecedented scale, the development of both had also increased their ability to harm to themselves and others.

Specialists often observed that those in the agricultural community could be shockingly casual regarding their work practices. In 1960, J.N. Roney, a University of Arizona Extension Entomologist, stressed that all of the phosphate poisoning deaths in his state could be attributed to carelessness. He indicated that in the six fatalities he had investigated, including both farmers and professional applicators, operator negligence represented a primary cause. He stated, “In two of these cases the men wore short-sleeved shirts, no respirator and no gloves. They wore the same clothing several days without being laundered. Too, they failed to bathe after exposure to the material.”³⁵⁹ In 1962, Keith Long, chief of toxicology at the University of Iowa’s Institute of Agricultural Medicine, echoed such observations. Long stated that farmers were often exposed to hazardous chemicals both during the mixing and application phases. He stressed that their attire was also often inadequate stating that many farmers he had observed did not don any protective apparel or devices while using chemicals.³⁶⁰ The chemical safety advocate’s advice supports the prevalence of casual chemical use. For instance, a USDA writer stressed that farmers should “never use your mouth to siphon a pesticide from a container.”³⁶¹ The writers of another chemical safety brochure warned farmers to “never

³⁵⁹ J.N. Roney, “Insecticides in the Southwest,” July/August 1960, 5.

³⁶⁰ *Transactions- National Safety Congress*, (Chicago: National Safety Council, 1962), 5.

³⁶¹ “Safe Use of Agricultural Pesticides,” 4.

stir any chemical solution with your hands.”³⁶² Dr. Clyde Berry stated, “Exposure to spray drift is unavoidable under most field conditions...there is nearly as many types of spray rig as there are farmers who have them. Most of the equipment is homemade affairs.”³⁶³ Such comments reveal that a cavalier attitude regarding chemical safety was not uncommon during the mid-twentieth century. However, farmers who practiced chemical safety followed rather elaborate practices.

Experts warned that it was essential for all chemicals to be placed in secure locations where they could not be accessed by those who were uneducated in handling such substances.³⁶⁴ They also emphasized that farmers needed to carefully place chemicals in places where they could not contaminate foodstuffs. In 1946, a *Farm Safety Review* writer related a story in which a family unwisely stored chemicals in an insecure container. He indicated that roaches transported the poison from the ripped sack to the sugar jar and “one entire family suffered seriously from slow poisoning for months before they discovered the cause.” Safety writers also stressed that farm workers always needed to place potentially harmful substances in labeled containers. The soundness of such advice was illustrated by the story of a farm family who was poisoned when an insecticide was accidentally mixed with baking material. The *Farm Safety Review* author stated that, “a Maryland farm family of eight died and the rest were seriously stricken... a coroner’s investigation revealed that the mother had unknowingly mixed some lead

³⁶² Iowa State University, Cooperative Extension Service, *Suggestions for Safety Spraying: Herbicides, Insecticides and Fungicides* by E.P. Sylvester, Harold Gunderson, and Gayle L. Worf (Ames: Iowa State University, 1963), 1.

³⁶³ Mary K. Farinholt, *The New Masked Man in Agriculture*, 17.

³⁶⁴ Iowa State University, Cooperative Extension Service, *Suggestions for Safety Spraying: Herbicides, Insecticides, and Fungicides*, 2.

arsenate in a birthday cake which she baked for a family party.”³⁶⁵ Safety writers also advised that any leftover chemicals needed to be returned to secure storage locations.³⁶⁶

Proper disposal of chemical containers after application was equally important. In 1955, C.O. Barnard, the executive secretary of the Western Agricultural Chemicals Association, highlighted the problem of improper discarding of chemical canisters. He stressed that makers of agro-chemicals depended on chemical applicators to observe such proper safety practices. Barnard also indicated that farmers frequently ignored appropriate chemical canister disposal procedures. He graphically illustrated the point by citing an incident in which “[a]gricultural inspectors at one airstrip drained the residual pesticide from ten-one gallon cans- and collected a full gallon of a very potent compound!” He also emphasized reasons for such carelessness indicating that growers often placed speed above such safety precautions as proper chemical container disposal.³⁶⁷

A farmer’s ingenuity and thriftiness regarding alternative uses of chemical containers could be especially hazardous. Farm safety advocates disapproved of individuals who modified chemical containers into feed troughs, water storage tanks, and raft floats since such ill-advised ingenuity could result into poisoning livestock fodder or water sources.³⁶⁸ Instead, farm safety advocates advised agriculturalists to observe proper storage and disposal procedures. In 1962, Keith Long, chief toxicologist for the University

³⁶⁵ “Spray Safe,” *Farm Safety Review*, March/April 1946, 4.

³⁶⁶ National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 3.

³⁶⁷ C.O. Barnard, “Safety...Problem Child of the Industry,” *Agricultural Chemicals*, 10 (December 1955): 38.

³⁶⁸ United States Department of Agriculture, Agricultural Research Service, *Safe Use of Agricultural and Household Pesticides*, 2.

of Iowa's Institute of Agricultural Medicine, stated "[a]ll used pesticide containers should be buried or burned, making sure that no one comes into contact with the smoke from the burning."³⁶⁹ Farmers had to be aware of additional hazards if they decided upon burning containers. In 1963, Iowa State Extension writers warned them to keep a safe distance from the smoke that resulted from incinerating chemical canisters. However, the consequences of the disposal problem are best illustrated by the continued occurrence of accidents. For instance, in 1960, the parents of one Arizona child were forced to grieve over their child's death after the child used an old chemical container for a seat.³⁷⁰

Safety writers also stressed the crucial nature of rinsing skin and clothing after applying pesticides. They recommended that gloves and clothing, as well as skin needed to be washed after handling such substances. They also suggested that hand cleaning was particularly important prior to smoking or eating. In 1962, Keith Long chief toxicologist, for the University of Iowa's Institute of Agricultural Medicine, emphasized that cleaning procedures varied. He stated that the "occasional rinsing in Kerosene may be necessary for clothing with heavy deposits of chlorinated hydrocarbons such as DDT and dieldrin." However, he suggested, "Ordinary washing soda is a better decontaminant for phosphorylated hydrocarbons such as Malathion, thimet or parathion."³⁷¹

Experts also emphasized the importance of wearing proper breathing protection as well as taking care of such devices. In 1962, Farinholt recommended, "Respirators should be worn by those who load pesticides into spray equipment, who burn empty containers

³⁶⁹ Donald L. Miller, *Farm Safety Review*, March/April 1958, 13; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1962), 7.

³⁷⁰ Iowa State University, Cooperative Extension Service, *Suggestions for Safety Spraying: Herbicides, Insecticides, and Fungicides*, 1; J.N. Roney, "Insecticides in the Southwest," 5.

³⁷¹ *Transactions- National Safety Congress*, (Chicago: National Safety Council, 1962), 7.

(the smoke can be lethal), who are exposed to obvious dusts, mists, or who are continuously exposed to not-so-obvious amounts.” She also stressed such devices required regular filter replacement, complete and regular cleaning, as well as storage in a “clean dry place.”³⁷² Mining firms manufactured some of the early breathing masks used in agriculture. As early as 1955, a Mine Safety Appliances Company advertisement writer boasted of the “protective benefits” of wearing their brand of breathing devices. According to the writer, an MSA respirator could protect farmers from a variety of well-known agricultural chemicals including: “EPN, Dieldren, Aldrin, TEPP, HETP, OMPA, and Systox.”³⁷³

Although safety writers and manufacturers encouraged farmers to use proper safety equipment, it appears that farmers initially had little access to adequate breathing protection. In 1964, USDA Entomologists R.A. Fulton, Floyd F. Smith, and Ruth L. Bugsby published their findings in a study entitled, “Respiratory Devices For Protection Against Certain Pesticides,” which examined the availability and quality of respiratory devices. They indicated that the development of breathing protection for agriculturalists had not kept pace with the rate of chemical innovation. They observed, “No suitable, fully effective respirators were found to be available in 1949 for protecting operators in the field from inhaling dusts or mists of parathion and related phosphorous insecticides.”³⁷⁴ It also appears that many farmers continued to be lax regarding suitable

³⁷² Mary K. Farinholt, *The New Masked Man in Agriculture*, 15.

³⁷³ “Don’t be a Hay Field Oldfield... and it’s just as dangerous to spray poisonous insecticides without your M.S.A Farm Spray Respirator,” Mine Safety Appliance Company advertisement, *Farm Safety Review*, June 1955, 15.

³⁷⁴ United States Department of Agriculture, Agricultural Research Service, *Respiratory Devices for Protection against Certain Pesticides*, by R.A. Fulton, Floyd F. Smith, and Ruth Busbey (Washington, D.C.), 1.

protective equipment and needed to consult experts throughout the period. In 1976, NSC employee Jack Burke stated, “Your pesticide dealer or extension agent can advise on appropriate equipment for your particular problems if you need guidance.”³⁷⁵ It is also reasonable to assume that farmers, burdened by the time constraints and financial obligations, might have neglected such consultation.

Nevertheless, the nation’s agricultural leadership responded to the need of identifying proper agricultural breathing protection. In the fall of 1949, many government organizations participated in a convention organized to find solutions for the issue. Leaders of both agricultural chemical companies as well as firms specializing in the manufacture safety equipment continued to meet following this initial meeting. These gatherings resulted in the creation of the “Interdepartmental Committee on Pest Control,” which was responsible for overseeing the manufacture of protective breathing devices suited for agricultural settings. The Bureau of Entomology and Plant Quarantine tested and evaluated protective respiratory devices, while other government agencies including the “Department of the Army, Food and Drug Administration, Public Health Service, Bureau of Mines, Production and Marketing Administration, and Bureau of Entomology and Plant Quarantine” assessed research results. In 1954, R.A. Fulton, an employee of the Entomology Research Branch, Agricultural Research Service, reflected upon the federal government’s accomplishments and indicated that farmers could now choose from several different “respirators and gas masks” suitable for agricultural contexts.³⁷⁶

Thus, leaders of federal agencies such as the U.S. Bureau of Entomology and Plant Quarantine, as well as the heads of respirator manufacturers worked cooperatively to

³⁷⁵ National Safety Council, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 2.

³⁷⁶ R.A. Fulton, “Respiratory Protectors for Pesticides,” *Farm Safety Review*, March/April 1954, 6-7.

encourage the development of new devices. They also regularly advertised the benefits of respirators which offered adequate protection. For instance, in a 1954 *Farm Safety Review* piece entitled, “Respirators and Gas Masks for Agricultural Use,” the author, Dr. R.A. Fulton, provided a list of USDA approved respirators and gas masks. The article identified gas masks and respirators manufactured by such firms as the American Optical Company of Southbridge Massachusetts, Wilson Products incorporated of Reading Pennsylvania, and the Mine Safety Appliance Company of Pittsburg, Pennsylvania.³⁷⁷ G.L. Seth also indicated that the US Government interdepartmental committee on pest control had made available a directory of appropriate protective breathing devices for farmers. However, he also stressed that the register was being continually updated since new chemicals and application equipment necessitated corresponding changes in protective equipment. However, it is plausible that the list’s existence did not necessarily mean that all farmers were consulting it.³⁷⁸

The view that farmers were often inadequately protected is supported by a number of authorities, both in the public and private sector. Experts stressed that farmers sometimes improperly used protective equipment or it was of insufficient quality. Some safety writers also suggested that such equipment was often impractical in the field. In 1952, G.L. Seth, a representative for the Mine Appliances Company, a manufacturer of protective breathing devices, reminded farmers that both adequate protection and comfort should also be a priority in choosing a protective device. Dr. Clyde Berry also emphasized the discomfort associated with using safety equipment, advocating that

³⁷⁷ United States Department of Agriculture, Agricultural Research Service, *Respiratory Devices For Protection Against Certain Pesticides*, by R.A. Fulton, Floyd F. Smith, and Ruth Busbey, 1; R.A. Fulton, “Respirators and Gas Masks for Agricultural Use,” *Farm Safety Review*, May/June 1954, 10-11.

³⁷⁸ *Transactions- National Safety Congress*, (Chicago: National Safety Council, 1952), 25.

researchers should don this equipment themselves. He stated, “Wear these protective devices yourselves if you doubt me. Wear them for a full day in the blazing summer sun, and you will return to your air-conditioned office and take another look at the Frankenstein you have created.” Berry had also observed that Iowa farmers often carelessly dropped their mask to their chin exposing the mask’s interior to air-borne spray residue. Berry also stressed that cleaning small components, such as the spray nozzles, often required the removal of gloves, sometimes resulting in direct chemical exposure. He indicated that occasionally the toxic liquid “runs down over the hands and arms of the operator, sometimes reaching the chest and abdomen.” Farinholt stated that on occasion agriculturalists used safety devices that were inadequate for meeting the safety requirements of new chemicals. She also believed that the problem could be corrected by requiring chemical manufacturers to create adequate protective devices for substances before they were allowed on the marketplace.³⁷⁹

Safety advocates also repeatedly emphasized the importance of reading the labels since such descriptive stickers represented the primary means by which farmers learned how to properly use a chemical. This also indicates that farmers were particularly dependent on experts who composed chemical labels for their safety. In 1955, Harold Heldreth an NSC employee indicated that by reading the label, farmers could access essential information such as detailed directions and appropriate safety measures. The tag also represented the combined expertise of both private industry and governmental regulatory agencies. Heldreth stated, “The label is checked by government regulators for the enforcement of the Federal Insecticide, Fungicide and Rodenticide Act. These regulations are constantly being strengthened by more specific, clarified labeling

³⁷⁹ Ibid., 25; Mary K. Farinholt, *The New Masked Man in Agriculture*, 15-17.

requirements.”³⁸⁰ In the mid-1970s, Jack Burke, an NSC official, pointed out that the label represented the consummation of years of research regarding a product’s safety, its suitability for the proscribed task, and its potential effect upon the ecosystem. He stressed the level of detail, indicating that it revealed “who made it, what is in it, what pests it will control, how to use it correctly, toxicity, precautions and safety measures that must be taken, [and] practical treatment in case of mishap.”³⁸¹ Burke’s comments reveal that farmers could only benefit from public and private sector expertise if they carefully read and observed the labels’ directions.

Although the era’s NSC writers were definitely correct in their view that agricultural chemical users should attentively read product label prior to use; substantial evidence suggests that directions were sometimes inadequate. During the late 1950s and early 1960s, a number of incidents illustrate the poor quality of some of the labels. Manuel Velez-Velez and Jamie Ramos-Sanches, two Puerto Rican farm workers were applying parathion dust on a Massachusetts vegetable farm. The product label lacked both directions regarding the need to dress in protective clothing as well as a cross-bones warning emblem; tragically both men died of parathion poisoning after repeatedly applying the chemical without such protective equipment. On other occasions individuals received delayed treatment for poisoning when labels lacked the antidote instructions. Furthermore, chemical company officials sometimes composed labels which used highly specialized language or excessively minute print, which were generally difficult to understand.³⁸² Such observations reinforce the point that farm families were generally ill

³⁸⁰ Harold Heldreth, “Read The Label—And Poison only the Pests!,” *Farm Safety Review*, June 1955, 11.

³⁸¹ Jack Burke, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 2.

³⁸² Daniels, *Toxic Drift: Pesticides and Health in The Post-War World War II South*, 138-139, 136.

prepared and inadequately informed to sufficiently protect themselves from the era's chemical hazards.

Despite critiques, both the era's agricultural chemical officials and safety specialists persistently emphasized the importance of reading the manufacturer's instructions for proper chemical use. On some occasions they did so with unwarranted confidence. In 1955, V.K. Rowe, a Dow Chemical researcher, called attention to the importance of following the label's instructions stating, "I should like to state that if every consumer would read, understand, and heed the precautionary information given on the label of the agricultural chemical product he buys today, it is doubtful that a single case of ill effects would result from the handling and use of that product. In the interest of safety—read the label!" In 1963, Iowa State Extension writers advised farmers "to completely and fully understand, and follow explicitly all directions on chemical containers and in pertinent brochures. Become thoroughly acquainted with chemicals you are using, including strong and weak points, tolerances, clearances, and uses for which it is recommended."³⁸³ Safety writers continually underscored that farmers also needed to thoroughly understand a product's label since the sheer diversity of chemical choices could be dizzying. General categories of pesticides included chlorinated Hydrocarbons, Organic Phosphates, and Rodenticides; however, these broad categories contained hundreds of individual chemicals. In 1960, J.N. Roney revealed how the nation's agricultural community had been forced to adapt to relentless waves of chemical innovation stating, "Since World War II, Organic insecticides have been used on the farm. First we had the chlorinated hydrocarbons like DDT, BHC, Toxaphene, Lidane,

³⁸³ Iowa State University, Cooperative Extension Service, *Suggestions for Safety Spraying: Herbicides, Insecticides, and Fungicides*, 1.

dieldrin, aldrin chlordane and endrin. Then along came the phosphates—TEPP, parathion (ethyl and Methyl) demeton or systox, phosdrin, thimet, malathion, diazon, dibrom and others.” He also indicated that such categories differed greatly in their toxicity to people and animals, stressing that the organic insecticides posed less of a concern than the phosphates. The label represented the primary tool to safely navigate this dizzying chemical diversity.³⁸⁴

However, safety writers acknowledged that chemical applicators did not always read the label. They also recognized that the label could not provide complete information regarding all application situations. In 1964, the writers of a pamphlet cooperatively produced by the NSC, USDA, and the National Agricultural Chemicals Association instructed farmers to “use common sense to bridge the gap between what is written on the label and the actual chemical application.”³⁸⁵ Safety writers also encouraged farmers to confer with a qualified chemical dealer or other authority if the label was not sufficient in answering all the farmer’s questions.³⁸⁶ In 1957, Henry Doyle, an official for the Occupational Health Program, U.S. Public Health Service, stated that unlike manufacturing workplaces, in which there existed a more controlled setting with strict safety measures, “agricultural workers generally have little idea of the hazards of

³⁸⁴ Mary K. Farinholt, *The New Masked Man in Agriculture*, 8-12; J.N. Roney, “Insecticides in the Southwest,” July/August 1960, 5. In 1952, Frank Princi also emphasized the hazards associated with organic phosphorous compounds stating, “Perhaps the most toxic of the new pesticides are that group known as the organic phosphorous compounds. In common with many other insecticidal materials, these substances may be absorbed through the skin, respiratory tract, conjunctive and gastro-intestinal tract.” See Frank Princi, “Toxicology and Hazard Record of Newer Pesticides,” *Agricultural Chemicals* 7 (January 1952): 46- 47; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1955), 15.

³⁸⁵ Publication produced cooperatively by National Agricultural Chemicals Association, National Safety Council, U.S. Department of Agriculture, U.S. Department of Health, Education, and Welfare, National Vocational Agricultural Teachers’ Association, Manufacturing Chemists’ Association, Inc, *Chemicals in Agriculture: Be Safe! Use them Properly* (Washington, D.C January 1964), 2.

³⁸⁶ Jack Burke, *Rural Accident Prevention Bulletin: Safe Use of Pesticides*, 2.

handling and applying powerful chemicals. Although most chemicals of this type carry warnings on the container labels, the tendency is to pay little or no attention to the labels, particularly if a material has been used previously without incident.”³⁸⁷

The farmer’s reliance on product labels underscores the nature of agricultural chemical safety from the 1940 to the early 1970s. Farmers carried most of the burden in keeping themselves, their families, and even their neighbors safe from chemical accidents. Although they benefited from the period’s chemical revolution, the explosion of new compounds added additional complexities to the farmstead. Unlike workers in other settings who benefited from a much more controlled and supervised setting, farmers were required to educate themselves regarding the proper use of potentially dangerous compounds. The copious amounts of safety literature regarding the proper mixing, use, and storage of chemicals revealed that it was far from easy. The significant number of chemical related accidents on farms illustrated that many users were either unwilling or unable to follow safe procedures. However, chemical manufacturers did not always write the labels correctly, which clearly suggests that even reading a product’s label did not guarantee an understanding of the various dangers associated with a chemical.

Additionally, the fact that both the availability and practicality of protective devices was not always sufficient reveals that some safety measures may not have always been feasible. Furthermore, the federal government and the states possessed rather weak chemical regulatory tools prior to the early 1970s, which lessened the possibility of sound safety conditions for the nation’s farm families. Nevertheless, farm safety advocates

³⁸⁷ Mary K. Farinholt, *The New Masked Man in Agriculture*, 6.

mounted a vigorous safety education campaign for all the nation's farm hazards, including those associated with chemicals.

CHAPTER SIX

Raising Safety Awareness: Farm Safety Advocates Educate in Response to a Complex and Ever-Evolving Issue

Farm safety activists demonstrated impressive levels of flexibility in creating educational programs since farm families experienced considerable change in their living and working environment. In 1978, Jack Burke, a veteran National Safety Council (NSC) farm safety writer, reflected on this reality stating that “new accident problems arise and some older ones fade into relative obscurity as the world passes them by or we learn how to deal with them.”³⁸⁸ Burke’s comments symbolize how the great technological transformation the agricultural sector experienced required continued reflection from farm safety educators. However, new technologies were not the only factors that advocates addressed in their safety programming. New legal realities were also considered. Such legislation included the emergence of federal laws that restricted certain types of child agricultural labor. Furthermore, by the 1960s, farm safety promoters were not only obligated to instruct farm families about hazards but also were called upon to raise awareness regarding new preventative devices. Such devices as roll-over-protective-systems (ROPS) and slow-moving-vehicle emblems (SMVs) either prevented tractor accidents or reduced the likelihood of one resulting in a fatality. Thus, extension workers, farm safety specialists, and youth club leaders continually demonstrated creativity regarding the development and implementation of their safety programs.

Safety advocates exhibited such inventiveness during the movement’s early years. For instance, in 1949, the employees of the Auto-Owners Insurance Company headquartered in Lansing, Michigan sponsored a particularly imaginative display. They

³⁸⁸ Jack Burke, “Out of that Mountain, You Could Mine Some Gold,” *Agri-Safety Newsletter*, Fall 1978, 2.

desired to raise awareness of farm dangers at Michigan State College's "Annual Farm and Home Week." A *Review* writer indicated that the exhibit showcased an electronic device akin to a "pinball machine" featuring various pictures depicting farm tasks. Such work as "Piling Filled Bags," "Using Power Take-Off," and "Leading Bull" were illustrated. The "Electronic Safety Quiz" presented participants with the choice of whether the person portrayed in the illustration was behaving in a safe or hazardous manner. Safety activists consistently demonstrated such ingenuity throughout the era in addressing almost every conceivable farm hazard.³⁸⁹

Agricultural safety education represented a crucial component in reducing the numbers of accidents since the unique aspects of the rural lifestyle required convincing farm families instead of forcing them to live and work with caution. They labored with few regulatory protections, exerted high-levels of workplace independence, and used machines in which often lacked sufficient safety features. Thus, activists often used the term "selling safety" to explain their efforts to reduce accidents. In 1961, Frank Burrows, a traffic safety specialist employed, by Citizens Traffic Safety Board headquartered in Chicago, Illinois, also emphasized the principle of selling safety to a farm safety activist audience. He pointed out that raising safety awareness required an imaginative and experimental approach. Burrows encouraged his listeners to use humor, eye-catching props, and other techniques to capture listeners' attention. He stated, "Let me encourage you to use some of these ideas so that you will not only be doing a good deed, selling safety, but will enjoy it more and you will be creating an appetite in people who are not

³⁸⁹ "Electronic Safety Quiz," *Farm Safety Review*, September/October 1949, 10.

hungry by making them want to do what they ought to do- that is, to do every job the right way.”³⁹⁰

A variety of organizations, including the state Farm Bureaus, agricultural implement manufacturers, as well as a variety of local businesses financially supported safety instruction. Such financial contributions ranged from very small donations to relatively substantial monetary gifts. In 1944, J.S. Jones, Secretary-Treasurer, of the Minnesota Farm Bureau Federation, indicated that his organization’s insurance division had a direct interest in supporting farm educational programming. Jones stated, “I have to admit that we had a selfish motive when we started the safety program. It was started as an issue to our insurance department. We had thousands of claims each year, and being a mutual insurance company where losses averaged over all policy holders, we found ourselves confronted with this situation and losses are paid from premiums- and losses showed us to be in the red for the state at the time to the amount of \$500,000.”³⁹¹ Although Jones’s comments reveal that self-seeking motives were present, such gifts undoubtedly bolstered the movement.

Although farm safety educators exhibited considerable zeal in their efforts, they also encountered significant obstacles in their attempts to “sell safety.” Many of these problems were rooted in human behavior including the willingness of rural residents to sacrifice safe practices in order to work quickly. In 1951, Maynard Coe, acknowledged the problem of farmers’ “indifference” to safety. He stated that although “it is heartening to note that farm folk in increasing numbers are recognizing the importance of safety, yet

³⁹⁰ *Transactions-National Safety Council* (Chicago: National Safety Council, 1961), 76.

³⁹¹ J.S. Jones, “Why Farm Organizations should be interested in Farm Safety, *Farm Safety Review*, November/December 1944, 6.

there are many who consider 'other matters' of greater importance. Such people practice safety only if they have a little extra time or when these 'other matters' are not pressing them too hard. And such people are the favored candidates for accidents."³⁹² In 1951, USDA officials sent a questionnaire asking farm safety specialists to list the most frequent problems regarding their work challenges. The experts cited problems such as needing more data to better formulate their safety programs, an improvement in their ability to reach the rural audience, and more effective methods to aid in eliciting a more enthusiastic response from farm families.³⁹³ Accident prevention activists appeared to have faced similar obstacles in their efforts to raise awareness throughout the period.

Rural educators during the era continued to reveal the existence of such difficulties. C.W. Dalbey, an Iowa agricultural educator, also indicated that sometimes farmers' preoccupation with promptly completing tasks overrode a cautious approach to work. He stated, "I remember many farmers in my adult evening classes who had lost fingers and hands. Often this was due to corn picker accidents. The attitude seemed to be that the job had to be done now."³⁹⁴ Although such comments contain considerable merit, farmers' perceived insensitivity to safety should be viewed with an understanding of their challenging lifestyle. Safety was only one of many concerns farm families faced in attempting to derive a livelihood from the land. Unlike safety professionals and extension employees who held a special concern toward the issues, farm families were inundated with a myriad of issues related to the many challenges of work and living.

³⁹² Maynard Coe, "Indifference," *Farm Safety Review*, January/February 1951, 1.

³⁹³ *Transactions-National Safety Congress 1951* (Chicago: National Safety Council), 32.

³⁹⁴ C.W. Dalbey, "Human Resources Our Most Important Commodity," *Farm Safety Review*, September/October 1968, 11.

Advocates attempted to “sell safety” to farm families in a variety of ways; however, one of the more important was utilizing the nation’s major communication media. In 1953, C.M. Ferguson stated, “Mass Media channels are important. Out of every 100 families asked where they get their new ideas, 38 say newspapers, magazines, radio, TV and other mass media. Extension agents use these methods of communication for two purposes: First to reinforce direct teaching; and second, to reach people not ordinarily available for face-to-face contact,”³⁹⁵ Such methods included distributing voluminous amounts of printed safety educational materials including handbooks, pamphlets, and posters. Activists also utilized radio and, later, television. Additionally, they provided direct instruction, including exhibits, formal courses, and demonstrations. Such displays often highlighted both the dangers of practicing unsafe habits as well as the benefits of safe work behaviors. NSC officials and other advocates were also constantly seeking better ways to raise farm families’ awareness regarding the numerous dangers lurking in their environments. Activists attempted to invigorate their safety campaigns with catch-phrases in hopes of capturing the public’s attention and encouraging community wide-participation. They also consistently proved that they were adept at enlisting the private sector financial support.

Although the issue had been addressed in safety textbooks and handbooks in an earlier era, the onset of the Second World War signaled the proliferation of such materials. Even though the NSC and the USDA fulfilled a major role in this aspect of the movement, they were just two of many organizations providing safety activists with this type of educational resource. Thus, extension employees, the staff of state educational

³⁹⁵ C.M. Ferguson, “Can Television Strengthen the Approach to Learning?,” *Extension Service Review*, July 1953, 123.

institutions, and even corporations developed their own printed resources.³⁹⁶ Accident prevention boosters depended on such publications to educate themselves regarding a number of issues, as well as to educate farm families regarding various safety issues. As the years progressed, educators could select from hundreds of resources to find those ideally suited to fulfill their educational requirements.

Even though the NSC had been producing farm safety publications since the early 1940s, the organization's materials continued to develop throughout the era. Farm safety leaders could benefit from an annual dose of information by signing up for NSC's farm safety service for only \$3.00. Subscribers received such resources as the *Farm Safety Review*, annual farm accident data summaries, and a register of safety films. They also were provided with the annual NSC congress transactions. A recipient also received resources to be used in local safety awareness campaigns, including a packet of promotional items specifically designed for use during Farm Safety Week. The organization continued to produce new safety educational materials to meet the new challenges of the agricultural work. In 1973, a *Farm Safety Review* writer indicated that the NSC authors had produced a handbook aimed at informing rural Americans about the importance of observing safety practices. The book entitled "Farm and Ranch Safety Guide" consisted of 40 pages of text covering a variety of significant agricultural hazards.³⁹⁷ In 1974, a *Farm Safety Review* writer celebrated the "31st consecutive observance" Farm Safety Week. The piece also revealed the NSC's continued emphasis on the publishing and dissemination of farm safety educational materials. The author

³⁹⁶ For an example regarding how authors of safety textbooks treated the farm safety problem, see, Harry W. Gentles and George H. Betts, *Habits for Safety: A Textbook for Schools* (New York: The Bobbs-Merrill Company, 1937), 110-124.

³⁹⁷ "New Safety Info," *Farm Safety Review*, September/October 1973, 11.

stated that “Program kits” have been sent throughout the country to in order to raise the public’s awareness.³⁹⁸ NSC staff continually expanded and adapted such material to the changing agricultural safety issues as demonstrated by the numerous educational materials ads that frequently appeared in the *Farm Safety Review* and other NSC publications, which cumulatively listed hundreds of separate educational documents throughout the era.³⁹⁹

Federal government agencies as the United States Department of Labor (DOL), U.S. Food and Drug Administration (FDA), the Public Health Service, and the Department of Interior’s Fish and Wildlife Division also published farm safety materials. DOL officials appeared to be particularly concerned with the issue of child agricultural labor. In 1965, Charles R. Cavagnaro, a DOL official cited such brochures as “Farm Safety and You” and “Going To Do Farm work? Take Safety Along,” as resources aimed at educating the agricultural community about the child labor issue.⁴⁰⁰ The FDA also produced a considerable number of pamphlets directed toward growers in hopes of instructing them concerning how to avoid excess chemical residues. The Public Health Service and the Department of Interior’s Fish and Wildlife Division also provided chemicals safety resources, but it appears to a lesser degree than the two other organizations.⁴⁰¹ Such examples reveal that as the technological complexity of farming increased, the amount of specialized safety information also rapidly ballooned.

³⁹⁸ “Farm Safety Week,” *Farm Safety Review*, May/June 1974, 7.

³⁹⁹ By the late 1970s, the NSC was publishing the *Agri-Safety Newsletter* in addition to the *Farm Safety Review*. This publication was less substantial than the *Review* and aimed more exclusively toward safety professionals. The newsletter frequently advertised safety resources, which addressed current safety topics.

⁴⁰⁰ Charles R. Cavagnaro, “A Full Measure of Safety for Young Farmhands,” *Farm Safety Review*, March/April 1965, 10.

However, the USDA assumed a particularly active role in generating printed safety resources. In 1943, Lester A. Schlup, chief of the USDA's division of information, stressed that more pamphlets needed to be published to meet wartime needs. The government printing office published "[f]ifteen thousand copies of 'safety for the U.S. Crops Corps'" and only "500,000 each of 'Start Them Right' and 'Going to the Farm Front'," which resulted in a shortage of materials for distribution."⁴⁰² In 1947, Stanley H. Gaines also verified his organization's information dissemination role. He indicated that the agency's farm safety council "devotes time and effort to prepare and distribute materials on fire prevention of interest to department employees as well as the farm public."⁴⁰³ The agency also routinely distributed pamphlets regarding the safe use of agricultural chemicals.⁴⁰⁴ However, USDA researchers were particularly important in disseminating the results of some of the first national farm accident studies. For instance, in 1942, the USDA's Bureau of Agricultural Economics produced a work entitled *The Prevention of Accidents on Farms and in Homes*, which provided a wealth of information regarding the national farm accident picture. Such publications were crucial since they alerted farm safety activists to those issues in need of special attention.⁴⁰⁵

⁴⁰¹ United States Department of Agriculture in cooperation with National Chemicals Association, National Safety Council, United States Department of Health Education and Welfare, National Vocational Agricultural Teachers Association, Manufacturing Chemists' Association, Inc. *Chemicals in Agriculture: A Guide for Adult and Youth Programs in Agricultural Chemical Safety*. Washington, D.C., 1964, 3; "4 Keys to Pesticide Safety," *Farm Safety Review*, November/December 1965, 6.

⁴⁰² "Farm Safety Roundup," September/October 1943, *Farm Safety Review*, 14.

⁴⁰³ Stanley H. Gaines, "Prevention is the Key to Farm Safety: The USDA and Farm Safety," *Farm Safety Review*, July/August 1947, 6.

⁴⁰⁴ *Chemicals in Agriculture: A Guide for Adult and Youth Programs in Agricultural Chemical Safety*. Washington, D.C., 1964, 3.

⁴⁰⁵ United States Department of Agriculture, Bureau of Agricultural Economics, *The Prevention of Accidents on Farms and in Homes*, Washington, D.C., 1942.

State extension officials and university faculty also contributed a significant amount of safety materials to address almost every conceivable farm hazard. In 1943, John C. Snyder created a series of pamphlets to tackle the dangers associated with those who labored during the apple and peach harvest. In 1961, W.E. Stuckey, a farm safety specialist employed by Ohio State University extension developed an “educational program” to educate farm families regarding the potential hazards associated with farm elevators. Stuckey and his associates advertised the kit in the pages of the *Farm Safety Review*. A recipient of the safety packet received “a cartoon, color slide series and a model elevator, as well as a script and promotional material.”⁴⁰⁶ Extension personnel generated materials regarding a host of others including the safe operation of harvesting equipment, electrical hazards, and material handling equipment.⁴⁰⁷

Agricultural journalists also devoted many of their articles to raising an awareness of the issue. Editors often expressed the view that they fulfilled an important educational responsibility by featuring farm safety pieces in their magazines. In 1964, Delmer E. Groves, an editor for *Nation's Agriculture*, supported the important place in the movement held by himself and his counterparts. He stated, “The average farm home receives and reads some two to five magazines.”⁴⁰⁸ Thus, Groves supported the importance of his communication medium in reaching rural America with the message. The large number of safety articles that appeared in *Wallace's Farmer, Successful*

⁴⁰⁶ “Safety Tips for Fruit Pickers,” *Farm Safety Review*, January/February 1944, 12; “Recent Programming Aids,” *Farm Safety Review*, March/April 1961, 5.

⁴⁰⁷ For an additional example, see, Harvey Hirning, Robert Woell and David Swenson, *Electric Farm Power: Look Up!* (Fargo, North Dakota: Prepared Cooperatively by the North Dakota State Agricultural Engineering Department, Cooperative Extension Service and the North Dakota Power Council, 1977), 1-4.

⁴⁰⁸ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1964), 26.

Farming, and a variety of other agricultural publications attests to the important part that such correspondents played in raising safety consciousness.

NSC officials also acknowledged those editors who made special contributions. In 1950, they formally recognized such efforts in an award ceremony held during the Agricultural Editors' Association's annual meeting in Chicago. Sidney J. Williams, an aide to an NSC president, presided over the award ceremony. He presented eleven agricultural publications with accomplishment certificates. These distinguished magazines included such important periodicals as *Wallace's Farmer and Iowa Homestead*, the *Southern Planter*, and *Farm Implement News*.⁴⁰⁹ In 1953, a similar recognition banquet reconfirmed how the farm press had continued a high degree of participation. A *Review* writer stated that in that year alone, "a mid-west magazine ran 12 major articles, or editorials, on farm safety during the year, and devoted its July 19 issue, including a striking cover to the theme of National Farm Safety Week, 'think safely –act safely.'"⁴¹⁰

In 1959, Milon Grinnell, the editor of *Michigan Farmer*, commented on the widespread attention the issue had received as well suggested effective methods to raise the public's awareness. He acknowledged the fact that many farmers showed little enthusiasm regarding safety education; nevertheless, he believed that the subject was vital. He stated, "Today practically all farm magazines devote considerable space to encouraging readers to work safely." Even so, he believed that such articles could be improved by making the content more specific and engaging. He believed that general pieces were far less effective than those which focused on a single issue and provided

⁴⁰⁹ "NSC Award Goes to Magazine and Radio Stations," *Farm Safety Review*, February 1950, 3.

⁴¹⁰ "For Exceptional Service to Farm Safety Program," *Farm Safety Review*, January/February 1953, 8.

specific safety recommendations. Grinnell also believed that they needed to be more positive in their approach stating that “[i]nstead of saying children shouldn’t drive tractors, it’s better to say: children are old enough to drive a tractor when they show mature judgment in completely maintaining the tractor without their father’s having to check on their performance.”⁴¹¹

Robert G. Rupp, an assistant editor for *The Farmer*, a Minneapolis-based publication, indicated that writers who incorporated farmers’ accident experiences were particularly effective at capturing attention. He stated, “The stories, after the first few had established themselves, climbed up to rank among the highest readership of any editorial content in the magazine.” He continued, “Readership surveys repeatedly have shown from 80 percent to 90 percent of all readers, both men and women, read each story.” The fact that communities sometimes raised money for injured members of distant farm communities supported the power of such first-hand accounts. He also indicated that his staff increased the effectiveness of such pieces by aligning particular topics with seasonal work schedules. Rupp wrote, “Stories on corn-picker accidents, for example appear in the fall, just before farmers begin picking corn.”⁴¹² Rupp’s comments support the view that if safety educators were to be effective they should be empathetic and knowledgeable toward their audience.

As could be expected, private organizations or business associations whose industries were closely tied to agriculture also produced printed safety materials. They often created materials aimed at educating farm families regarding the potential dangers of their products. In 1964, a pamphlet entitled *Chemicals in Agriculture: A Guide for*

⁴¹¹ Milon Grinnell, “Present Positive Programs,” *Farm Safety Review*, January/February 1959, 3.

⁴¹² *Transactions-National Safety Council* (Chicago: National Safety Council, 1953), 4-42.

Adult and Youth Programs in Agricultural Chemical Safety cooperatively produced by the NSC, the USDA, and the National Agricultural Chemicals Association (NACA) featured an extensive bibliography of potential chemical-related safety materials. The tract listed five pamphlets and other kinds of written material which NACA members had made available to the public including *Four Keys To Pesticide Safety*, *Agricultural Chemicals Safety Code* and *Pesticides and Safety*.⁴¹³ NACA also provided the NSC with many of the written materials required for the safety organization to encourage state and local activists to mount agricultural chemical safety awareness campaigns. A *Farm Safety Review* writer indicated that safety educators could also obtain such resources from the Manufacturing Chemists' Association (MCA).⁴¹⁴

Farm safety specialists found these chemical industry resources helpful in their educational activities. In 1963, Norval Wardle, the first president of the newly formed National Institute of Farm Safety (NIFS), indicated that both NIFS members and the faculty members at his home institution of Iowa State University were actively involved in chemical safety education. He pointed out that the NIFS leadership had created a separate committee devoted exclusively to addressing the issue. Wardle also disclosed that ISU had recently hosted a "Youth Safety Conference" in which chemical safety had been addressed. In a letter to MCA members, Wardle revealed how his work had been greatly aided by the association's materials. He stated, "I wrote to your organization requesting copies of your booklet, *Agricultural Chemicals-What They Are and How They Are Used*. You very graciously provided us with sufficient copies for this workshop and

⁴¹³ *Chemicals in Agriculture: A Guide for Adult and Youth Programs in Agricultural Chemical Safety*. Washington, D.C., 1964, 3-4.

⁴¹⁴ "4 Keys to Pesticide Safety," *Farm Safety Review*, November/December 1965, 6.

also for a Youth Safety Conference which was held here on the campus.” Wardle also invited MCA associates to participate in future farm safety specialists’ meetings.

Accident prevention educators continually received such literature and by the late 1960s could freely obtain a variety of posters, stickers, and other written materials designed to warn and educate the public regarding chemical hazards.⁴¹⁵

Safety leaders also incorporated more recent forms of communication including films, radio, and television into their educational efforts. Advocates used all three of these methods to alert rural Americans regarding the many dangers existing in their homes and workplaces. Members of both the private and public sector produced an extensive collection of safety films. Farm broadcasters often searched for new ways to capture the public’s attention in order to raise awareness. They often discussed real accidents and sometimes infused their shows with such attention-grabbers as ear-catching sound effects. Promoters also harnessed the power of new information disseminating tools, such as television, in an effort to inform the public regarding potential threats to their well-being.

Both non-profit organizations and the private sector produced a burgeoning number of farm safety films with assistance from academia. During the 1950s, the NSC’s Farm Safety Division distributed an ever-increasing number of these short movies. In 1952, the NSC produced a film regarding possible corn-picker dangers entitled, “Are You Inviting Corn-Picker Accidents?” The film’s narrator discussed the problem’s scope, the consequences of careless practices, as well as preventative measures. The NSC staff received support in producing such films from farm safety experts, various land-grant

⁴¹⁵ Norval Wardle, Ames, Iowa, to Manufacturing Chemists Association, Inc., 5 September 1963, Norval Wardle Collection, Special Collections, Iowa State University, Ames; “Pesticide Materials Available,” *Farm Safety Review*, January/February 1967, 6.

college faculty members, and researchers employed by agricultural implement manufacturers.⁴¹⁶ Such for-profit entities as insurance companies also produced films with the aid of university staff. The Iowa division of Blue Cross also funded the development of a film entitled, “Hands Off,” which used farmers’ personal accident experiences to highlight corn-picker hazards. Visual aid technicians at Iowa State College created the film, which provided farmers with ways to prevent corn-picker mishaps. Although such resources were distributed nationally, the number of farm families who viewed them is impossible to ascertain.⁴¹⁷

The nation’s oil companies also recognized the dangers associated with the use of their products. Such activities probably not only represented a desire to assist in preventing farm fires, but also a desire to promote a positive image. In 1954, the members of the American Petroleum Institute’s Committee on Agriculture produced a film entitled, “Farm Petroleum Safety.” Clifford N. Hinkle, a Standard Oil Company executive, provided much of the administrative leadership in creating the film. The picture’s first segment featured a narrator at a county fair explaining the basic properties of various petroleum products. This portion of the piece included a lengthy discussion of the high flammability of fossil fuel products. Following this section, a teenage boy related the story of how his family had lost their home in a fire. Subsequent sequences dramatically recreated an incident in which a farm wife attempted to start her stove using kerosene. Unfortunately, her innocent attempt to ignite a fire led to a conflagration resulting both in personal injury and her home’s destruction. This part of the movie

⁴¹⁶ “Timely Visual Aids,” *Farm Safety Review*, September/October 1952, 3.

⁴¹⁷ *Ibid.*, 3, see also “The Safest Township Anywhere,” *Farm Safety Review*, January/February 1961, 5 which discusses the content of a General Motors sponsored film.

featured an actual farmhouse burning down which graphically confirmed the tragic consequences of careless practices.⁴¹⁸

Advocates also recognized the importance of enlisting radio broadcasters into their cause. Extension researchers had long verified the radio's importance in the lives of rural Americans. NSC staff fulfilled a key role in getting the nation's radio broadcasters involved in the effort to raise safety awareness. They encouraged cooperation amongst different stations, provided broadcasters with audio material as well as developed ideas regarding the most effective means of utilizing radio to improve farm safety.⁴¹⁹ In addition, radio journalists displayed much initiative in raising their listeners' awareness of the importance of living and working safely. In some cases, radio broadcasters even assumed leadership roles in the movement by serving on state farm safety committees or by assuming voluntary NSC positions.

The NSC promoted the involvement of radio broadcasters by providing them with safety material and opportunities to meet and discuss their respective efforts. As early as 1943, the NSC provided farm safety announcements, transcripts, and scripts to stations throughout the nation. *Farm Safety Review* writers also provided useful articles such as one piece entitled "What You Can Do to Help Put Safety On the Air." Such writings informed safety leaders how they could utilize their medium to spread the farm safety message.⁴²⁰ The NSC's Publicity Director and Farm Radio Safety Committee provided the administrative leadership required to enlist broadcasters in raising awareness. The committee included influential media figures representing NBC, the BLUE Network's

⁴¹⁸ "New Farm Color Film," *Farm Safety Review*, March/April 1954, 4.

⁴¹⁹ "Farm Radio Audience in Pennsylvania," *Farm Safety Review*, March/April 1943, 6.

⁴²⁰ Dan Thompson, "What You Can do to Help Put Safety on the Air," *Farm Safety Review*, July/August 1943, 6.

National Farm, and Home Hour as well as other important stations. These individuals met periodically to discuss ways to enroll radio journalists in a cooperative effort to reduce agricultural-related accidents.⁴²¹

By 1946, the NSC also recognized those radio broadcasters who had made exceptional contributions in raising the public's awareness. In 1950, Sidney J. Williams, the aide to the president of the NSC, presided over a ceremony to acknowledge their efforts. A *Farm Safety Review* writer stated that, "Fourteen radio stations and three networks also received the National Safety Council's Public Interest Award for exceptional service to farm safety during a luncheon given by the council to members of the National Association of Radio Farm Directors." The NSC held an awards banquet honoring the members of the National Association of Radio Farm Directors who had used their stations to endorse the cause.⁴²² The following year, organization members hosted another award ceremony at the Hilton Hotel in Chicago. The dinner celebrated the contributions of the staff of thirteen radio stations that had marshaled an exceptional effort in increasing public safety knowledge. Stations receiving recognition included KFEQ of St. Joseph, Missouri, WHFB of Benton Harbor, Michigan and, WHO of Des Moines, Iowa. These and the other ten broadcasting stations had featured a diverse range of safety programming. Such activities included numerous interviews with farm accident sufferers, sponsoring various kinds of safety contests, and placing numerous safety awareness ads on the air. For instance, an NSC staff member indicated that KWTO of

⁴²¹ "Farm Safety on the Air," *Farm Safety Review*, March/April 1944, 6.

⁴²² "Farm Week Publicity Winners Named," *Farm Safety Review*, November/December 1946, 13; "NSC Award Goes to Magazine and Radio Stations," *Farm Safety Review*, February 1950, 3.

Springfield Missouri featured “50 special programs and 400 spot announcements during the year.”⁴²³

Broadcasters demonstrated much initiative and sometimes even assumed highly influential roles in the movement. Keith Kirpatrick, a “farm broadcaster with WHO Radio in Des Moines, Iowa” not only regularly included safety spots on his station, but also assumed a leading role in directing safety efforts in his state. He was an important member of the Iowa Safety Council, worked closely with Iowa youth organizations, and even assumed important positions in the NSC’s Farm Division.⁴²⁴ His station also exhibited creative methods in alerting the public to farm hazards such as employing safety jingles and farm accident victims’ individual stories and contests. For instance, during the winter of 1949, WMT, a radio station located in Cedar Rapids, Iowa offered a prize for a listener who could come up with the best safety device. Howard D. Fountain, of Iowa City, won by creating a device that prevented stock tank drownings. A.L. Hamilton of the NSC, and Norval Wardle, cooperatively judged the radio safety competition.⁴²⁵

Radio journalists demonstrated enthusiasm in enlisting youth in the effort by instigating a variety of activities, including encouraging children to develop their own safety ideas and sponsoring a variety of competitions. In 1949, Ohio farm radio broadcasters and that state’s farm safety council cooperated in creating a slogan and

⁴²³ “1951 Publicity awards,” *Farm Safety Review*, January/February 1952, 9; see also, “Safety Publicity Winners,” *Farm Safety Review*, January/February 1949, 8 for an earlier example of such a NSC sponsored awards banquet.

⁴²⁴ “Focus on People,” *Farm Safety Review*, November/December 1967, 3.

⁴²⁵ “Safety Rhythm,” *Farm Safety Review*, May/June 1948, 3; “Use Radio to Promote Farm Safety,” *Farm Safety Review*, November/December 1948, 12; Chuck Worcester, “Gadgets that Save Lives,” *Farm Safety Review*, March/April 1949, 3.

jingle contest. Station managers compiled all the submissions and sent them to a panel of judges, which included state 4-H leaders, home economics instructors, and other safety conscious individuals. The winners included Dan Barlow, of Hudson, Ohio who came up with the catchphrase, "Safety is a factor that is often sought, but it has to be practiced and can't be bought." Richard Dacklin of Lima, Ohio triumphed with the maxim, "Leave no pitchforks loose on the farm, but a lot of people don't give a darn. It is easy to get hurt with a pitchfork too, if you don't put them up they'll run right through your shoe, may puncture an eye, a leg or two."⁴²⁶ In 1950, Frank F. Atwood, a radio station manager for Connecticut's station WTIC challenged the state's youth to develop safety projects in observance of Farm Safety Week. He indicated, "Twenty-four prizes worth more than \$1000 were awarded to the winners."⁴²⁷ Similar contests were held in other states across the nation.

Both the academic community and the NSC provided broadcasters with advice regarding their radio segments. In 1955, Frederick E. Beckett, a faculty member at Louisiana Polytechnic Institute's department of agricultural engineering, praised his pupils for their accomplishments. He indicated that his students had developed methods aimed at improving such programming. Beckett's students had identified problems with the university radio station's safety spots believing that they were rather bland. The college students thought, probably correctly, that such lackluster safety ads failed to attract attention. Thus, they harnessed the station's resources and produced more exciting programming by infusing realistic sound effects into their shows. Beckett stated that

⁴²⁶ Chester S. Hutchison, "Jingles And Slogans Promote Safety," *Farm Safety Review*, November/December 1949, 11.

⁴²⁷ Frank F. Altwood, "Radio Contest Saves Lives," *Farm Safety Review* September/October 1950, 13.

“although the production of the dramatized programs requires more work on their part, students have derived a great deal more enjoyment from producing these programs.”⁴²⁸ In 1956, Wallace N. Dudney, a *Farm Safety Review* contributor also provided advice regarding ways to improve radio safety spots. He stressed those who deliver such segments should “talk clearly,” the programs should be “personal,” and they should direct listeners to where they can “obtain additional information.”⁴²⁹ Thus, activists continually sought to improve broadcaster’s ability to help farm families avoid accidents.

Rural educators also believed television could propagate information more effectively than other media tools. Miriam J. Kelley, a marketing and consumer information extension expert from Kentucky, wrote, “Television is a natural for presenting any kind of information, offers opportunity for reaching a vast new audience, both rural and urban. It helps bridge the gap for the person too busy to get to a meeting brings in the ones who had been ‘cool’ to participate in extension activities.”⁴³⁰ C.E. Craver, a Blair County, Pennsylvania extension agent expressed similar sentiments. He stated that “[o]ur T.V. station has potential viewers of 1 million sets. If 1 percent of these sets are on and people watching, that means that probably 10,000 people seeing the demonstration or the information we are presenting. We feel that this is one of the best extension meetings we could possibly have.”⁴³¹ Farm Safety promoters also hoped to

⁴²⁸ Frederick Beckett, “Farm Safety with Sound Effects,” *Farm Safety Review*, June 1955, 13.

⁴²⁹ Wallace N. Dudney, “Publicity Techniques for Farm Safety Leaders,” *Farm Safety Review*, June 1956, 12-13.

⁴³⁰ Miriam J. Kelley, “Open the Door to Television,” *Extension Service Review*, July 1953, 129.

⁴³¹ C.E. Craver, “We Multiply our Efforts on TV,” *Extension Service Review*, March 1956, 61, for additional evidence regarding extension officials’ excitement about television’s potential to reach their audience, see, Arlie A. Pierson, “One Way To Measure the Value of Mass Media,” *Extension Service Review*, February 1956, 45.

capitalize on this potentially influential technology. A *Farm Safety Review* writer stated, “Imagine actual demonstrations of intricate farm operations brought into every farm home through the magic of television.”⁴³² Such comments were common during the late 1940s and 1950s as the technology’s potential began to be revealed.

Campaigners used television to educate farm families regarding the dangers present in their environment. In 1952, C.V. Phagan, an Oklahoma Extension engineer, and Burnis Arnold, director of the organization’s Radio and Television Department, cooperatively produced a farm safety program which aired on station WKY-TV. A *Farm Safety Review* writer indicated that Phagan incorporated a combination of elements into his demonstration including “model farm machinery, parts from machines which had been involved in accidents, photographs, and sketches.” He addressed a number of issues including hazards associated with electricity, farm machinery, and livestock. He also informed viewers regarding how they could identify potential farm dangers and take practical steps in eliminating them.⁴³³ In 1957, O.L. Hogsett, an Illinois farm safety specialist, indicated that he had worked cooperatively with his state extension’s editorial office to produce short farm safety film clips. He assisted in incorporating the short films into “a packet of news and information,” which the Illinois extension service had sent to the state’s television broadcasters. A *Farm Safety Review* writer pointed out that “all told, 29 stations are receiving television materials.”⁴³⁴

Safety promoters advanced used television to advance their message throughout the era; however, it appears that they utilized television less vigorously than radio.

⁴³² “Farm Safety Roundup,” *Farm Safety Review*, July/August 1945, 14.

⁴³³ “Farm Safety via TV in Oklahoma,” *Farm Safety Review*, July/August 1952, 4.

⁴³⁴ Ibid., “Selling Safety with Television in Illinois,” *Farm Safety Review*, January 1957, 12-13.

Evidence suggests TV stations did not enlist into the movement to the degree to which radio broadcasters participated. In 1956, the NSC gave three achievement certificates to TV stations, while the organization gave awards to a vastly larger number of radio stations. Such facts reveal the likelihood that there was less involvement amongst the television community. Although safety educators were probably less successful in utilizing television, they, nevertheless, occasionally employed its communicative powers. In 1974, a *Review* writer indicated that an Indianapolis station, WTTV, observed Farm Safety Week by including the topic in their regular programming. Station managers emphasized the importance of youth safety by featuring the issue on the “Chuckwagon Theatre,” a locally popular children’s show. The host stated, “Although we have lots of city children watching the program, farm safety rules still apply because these youngsters may be around lawn mowers, garden tractors, and various lawn and garden chemicals. Also, they may be visitors to a farm at some time.”⁴³⁵

Although farm safety activists’ use of print, film, radio, and TV were crucial elements in their accident reduction efforts, direct instruction also played an important part in their educational work. Demonstrations regarding agricultural machinery hazards represented some of the more popular events. Farmers sometimes witnessed such presentations as part of larger agricultural contests including such popular occasions as corn-picker matches and tractor pulls. Advocates also developed occasions exclusively devoted to disseminating the safety message such as fire fighting simulations and tractor tipping displays. Such exhibitions served to highlight dangerous habits as well as safe-

⁴³⁵ “Radio and Television... Award winners,” *Farm Safety Review*, January 1956, 7; “NSC Public Interest Awards,” January/February, 1960, 15; “Media Awards Given,” *Farm Safety Review*, January 1962, 8; Becky Surface, “Showing and Telling About Farm Safety Week,” *Farm Safety Review*, November/December 1974, 9.

operating practices. These displays tended to attract large crowds due to their dramatic and competitive nature. Safety proponents' use of the in-person approach addressed a variety of farm dangers including those associated with the rural fire problem. Such activities also evolved as the political, social, and legal context of the problem changed.

Stand-alone safety demonstrations included those aimed at the rural fires. In 1949, Chuck Forbes, a KASI farm broadcaster, became concerned with the rural fire threat as a result of several incidents near his hometown of Ames, Iowa. He quickly discovered that members of other organizations and institutions such as Iowa Retail Farm Equipment Association, the Ames Fire Department, and Iowa State College were also troubled about the issue. Forbes, with the aid of individuals from these organizations, worked together to create the "First Annual KASI Farm Safety and Rural Fire Prevention Field Day," which was held "on a farm south of Iowa State College at Ames, Iowa." Event organizers were pleased at the large numbers of local farmers who attended and watched the activities. These included the opportunities to observe firemen putting out an actual fire, implement dealers demonstrating the importance of using protective guards, as well as exhibits advertising other safety equipment. Activity leaders also installed a "5,000 gallon concrete tank" at the location to show the importance of having an adequate water supply required to fight fires.⁴³⁶

In 1952, Norval Wardle, an Iowa State College Farm Safety Specialist, Chuck Forbes, of WHO radio station, and Keith Royer, Iowa State College fire fighting instructor, collaborated in creating another fire fighting demonstration. They presented their program at a Conservation Field Day. The event provided a wonderful opportunity

⁴³⁶ "Farm Safety Field Day," *Farm Safety Review*, July/August 1949, 3.

to raise fire safety awareness for the approximately 14,000 Iowa farmers in attendance. A *Farm Safety Review* writer summarized their display by stating, “[I]n one demonstration a farm tractor was doused with gasoline and set afire, similar to a gasoline spill while refueling a hot tractor. Then various extinguishers were used, as well as a shovel and dirt. Farmers were shown how valuable a short-handed shovel can be in case of a fire with farm machinery in the field. The crowd also saw how a pool of burning gasoline could be controlled, and how difficult it is to extinguish a fire in piles of burning boards.” The author commented that the event attracted much attention as demonstrated by the many questions from the audience.⁴³⁷

However, safety experts and the farm community demonstrated particular enthusiasm in response to tractor-tipping demonstrations. In 1953, the University of Nebraska’s agricultural engineers conducted one of the first of these types of events at the state’s Tractor Field Day. The display primarily involved showing farmers the various kinds of operator decisions which resulted in over-turns. The tractor was fitted with a dummy named “Jug-head” who represented a reckless farmer. Dan Kitchen, a University of Nebraska at Lincoln agricultural engineer, commented on the symbolism associated with the mannequin. He stated, “Jug-head represented a common type of operator, always hurrying, never stopping to think, and who fails to recognize danger until it is too late.” Another dummy named “Bozo” signified the dangers associated with “showing off” while operating a second rider. Kitchen stressed that such unwise practices could have tragic consequences. He stated, “Bozo, a different type, represented the show-off. With little brother in his lap, he thrilled him with tractor capers, zig-zagged, turned corners at eight miles per hour.... the tractor rolled over, fatally crushing Bozo and his little

⁴³⁷ “Farm Fire Fighting Demonstrated,” *Farm Safety Review*, November/December 1952, 3.

brother.”⁴³⁸ Although the names of the demonstration dummies were humorous, their presence provided a realism regarding the catastrophic harm that might occur if one drove a tractor carelessly.

Safety activists also hosted another tractor roll-over affair in Boone, Iowa shortly following the Nebraska event. C.L. Hamilton, an NSC agricultural engineer, stated, “People who pass up articles and lectures on safety stood up in the hot sun for over an hour to catch every point demonstrated. The exhibition’s popularity was verified by a flood of requests for repeat performances.” Hamilton indicated that more than 20,000 farmers had viewed both the Iowa and Nebraska demonstrations. These dramatic displays proved to be much more effective than the earlier use of small tractor models in instructing farmers of the dangers of careless tractor driving practices.⁴³⁹ Kitchen agreed with Hamilton’s sentiments regarding the usefulness of such realistic demonstrations. He stated that “[t]his full scale visual education was highly effective. People who ignore safety articles or lectures stood to catch every point. Numerous local groups requested repeat performances. With equipment scheduled ahead and demonstrations promised throughout Nebraska, many requests cannot be met.”⁴⁴⁰ Both safety experts most probably correctly assessed the educational value of such events since they appeared to better capture the public’s attention than less vivid educational programs.

In 1954, a *Farm Safety Review* writer indicated that safety advocates outside of the Midwest were also experiencing success with tractor tipping events. The author stated, “Today, tractor tipping is demonstrated throughout from the Atlantic to the

⁴³⁸ Dan Kitchen, “Tractor Tipping Demonstrations,” *Farm Safety Review*, September/October 1953, 9.

⁴³⁹ *Agricultural Leaders Digest*, October 1953, 18. The popularity of tractor tipping demonstrations is also evidenced by the occasions in which he received requests regarding proper tractor tipping procedures.

⁴⁴⁰ Dan Kitchen, “Tractor Tipping Demonstrations” *Farm Safety Review*, September/October 1953, 9.

Pacific.” This popularity is supported by the success achieved by New Hampshire safety educators while using roll-over exhibitions. The state’s farm families viewed their first tractor-tipping event at the “Coos County Farmers’ Field Day.” The *Review* writer indicated, “Over 500 attentive spectators saw the roaring tractor tip and thud on the turf.” The *Review* contributor revealed that local implement dealer provided many of the tractors and much of the other types of equipment required for the event. He stated, “The tractor was made available by Nathan Beecher, Lancaster equipment dealer.” The business also provided the funding required for “the labor of assembling the ramp for the grade demonstration.”⁴⁴¹ Thus, local businesses, like their national counterparts, most likely recognized the public relations value of supporting such efforts.

Safety experts displayed great interest in tractor-tipping exhibitions and actively sought out how their counterparts in other states conducted such affairs. In 1956, Norval Wardle received information after inquiring Kansas Farm Bureau Safety Department officials regarding how to implement a program. Grice E. Sexton, the Bureau’s director of safety, expressed confidence in their educational validity. He stated, “We certainly feel that this demonstration is making all the tractor operators who see it more safety conscious.” Sexton’s letter also contained a detailed instructional packet. The most vivid aspects of the demonstration involved graphically revealing how careless driving practices could easily lead to overturns. Such programs also often informed attendees regarding power-take-off hazards, dangers associated with poor fueling practices, and precautions necessary for navigating rural roadways. Sexton also included materials detailing the layout of bleacher locations, agricultural implement dealer’s booths, and

⁴⁴¹ “New Hampshire Demonstrates Tractor Tipping,” *Farm Safety Review*, September/October 1954, 5.

even phony tombstones, which were added for dramatic effect. Thus, Sexton, like many other specialists, was very thoughtful in his planning of educational programming.⁴⁴²

Instructors who lacked the resources required for full-scale tipping demonstrations continued to purchase small tractor model kits well into the 1960s. Specialists could obtain such teaching aids from companies which manufactured realistic miniature tractor replicas. In 1958, the advertisers employed by MO-RE, INC of Bonner Springs, Kansas promoted such a scaled-down tractor model. The author of one company's advertisement pamphlet described the tractor's quality stating, "The tractor is electrically powered with a special 12 volt direct current motor. Its gear box is designed with the precision of a fine watch." The tractor came with a variety of other useful teaching materials including a guidebook, a small ramp to demonstrate points of instability, and charts to assist in conveying the information. The booklet advertised the product's many benefits, stressing that it was useful in teaching safety in school classrooms, county fairs, or at farm organization meetings.⁴⁴³ Although educators often commented on the superiority of large-scale tractor demonstrations, specialists were still using these models due to their affordability and practicality.⁴⁴⁴

Safety advocates also used mechanical corn-picking and tractor-pulling competitions to reach large rural audiences with the safety message by including safety in their assessment of a participant's performance. Chuck Worcester, a Cedar Rapids, Iowa radio broadcaster, indicated that referees investigated contestants' corn-pickers to

⁴⁴² Grice E. Sexton to Norval Wardle, 25 June 1956, Norval Wardle Papers, Special Collections, Iowa State University Library, Ames.

⁴⁴³ The employees of MO-RE, Inc., Bonner Springs, Kansas, composed the advertisement pamphlet entitled, "Tractor Safety Teaching Aid," which came into Norval Wardle's possession, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁴⁴⁴ "New Tractor Kit," *Farm Safety Review*, May/June 1961, 12.

determine whether they operated the machine properly. The judges deducted points from a farmer's total score for not working safely. He stated, "The safety score card used in judging the contests is divided into three sections: equipment on the tractor and picker, safety features and operation."⁴⁴⁵ Safety specialists also assisted event organizers in developing the appropriate operating criteria.⁴⁴⁶ Participants who displayed careless practices were sometimes even disqualified. In 1952, Harold J. Schmitz, a Missouri radio broadcaster, recounted how seriously some of the contest's officials regarded safety and how the judges' actions left a strong impression on the audience. He recalled that at one event, "Levi Caraway, from Jamesport, Mo., was conspicuously disqualified before a crowd of over 5,000 people, because he got off the tractor and left the corn-picker running."⁴⁴⁷ In 1953, O.I. Berg, a University of Wisconsin agricultural engineer, indicated that safety had been included in tractor-pulling contests. Berg stated, "Safety was incorporated by penalties for raising the front wheel off the ground, hitch height and rear wheel weight." Thus, just as in corn-picker contests, safety boosters incorporated the accident prevention message into the competitive farm events rural Americans had long enjoyed.⁴⁴⁸

Although the safety instructors' ingenuity did much in shaping safety programming, other factors were also important in influencing the nature of accident-

⁴⁴⁵ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1953), 36.

⁴⁴⁶ "National Corn-Picking Contest," *Farm Safety Review*, January/February 1950, 6.

⁴⁴⁷ Harold J. Schmitz, "Rules that Count," *Farm Safety Review*, November/December 1952, 12.

⁴⁴⁸ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1953), 37; for a useful discussion of the development and importance of corn husking competitions in North Dakota, see, Gordon L. Iseminger, "North Dakota's Cornhusking Contests, 1939-1941," *Agricultural History* 71 (Winter 1997): 19-45; Iseminger reveals how such events were especially popular, showing how similar contests would provide an ideal venue for safety activists to communicate their message to a large audience.

prevention instruction. An altered legal environment and a greater recognition of dangers associated with specific technologies were also important determinants. These new legal realities included restrictions pertaining to child labor in agriculture, which contributed to the rise of more standardized forms of tractor-driving training. The recognition of the dangers associated with increasingly diverse types of agricultural chemicals all contributed to more formalized types of safety education for these potentially dangerous substances. Activists also diligently promoted new safety devices such as ROPS and SMVs, which were developed primarily by the nation's agricultural engineers. Even though safety instruction exhibited such change, the labor requirements of farmers persisted as a motivating factor for such efforts, representing historical continuity with the movement's origins.

In the 1970s, an altered regulatory environment influenced the character of educational programming. Vocational agricultural instructors created youth-oriented safety classes in response to the enactment of the Hazardous-Occupations Order in Agriculture. This legislation represented an amendment to the Fair Labor Standards Act barring youth under the age of sixteen from doing certain kinds of agricultural work on farms which their own families did not own. However, students under sixteen who completed training received certificates which allowed them to be "exempt" from some of the restrictions.⁴⁴⁹ Thus, the development of such safety courses reinforced the theme that the features of the safety movement were shaped by a host of technological, political, and cultural factors.

⁴⁴⁹ Charles E. Wilson, "Rural America Cooperates for Safety," *Safety Standards*, November/December 1970, 1; for a detailed discussion of the characteristics of such training programs, the nature of completion certificates, as well as a course curriculum, see, Thomas A. Silletto, Dale O. Hull, J. Clayton Herman, "Safe Operation of Agricultural Equipment," Ames: Iowa State Cooperative Extension Service, October 1975, 3.

In 1970, Michigan State agricultural educators indicated farmers' labor concerns had encouraged the development of such safety courses. They stated that although "[t]he intent of the order was to protect the well-being of youth. It presented problems to farm operators who had traditionally hired youth to cultivate, drive tractors, and perform other tasks now listed as hazardous." They also stressed that "[a]s a result, Vocational Agriculture teachers received many requests from farmers for some type of assistance with these problems." Such comments reveal that although such classes did present a positive step in providing youth safety training, the desire for the courses essentially rose from growers' concerns about meeting their labor needs. Interestingly, this was not the first time in which labor concerns had instigated an interest in safety training. For instance, the fear of labor shortages precipitated improved safety awareness during the Second World War.⁴⁵⁰

Such classes provided these youths with practical safety training especially regarding safe tractor operation. Vo-Ag instructors, owners of agricultural implement businesses, and extension specialists cooperatively produced and supported such instruction. Charles E. Wilson, a US Bureau of Labor official, indicated that these local safety classes were met with enthusiasm from the agricultural community. Wilson stated that private businesses had been particularly supportive. He also stressed that "[h]undreds of implement dealers have donated the use of their shops as classrooms and have provided the tractors and machinery to be used in the instructions."⁴⁵¹ Such sponsorship

⁴⁵⁰ Neil O. Snepp, Frank Bobbitt, and Howard Doss, *Vocational Agriculture Training Program*, (East Lansing: Michigan State University, Rural Manpower Center, December, 1970), ii.

⁴⁵¹ Wilson, "Rural America Cooperates for Safety," 2-3.

confirms once again the important support the private sector continually supplied to farm safety efforts.

Although the training was originally developed for those youths working on farmsteads not owned by their families, young people with different motivations also attended. In 1970, Wilson stated, “Many youth enrolled in the training program do not anticipate working for anyone other than their father.” He also supported this point by indicating, “In a recent survey of the students in one area, it was found that less than 50 percent planned to work off the farm home during the summer.” Wilson also revealed that many students who met legal age requirements lacked agricultural equipment training and wished to acquire such skills. He stated that one sixteen year-old Iowa boy who possessed little tractor driving experience wanted to learn how to safely operating one before beginning a farm job.⁴⁵² Thus, such a course probably had a positive effect on improving the skills of agricultural workers other than the target audience.

In the 1970s, private industry also occasionally sponsored such formalized tractor-driving training. Such was the case regarding a vigorous educational effort cooperatively created by International Harvester (IH) officials and the staff of Harlingen Technical College located in the Rio Grande Valley of South Texas. A *Review* writer wrote, “Local IH dealers and other company personnel developed an intensive training program to help a group of 114 sugar cane growers in the valley who had joined together to form a local cooperative and build a new processing mill with a daily capacity of 8,500 tons of cane.” The services of “160 tractor drivers” were required to harvest the approximately 25,000 acres of cane. Jack Niles, an IH marketing official who greatly influenced development of the course, summarized the program’s objectives. He stated,

⁴⁵² Ibid., 1.

“we wanted a complete training course-one with heavy emphasis tractor maintenance and safety-and one the could properly prepare someone who had limited tractor experience.” His goals appear to have been achieved since the program’s participants received a mixture of classroom instruction and supervised tractor-driving instruction from highly qualified teachers.⁴⁵³

By the late 1960s, agricultural chemical safety education was also becoming more official. In 1969, Dr. L.C. Gibbs, an administrator for the Federal Extension Services Agricultural Chemicals Program, discussed the success of his organization’s “applicator schools.” Instructors at these seminars sought to educate chemical applicators regarding general safety principles. They also provided advice on how to avoid harming bystanders and polluting the environment, in addition to offering specifics regarding application equipment maintenance. Gibbs indicated that attendees included “aerial and ground applicators, pest control operators, representatives of chemical companies, associations, State and Federal government agencies, and university research and extension workers.” He also said, “About 5,000 persons have attended the 18 schools that have been held in the past two years in the Northwestern, Southern, and Western regions of the country.” The development of such schools revealed that government officials acknowledged that the proliferation of agricultural chemicals required an increased emphasis upon safety.⁴⁵⁴ Unfortunately, farm families had been using ever-increasing numbers of such substances since the early 1940s, long before the developments of such formalized chemical training.

The emergence of Rollover Protective Systems (ROPS) influenced farm safety education as well. ROPS included roll-bars and protective canopies attached to tractors

⁴⁵³ “Driver Training-Texas Style,” *Farm Safety Review*, November/December 1974, 10-13.

⁴⁵⁴ L.C. Gibbs, “Pesticide Safety,” *Extension Service Review*, January 1969, 6-7.

aimed at preventing drivers from receiving catastrophic injuries as a result of tractor roll-overs. Even though workers in the lumber industry had been using ROPS since the late 1950s, the farming community adopted them much more slowly. Nevertheless, by the early 1970s, *Review* writers were directing safety activists to encourage farmers to purchase tractors fitted with ROPS or to install such protection on older models. Efforts included writing articles for the farm press and showing informational films to rural audiences regarding the benefits of operating ROPS-fitted tractors. By 1973, both International Harvester and John Deere had produced films highlighting the advantages of such devices. NSC officials recommended that safety activists hold tractor accident demonstrations highlighting how the new technology prevented serious injury and death.⁴⁵⁵

For instance, in 1970, a tractor roll-over demonstration held at Nebraska's "Tractor Power and Safety Day" featured a tractor fitted with a protective cab. A *Des Moines Register* reporter indicated that the tractor's interior remained structurally intact despite undergoing significant stress. The journalist commented on the pictures featured in the article stating, "The particular cab shown here survived not only this overturn, but also a crushing resistance test carried out with the aid of a heavy pendulum, and another test involving three backward flips." These demonstrations encouraged farmers to install ROPS or purchase tractors which already possessed them.⁴⁵⁶ By the early 1970s, the NSC's staff vigorously promoted ROPS use by instigating their "Tractor Overturn Prevention and Protection (TOPP) program." The NSC effort included the distribution of

⁴⁵⁵ David V. MacCollum, "Tractor Canopies: Army Engineer Research Proves their Value for Protection of Operators," *Pacific Builder and Engineer*, October 1958, 3; "Reducing Injuries with ROPS," *Farm Safety Review*, January/February 1973, 14-15.

⁴⁵⁶ "Safety is not an Option," *Des Moines Register*, 27 October 1970, 1F.

educational materials in addition to cooperating with other organizations in hopes of increasing farmers' awareness of the life-saving advantages of ROPS.⁴⁵⁷

Activists also sought ways to encourage farmers to attach slow-moving vehicle emblems (SMVs) on the back of their tractors, wagons, and other farm machinery. Although researchers had sought various ways to improve farm equipment visibility, an Ohio investigator eventually developed a reflective triangular sign that became the standard device. A *Review* writer described the symbol's appearance and function as being "a 14 inch-high equilateral triangle with fluorescent orange in the center and reflective red as a border. It is designed for use on the farm tractors, trailing equipment, animal-drawn vehicles, self-propelled farm machinery and construction equipment." In 1963, Kenneth A. Harkness and other Ohio State university faculty members discovered a solution after a lengthy investigation of the issue. Organizations such as the Automotive Safety Foundation and the Ohio Agricultural Experiment Station financially supported their efforts.⁴⁵⁸ Harkness and other farm safety authorities encouraged farm safety activists across the nation to mount promotional efforts intended to persuade farmers to adopt the sign. Such suggestions included mounting campaigns to educate farmers about the emblem's benefits, enlist the aid of local media to promote SMV use, and personally contact rural residents regarding the devices' advantages.⁴⁵⁹

⁴⁵⁷ "Zero in on Safety," *Farm Safety Review*, September/October 1970, 4.

⁴⁵⁸ Unpublished slide presentation composed by Norval Wardle regarding the history of visibility devices entitled "Tractors + Traffic = Trouble," 15 March 1968, 1-3, Special Collections, Iowa State University Library, Iowa State University, Ames; "The Slow-Moving Vehicle Emblem," *Farm Safety Review*, September 1963, 14-15.

⁴⁵⁹ "Developing an effective SMV emblem program for your community," *Farm Safety Review* March/April 1965 5-7; initially farm safety activists were forced to convince farmers to use the emblem; however, by the late 1960s, Michigan lawmakers and legislators in other states had made the emblem's use the law for farmers, see, "The SMV Emblem in Michigan," *Farm Safety Review*, September/October 1968, 14-15.

Farm safety leaders not only devoted themselves continually refashioning their programs to the new situational realities, but also occasionally reflected upon their own effectiveness. They generally provided a mixed view regarding the levels of participation safety programs elicited from the rural public. While they often boasted of the numbers attending a tractor-tipping demonstration or other event, some safety activists expressed a general frustration at a public lack of interest. In 1970, Page Bellinger, chairman of the American Society of Mechanical Engineers safety committee, admitted disappointment regarding how much attention the issue had attracted. He stated, “You’ve heard it many times: ‘farmers won’t buy safety’ why not? They buy other things they consider essential for a productive effort. Why not safety?” He also stated, “Early efforts did not produce an avalanche of response, so safety received a back-page treatment, except by a handful of dedicated persons.” His comments mirrored the assessments of other safety proponents who had earlier concluded that those in the agricultural community enthusiastically embraced technological improvements without an equal zeal for working cautiously.⁴⁶⁰

Nevertheless, there is also evidence that contradicts such pessimistic appraisals of the responsiveness of farm families to the issue. As early as 1953, George Small, a farmer from Clinton County, Iowa mounted his own safety campaign. Small had been forced to leave farming after his arm was amputated in a corn-picker accident. He raised awareness of the need to be cautious around corn-pickers by creating a “countywide card campaign.” He along with the assistance of local farm youth distributed signs which stated, “Will You be Next to Swap Your Hand for a Hook?” These posters were “distributed to all farmers through school children and 4-H clubs, to hang on corn pickers where operators could see them constantly.” A *Farm Safety Review* writer stated, “As a

⁴⁶⁰ Page L. Bellinger, *Farm Safety Review*, November/December 1970, 16.

result no corn-picker accidents were recorded in the county during the harvest season. In the previous harvests there were three arm and four hand or finger amputations from corn-picker accidents in Clinton County.” Farm safety programming often contained similar examples of community spirit, which translated into enthusiastic participation.⁴⁶¹

Farmers who owned large farm operations which required the services of a large number of employees also appeared to be interested in promoting safe operations. In 1966, William Spangler who operated a 3,700-acre farm in California’s Sacramento Valley revealed a number ways in which his agricultural business had benefited from safety improvements, especially financially. Spangler revealed that during harvest time he employed a minimum of twenty people full time. He indicated that it was challenging to find a suitable substitute for a experienced agricultural laborer, and that the costs associated with his “workmen’s compensation insurance” were partially figured by the number of accidents that occurred in a given year. Spangler revealed that such practices as adding guards to machinery, requiring the use of safety goggles when workers used “grinding equipment,” and holding regular safety sessions had decreased the number of farm mishaps.⁴⁶²

Regardless of farmers’ interest in the subject, safety advocates argued that educational programs had a positive effect in reducing accident rates. In 1965, Ralph E. Patterson, a Federal Extension Service Agricultural Engineer, stated, “It has been proven many times under many circumstances that where there is an active safety program, there the accident rate is reduced. Also, where there is no accident prevention program, the accident rate does go up.” He cited a reduction in accidents both Minnesota and Georgia,

⁴⁶¹ “Corn Picker Programs Pay Off,” *Farm Safety Review*, September/October 1953, 5.

⁴⁶² “Safe Practices Cut Operating Costs,” *Farm Safety Review*, September/October 1966. 4-5.

both of which had active rural safety programs. Patterson indicated that Minnesota's farm families had benefited from a farm safety program. Glenn Prickett, the state's farm safety specialist, directed the Minnesota program, which Patterson credited with dramatically reducing farm mishaps. Patterson indicated that between 1949 and 1964 accidents on the farm had been reduced by fifty percent. He also indicated that the "water safety program" in Georgia had also dramatically reduced the numbers of people who had died in "drowning" incidents.⁴⁶³

Despite Patterson's comments, ascertaining their ultimate effectiveness of educational efforts presented considerable difficulties. For instance, it is important to remember that farm safety statistical data was often incomplete and that accidents might have been less frequent due to factors other than an education program. For example, safety writers acknowledged that some older types of machinery appeared to be potentially more dangerous than other new types of machinery. The case of the combine replacing the corn-pickers in the 1960s provides one example. Furthermore, safety activists often presented the numbers attending an educational event as a singular measure of success. This obviously signifies a superficial approach in determining a program's value in accident prevention. Despite such criticisms, safety activists also identified such problems in measuring the effect of their efforts.⁴⁶⁴

⁴⁶³ Ralph E. Patterson, "We are Responsible for Farm Safety," *Extension Service Review*, November 1965, 14. In 1970, Charles E. Wilson praised the positive effect of the "Cooperative Extension Service and the U.S. Office of Education training programs in safe operation of farm equipment," claiming that of the 35,000 graduates of the program not one had yet been involved in a farm mishap causing "serious injury," see, Wilson, "Rural America Cooperates for Safety," 13.

⁴⁶⁴ David W. Taber, "Promoting Safety Awareness," *Extension Service Review*, December 1969, 3; farm safety writers often identified the problem of non-standardized farm accident research methods, which they believed greatly reduced the usefulness data collection projects, see, "Zero in on Safety," *Farm Safety Review*, September/October 1970, 4.

Additionally, other abundant examples of farm safety specialists who critiqued their work exist. *Farm Safety Review* writers and attendees at the annual farm safety division meeting continually offered advice concerning better ways to both disseminate the accident prevention message and quality of programming. Writers and speakers emphasized such techniques as personalizing the information, selecting the proper words in communicating to the public, and continually seeking ways to capture an audience's interest. In 1965, E. Gene Brown, an NSC employee, elaborated on the latter point stating that "competition for people's attention is tremendous. The average person is literally barraged with appeals to get him to buy something, do something or adopt a particular way of thinking. In order to compete, your exhibit must have the impact to capture attention and thought." In 1967, Jack Burke also indicated that detailed planning should precede every safety campaign or program. He stressed that preparation should include obtaining a detailed understanding of the problem, eliciting the assistance of the local community, and creating a sound strategy to carry out the program. He also suggested that activists should thoroughly assess their performance upon the campaign's conclusion.⁴⁶⁵

As the movement progressed, rural educators gained additional insights regarding the most effective ways to gain farm families' attention. A particularly interesting insight pertained to their view that people were more likely to listen and internalize information if it was presented by people from their own communities. In 1968, Robert E. Kowalski, an Iowa State University extension official, elaborated upon this point stating, "Research

⁴⁶⁵ *Transactions-National Safety Congress*, (Chicago: National Safety Council 1962), 8-13; Jack Burke, "Guidelines for Successful Community Safety Programs," *Farm Safety Review*, January/February 1967, 7-10; see also, "Are They Getting Your Message?," *Farm Safety Review*, September 1963, 4-7.

shows that people are sometimes more willing to believe messages conveyed by friends and acquaintances than those who are purported to be experts.” Kowalski indicated that his fellow extension colleagues had recently used this finding in their effort to raise awareness regarding the dangers of placing “household chemical” containers near food products. He revealed that they placed posters to alert women of the issue in local grocery stores. Kowalski stressed, “Homemakers shop in supermarkets which give them the most for their money, and in which they can place their trust concerning quality of products. They eventually establish friendly relationships with their grocer, perhaps on a first-name basis.” Thus, safety proponents became increasingly perceptive in their approach as the movement matured.⁴⁶⁶

This discussion reveals that farm safety educators were generally responsive to the changing realities of the farm accident situation. They attempted to raise the rural public’s awareness of the issue by utilizing varied types of communication technologies and teaching techniques. In the decades immediately following the Second World War, activists produced increasingly diversified safety educational materials and accident prevention programs. Nonetheless, they faced a number of obstacles in disseminating their message into the countryside including the demands of educating during an era of great agricultural change as well as overcoming public indifference to their message. The movement’s leaders also appeared to devote insufficient efforts in determining their effectiveness in raising safety awareness. However, in all fairness, any attempt to determine the connection between their efforts and a reduction in accidents was problematic. Nevertheless, safety specialists believed, probably correctly, that safety

⁴⁶⁶ Robert E. Kowalski, “New Route for Safety Messages,” *Extension Service Review*, February 1968, 3.

programs that encouraged community participation or elicited excitement from the audience were superior to less dynamic educational approaches. Such a contention can be easily supported by an investigation into the many youth-centered safety programs. Such efforts were particularly effective in infusing community involvement and excitement into safety education efforts.

CHAPTER SEVEN

An Ideal Fit: 4-H, FFA, and the Farm Safety Movement

Both 4-H and FFA clubs were crucial in reaching the rural public with the farm safety message. The fact that both organizations viewed community service as crucial for the proper development of young people made them particularly well-suited for contributing to the farm safety movement. Youth group leaders held the view that youth should be instilled with a desire to contribute to the local community's betterment. In 1940, Leon O. Clayton, a South Carolina 4-H club leader, expressed his organization's high regard for community service. He stated, "The club leader is that big hearted, likable person in the community who gives freely of his or her time to broadly developing the community through working with the 4-H Club Boys and Girls. The 4-H leader lives a life of service." Club leaders also hoped to instill the value of community service into youth group members. Both 4-H and FFA exemplified these principles as they enthusiastically assisted in the effort to reduce farm accidents in the nation's countryside.⁴⁶⁷

Safety advocates also acknowledged both the advantages of aiming accident prevention programming toward young people as well as the eagerness with which young people participated in such activities. In 1940, T.A. Erickson, an official for the Minnesota Extension Service, articulated this sentiment at the NSC 's Farm Division annual meeting, stating, "They are still plastic, they are still receptive to ideas, they

⁴⁶⁷ Leon O. Clayton, "Factors Contributing to 4-H Success," *Extension Service Review*, November 1940, 149. Thomas Wessel and Marilyn Wessel, *4-H An American Idea 1900-1980: A History of 4-H* (Chevy Chase, Maryland: National 4-H Council, 1982), 1; for other examples which demonstrate how 4-H leaders placed a high value on community service, see, Donald Y. Yates, "Two Years of Club Work," *Extension Service Review*, September 1940, 118; H.N. Hunsicker, "The Farmers of the Future," *American Education*, February, 1966, 20-22.

become enthusiastic about things, and they can talk dad and mother and put these ideas across them where a grown-up person wouldn't be able to do it."⁴⁶⁸ In 1949, Kenneth H. Anderson, a member of the committee for Boys and Girls Club Work, stated, "For the time money and effort expended, I believe that more can be accomplished with youth in the safety field than adults. I say this because youths are open-minded and receptive. They are joiners and like to participate in organized efforts. They usually have more time than adults and their persuasive powers with parents and neighbors are great."⁴⁶⁹ In 1956, Maynard Coe, Director of the NSC farm Division, recognized how rural youth were enthusiastically participating in safety activities. He stated, "They are truly missionary in their zeal to make the families in their home communities safer at work and play. This work is not being carried out under the compulsion of a curriculum, but rather from a sincere interest in the safety of neighbors and friends." Safety leaders also recognized the growing involvement of 4-H and FFA organizations in their movement. For instance, in 1956, 130,000 Texas 4-H youth were participating in accident prevention activities. Willie L. Ulich, the vice president of the state's Farm and Ranch Safety Committee, stated, "Hazard Hunts, Safety Meetings and workshops are common to practically community clubs."⁴⁷⁰

Youth groups shared some of the same challenges that other organizations faced in raising safety awareness, such as convincing local citizens of the need to address the problem and gaining their participation in safety events and activities. An Ohio youth delegate to the NSC Farm Safety sectional meeting also indicated that young people in

⁴⁶⁸ *Transactions-National Safety Congress* (Chicago: National Safety Council, 1940), 40.

⁴⁶⁹ Kenneth H. Anderson, "4-H Safety Marches On," *Farm Safety Review*, January/February 1949, 3.

⁴⁷⁰ Maynard Coe, "Youth Works for Safety," *Farm Safety Review*, November 1956 1, 15; Willie L. Ulich, "Texas 4-H Members Fight Farm Accidents," *Farm Safety Review*, October 1956, 15.

their state needed more reliable farm accident statistics and wider cooperation amongst other organizations to improve his state's program.⁴⁷¹ Nevertheless, youth groups also possessed some advantages, including the fact that local citizens trusted youth club members and that the youth possessed an understanding of the safety issues in their own neighborhoods, as well as access to local resources. Safety advocates also often expressed the view that if they reached the youth with the message, it would assist in raising accident prevention awareness in adults.⁴⁷²

Rural youth became involved in the farm safety movement at its very inception. In 1943, the National Committee on Boys and Girls Club Work cooperated with the Federal Extension Service by enacting the "Farm and Home Safety Campaign." The national program was patterned after Minnesota and Kansas 4-H safety programs, which had been in existence since the mid-1930s.⁴⁷³ The nation-wide effort demonstrated that the national 4-H leadership was committed to enlisting their organization into the cause of safety. Such interest was also verified by the fact that the youths of hundreds of local chapters participated in safety programming. In 1946, the comments of a *Farm Safety Review* writer reflected the rapid expansion of youth-oriented efforts. The author stated,

⁴⁷¹ Hazel K. Beman, "What's New in Safety," *Farm Safety Review*, January/February 1954, 4-5.

⁴⁷² *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1959), 18; The *Farm Safety Review* featured a significant number of articles whose authors expressed the view that reaching youth could also result in disseminating the safety message to adults. For an example, see, "When Youngsters Preach Safety, Adults Listen," *Farm Safety Review*, May 1955, 10-11.

⁴⁷³ "4-H Names Safety Winners," *Farm Safety Review*, January/February 1944, 5; although the development of the 4-H "Farm and Home Safety Campaign" represented a considerable expansion of 4-H safety activities, the program was not the first. Several state and local 4-H clubs had already autonomously enacted safety programs. For instance, Bob Rupp, an employee of the University of Minnesota's office of publications, indicated that his state's 4-H clubs had been involved in safety activities since 1934. Minnesota youth conducted Hazard Hunts, distributing safety information and constructing exhibits prior to the creation of the 4-H national program. For more on these early activities, see, Bob Rupp, "Minnesota 4-H Program For Safety," *Farm Safety Review*, March/April 1947, 6-7 and Clara M. Oberg, "They Know Their Hazard Ten-Year 4-H Safety Program Saves Old and Young Untold Misery," *Farm Safety Review*, September/October 1943, 10-11.

“Leading the nation in practical farm accident prevention work for another year, 35,000 4-H club boys and girls have completed their 1945 safety activities.” The *Review* contributor also congratulated rural youth’s “immeasurable” contribution to the effort to reduce farm accidents.⁴⁷⁴ Another writer indicated that the club leaders who participated in the program hoped to “draw members’ attention to common accident hazards on farm and in homes and encourage them to participate in programs and promote safety as a 4-H principle.”⁴⁷⁵

The 4-H “Farm and Home Safety Campaign” directors recognized youth who devoted special efforts for the cause. In 1950, the Jackson County, Arkansas 4-H chapter won a special commendation. Club members had divided themselves into “four committees,” each dedicated to a specific farm danger including fire, home, highway, and farm hazards. Helen Baker, a particularly active member, gave farm and home safety demonstrations to a combined audience of 2,000 people. Both individuals and club chapters whose achievements were exceptional received prizes. These awards included free trips to the National 4-H congress, cash awards, and a plaque. The 4-H Farm and Home Safety Campaign’s participants expanded from 100,000 in 1943 to approximately 400,000 a mere seven years later.⁴⁷⁶ The numbers remained large and consistent throughout both the 1950s and 60s. In 1968, a *Farm Safety Review* writer indicated that 516,600 youth participated in the 4-H Safety program.⁴⁷⁷

⁴⁷⁴ “Honor 4-H Safety Champs,” *Farm Safety Review*, January/February 1946, 3.

⁴⁷⁵ “4-H Safety Winners,” *Farm Safety Review*, January/February 1953, 3.

⁴⁷⁶ Margarite McNally, “Millions of Hazards Removed,” *Farm Safety Review*, September/October 1950, 8. Prior to the enactment of this national program, the NSC had encouraged FFA youth to instigate safety awareness activities by recognizing students who had made special contribution to making their communities safer with certificates of recognition, see, “Safety Award For FFA Boys,” May/June 1943, 12.

FFA leaders also enacted a national safety program, which attracted a similarly enthusiastic response. In 1950, the Future Farmer of America Foundation sponsored a program which was comparable to the 4-H's "Farm and Home Safety Campaign." The organization's national leadership began a program in which they provided cash prizes to clubs that made special contributions to improving safety conditions in their local areas. FFA foundation leaders presented 200 separate \$50 awards to winning chapters and medals to individuals who had contributed exceptionally. In 1950, an FFA chapter from Smith County, Tennessee earned a particularly high recognition. John Farrar, an official for the Federal Security Agency, praised the chapter's members who had implemented a variety of awareness activities including constructing safety exhibits and distributing educational materials.⁴⁷⁸

The Smith County FFA chapter provides a vivid example of how a local youth club could mount a vigorous effort. Members enthusiastically involved themselves in a variety of safety-related activities, including constructing exhibits, participating in Farm Safety Week, and enlisting the local media's involvement. Chapter members constructed an exhibit highlighting the most common farm hazards and showed it at their county and state fair. Area youth also observed Farm Safety Week by visiting schools and private residences to raise safety awareness. They also distributed safety materials to an

⁴⁷⁷ "4-H Club Safety Winners Named," *Farm Safety Review*, January 1968, 8.

⁴⁷⁸ John Farrar, "First National FFA Safety Award," *Farm Safety Review*, November/December 1950, 4-5. The FFA national leadership continued to recognize accomplishments and offer prizes throughout the era. By 1956, such cash prizes given to youth and chapters totaled \$6,100 for that year alone, see, "Future Farmers Name Safety Winners," *Farm Safety Review*, December 1956, 1; although national coordination of FFA safety activities emerged in the 1950s, some chapters in states such as Illinois and Wisconsin were already intensively involved in improving safety in their communities, see, "FFA Safety Club," *Farm Safety Review*, May/June 1945, 6; and "FFA and Rural School Promote Safety," *Farm Safety Review*, January/February 1949, 8-9 for a discussion of these early state and local programs.

estimated eighty-five percent of the county's citizens. Club members also developed safety radio announcements and newspaper ads, which local media outlets featured. In addition, they educated themselves in first aid techniques and distributed first aid materials to area farmers. The Smith County example is representative of numerous other 4-H and FFA chapters throughout the nation and also demonstrates how successful agricultural educators were in galvanizing rural youth for the safety cause.⁴⁷⁹

Many organizations and individuals supported the nation's youth leaders and chapters in mounting safety programming. Farm safety specialists and state extension services employees provided important professional advice regarding specific information. They also aided in designing educational programming for chapters. Donor assistance also made it possible to provide youths who won safety contests with plaques or financial gifts. Such contributors included not only the National Safety Council and state governments, but many corporations as well. The NSC also played a crucial supporting role in all these activities by providing educational materials, advising club leaders, and encouraging private companies to donate funds.

Extension personnel and farm safety experts continually offered their expertise, educational materials, and also, on occasion, helped guide the creation of youth safety programs. Extension workers often served as judges in various youth safety contests, including national competitions. In 1961, the National Institute for Farm Safety attendees produced a paper which outlined numerous considerations in developing educational programming aimed at farm equipment safety. The booklet clearly explained basic yet crucial operating instructions helpful for preventing machinery accidents. 4-H and FFA

⁴⁷⁹ Ibid., 4-5; for a discussion of a 4-H chapter in Kansas which was particularly committed to safety, see, Franklin M. Reck, "The 4-H Story: A History of 4-H Club Work," (Ames: Iowa State College Press 1951), 289.

advisors could receive the paper by writing the NSC's Farm Division, which provided it free of charge. Farm safety specialists also supplied more direct support by visiting and advising youth groups. In 1967, Fred Meinke, a Vo-Ag and FFA advisor from Beaver Dam, Wisconsin acknowledged that much of his local chapter's success was due to the dedicated support of specialists including Randall Swanson, the state's safety specialist, and Donald Jensen, an "emergency preparedness" expert who was employed at the University of Wisconsin. Meinke indicated that he had received useful educational materials from them, as well as obtained personal assistance in designing their safety programs.⁴⁸⁰

Private sector donations were crucial to the creation of 4-H and FFA safety programs. Benefactors included manufacturers of farm equipment, food processors, and even automobile manufacturers. Such contributions not only assisted in the development of educational activities, but they also provided opportunities for companies to improve public relations. 4-H Historians Thomas Wessel and Marilyn Wessel indicated that Standard Oil's support of 4-H tractor maintenance programs largely stemmed from the company's desire to enhance its reputation amongst rural Americans. Their long-standing financial support of 4-H tractor educational programs confirmed this desire.⁴⁸¹ The nation's implement dealers also routinely donated tractors as well provided the needed repairs for tractors used in youth tractor educational programs. Thus, symbolizing a desire to promote positive relations with the communities in which they served.⁴⁸²

⁴⁸⁰ "4-H for Safety," *Farm Safety Review*, January/February 1947, 3; "For Your Operator Training Program," *Farm Safety Review*, July/August 1961, 12; Jack Burke, "Beaver Dam's FFA: A Safety Program for Young and Old," *Farm Safety Review*, September/October 1967, 3.

⁴⁸¹ Wessel, *4-H: An American Idea*, 94.

⁴⁸² Leon M. McNair, "Make Safety Part of the Project," *Farm Safety Review*, March/April 1949, 13.

Corporate supporters of rural youth safety programming provided the financial assistance required for many accident prevention activities. The events included safety campaigns, recognition banquets, and the expenses required for trips to national youth meetings. The *Farm Safety Review* is filled with numerous examples of such corporate backing. In 1959, the Farm Equipment Institute provided the monetary support for the FFA's National Safe Corn Harvest Program. In 1960, the Oscar Mayer Company provided an award dinner for Wisconsin youth who had made special contributions for Wisconsin safety programs. In 1961, Allis-Chalmers and other agricultural equipment manufacturers paid for several 4-H Wisconsin youth members to attend the National Safety Congress meeting.⁴⁸³

Private donations sometimes supported efforts to educate rural youth regarding the dangers associated with their products. Throughout the 1960s, Firestone Tire and Rubber Company provided substantial monetary support for the 4-H Automotive Safety Program. Insurance companies likely contributed at least partially out of self interest. For instance, in 1961 William P. Steinmetz, an assistant secretary to the National Association of Mutual Insurance Companies, indicated that his organization had faithfully sponsored the "National Youth Fire Safety Contest." Steinmetz's association supported the program by developing contest materials, providing the monetary awards, as well as assisting in the contest's administration. In 1966, Schwinn Bicycle Company supported an effort to improve bicycle safety in Kansas. The bicycle manufacturer provided monetary

⁴⁸³ "FFA Corn Harvest Program," *Farm Safety Review*, July/August 1960, 8; Wisconsin Honors FFA, 4-H Clubs," *Farm Safety Review*, July/August 1960, 10; "Awards for Farm Youth," July/August 1961, 11.

achievement awards for the program. Instructors taught children about proper riding practices, basic traffic rules, and repair procedures.⁴⁸⁴

The General Motors Corporation was especially involved in supporting 4-H safety efforts. In 1945, GM initiated its backing of such programming and continued such assistance for decades. In 1968, a *Farm Safety Review* writer stated that currently “516,600 4-H members were enrolled in the safety program which has been sponsored by General Motors for the last 23 years.”⁴⁸⁵ GM’s leadership also displayed a personal interest in the promotion of safety and the company’s contributions supported the cause in a variety of other ways. In 1961, GM funded the development and distribution of a book entitled *4-H Leaders’ Handbook*, which outlined specific strategies and ideas that were useful in planning a local 4-H accident prevention programs. Company executives also presented safety awards at the National 4-H Congress or National 4-H meetings. In 1970, Richard C. Gerstenberg, GM’s vice president, personally presented safety award winners with scholarships. He praised their accomplishments, stating, “You are working in an area of vital importance to everybody. I am sure the 4-H Safety Program has saved many lives and prevented countless injuries.”⁴⁸⁶

The corporate support which the nation’s 4-H and FFA members received was well deserved. Youth who were members of both organizations made substantial contributions in addressing the problem. They initiated local safety awareness campaigns and participated in a wide range of other educational programming, including

⁴⁸⁴ “Let the Sun Shine,” *Farm Safety Review*, November/December 1969, 13; William F. Steinmetz, “Young Hazard Hunters Wage War on Fire,” *Farm Safety Review*, September 1961, 6-7; Joe Van Cleave and Gary Staiger, “4-H Team Up on Bicycle Safety” *Extension Service Review*, August 1966, 20-21.

⁴⁸⁵ “4-H Club Safety Winners Named,” *Farm Safety Review*, January/February 1968, 8-9.

⁴⁸⁶ “Handbook Out,” *Farm Safety Review*, September 1961, 15; “4-H Safety Winners Named,” *Farm Safety Review*, January/February 1970, 8-9.

constructing posters and exhibits, and producing plays. They also instigated more intensive efforts such as personally examining local farms and correcting hazards. Youth sometimes even led community discussions regarding the issue. They also distributed educational materials throughout their communities, which assisted rural Americans in gaining the latest safety information. Young people addressed the entire gamut of hazards from those experienced at play, at work, and in the home.⁴⁸⁷

Agricultural fairs and meetings of various agricultural organizations provided a place for safety exhibits and posters that rural youths constructed to be displayed. In 1948, James A. Schwalbach, a Wisconsin extension employee indicated that fifty-three Wisconsin youth had participated in “a farm safety poster contest.” He also revealed that Maynard Coe, the director NSC’s farm division, presented cash prizes to youth who produced exemplary work. The Allis Chalmers Manufacturing Company granted the necessary funds for the cash awards. Schwalbach also emphasized the educational value of the poster competition for both adults and youth. The event’s organizers distributed the winner’s poster throughout the state in order to heighten public awareness regarding the need to raise safety consciousness. Schwalbach also indicated that “[e]very boy and girl who participated in the contest learned something about safety as they worked on their posters.”⁴⁸⁸ In 1950, a safety exhibit contest was held at the Pennsylvania Farm Show for the state’s FFA youth. The club that created the best exhibit received a monetary prize of fifty dollars.

⁴⁸⁷ Although most of the youth group safety efforts were directed toward more prevalent dangers such as those associated with automobiles, fire, and agricultural equipment, 4-H and FFA efforts included almost the entire breadth of dangers including those experienced during recreational activities such as swimming and bicycle riding, see, Virginia Nance, “Paving the Way to Farm Pond Safety,” *Extension Service Review*, July 1959, 149 and “4-H Members Ride Bikes Safely,” *Extension Service Review*, March 1951, 42.

⁴⁸⁸ “Rural Schools Raise Big Crop of Safety Posters,” *Farm Safety Review*, July/August 1948, 7.

Club leaders, extension personnel, as well *Farm Safety Review* writers provided 4-H and FFA youth with guidance regarding the proper construction of their visuals. In 1953, Samuel L. Horst, a safety education expert employed by the Pennsylvania Department of Public Instruction, while speaking at the NSC Farm Division meeting, provided a variety of suggestions concerning how such displays should be constructed. He stated, “Exhibits should be colorful and leave something in motion to attract attention. For motion you can use a continuous slide projector, poster machine, or mechanical devices such as a model of a power take-off, a corn picker or a tractor.”⁴⁸⁹ In 1957, Martha Kohl, a National Safety Council Home Economist, stressed the usefulness of such displays as a creative means to educate the public regarding a variety of safety issues. She stated that a good display should “fit the audience,” have an “uncluttered” appearance, and possess appealing features to “attract attention” from onlookers. Kohl also suggested that such artistic creations should possess a main idea and be well organized.⁴⁹⁰

Youth group leaders also incorporated farm accident plays into their programming. These dramatic presentations provided an interactive approach to instruct youth and educate the larger community about safety. The titles of such plays usually made their message very clear, possessing such titles as “This May Happen to You,” “You Use Your Head: Else You Wind Up Dead,” and “Farm of Broken Men.”⁴⁹¹ The scripts of such plays were sometimes rather absurd. In “This May Happen to You,” the

⁴⁸⁹ “Safety Displays Win,” *Farm Safety Review*, July/August 1950, 5; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953), 39. For an example of the kinds of advice Extension personnel provided in the construction of visual displays, see, John H. Behrens, “Open the Way with Visuals,” *Extension Service Review*, February 1957, 27.

⁴⁹⁰ Martha Kohl, “Safety Exhibits Prevent Accidents,” *Farm Safety Review*, July/August 1957, 7.

⁴⁹¹ E.H. Regnier, “This May Happen to You,” *Farm Safety Review*, December 1955, 11; “You Use Your Head: Else You Wind Up Dead,” *National 4-H News*, September 1950, 22-23; George Forgey, “Farm of Broken Men,” *Farm Safety Review*, July 1955, 13.

main characters were named “Minor Injury,” “Permanent Injury,” and “Fatal.” One of the “Fatal” character’s lines included the statement, “Yes, I am fatal. I remove the victims who get beyond my brothers, Minor and Permanent.” The writer directed the actor playing “Fatal” to “laugh hideously” while delivering the line. Although safety plays might have had questionable artistic merit, they nonetheless served to educate both parents and their children. However, the popularity of such presentations diminished by the 1960s when they ceased to be published in either the *Farm Safety Review* or the *National Safety Congress Transactions*.⁴⁹²

4-H and FFA youth often conducted “hazard hunts,” which involved club members visiting rural residences searching for hazards. Such investigations not only assisted in the elimination of farm dangers but also provided youth with useful educational experiences. Investigators visited local farms armed with safety checklists used to assess the property’s potential dangers. The examiner then alerted farm families to specific hazards and provided recommendations for correcting them. Participants usually returned to the farm to see if the problem had been corrected and sometimes even offered to fix the hazard. Such investigations also benefited the youthful investigators since they were required to learn about many dangers prior to conducting such investigations. Participants usually discovered a variety of hazards while conducting the hazard hunts, which sometimes involved investigations inside the home. In 1950, Margarite McNally, a national 4-H leader, indicated that young peoples’ investigations involved identifying the entire gamut of farmstead and household dangers including those

⁴⁹² E.H. Regnier, “This May Happen To You,” *Farm Safety Review*, December 1955, 11-12.

associated with electricity, livestock confinement practices, and agricultural equipment.⁴⁹³

Rural families were usually receptive to such events, which was probably related to the fact that the youths who examining the homes were from their own communities. Thus, they were not outsiders, but were probably perceived as helpful neighbors wishing to aid fellow farm families. In 1962, Roger Moan, a 4-H club member from South Dakota, indicated that most of the people whose farmsteads he had examined were appreciative. Moan stated, “On the 32 farms that I inspected, I found people to be very cooperative and happy to learn that hazards existed.” The large number of inspected homes supports Moan’s statement. Thus, 4-H and FFA youth chapters were well-suited to delivering the safety message since they were closely connected to the local community.⁴⁹⁴

The nation’s youth groups displayed impressive levels of enthusiasm while conducting these investigations. In 1952, Leigh Cree of the University of West Virginia, revealed that youth in his mountainous state had enthusiastically mounted a large number of hazard inspections. Cree congratulated the region’s youth regarding the cumulative effects of the hazard hunts when he shared that “[m]ore than 8,800 accident hazards” had been discovered and that “about 5,325” had been “corrected.” Cree also stressed that such hazard inspections, as well as many other activities, had brought the 4-H youth of his

⁴⁹³ “State-Wide Farm Youth Hazard Hunt,” *Farm Safety Review*, May/June 1954, 3; Margarite McNally, “Millions of Hazards Removed,” *Farm Safety Review*, September/October 1950, 7-8; during the early years of such investigations, 4-H clubs adapted their hazard “checklists” from those developed by organizations such as the American Red Cross, see, “4-H Clubs Use Hazard Check Sheet,” *Farm Safety Review*, March/April 1943, 12.

⁴⁹⁴ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1962), 25.

state “community, state and national attention.”⁴⁹⁵ In 1956, the Rocky Gap, Virginia Future Farmers, received an FFA national safety award partially due to their successful “Hazard Hunt.” The investigation was particularly impressive since they “surveyed 128 farms of the community for safety hazards and marked nearly 5,000 conditions that might lead to an accident of fire. A later survey showed that 90 percent of the hazards had been corrected.”⁴⁹⁶

However, a large number of such inspections were related to the rural fire problem. For instance, in 1952, Iowa’s Rural Fire Prevention Program included a particularly vigorous youth fire inspection campaign. Norval Wardle believed that the most significant part of the fire prevention program concerned youth’s “inspection of their own and neighboring farms and the removal of as many hazards as possible.” He celebrated Iowa’s youth accomplishments, stating that “2,292 of the state’s youth made 5,605 inspections, located 4,920 hazards and removed 2,802 of these dangers.” Wardle also pointed to the 3,850 fire prevention discussions that youth had conducted with adults as another positive outcome of the program. During the same year, J.L. Pennington, advisor of North Dakota’s Rugby FFA chapter, also acknowledged the accomplishments of youth stating, “I know that the men of the Rugby Fire department agree when I say that the tremendous reduction in fire losses in our community is due almost entirely to the fine work of FFA boys.”⁴⁹⁷

The fire problem was one of the earliest hazards rural youth organizations focused on due to the extensive financial cost and human life they exacted. FFA and 4-H clubs

⁴⁹⁵ Leigh Cree, “4-H Safety Goes Specific,” *Farm Safety Review*, September/October 1952, 6.

⁴⁹⁶ “Future Farmers Name Safety Winners,” *Farm Safety Review*, December 1956, 2.

⁴⁹⁷ Norval Wardle, “Rural Schools Check Farm Fires,” *Farm Safety Review*, July/August 1952, 11; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1952), 16.

began their fire educational programs in the early 1940s. The NSC, the National Committee for Boys and Club work, and the farm press often provided the required advisory assistance. However, the effort to reduce fires garnered the support of a diverse group of organizations including both the Volunteer Firemen's Association and various insurance companies. In 1958, the Volunteer Firemen's Association and various national insurance companies supported the development of New York's fire awareness program. Instructors who participated in the project provided young participants with five informative sessions aimed at educating youth in both identifying and eliminating fire hazards. L.W. Knapp, Jr., Cornell University Extension agricultural engineer, stated "One of the chief purposes of this project is to acquaint boys and girls of all club ages with the potential hazards and control of the fire." He also stated the program was "intended to make safer farms and homes through fire drills and a practice use of both homemade and purchased fire extinguishers." Knapp emphasized that this educational effort was well suited to complementing fire inspection programs.⁴⁹⁸

The Iowa Farm Safety Committee directed another particularly successful state-wide fire prevention program. In 1943, this effort took the form of the state's annual Rural Fire Prevention Program. The Iowa Association of Mutual Insurance Companies, Iowa Fire Prevention Association, Farmers Mutual Reinsurance Company, and radio station WHO provided the financial support for the annual event. The faculty members of Iowa State College assisted the state's school districts in administering the effort. The staff of the state's rural school districts encouraged their pupils to engage in a variety of fire prevention activities. This work included accessing local radio stations with the fire prevention message, participating in essay contests, and constructing prevention

⁴⁹⁸ L.W. Knapp, Jr., "4-H Cubs Learn Fire Control," *Farm Safety Review*, July/August 1958, 12-13.

awareness exhibits. Norval Wardle, the state's farm safety specialist, stated "their most important activities involved the inspection of their own and neighboring farms and the removal of as many hazards as possible." In 1952, Wardle proclaimed, "2,292 of the state's youth made 5,605 inspections, located 4,920 hazards and removed 2,802 of them." They had over 3,800 fire prevention discussions with owners and conducted 131 local programs with a total attendance of about 4,500. During that year, 17 of the state's 99 counties participated in the program He also stated, "During the nine years this program has been underway, the elementary school children from Iowa farms have removed 39,412 farm fire hazards. They have made a total of 61,705 inspections and uncovered 77,160 hazards. During the last four years, they have discussed fire hazards with 14,851 farmers and presented 366 fire prevention programs to 9,087 Iowa farm people."⁴⁹⁹

Although fire was an important era of emphasis, rural youth organizations appeared to dedicate particular attention toward dangers related to farm technology. These included long-standing programs aimed at improving safe use tractors and corn-pickers. Such efforts as the 4-H's tractor maintenance program and the FFA Safe Corn Harvest Program persisted throughout the era. Youth organization leaders believed such training was crucial to provide young farmers with the tools to safely operate in agriculture's increasingly mechanized environment. In 1949, Leon M. McNair, an official for the National Committee on Boys and Girls Club Work, indicated that such programs as the 4-H tractor maintenance program had been conceived to meet this need. He stated that participants in the program were "instructed that a tractor which is improperly operated is a menace to life and limb, and that making a habit of the rules of safe tractor operation is equally important" as all other aspects of the care and operation of a

⁴⁹⁹ Norval Wardle, "Rural Schools Check Farm Fires," *Farm Safety Review*, July/August 1952, 10-11.

tractor.⁵⁰⁰ In addition, such organizations also dedicated themselves to lowering the numbers of accidents with other technologies that were not exclusively rural in nature including automobiles and electrical appliances.

In 1944, the national leadership of 4-H instigated the tractor maintenance program hoping to instruct the nation's youth in the proper tractor use and care. They believed that wartime labor shortages had resulted in less experienced drivers operating these dangerous machines. Such a view served as a justification for the program into the 1950s. In 1951, a writer for the *National 4-H News* stated that "in the last war as the lads of 18 and older were called to service younger boys and girls, slipped into their tractor seats. Should this again come to pass it will be a godsend to farmers if these younger ones have been trained to operate tractors correctly." In that year alone, 4-H members from 46 states participated in tractor maintenance programs. These events included clinics conducted by extension officials, 4-H leaders or university faculty members. In 1951, a tractor training session held at Purdue University covered a variety of topics encompassing how to perform routine tractor upkeep as well tips for observing proper safety considerations.⁵⁰¹ Historians Thomas Wessel and Marilyn Wessel noted that every state but Pennsylvania had a tractor maintenance program in progress by 1951.⁵⁰² The popularity of such instruction is a testament to the reality that although the tractor represented a particularly important piece of agricultural equipment, it was potentially one of the most dangerous.

By the early 1950s, Nebraskans possessed a particularly vigorous program through creation of over eighty tractor clubs that educated the state's youth in proper

⁵⁰⁰ Leon M. McNair, "Make Safety Part of the Project," *Farm Safety Review*, March/April 1949, 12.

⁵⁰¹ "Tractor Again is Farmers' Key Weapon," *National 4-H News*, February 1951, 46.

⁵⁰² Wessel, *4-H: An American Idea*, 95.

tractor operation. In 1953, William D. Lutes, a University of Nebraska farm safety specialist, stated that they are “doing a commendable job in developing a safety conscious attitude amongst young tractor drivers.” Lutes stressed that clubs provided a setting in which young tractor drivers were informed of tractor’s “safety features” and the “hazards” inherent in improper operation. He emphasized that participants also benefited from tractor driving contests which assessed their operating skills. In 1955, Henry Hatcher, the manager Omaha Safety Council, revealed that Bennington’s 4-H tractor club members endured blazing 100 degree summer heat to clear dangerous vegetation obstructions. He stated that the youth “armed with sickles, scythes and corn knives” successfully cleared vegetation which could potentially block a driver’s vision at dangerous intersections. Hatcher indicated that the entire community benefited from “unobstructed vision for the remainder of the summer.”⁵⁰³

A tractor program’s success depended largely on enthusiastic community support as evidenced the Jackson County, Arkansas tractor club’s achievements. Ollie Smith, a prosperous farmer who owned 650 acres and possessed a long record of community service contributed greatly to the success of the 4-H program. Smith donated countless volunteer hours to establishing the county’s tractor club and transformed it into both a popular and valuable educational experience. Club members learned how to keep a tractor in proper running condition, as well as operate the machine safely. The county implement dealers donated equipment and local businesses financially supported the program. The club also provided entertainment and social activities for the youth who participated. A *National 4-H News* writer stated, “Glamour is attached to the tractor

⁵⁰³ William D. Lutes, “4-H Tractor Clubs Build Safe Drivers,” *Farm Safety Review*, November/December 1954, 8. Harry Hatcher, “Cutting Corners For Safety,” *Farm Safety Review*, June 1955, 4.

program through county-wide events which have become popular social affairs for the boys and their girlfriends and parents.” The program’s success was illustrated by the expanding enrollment and the high achievements of the program’s participants. In 1947 the tractor club began with a mere three members, but by 1958 over 200 Jackson County youngsters were participating annually.⁵⁰⁴

Youth who participated in such educational efforts could also test their knowledge and skills in tractor operator competitions. Young drivers who had mastered safe practices earned recognition in these matches. In 1949, the winners of county 4-H tractor driving competitions competed for the New York state title in an event held to determine the state’s best drivers. C.M. Edwards, of Cornell University, stated, “During the operation of the tractors the judges checked on such points as the use of time, engine speeds for starting, turning, gear shifting, clutching, steering, braking, hitching and maneuvering skill.” He stressed that the event also tested participants regarding their knowledge of proper maintenance procedures. Edwards indicated that the winners received an expense-paid trip to tour farm equipment manufacturing facilities. They were also given the opportunity to attend the “International plowing match,” held in Canada. The state’s extension agents provided much of the leadership required for the event and the “New York State Farm Equipment Dealers Association” donated the cash prizes given to event winners.⁵⁰⁵

Tractor operator contests also included regional competitions, which brought young drivers together from across the nation. In 1961, 4-H youth from 40 states

⁵⁰⁴ Ex-Air Force Technician sparks an Arkansas...County Tractor Club,” *National 4-H Club News*, July 1958, 11-12.

⁵⁰⁵ C.M. Edwards, “Tractor Operators Show Their Skill,” *Farm Safety Review*, January/February 1949, 10. For discussion of similar events in other states, see, Harlan Geiger, “Tractor Cowboys Thrill Farm Folk,” *Farm Safety Review*, November/December 1948, 6.

participated in 11th Annual Eastern United States and Western United States 4-H Tractor Operators Contests. Tractor drivers from eastern states traveled to the Virginia State Fair held at Richmond while their Western counterparts gathered in Dallas, Texas.

Participants were judged by a variety of criteria including observing proper starting procedures, practicing sound driving habits, and employing the correct refueling practices. The 4-H judges also took advantage of these contests to instruct parents in proper operating procedures. Such advice included avoiding the careless practices of having a “second rider” or wearing “loose-fitting clothing” which might become entangled in a power-take-off.⁵⁰⁶

In the 1960s, the NSC and the Industrial Equipment Institute (IEI) assisted in making tractor safety education more standardized. In 1963, the NSC and the IEI cooperatively produced a tractor safety program for the nation’s FFA chapters. A *Farm Safety Review* writer said that the “kit is designed to assist any chapter in developing an effective local farm safety activity. It contains materials for a community tractor accident prevention program, among which are stickers ‘remember cards’ given out during farm visits. Stickers and cards can be ordered free in quantity.” By the early 1970s, these materials also included “a safety lesson outline, a large tractor safety poster and a guide for a community Slow-Moving Vehicle Program.” Both the NSC and IEI received assistance from University of Nebraska faculty. These agricultural engineers assisted in the development of the materials that derived from their research activities. In 1970, a *Farm Safety Review* writer wrote, “During the 1969-1970 school year, more than 8,300

⁵⁰⁶ “4-H Youth Learn Tractor Safety,” *Farm Safety Review*, November 1961, 9.

FFA chapters in 49 states uses the tractor safety kit,” which represented the largest number which had ever used such materials.⁵⁰⁷

Youth organizations also launched corn-picker safety campaigns to combat the frightening toll caused by these potentially deadly harvesting machines. These crusades to reduce corn-picker accidents included conducting corn harvest accident surveys, using the media to raise awareness, and inundating farm families with safety information. The efforts to reduce corn-picker accidents were very similar to education efforts aimed at other rural safety issues. They utilized a diverse group of rural organizations and institutions in the enactment of a focused safety program. They were also successfully mounted due to the cooperation of a diverse group of organizations who pooled their collective resources to combat a rural accident problem. Although such corn-picking safety campaigns originated in the Corn Belt, such awareness crusades eventually encompassed a much wider geographical area.

In 1952, the Illinois FFA enacted the first corn-picker safety program, which resulted in informing thousands of farmers about the specific hazards of using these machines. The Illinois program received financial support from the state’s implement dealers, the National Safety Council, the Illinois Farm Bureau, and other benefactors who were concerned about the problem. J.B. Adams, Illinois FFA president, planned the ambitious effort in which 100 FFA chapters contacted 10,000 farmers with the corn-picker safety message. Art Johnson, an employee of the Illinois Farm Supply Company, celebrated the campaign’s achievements stating that youth “armed with leaflets, posters,

⁵⁰⁷ “FFA Tractor Program Announced for 1970-71,” *Farm Safety Review*, March/April 1970, 9.

film strips and pledge cards” had “launched a successful attack on corn picker accidents.”⁵⁰⁸

By 1954, the Illinois FFA corn-picker program had significantly expanded since the campaign’s organizers enlisted the aid of a total of “142 FFA chapters in the corn picker safety program.” The Newark, Illinois FFA chapter’s corn-picker campaign was typical of state efforts during the year. FFA leaders directed their members to make five or six neighbors aware of corn-picker safety’s importance by distributing corn-picker pamphlets, discussing some typical causes of accidents, and inviting local farmers to safety film showings. FFA members also placed safety posters throughout the community and utilized local news papers that carried corn-picker safety ads in their issues. FFA youth also dispensed stickers to farmers to place on their machines displaying their promise to “pick corn safely.”⁵⁰⁹

The Illinois program’s success led to the development of a national effort. In 1957, the FFA leadership enacted the Future Farmers of America Safe Corn Harvest Program, representing a concerted Midwestern effort to reduce picker accidents. The National Safety Council’s Farm Division, the Farm Equipment Institute, and the National Retail Farm Equipment Association supported the expanded plan. In 1957, over 2,100 FFA chapters from ten states participated. FFA members “made more than 150,000 personal calls on corn-picker owners,” successfully dispensed “2,700 corn-picker safety information packets,” and “161,250 stickers and pledge cards.” FFA clubs whose

⁵⁰⁸ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953), 20-21; Art Johnson, “Illinois FFA Tackles Corn Pickers,” *Farm Safety Review*, March/April 1953, 6.

⁵⁰⁹ V.E. Burgener, “FFA Out to Stop Farm Accidents,” *Farm Safety Review*, September/October 1954, 4-5, *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953), 33.

contributions were exceptional were recognized at the FFA National Meeting.⁵¹⁰ The program was even popular in states beyond the corn-belt. For instance, the contributions of the Berthoud, Colorado FFA chapter illustrate the enthusiasm displayed by Western rural youth. These young people “contacted 75 operators and visited 105 farmers to show them special safety precautions for the corn harvest season.”⁵¹¹

In 1963, R.E. Hauptmann, a vocational agricultural teacher and FFA advisor from Mount Ayr, Iowa, discussed his club’s experience with the Safe Corn Harvest Program at the NSC’s farm division meeting. He revealed that Vo-Ag teachers throughout Iowa had consistently cooperated with each other to ensure the program’s success. He also indicated that community of Mount Ayr had vigorously supported the program as evidenced by the willingness of local newspaper staff to publicize the event. Hauptmann also indicated seven local businesses contributed financially. He also stressed that the FFA youth held each other accountable for carrying out the required duties. The instructor stated, “Without my knowledge, class members were assuming the responsibility of talking with and encouraging the slow doers to get on the job and support the program. They let it be known that class members would not tolerate a poor job by any member.” Such comments reveal that the young peoples’ competitive nature and peer pressure also worked in favor of strong participation in youth safety campaigns.⁵¹²

⁵¹⁰ Maynard Coe, “An Impressive Example,” *Farm Safety Review*, September/October 1958, 1; “Here are the Winners,” *Farm Safety Review*, July/August 1958, 6. James E. Hamilton, “How They did it in Iowa,” *Farm Safety Review*, September/October 1959, 14.

⁵¹¹ “Introducing-the FFA Winners,” *Farm Safety Review*, January/February 1961, 3.

⁵¹² *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1963) 8-9.

Youth organizations also responded to dangers of both urban and rural Americans, including hazards associated with electrical use. The electrification of the nation's farms posed special hazards. Rural youth responded by mounting safety awareness efforts devoted to the prevention of electrical accidents. In 1947, the Wisconsin Utilities Association assisted the state's 4-H club organization in conducting electrical safety seminars for the state's youth. Evelyn Evert, an official for the Wisconsin Electric Power Company, indicated that the educational effort centered on various demonstrations highlighting the dangers of improper electrical wiring. She stated such demonstrations provided rural people with "a visual appreciation of the relation of proper wiring and fusing to satisfactory performance of electrical equipment." Arkansas FFA youth were also active in promoting safe electrical practices. In 1948, FFA youth supported by the Arkansas Power and Light Company labored to prevent electrical accidents in their state. In the early 1950s, 4-H clubs in West Virginia also mounted in electricity awareness programs. Home demonstration workers, County Extension Agents, and Agricultural Engineers supported 4-H clubs in conducting such electrical danger awareness efforts in that mountain state.⁵¹³

The nation's rural youth organizations also directed their energies toward the auto accidents problem, which also threatened lives irrespective of place of residence. Both 4-H and FFA also directed their energies toward reducing the numbers of rural Americans who were injured or killed on the nation's roadways. Such safety activities were aimed at both reducing automobile accidents as well as accidents involving slow-moving tractors

⁵¹³ Evelyn Evert, "Demonstrating Electrical Safety," *Farm Safety Review*, November/December 1947, 12-13; Cleve Burks, "'Know How' Wins Trip for Boys," *Farm Safety Review*, January/February 1949, 13; the activities of the Arkansas youth included one FFA student assisting in improving the electrical wiring for his school; "State Starts Safety Program in electricity," *National 4-H Club News*, March 1953, 35.

and other agricultural equipment. In 1956, 4-H directors established the “4-H Automotive Project,” which provided young people with automobile training. The overall goals of the course were to “give teenagers the opportunity to learn and practice safety rules and to teach them to take precautions and keep their cars in safe operating condition.” Extension agents, law enforcement officials, as well insurance industry representatives assisted the nation’s 4-H clubs in establishing the program. Topics for instruction included safe driving habits, basic car upkeep, and the criteria for selecting a car.⁵¹⁴

Ohio was one of the first states to mount a 4-H course aimed specifically at educating young drivers. H.W. Harshfield, the state director of Ohio’s 4-H clubs, applauded the adding of the class into his state’s 4-H programming. Club leaders used a 69-page booklet as a resource to cover a variety of car maintenance and safety issues. The instructional manual also provided assessment materials, auto maintenance checklists, and a variety of other resources, which provided instructional support. During the program’s first year, 4-H clubs in nine Ohio counties participated in the program. However, the citizens received the class so enthusiastically that soon it was available to youth in all of the state’s counties. Austin Showman, an Ohio State Extension employee, stated, “The project was so popular that this year it is being offered to all Ohio club members 15 years of age and older. Other states across that nation now are picking up on the cue from the Buckeye State offering a similar activity to their older club members.”⁵¹⁵ Rural youth benefited from such programs since they lived farther away from commercial and entertainment centers and thus were tempted to drive at a younger age than their

⁵¹⁴ “4-H Project Stresses National Emphasis,” *Farm Safety Review*, March/April 1961, 8-9.

⁵¹⁵ Austin Showman, “Ohio 4-H Boys and Girls Learn Auto Maintenance and Safety,” *Farm Safety Review*, June 1957, 5.

urban counterparts. Additionally, they often experienced more challenging driving conditions due to roads which were less well-maintained in adverse weather conditions.

Showman's assessment of the national scope of the program was correct. In addition, automobile safety education also remained a part of 4-H education throughout the era. Lin Helton, a county extension agent responsible for three Western Nebraska counties including Garfield, Loup and Wheeler, assisted in directing an auto safety program. The 4-H clubs and Boy Scouts of the tri-county area cooperated in conducting automobile instruction. The members of both organizations received assistance from area businesses, schools, and law enforcement officials. Participants raised automobile safety awareness by placing auto safety posters throughout their communities. They also involved themselves in activities such as volunteering to check the cars of local citizens for hazards. The automobile inspection included "horns, lights, wipers, and play in the steering column." Lin Helton revealed that most drivers appreciated the vehicle examinations. He commented that the "4-H campaign got a 'wonderful reaction in town'" and that the state's highway patrol was particularly pleased with the efforts of these Nebraska youth. The nation's 4-H club membership participation in the organization's automobile safety program continued unabated. In 1969, a *Farm Safety Review* writer indicated that approximately 70,000 youths had satisfactorily fulfilled the course's requirements in that year alone.⁵¹⁶

Although automobile collisions represented a major problem, the issue of crashes involving slow-moving agricultural equipment signified another cause of rural highway

⁵¹⁶ "Sand Hills Safety," *National 4-H News*, July 1959, 17; "Let the Sun Shine," *Farm Safety Review*, November/December 1969, 13.

fatalities. In 1954, the NSC enlisted the aid of the growing number of state farm safety committees in hopes of enrolling thousands of youth in an effort to “reflectorize” farm equipment. Both FFA and 4-H members participated enthusiastically in the NSC’s “Lite-Farm Equipment” program. The campaign’s success was largely due to a cooperation of the National Safety Council, state farm safety committees, and local youth clubs. The NSC provided the state committees with highway safety awareness tracts, reflective materials, and directions for applying these illuminated strips. State committees distributed such supplies to local youth clubs. Rural youth then encouraged local farmer to use reflective materials and even helped them attach the materials to their equipment.⁵¹⁷

The NSC program received widespread participation from nation’s 4-H and FFA Clubs throughout the late 1950s. In 1957, a *Farm Safety Review* writer stated, “The National Safety Council continues to urge that farmers equip farm machines with reflective material to supplement regular lighting devices provided by equipment manufactures.”⁵¹⁸ Youth groups worked diligently in the closing years of the decade to fulfill this aim. In the spring of 1955, only the program’s second year, youth in nineteen state’s participated “Lite-Farm Equipment” program. A *Farm Safety Review* writer stated, “In one state, more than 20,000 pieces of farm equipment and 2,500 farm automobiles and trucks were reflectorized in the first 60 days after the project got under way.”⁵¹⁹ In

⁵¹⁷ “National Safety Campaign: FFA and 4-H Members Reflectorize Farm Implements,” *Farm Safety Review*, May/June 1954, 4-5; although the federal government would soon mandate lighting through the Lamps on Farm Tractors and Equipment section of the uniform traffic code. Many safety writers believed that many farmers still lacked adequate lighting and reflective materials, thus farmers needed to augment such lighting by attaching additional reflective devices. For specific information regarding this legislation, see, Kenneth Fiske, “Light for Life,” *Farm Safety Review*, April 1957, 12-13.

⁵¹⁸ “Reflectorizing-A Continuing Program,” *Farm Safety Review*, April 1957, 4.

1956, the Iowa Farm Safety Committee alone enlisted a host of local 4-H and FFA chapters, resulting in the attaching reflective material to “15,000 pieces of farm equipment.”⁵²⁰ Such state campaigns illustrated the effectiveness of the farm safety organizational network since the NSC provided reflective materials and accompanying educational materials to state farm safety committees who then distributed them to the states 4-H clubs. The USDA also supported the reflective drive by “supporting the project through publicity releases to TV and radio stations.”⁵²¹

The ultimate effectiveness of these youth programs on promoting safety awareness and reducing accident rates in their communities is difficult to ascertain. This is particularly true regarding the educational value of safety exhibits, posters, and plays. Although they probably served to instruct youth regarding a host of safety issues, as well as raising the public’s safety awareness, it is difficult to tell to what degree. Even the era’s 4-H and FFA club leaders admitted this point. In 1952, Richard M. Goss, a 4-H leader from Colorado, stated, “We can’t tell exactly how many accidents we have prevented or lives we have saved. But we do know that many farms and home are safer places to live.”⁵²² 4-H historians Thomas Wessel and Marilyn Wessel also admitted that it

⁵¹⁹ “Nineteen States Set Up for Reflective Lighting,” *Farm Safety Review*, March/April 1955, 4; although, the NSC’s Lite-Farm Equipment campaign represented a particularly large and well-coordinated improve vehicle visibility effort it was not the only effort of conducted by youth groups during the era. In 1954, Rodger Sandage, a 4-H club leader from Benton County, Iowa, mounted such an effort independently of the NSC. The county’s 4-H youth sold flags to farmers who attached them to their tractors to improve visibility, see, Mark Kruse, “Iowa’s Record County Record Drive: Benton County 4-H Boys Make Highways Safer For Tractors and Motorists,” *Farm Safety Review*, May/June, 1954, 5.

⁵²⁰ “Reflectorizing: A Continuing Program,” *Farm Safety Review*, April 1957, 5.

⁵²¹ “National Safety Campaign FFA and 4-H Members Reflectorize Farm Implements,” *Farm Safety Review*, May/June 1954, 4; “Nineteen States Set Up For Reflective Lighting,” *Farm Safety Review* March/April 1955, 4.

⁵²² “The Miracle of Safety Comes to Montrose County,” *National 4-H News*, November 1952, 11.

would be difficult to assess the effect safety education had in reducing hazards in the countryside.

Nevertheless, the NSC, state extension officials, and rural youth organizations collected enough favorable data to justify the continuance of rural youth safety programs. Wisconsin safety advocates believed young people had played a crucial role in the reduction of farm accidents. In 1952, a brief article in the *Farm Safety Review* indicated that farm mishaps that resulted in death had been reduced from 168 in 1945 to 115 by 1951 in their state. The piece also revealed that every year in that six-year period had witnessed a gradual reduction in the fatality numbers. In 1955, Randall Swanson, Wisconsin's farm safety specialist, gave much of the credit to the state's youth stating, "We have had large reductions in farm accident deaths. Much of the credit for this goes to the youth organizations of our state."⁵²³

Although it is difficult to determine the overall effectiveness of hazard hunt activities, it is highly probable that they at least temporarily reduced the presence of dangerous conditions. Youth clubs that conducted such investigations often examined hundreds of farmsteads and also identified hundreds of potential dangers. In 1951, the Rugby North Dakota Chapter examined the properties of 496 farm families. Even though they did not correct the hazards themselves, they provided the families with specific advice on how to rectify dangers. Investigations including a second visit were probably more effective in reducing risks to farm families. An examination by a group of 4-H youth in Ohio featured such a structure and produced impressive results. In 1951, George

⁵²³ "Progress in Safety," *Farm Safety Review*, November/December 1952, 11; although the cited farm accident study shows a reduction in the instances of farm accident fatalities, it does not provide information regarding who conducted the study; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1954) 31.

Tewksberry, an employee of the Ohio, Farm Bureau Insurance Company, stated, “After a second inspection tour found that Mr. Farmer had corrected over 2000 hazards, giving them a 53.5 percentage of hazards eliminated.”⁵²⁴ Club members who directly eliminated dangerous conditions ensured safety improvements. In 1954, the Bottineau, North Dakota FFA youth club members revealed that they had “repaired or installed power-take-off shields on 37 tractors, replaced 271 loose or broken tool handles, repaired or built 48 ladders, inspected 560 electrical appliances for shorts, repaired the cords on 189 appliances, removed the sharp edges from 540 machines, repaired floors on 50 hay racks and wagons.” Youth groups who conducted hazard hunts throughout the era boasted of similarly impressive results.⁵²⁵

FFA and 4-H members who conducted reflective campaigns measured success similarly. Instead of disclosing how many hazards they had identified and corrected, they revealed how many pieces of farm equipment they had “reflectorized.” In 1955, Melvin Simmons of the Jasper Missouri FFA chapter enthusiastically proclaimed that his chapter that “purchased 400 feet of Scotch light tape and applied the tape to 180 machines.”⁵²⁶ Sharon Hansen, a member of the Richland Center, Wisconsin 4-H chapter also measured success in the same fashion. She stated that her 4-H club participated in the national organization’s “reflectorizing” campaign by “applying the reflective tape to 125 farm machines and vehicles that travel on the road at night.” Hansen believed that the

⁵²⁴ “FFA Farm Safety Award,” *Farm Safety Review*, November/December 1951, 8; “443 Safer Farms,” *Farm Safety Review*, March/April 1951, 3.

⁵²⁵ “National FFA Makes Awards,” *Farm Safety Review*, November/December 1954, 7; for additional examples of the results of youth investigation of farmsteads, see, “FFA Safety Awards,” *Farm Safety Review*, January/February 1953, 4; Peggy Duggan, “Safety Enthusiasts,” *National 4-H News*, April 1955, 45; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953), 25.

⁵²⁶ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1955), 26.

campaign had helped reduce the number of accidents, stating, “This year we had only three minor accidents in our community but this number is considerably smaller than that of last year.” Although it is probable that the 4-H safety activities helped in this reduction, there could easily have been a myriad of other factors that contributed to the reduction of automobile accidents in that part of Wisconsin.⁵²⁷

Rural safety leaders provided more convincing evidence to support the effectiveness of corn-picker safety campaigns. In 1953, Otto Steffey, a high-ranking official for the Illinois Farm Supply Company, credited his state’s “Corn Picker Safety Program” for reducing the number of harvesting accidents. Steffey, who was a vigorous supporter of the program, disclosed that in Illinois there had been 235 corn-picking accidents in 1951, which had been lowered to 168 the following year. Robert Howey, a Vo-Ag teacher from Sycamore High School, admitted that “part of this may have been due to better picking conditions.” However, he also stated, “We like to think that part of it was due to our safety education program.”⁵²⁸ In addition, Minnesotans also experienced success with the program. In 1953, Glenn I. Pickett, a University of Minnesota farm safety specialist, remarked that Minnesota’s Corn picker Safety Program had also been worthwhile. He stated, “One county reports results of this type of safety campaign: ‘no corn picker accidents in a heavy corn producing area for the last three years to October 17, 1953.’”⁵²⁹

⁵²⁷ Sharon Hanson, “Year ‘Round Safety,” *National 4-H Club News*, February 1955, 37. 4-H and FFA clubs improved the visibility of thousands of tractors and pieces of farm equipment while participating in such campaigns, see, “FFA Farm Safety Award,” *Farm Safety Review*, November/December, 1951, 9; FFA Safety Awards,” *Farm Safety Review*, January/February 1953, 4.

⁵²⁸ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953), 21, 33; Howey is referring to the reality that varying conditions in the crop contributed to instances of clogging which invariably increased the likelihood of harvesting accidents.

⁵²⁹ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1953) 56.

The corn-picker campaign's success is also supported by both more longitudinal and nationally grouped data. In 1955, Roland Espensheid, a Vo-Ag teacher from Franklin, Illinois, provided a more comprehensive picture of the corn-picker campaign's positive effects in his state. He stated, "In 1951, we did not have an organized corn-picker program in Illinois, and we had, at that time, about 292 corn picker accidents in our state. In 1952, we had 221; in 1953, we had 192; and in 1954, we had 115."⁵³⁰ The "FFA Safe Corn Harvest Program" had expanded to ten states by 1958, which resulted in thousands of farmers being reached with information regarding the safe use of corn-pickers.⁵³¹ Safety advocates believed that the campaign's dissemination had achieved significant cumulative results. In 1959, an anonymous *Farm Safety Review* writer indicated that there had been 83 corn picker related injuries in 1958, which had been reduced from 214 the previous year.⁵³²

Such less exclusively rural accidents as fires and automobiles accidents also witnessed marked reductions by youth-driven safety efforts. Norval Wardle indicated that since the inception of the youth-oriented fire prevention program in the early 1940s, instances of farm fires had been lowered from 844 conflagrations to 544 in 1952. In 1952, J.L. Pennington, an advisor for North Dakota's Rugby FFA chapter, also speculated that his area's fire prevention campaign had resulted in a positive impact since there had not been a fire in the surrounding area since the program's inception. In 1969, a *Farm Safety Review* writer E.C. Hale, Lexington, Kentucky's chief of police commenting on the state 4-H automobile program revealed that although the program had only been

⁵³⁰ *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1955) 36.

⁵³¹ "Here they are-The Winners," *Farm Safety Review*, July/August 1958, 6.

⁵³² "A Job Well Done," *Farm Safety Review*, September/October 1959, 14.

existence for three years, area accidents had been reduced from 1,034 to 967 and accidents resulting in death had been lowered from nine to two.⁵³³

Regardless of the ultimate impact of youth-oriented safety activities, such accident prevention programs represented some of the era's most vibrant and widespread safety efforts. Safety advocates had early on identified both 4-H and FFA as ideal organizational tools to reach the rural public with the safety message. Characteristics of youth safety programs such as their diverse nature of safety programming, the large numbers of participants, and the apparent receptiveness of farm families appear to have justified their positive appraisal of such organizations to be uniquely suited to carry the message. Fortunately for farm safety proponents the call to enlist rural youth in accident prevention efforts was met by the generous support of individuals and groups both from the private and public support. Although such backing was not entirely altruistic, it was nevertheless crucial for providing the resources required for the participation of thousands of youth in the Farm Safety Movement. In 1951, Franklin M. Reck reflected on the accomplishments of the organization in the first history of the 4-H organization. He stated, "Multiple streams of precious knowledge have flowed from the source of learning to the farms, there to be converted into practice by willing young hands and minds and hearts." Reck's words were particularly valid pertaining to the information disseminated by 4-H safety activities.⁵³⁴

⁵³³ "Rural Schools Check Farm Fires," *Farm Safety Review*, July/August 1952, 11; *Transactions-National Safety Congress*, (Chicago: National Safety Council, 1952), 16; "Let the Sun Shine," *Farm Safety Review*, November/December 1969, 13.

⁵³⁴ Reck, *The 4-H Story*, 289.

CHAPTER EIGHT

Lawsuits, Institutional Struggles, and Legislation: A More Contentious Environment Characterized the Farm Safety Movement

By the early 1960s, the nation's farm safety leaders could reflect on their notable achievement of establishing a coordinated national farm safety movement. They had demonstrated flexibility in their successful effort to increase the public's awareness of the problem. The same organizations continued to direct the movement's course; however, the effort's cooperative tone had become less dominant. A variety of factors and events altered the character of a movement that had arisen amidst Americans' feelings of unity and patriotism. Farm safety leaders desired to increase their professional prestige and autonomy, which in some cases meant that they were willing to sacrifice a harmonious relationship with other members of the movement. Individuals involved in farm accidents increasingly responded to their injuries by taking legal recourse against farm equipment manufacturers, which also produced a more contentious environment. This trend was demonstrated particularly in the growing numbers of product liability cases concerning accidents involving farm equipment. Furthermore, by the 1970s, OSHA's attempt to improve agricultural safety also sparked controversy as many farm community members resisted what they viewed as an unwarranted intrusion into their affairs.

In the early 1960s, farm safety specialists separated themselves from the NSC by creating a distinct organization. In July 1962, they changed the National Institute of Farm Safety into their own autonomous non-profit organization. They took this step at the yearly NIFS meeting held at Sarasota, Florida. The NSC's Farm Division had previously exerted control over the annual meeting; however, farm safety experts wanted their own

independent organization. Although farm safety specialists had been without such a professional association, it appears they had long desired one. In a letter dated March 6, 1963, Norval Wardle, the first president of the NIFS, wrote to Howard Pyle, the head of the NSC, regarding the origins of the newly independent association. He stated, “This is not a fly-by-night organization which developed overnight. It is the result of the desires, dreams, studies and plans of a large group of the professional workers in farm safety over the years since 1950 when I had the honor of first proposing it at one of our workshop get-togethers. It did not appear feasible at that time, but we think it is proper and right now.”⁵³⁵

The correspondence between the leaders of the NSC and the NIFS also reveals that this rather audacious move had caused some tension. In the spring of 1963, Wardle wrote another letter to Pyle revealing a lack of communication. He expressed dismay regarding how NSC officials had not corresponded with the Farm Institute officials and also articulated his determination to forge an independent organization. Wardle stated, “May I assure you again that we have every desire to cooperate with the National Safety Council but we do not plan to subordinate.”⁵³⁶ Although this particular letter was never sent, the correspondence between NIFS and NSC officials throughout 1963 alludes to the

⁵³⁵ Norval Wardle to Howard Pyle, National Safety Council President, March 6, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵³⁶ “National Institute for Farm Safety,” *Farm Safety Review*, November, 1962, 14. Norval Wardle to Howard Pyle, National Safety Council President, May 2, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames. Although Wardle indicates that he did not send the letter, it nonetheless reveals how the NSC coolly received the news of the development of a separate farm safety organization and the determination of the specialists to be autonomous. The initial steps to establish a discrete organization had been taken unbeknownst to NSC leaders by farm safety specialists at their annual meeting which was to be held in Florida, see Norval Wardle, “To All Safety Specialists,” September 21, 1962, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

existence of some inter-organizational strain. On May 8, Norval Wardle sent a memo to Howard Pyle demonstrating the desire of NIFS members to work harmoniously with NSC leadership. He stated, “May I assure you again that we have every desire to cooperate with the National Safety Council and particularly with the Farm Division. There is no desire or consideration of being in any way competitive but only complementary and supplementary.”⁵³⁷ The letter’s conciliatory tone reveals the likelihood NSC officials had not greeted the NIFS establishment favorably.

Additional correspondence between NSC and NIFS leadership provides more convincing evidence of a relationship in stress. In June 1963, Glenn I. Prickett, a University of Minnesota farm safety specialist, wrote to Randall C. Swanson, his University of Wisconsin counterpart, regarding the situation. Prickett indicated that he would be disappointed if any hard feelings resulted with the NSC as a result of the organization’s desire to be autonomous. He stated, “My personal feeling is that we can be of help to the Farm Department and we do need the Farm Department in carrying on our educational program.”⁵³⁸ On November 15, Randall Swanson wrote to Norval Wardle stating that, “all of us appreciate the fine work that you did as the first president of the National Institute for Farm Safety. It has been a difficult year because of resistance coming from the National Safety Council. I believe that we have conquered our major obstacles and that we can go forward from here.” He further indicated that the

⁵³⁷ Norval Wardle to Howard Pyle, May 8, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵³⁸ Randall C. Swanson to Glenn I. Prickett, University of Minnesota Farm Safety Specialist, June 21, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

organization's first meeting held at Des Moines, Iowa had been a "real 'touch and go' affair."⁵³⁹

Although the organization's first meeting resulted in some tension, Norval Wardle had taken the opportunity of his first presidential address to usher in a new period in his occupation's development. He indicated that the creation of a professional organization meant that, "we are, as a group, now mature." Wardle alluded to the fact that farm safety efforts needed to be increasingly based upon sound research and analysis. He also indicated that a more rational approach would not only make the nation's farms safer but also improve the farm safety profession's stature. He stated, "Our safety programs can no longer be based on what we think is right. We have some knowledge, some facts in safety; here is where we should have our programs. As we get more and more facts, we can broaden and extend or programs."⁵⁴⁰ Such words indicate that farm safety leaders now fully identified their cause as one that demanded a more systematic approach. They also appear to have fervently believed it was a challenge which could best be solved by applying their own unique brand of expertise.

Despite Wardle's optimism, a number of individuals in the movement disliked the organization's exclusionary practices. The NIFS leaders' creation of rather rigid membership qualifications stirred controversy. Such selectivity reflected their desire to increase the professional respectability of farm safety careerists. Wardle reflected this view when he stated that the organization should not only "promote the safety of farm people in all ways possible," but also "develop the profession of farm safety." In 1963,

⁵³⁹ Norval Wardle to Randall C. Swanson, November 15, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁴⁰ Norval Wardle, "First President's Message," 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

Randall Swanson stated that “we have a sound foundation on which to build the prestige of our profession so that we might take our proper place among other professional groups.”⁵⁴¹ Institute leaders expressed this desire in the organization’s restricted membership requirements. NIFS policies limited full membership to individuals who devoted themselves exclusively to the safety profession. Swanson expressed this view to C.E. Stevens, a safety specialist employed at the University of Missouri, stating that he did “not want to belong to an organization professing professional status on one hand and accepting anybody that had money for membership on the other.” Thus, the institute’s leaders fashioned a system in which full membership was reserved to those who devoted their time exclusively to accident prevention. A candidate could only become a full member if they had been employed for at least five years as a safety specialist. Such procedures eventually involved a prospective member submitting a detailed application in which NIFS officials would then decide if their qualifications best suited them to be a full member, associate member, or sustaining member.⁵⁴²

The policy meant that many of the organization’s associate members exerted less influence than those who served as full-time farm safety specialists. In the summer of 1963, E.W. Foss, a Cornell University safety specialist, resented this practice since it symbolized the dominance of a small group of individuals over the field. In a letter to Howard Pyle, he stated that upon attending a meeting of the incorporated group at the 1962 NSC Congress, “I learned that this newly formed institute had bylaws which

⁵⁴¹ Randall Swanson to Norval Wardle, March 21, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁴² Norval Wardle to Howard Pyle, March 6, 1963; Randall Swanson to Norval Wardle, March 2, 1963; Randall Swanson to C.E. Stevens, September 19, 1962, see the NIFS membership application which reveals how each of these status levels afforded distinct privileges, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

restricted membership.” He went on to state that this membership policy “automatically cuts out a large number of part time farm or rural safety specialists.”⁵⁴³ The leaders of the newly formed NIFS did not view Foss’s complaints with sympathy but probably feared that he represented a threat. In an October letter from Randall Swanson to Norval Wardle, Swanson wrote that, “You are aware, I am sure, of the Ed Foss situation which is rather disgusting, at best, but I am sure it will work out with any serious problem. We have a solid majority of the executive committee so that we can handle the situation even if some of them get foolish enough to support approval of such a move.”⁵⁴⁴ Although the existent letters do not provide sufficient evidence regarding what might have been Foss’s retaliatory plan, such letters, nevertheless, reveal that veteran farm safety professionals wanted to limit the influence of those they perceived to be less qualified to lead the organization.

Additional correspondence supports Foss’ view that a select few were guiding the organization’s aims and structure. In a letter from Randall Swanson to Norval Wardle regarding meeting place selection for the 1964 institute, Swanson voiced concerns on the subject of holding their meeting at the University of California at Davis since it might threaten the institute’s emerging structure. Swanson distrusted the intentions of that university’s extension safety specialist stating, “Ralph Parks is not a member or a sympathizer with the Institute’s organization.” He also felt the NSC would have a prominent presence at the meeting believing that “if this [meeting] were held in California, the Safety Council can travel to and from that area at their expense while the

⁵⁴³ E.W. Foss, Farm Safety Specialist, Cornell University to Howard Pyle, July, 31 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁴⁴ Randall Swanson to Norval Wardle, October 22, 1962, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

Institute will not have travel funds with which to protect themselves. I think it is very important that for at least another year the institute be held at a location where a strong full membership can protect the interests of our organization.” Despite such controversies, most farm safety specialists confirmed their support for the organization since almost all of them quickly joined the NIFS.⁵⁴⁵

The leadership of the NIFS also created the institute’s committee of professional development, which symbolized an additional effort by farm safety experts to improve their profession’s status. The committee’s members continually encouraged their associates to publish academic articles, create farm safety college classes, and become active in other professional organizations. In 1967, the group composed a report identifying such activities as crucial to improving their profession’s standing. They wrote that, “the quickest way to develop professional status and recognition is by the publication of papers” and that members should work to create “farm safety courses in our colleges and universities.” The individuals serving on the committee also encouraged their associates to gain “the recognition” of “other professional groups.” Such organizations included the American Society of Safety Engineers, the American Society of Agricultural Engineers, and the National Fire Protection Association.⁵⁴⁶ These efforts

⁵⁴⁵ Randall Swanson to Norval Wardle, October 14, 1963; Randall Swanson to Norval Wardle, March 21, 1963, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁴⁶ Professional Improvement Committee Report, June 18, 1970. This report and similar documents reveal how the NIFS leaders created a number of committees including groups such as Tractor and Machinery, Fire and Electricity, Emergency Preparedness, Home and Farmstead, Rural Traffic, Farm Chemicals and others associated with studying and reducing agricultural dangers. Committees dedicated to improving the organization’s effectiveness and prominence included the membership, program planning, and professional development committees. For details regarding who served on these groups, see Program Area Committee Roster 1967/1968, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

bore fruit in an organization whose leaders dedicated themselves to furthering the professional advancement of members as well as contributing to the emergence of a respected cadre of farm safety specialists.

In the 1960s, the farm safety movement was also influenced by a considerable shift regarding the public's view of accident culpability. The opinion that corporations needed to provide both safe environments for their workers and place greater emphasis upon safety in product design became more prevalent. This trend is illustrated by the fact that farm equipment manufacturers and implement dealers faced increasingly large numbers of lawsuits from people injured in accidents while using their products. In 1967, Norval Wardle, while speaking to a group of Iowa trial lawyers, reflected upon this development. Wardle stated, "Product liability is becoming an increasingly potent force because courts are rewriting the liability laws. Twenty years ago, if an individual had an accident with an agricultural machine, he was simply recognized as a careless person. Today there is an implied warranty that if you put a machine on the market, it is merchantable for a stated purpose, with a strict liability for defects notwithstanding they may occur without intended negligence. Liability insurance is affecting and being effected drastically." He also went on to state that, "[t]here is an increasing tendency to write safety into strict compliance laws."⁵⁴⁷ Wardle's comments suggest that product safety was becoming an increasingly important issue amongst the agricultural community by the late 1960s.

In 1969, speakers at an Iowa Farm Safety Council meeting articulated similar sentiments. Lex Hawkins, a Des Moines attorney, who had represented auto accident

⁵⁴⁷ Speech Given by Norval Wardle entitled "A Safety Engineer's Views on Accident Responsibility," to Iowa Trial Lawyers, at Iowa State University, August 1967, 4, Norval Wardle Collection, Special Collections, Iowa State Library, Ames.

victims, addressed the audience concerning the issue. Hawkins had also worked with Ralph Nader and other safety advocates in convincing the nation's political leaders to increase auto manufacturing safety standards. He warned farm equipment manufacturers of the dangers of ignoring the issue. He stated that, "In my business as an attorney, I make my living off the manufacturers' and distributors' goofs in not protecting the user of machines and equipment." He went on to discuss how car manufacturers had already been forced to learn about the need to improve safety. Hawkins stated, "I saw what happened there...the industry refused to make cars safer so the government stepped in and drew up safety standards. This same thing can happen in farming." He also implied that if they neglected the problem they had a lot to lose financially.⁵⁴⁸ In 1974, L.R. Modlin, a John Deere attorney, expressed a similar view at a regional ASAE meeting. He stated, "Fueled both by outspoken advocates such as Ralph Nader and by each consumers own experience and frustration in coping with inadequacies and breakdowns of increasingly sophisticated goods available to the buying public, the consumer is demanding action and is getting it."⁵⁴⁹ Such instances reveal that the potential for legislation and improvements in safety engineering appear to have begun to overshadow education as a means to improve farm safety.

In 1974, Frank Buckingham, an *Implement and Tractor* writer also indicated that manufacturers and dealers were operating in a more challenging legal context. He

⁵⁴⁸ Don Muhm, "U.S. Could Act if Farm Tractors Not Made Safer," *Des Moines Register*, December 6 1969, 1.

⁵⁴⁹ Frank Buckingham, "The Dealer's Position In Product Liability," *Implement and Tractor*, August 7, 1974, 61; the view that a shift had occurred in American society regarding placing responsibility upon manufacturers was expressed repeatedly during the era, such comments also persisted past the era studied, see, Johnson, "Product Safety and the Agricultural Engineer," 553; T. David McFarland, "On-Farm Accidents... How to make the farm machine man-environment system function as it should," *Agricultural Engineering* 49 (October 1968): 581, 611 and Kenneth F. Packer, Rodney E. Schaeffer, William M. Cade, "Products Liability: How Can We Minimize Hazards?," *Agricultural Engineering* 67 (May 1986): 30-32.

stressed a number of changes in ways judges interpreted the law had expanded the consumers' power. Such developments included much less of a demand on the operator to be "free of fault" in accidents, that the machine no longer had to be the "sole cause" of the mishaps but just a "contributory cause" and that the extension of written "warranties" to "implied" ones.⁵⁵⁰ William Johnson, an NSC official, indicated that accident victims were also becoming more likely to receive large monetary awards as a result of changing legal understandings. He stated, "In some areas the doctrine of punitive damages has been added. This means that if a manufacturer had acted wrongly you might almost say 'immorally,' as in not testing a drug, the courts will assess punitive damages. In such cases that damages are usually large enough to impress upon the company the seriousness with which its actions are viewed."⁵⁵¹ In 1976, R.O. Diedrichs, an engineer who had served as an expert witness and had done extensive safety research, spoke at an ASAE winter meeting. He alerted his listeners regarding the expanding costs which liability case awards had exacted upon the nation's manufacturers. Such monetary penalties had totaled \$500 million in 1965 but had ballooned to approximately \$50 billion by 1975.⁵⁵²

⁵⁵⁰ Buckingham, "The Dealer's Position in Product Liability," 61.

⁵⁵¹ William Johnson, "Product Safety and the Agricultural Engineer," *Agricultural Engineering* 48 (October 1967) 553, see "Learning to Cope with OSHA Product Liability," *Implement & Tractor*, December 15, 1972, 9; for additional insights regarding how farm equipment industry leaders were becoming increasingly concerned about the issue.

⁵⁵² R.O. Diedrichs, "Product Liability-Some Background and a Team Approach to Defense," (paper presented at the 1976 American Society of Agricultural Engineers Winter Meeting, Chicago, Illinois, 14-17 December 1976), 2. In 1968, E.C. Carlson, an International Harvester engineer, expressed similar sentiments regarding ROPS. He stated, "People are now less inclined to accept safety and safety devices as only 'luxury' items; they now consider safety in the framework of a requirement." See E.C. Carlson "Tractor Roll-Protection Frames," *National Safety News*, March 1968, 66. In 1973, Warren W. Eginton, a lawyer who specialized in product liability law characterized the growth of such cases as a "geometric progression in product liability claims," see, Warren W. Eginton, "Minimizing Product liability Exposure," *Quality Progress* 5 (January 1973): 21.

These expanding costs also coincided with disagreements amongst members of the agricultural engineering community regarding how diligent farm equipment makers had been in incorporating safety into their machines. The issue appears to have in some cases pitted the agricultural engineering community against itself. Those employed by private industry often believed that manufacturers were designing machines with safety in mind while some working for public institutions such as universities often alleged that manufacturers had responded slowly. In 1980, the comments of Bill Field, ASAE Agricultural Safety Committee secretary, commented upon this more acrimonious tone. He stated, “There is a struggle within the farm safety profession between persons and groups being motivated by different concerns. Farmers, professors, insurance executives, engineers and others are not all driven by the same interests and desires. Therefore, our joint efforts may be modified by the fear of adverse economic impact, hurting someone’s feelings or the desire to avoid conflicts.”⁵⁵³ Field’s statement appears to have described many of the events related to the farm safety movement that occurred in the 1970s.

Norval Wardle’s accusations about agricultural equipment manufacturers were particularly visceral. In 1972, he spoke as part of a panel to an audience of farm safety experts at a NIFS summer meeting. Wardle, along with Carlton Zink and Randall Swanson, both safety experts, commented on farm implement makers’ accident prevention responsibilities. Although he believed some improvements had been made in

⁵⁵³ Bill Field, “Getting Personal,” *Farm Safety Review*, July/August 1980, 15. Carlton Zink, a veteran agricultural engineer, also provided evidence of these diverging opinions. In 1972, Zink stated, “I am a middle of the roader. Brother Norval give the manufacturers ‘hell’—nicely of course, and Swannie stands up for them and points to what has been done with some approval, but I am not satisfied to take either unqualified stand. I think that there is responsibility enough for all if we are to reach what I consider to be the ultimate goal—the elimination of injuries and fatalities on the farm.” Speech given by Carlton Zink at NIFS summer meeting as part of a panel discussion regarding agricultural machinery manufacturers’ safety responsibilities, June 18-22, 1972, 1-2, Norval Wardle Collection, Iowa State University, Special Collections, Ames, Iowa.

agricultural related technologies, he nevertheless thought that such efforts had been inadequate. Wardle stated, “The progress in actual machines, chemicals, electrical systems and farmstead equipment as used on the farm when compared to the knowledge in the field available to guide in this field is skimpy, kindergarten, inadequate and entirely unworthy [of the] mechanical genius of America.” He also believed that the rise in liability cases was a positive development indicating that, “[o]ur courts and trial lawyers are performing a real function to make the manufacturers and merchandisers of such machines and equipment realize what the real cost of accidents resulting from such machines and equipment really are.”⁵⁵⁴ Wardle also expressed his view that farm equipment manufacturers treated accident prevention measures only as an afterthought on another occasion.⁵⁵⁵ The passionate safety advocate also came to believe that such views had cost him professionally.

In February 1978, Norval Wardle authored a rather emotional letter to Marvin Nicol, an NSC employee, who suffered from health problems. Wardle expressed the view that he had suffered because he had aided individuals involved in lawsuits against agricultural equipment manufacturers. Wardle stated, “I have always felt that my first obligation as a safety worker was to the farm people and I have always tried to bring to light the truth of these accident cases. It has come to be that I am about the only one that

⁵⁵⁴ Speech given by Norval Wardle at NIFS summer meeting as part of a panel discussion regarding agricultural machinery manufacturers’ safety responsibilities, June 18-22, 1972, 1-2; Zink unlike Wardle had spent most of his professional career in private industry including a short stint at Firestone, followed by over eighteen years at John Deere. Randall Swanson was an agricultural engineer and farm safety specialist retiree from the University of Wisconsin, Norval Wardle Collections, Iowa State University, Special Collections, Ames, Iowa.

⁵⁵⁵ Norval Wardle, “A Safety Engineer’s Views on Accident Responsibility,” (paper presented at a meeting of the Iowa Trial Lawyers in 1967, specific date not provided, 3), Norval Wardle Collection, Iowa State University, Special Collections, Ames, Iowa.

they can turn to since Randall has stated that he will work only for manufacturers in such cases; and of course Edwin Tanquary and Carlton Zink, with their long association with manufacturers also work for them. As a result I have surely raised the ire of the manufacturers.” He went on to explain what he viewed to be the sanctions of the professional community. Wardle stated, “They have succeeded in getting me kicked out of ASAE and are still pushing me. What is one little guy doing opposing the great FIEI? I never expected to do such a thing. The irony of life.”⁵⁵⁶ Although Wardle’s situation appears not to have been exclusively related to his consulting work, his predicament does reveal that a contentious air had infiltrated the movement.

Wardle’s correspondence with Wesley F. Buchele, a prominent Iowa State University agricultural engineer, further illuminates Wardle’s problems. These documents reveal that the prominent farm safety specialist believed that farm manufacturers had been negligent in their duty to properly consider safety in their product designs. Buchele had requested information because he was considering writing a farm safety history. However, Wardle cautioned Buchele against his proposed endeavor due to his perception that his work with those suing farm equipment manufacturers had strained his relationship with the members of the farm equipment industry. Thus, Wardle must have believed that such a history would have placed farm equipment manufacturers in a bad light. On May 25, 1978, Wardle stated, “Last August you wrote me a letter in regard to your project of writing a history of agricultural safety in the United States. Are you sure you want to do this?” He went on to comment regarding his doubts about composing such a book since Wardle appears that he had thought about it as well. He

⁵⁵⁶ Norval Wardle to Marvin Nichol, February 3, 1978, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames; Wardle had been working for eight years as a consultant and expert witness mostly for farm accident victims since his retirement from ISU.

stated, “Who would publish such a story; not the ASAE, not the farm division of the National Safety Council. However, I have had offers from some people who think they know how to do it effectively. Personally I have had no feelings about this but what about all of the farm people over America who are being sold out on their safety?”⁵⁵⁷ Wardle described his recent troubles indicating that the Iowa Board of Engineering Examiners had recently issued a lawsuit against him. He stated, “They were asking for a temporary and then a permanent injunction against me presenting myself in the state of Iowa as a registered professional engineer.” Wardle denied the allegation in his letter to Buchele and expressed his view that both International Harvester Company officials and other members of the FIEI had supported the Engineering Examiners’ efforts. Wardle also believed the incident had hurt his relationship with the members of ISU’s agricultural engineering department. He stated, “I have received the kiss of death as far as Ag. Engineers are concerned. I have dared to speak out in regard to the safety of farm machinery. I had rather thought the FIEI owned some, but not all.”⁵⁵⁸ Thus, unlike many of his associates, Wardle believed that farm equipment manufacturers had been too slow

⁵⁵⁷ Norval Wardle to Dr. Wesley F. Buchele, May 25, 1978; on August 2, 1977 Wesley F. Buchele had sent a letter to Norval Wardle indicating that he was “attempting to write a history on the agricultural safety in the United States,” and that he believed that Wardle was “eminently qualified to provide information.” Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames; see Norval Wardle to Dr. Wesley F. Buchele, 2 August, 1977, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁵⁸ Norval Wardle to Dr. Wesley F. Buchele, May 25, 1978; on August 2, 1977 Wardle did occasionally use the term Agricultural Safety Engineer, although this does not necessarily providing definitive proof that he had incorrectly represented himself, it nevertheless reveals that his professional title could potentially be a source of confusion, see, Norval Wardle to William Fletcher, April 12, 1973, and Norval Wardle to Office of Standards, Occupational Safety and Health Administration, October 15, 1973. In these documents Wardle adopts the title of agricultural safety engineer. This is important since Wardle’s Ph.D. was in Vocational Agricultural Education and he only possessed a minor in agricultural engineering. Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

to fully commit themselves to safety in their machine designs. Wardle also believed that his consulting work against agricultural equipment manufactures had cost him.

Nevertheless, prior to his death, Wardle appears to have a least partially reconciled such negative experiences for the larger safety cause. In 1986, he was invited to attend the 25th anniversary NIFS meeting, which included a commemoration of the organization's establishment. Although he declined the request, his sentiments were positive. Wardle stated, "I am thrilled with the great progress which has been made in safety throughout rural America. Much progress has been made. We have safer homes, workplaces, equipment highways and recreation places. The three great E's of Safety have all become more effective today, of Engineering, Enforcement and Education. Let us put bickering and fault blaming behind us. Just work at all of these to see that each area is given proper attention and we will make still further progress through the years."⁵⁵⁹

Wardle was not alone in his view that manufacturers were not giving proper attention to accident prevention. In 1966, L.W. Knapp, a University of Iowa farm safety expert, also believed that engineers had been too slow to sufficiently include safety into their products. He thought that education in some cases had been overemphasized and had served as a justification in delaying other accident prevention measures. He stated, "It is possible that those of us involved in accident prevention efforts may be our own worst enemies. The common license of us all is to attempt, through education, to make individuals safer." He elaborated by indicating, "We have created and are perpetuating the idea in everyone's mind that accidents are an individual's own fault, thus neglecting

⁵⁵⁹ Norval Wardle to NIFS members, May 19, 1986, Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

the things that can be done mechanically and physically.”⁵⁶⁰ T. David McFarland, an NSC agricultural engineer, echoed Knapp’s statements stressing, “Incorporating a high degree of safety into the product also lessens the need for extensive consumer education.”⁵⁶¹

Despite such disparaging comments, industry representatives often boasted of the many measures they had been taken to integrate safety into their machine design. In 1963, J.D. Morris, a Allis-Chalmers Manufacturing Company sales manager, pointed to a number of achievements his industry had made to the cause of safety. He pointed to improvements made to the tractor such as “electric starters” as opposed to hand cranks, “tail-lights” on tractor drawn implements, and a variety of features which made tractors more “comfortable” to drive.⁵⁶² An author who contributed to the *Agricultural Engineers 1967 Yearbook*, a annual ASAE publication, listed “eighteen recommendations or standards” aimed at “operator safety.” These included proposals for manufacturers to install safety features aimed at preventing falls, protecting operators from moving parts, and features to prevent the misuse of operator controls.⁵⁶³

The individuals on the FIEI’s safety committee also defended the industry’s attention to safety. In 1969, the group’s members authored a report indicating that farm equipment manufacturers extensively tested their products for safety prior to their

⁵⁶⁰ Harry M. Philo, “Who’s Responsible for Machine Safety?,” *National Safety News*, March 1966, 38.

⁵⁶¹ McFarland, “On-Farm Accidents... How to make the farm machine man-environment system function as it should....,” 611.

⁵⁶² *Transactions-National Safety Congress* (Chicago: National Safety Council, 1963), 27-29; Morris also listed PTO guarding, various features that improved the ease of climbing into the tractor’s seat, and more operator friendly controls.

⁵⁶³ Carlton Zink, “Safety in Farm Equipment: The Manufacturers’ Concern,” *Agricultural Engineering* 8 (February 1968): 74-75.

entrance into marketplace. The paper's writers also indicated that the organization was crucial in propagating safety standards. In addition, they highlighted how member companies had consistently supported farm safety educational programs. They emphasized a number of benefits that occurred from such sponsorship writing, "Through this cooperation, valuable information for the design engineer is obtained and joint programs are developed to provide safety information for the operator." The writers also stressed that the individuals who composed owner manuals included a thorough consideration of safety while preparing such booklets,"⁵⁶⁴ Such contrasting sentiments reveal that a more divisive environment had significantly fragmented the members of both the agricultural engineering and farm safety community.

In 1973, Wesley F. Buchele expressed particularly insightful comments while composing a rough draft for a conference paper regarding the issue. Although admitting that manufacturers could have been faster in implementing safety features into their equipment designs, his discussion was less visceral than Wardle's view of such companies. Buchele's comments provide basic answers for those who believed progress in designing machines with a greater safety emphasis had been too slow. He indicated that in his view it was not because equipment makers were evil or enjoyed the prospect of users becoming injured while using their machines, but could best be explained by the demands of the marketplace. Buchele stated, "Machinery manufacturers are shrewd businessmen; each has to balance the cost of manufacturing and marketing his product against competitors. Each does things that will make his machine most attractive in the marketplace. Low selling price is one of the more attractive items. Safety features may

⁵⁶⁴ Farm and Industrial Equipment Institute. *Report of Safety Committee of the FIEI Engineering Group of Committees* (Safety Committee of the FIEI Engineering Group of Committee, 1969), 7.

increase the cost and the complexity of the machine, increase maintenance problems, and reduce the potential numbers sold.” He also indicated that despite the advent of safety features, “Someone will inadvertently find a way of becoming injured while operating the machine.” Perhaps Buchele’s view provides a more prudent middle ground between the era’s two diverging camps of agricultural engineers.⁵⁶⁵

In 1970, the passage of the Occupational Safety and Health Act and the subsequent creation of OSHA, proved to be another factor that contributed to a more contentious climate. The agency’s establishment represented a significant expansion of the federal government’s power in both instituting and enforcing safety regulations. Scholar Charles Noble stresses that the creation of the organization represented a significant shift in the history of U.S. regulation. Noble indicates “the new law centralized existing factory legislation by establishing a single federal agency with economy wide rulemaking powers. A federal inspectorate was established to monitor firm compliance and empowered to fine employers who violated standards.”⁵⁶⁶

Despite its lofty aims, OSHA’s involvement in improving safety in agriculture proved to be limited. In 1985, Glen H. Hetzel, who at that time was the NIFS president, expressed his disappointment regarding what he viewed to be OSHA’s marginal impact. He stated, “Most of us have the occasional success that keeps us going and makes us try harder. Perhaps one of my biggest disappointments came when the OSHA regulations

⁵⁶⁵ Wesley F. Buchele, “Product Specifications and Product Liability Litigations,” 1. Wesley Buchele Collection, Special Collections, Iowa State University, Ames.

⁵⁶⁶ Charles Noble, *Liberalism at Work: The Rise and Fall of OSHA*, (Philadelphia Press: Temple University Press, 1986), 46. OSHA’s regulatory activities were not only controversial in agriculture but also attracted critics from a variety of segments of American society. For an example of a particularly passionate critique of OSHA’s policies see Alan Stang, “OSHACRATS: Mr. Businessman, The Buck Stops with You,” *American Opinion* (December, 1972): 1-13.

were, for all practical purposes not applied to agriculture.”⁵⁶⁷ Hetzel’s assessment of OSHA’s minor impact appears to have been valid. During the early 1970s, most of the agency’s regulations pertained only to farmers who hired employees; thus, farmers who depended on family members for labor continued to work largely outside its regulatory purview. A careful reading of the various standards in the *Federal Register* repeatedly emphasize the point that only farmers who hired workers were the ones who were required to obey standards. In addition, agricultural standards were relatively few including those pertaining to tractor roll-over protection, slow vehicle emblems, machinery guarding, field sanitation, and the handling of anhydrous ammonia.⁵⁶⁸ Finally, the agency not only issued few regulatory standards for agriculture but considerably fewer resources were devoted to inspection. In 1976, Morton Corn, OSHA’s Assistant Secretary, stressed that “very few of OSHA’s inspections have been on agricultural sites.” He emphasized that “in 1975, OSHA conducted only 1,117 such inspections [in agricultural settings] out of a total of 100,000. This was 1.5 percent of OSHA’s total federal inspection effort last year.”⁵⁶⁹

⁵⁶⁷ Glen H. Hetzel, “President’s Address,” (speech given at the NIFS summer meeting held in St. Louis, Missouri, summer meeting 1985), Norval Wardle Collection, Special Collections, Iowa State University Library, Iowa State University, Ames.

⁵⁶⁸ For a brief but insightful summary of a public hearing regarding proposed OSHA machine guard standards, see “OSHA in Agriculture: Machinery Guarding Hearing,” *Implement and Tractor* (October 7, 1974), 56-58. This piece and others reveal a number of controversies regarding OSHA standards including the cost prohibitions of retrofitting older equipment with new safety features such as machine guards. For specifics regarding some of OSHA’s agricultural standards in the early 1970s, see, the *Federal Register* including important documents such as the Federal Register, Department of Labor, Occupational Safety and Health Administration, *Agricultural Tractors: Roll-Over Protective Structures*, 4536-4549 (Washington, D.C, February 4, 1974) and the Federal Register, Department of Labor, Occupational Safety and Health Administration, *Guarding of Agricultural Equipment*, 4925-4927, Washington, D.C., February 8, 1974).

⁵⁶⁹ Congress, House of Representatives, Investigations and Oversight of the Committee on Agriculture. OSHA Regulations Affecting Agriculture. Ninety-Fourth Congress, 2nd Session, July 27, 1976, 15-16. For a brief but insightful summary of a public hearing regarding proposed OSHA machine guard standards, see “OSHA in Agriculture: Machinery Guarding Hearing,” *Implement and Tractor* (October 7, 1974): 56-58.

Nevertheless, government officials and politicians expressed a widespread view that the agency had been overly intrusive in a congressional hearing regarding OSHA's involvement in agriculture held in 1976. The hearing's participants leveled a range of criticisms regarding the agency's efforts to enforce its rather small set of agriculture standards. USDA's John Knebel, Undersecretary of the U.S. Department of Agriculture, and Iowa Congressman Charles Grassley were particularly passionate in their assessment of OSHA's overall mis-management. Grassley complained that OSHA officials had failed to clearly communicate safety information and they had also worked too independently of other federal agencies. He also stated that most farmers viewed OSHA officials primarily as "a roomful of lawyers drafting regulations which pertain to an area about which they know nothing." Knebel also believed that the agency had done a poor job in explaining its standards and that it had not given farmers sufficient time to enact regulations. He also pointed to the impracticality of regulating many rural work environments since "the diversity and dispersion of farm/ranch operations points out the need for a heavy emphasis on voluntary educational efforts." Thus, Knebel recognized this fundamental characteristic of agriculture that prohibited intensive regulation.⁵⁷⁰

The historical evidence also suggests that many others, who were more directly involved in agriculture, including farmers and implement dealers, often feared or were

This piece and others reveal a number of controversies regarding OSHA standards including the cost prohibitions of retrofitting older equipment with new safety features such as machine guards. For specifics regarding some of OSHA's agricultural standards in the early 1970s, see, the Federal Register including important documents such as the Federal Register, Department of Labor, Occupational Safety and Health Administration, *Agricultural Tractors: Roll-Over Protective Structures*, 4536-4549 (Washington, D.C., February 4, 1974) and the Federal Register, Department of Labor, Occupational Safety and Health Administration, *Guarding of Agricultural Equipment*, 4925-4927, Washington, D.C., February 8, 1974).

⁵⁷⁰ Ibid., 2-5. For a discussion of the nature of OSHA regulatory activities in one Midwestern state and the controversy the agency engendered amongst the state's agricultural leaders, see, Plambeck, ed., *Iowa Farm Safety in the 20th Century*, 143-148.

hostile towards the agency. Such antagonism was probably related to the fact that the agency placed additional responsibilities on individuals who were already engaged in a particularly demanding occupation. In 1971, OSHA officials mailed instructional packets and paperwork to those “farmers and ranchers” who employed non-family members on their farms. Employers were not only required to observe all the agency’s safety standards but also “keep accurate records of work-related deaths, injuries, and illnesses, except those requiring minor first aid.” Such record-keeping duties also included that they take note of any significant exposures to potentially harmful substances as well as making yearly accident reports easily available to their workers.⁵⁷¹ Thus, it is easy to imagine that already overworked farm and ranch owners would resist such responsibilities, which demanded additional time and energy.

In 1976, the editors of *IH Farm Forum*, a periodical sponsored by the International Harvester Company, surveyed their readers regarding their opinion of OSHA. Although this investigation only involved the 829 *Farm Forum* subscribers who returned the feedback form, it nevertheless indicated that they generally held an unfavorable view of the agency. The study revealed that the majority believed that OSHA officials were largely incompetent and that they were wrongly interfering with farmers’ work. The piece also exposed some rather casual attitudes regarding farm safety. Lloyd Ziegler, an Illinois farmer, revealed that he assumed that it was appropriate for adolescent boys to operate tractors. He stated, “I’ve trained three sons to operate tractors, and I started each one of them at 12. First, they learned to operate the tractor with no equipment attached. Then I let them operate the tractor with light loads for an hour or two

⁵⁷¹ “Farm Employers Must Keep OSHA Records,” *Agri-Safety News* 3 (1971): 2.

at a time until they were ready to do bigger jobs. Any showing off and they were grounded.” Ziegler also represented a majority of the respondents who did not appreciate what they viewed to be OSHA’s misguided attempt to prevent accidents.⁵⁷²

In March 1972, Dave Lucy, a contributor to *Farm & Power Equipment*, wrote a piece entitled, “May I see you in your office?” which also expressed an adverse view of the agency. He described how intimidating it could be to have a U.S. Department of Labor inspector make an unannounced visit to a farm implement dealership. Lucy ominously told his readers that after a government employee tours your business, “Be ready for the boom to fall.” He went on to describe an unpleasant experience that a Pennsylvania equipment dealer had after an OSHA inspector had completed a visit. The owner discovered that in order to comply with OSHA standards it would require an outlay of 5,000 dollars. Changes included updating the establishment’s electrical system, “installing guard rails on all stairs,” and renovating the shop’s painting area in order to comply with ventilation standards.⁵⁷³ Such stories undoubtedly circulated throughout the countryside and contributed to feelings of fear and distrust regarding the federal government’s attempt to improve safety.

Although large numbers of people in the agricultural community appeared to view OSHA’s actions as a misguided intrusion into their lives, such criticism was not entirely fair. For instance, their belief that the agency was grossly ill informed was probably overstated. OSHA officials arrived at their standards only after lengthy consultations with

⁵⁷² In fact, eighty-eight percent of the respondents either chose “No, a farmer’s safety should be his own responsibility and no law is going to make him more safe,” or “Under no circumstances does the government have any business telling a farmer whether to practice safety” in response to the question “Should OSHA or OSHA type regulations be extended to include the farmer and members of his family as well,” see, “Reporting Back: on Farm Safety and OSHA,” *IH Farm Forum* 1 (Fall 1976): 26-29.

⁵⁷³ Dave Lucy, “May I See You in Your Office?,” *Farm & Power Equipment* 54 (March 1972): 40.

members of the agricultural community. For example, in 1972, during the organization's formative years, OSHA officials depended upon an "advisory panel" to determine appropriate agricultural standards. The advice-giving body consisted of 15 individuals who represented a cross-section of the members of the nation's agricultural sector. These included leaders of commodity groups, agricultural laborers, farm safety experts, and others who possessed considerable knowledge.⁵⁷⁴ Such panels collectively possessed years of theoretical and practical experience with agricultural technology. Thus, despite the fact that inexperienced or over-zealous inspectors might unfairly interpret such standards, they were nevertheless carefully considered prior to adoption. In 1973, Rollin D. Schnieder, who OSHA officials selected as one of the panel's members stated, "One of the early criticisms of the standards was that 'they were poorly written and must have been written by those people in Washington.'" Actually, these were consensus standards that were adopted from associations or societies such as ASAE. In each instance the American National Standards Institute or National Fire Protection Association has adopted some of the industry standards and have recommended these to OSHA. This was evident in the agricultural standards relating to the Slow Moving Vehicle Emblem and anhydrous ammonia.⁵⁷⁵ Schnieder's comments serve to balance the many negative reactions that the actions of OSHA officials appear to have elicited.

⁵⁷⁴ United States Department of Labor, Office Of Information, *News: OSHA Names 15 to Agriculture Standards Advisory Committee*, (June 20, 1972), Washington, D.C., 1972. The committee also carefully consulted such important organizations as the ASAE, FIEI, and the NIFS in determining their recommendations to OSHA officials. OSHA standards also appear to have closely followed the recommendations of these standard writing organizations, see also, Rollin D. Schnieder, "The Function and Status of DOL's Agricultural Standards Advisory Committee," (paper presented at the 1973 American Society of Agricultural Engineers Winter Meeting, Chicago, Illinois, December 11-14, 1973), 1-5.

⁵⁷⁵ Schnieder, "The Function and Status of DOL's Agricultural Standards Advisory Committee," 5.

Thus, the OSHA debate reveals that the agency's involvement in farming not only infused a more combative tone into the safety movement, but it also reconfirmed a persistent difficulty in improving farm safety through legislation. Farm safety leaders had recognized farmers' independent working environment for decades. In 1968, a mere two years prior to the enactment of OSHA, Jack Burke, a NSC official, emphasized the differences between the farmer and the factory worker stating that "no master mechanic routinely checks out a farmer's equipment for safety. There is nothing to keep him from running the most beat-up equipment that binder twine and baling wire can keep together. You can't get a ticket for plowing with a tacky old tractor." Since World War II, farm safety leaders had responded to this challenge by fashioning a collaborative and cooperative national effort. However, by the 1970s, the involvement of an ever-growing number of groups possessing their own distinctive interests created a tone which was far removed from the patriotic feelings and organizational cooperation which had given birth to the movement.⁵⁷⁶

One might question the cumulative impact the paucity of regulation had upon farm safety conditions. A brief review of the history of Roll-Over-Protective-Systems (ROPS) is illustrative of the dramatic effects this situation had upon the working conditions of the nation's farm families. A discussion of ROPS is particularly illuminating since a more prompt implementation of a relatively simple device could have potentially saved the thousands of lives.⁵⁷⁷ The story of ROPS also reveals how

⁵⁷⁶ *Farm Safety Review*, March/April 1968, 14.

⁵⁷⁷ J.R. Myers and K.A. Snyder, "Roll-over Protective Structure Use and the cost of Retrofitting Tractors in the United States, 1993" *Journal of Agricultural Safety and Health* 1 (June, 1995): 185. In 1967, David H. Bucher, a high-ranking engineer for John Deere, indicated, "Tractor upsets cause 50 to 70 percent of the fatal farm accidents in this country." David H. Bucher, "A Protective Canopy for the Farm Tractor," *Agricultural Engineering* 48 (September, 1967): 496. For additional discussion regarding how tractor

large numbers of farm families used tractors without ROPS well into the 1990s, despite the fact that such devices had been in existence for decades. In addition, safety organizations such as the NSC and safety specialists had advertised their benefits at least as early as the late 1960s.⁵⁷⁸ Nevertheless, thousands of rural Americans continued to be harmed in such accidents throughout the late twentieth century. For instance, as late as 1988, 331 people died as result of this type of accident on the nation's farms.⁵⁷⁹

Observers had long indicated that deaths resulting from inadvertent overturns represented a significant danger. In fact, as early as 1919, Edward R. Hewitt, a New York auto designer, identified the considerable ease in which a tractor driver could become harmed in a tractor rollover. A number of other researchers identified the problem over the next twenty years.⁵⁸⁰ However, it was not until the 1960s that the problem was almost universally identified as a major safety issue. In 1963, a *Farm Safety Review* writer stated

overturns were a leading cause of deaths on the nation's farms, see, Ernest C. Carlson, "Frame the Operator for Safety's Sake," *Excavating Contractor* 56 (October, 1968): 12.

⁵⁷⁸ Regarding NSC's Tractor Over-Turn Prevention Program (TOPP), see, "NSC's Farm Safety Conference Approves TOPP Program's Safety Objectives," *Farm Safety Review*, July/August 1967, 7 and "NSC Introduces TOPP," *Farm Safety Review*, September/October 1968, 9. NSC's Tractor Over-Turn Prevention Program (TOPP) The TOPP represented the NSC's effort to publicize the benefits of using ROPS, encourage tractor operators to purchase tractors that already possessed ROPS, or fit older tractors with the device. For a discussion regarding the important role that University farm safety specialists had in advertising ROPS' advantages particularly in Nebraska, see, "Demonstrations Reveal Value of Tractor Roll-Over-Protection," *Farm Safety Review*, September/October 1966, 14-15; "Crush Resistant Cab Shows Muscle," *Farm Safety Review*, September/October 1968, 8; "The Egg that didn't Break," *Farm Safety Review*, November/December 1969, 4.

⁵⁷⁹ Sidney M. Wolfe, ed. "Farm Families: an Endangered Species," *Health Letter*, 10 March 1989, 1. Although the lack of overturn protection was significant problem, it appears it was one of many regarding the absence of safety features on machines. In December 1972, Robert E. Glidden, a high-ranking official for Kewanee Machinery & Conveyor, revealed the lack of safety standards regarding auger design. He stated, "Since there were no written auger safety standards, 13 manufacturers met in early 1971 with two FIEI representatives and formed a committee.... Standards are not easy to write; a majority must agree to them, and some firms might have trouble bringing their products into conformance....," see, "Learning to Cope with OSHA Product Liability," *Implement & Tractor*, December 15 1972, 9.

⁵⁸⁰ Arnold B. Skromme, "The History of Rollover Protection for Farm Tractors," (paper presented at the meeting of the ASAE, Davis, California, January 19, 1988): 4.

that “nearly two-thirds of the deaths” that involved tractors were these kinds of accidents.⁵⁸¹ In 1969, Jack Burke of the NSC, stated that, “Of the 1,000 annual tractor accident fatalities, about 600 involve overturns. An estimated 5,000 persons incur disabling injuries, often severe or crippling due to the nature of this type of accident.” He went on to express his view that ROPS could prevent or minimize such catastrophic effects.⁵⁸² In the same year, Rollin D. Schnieder and Robert J. Florell, both of whom were University of Nebraska farm safety experts, published a study which supported the use of such protective structures. Schnieder discovered that all of the Nebraskans that had died in such accidents were driving tractors that did not have ROPS.⁵⁸³ A number of important health-related organizations also advocated ROPS use as a preventative measure. In 1967, the members of the American Medical Association (AMA) issued a statement that decreed that all tractor makers should make such devices “standard equipment.” The proclamation also included the declaration that, “the farm equipment industry be encouraged to make available, as standard equipment, basic overturn protection of the operator on farm tractors that will conform to these standards.”⁵⁸⁴

Both the technical expertise required for ROPS as well as specific designs were present throughout most of the era. Inventors began submitting patents for tractor cabs and protective frames as early the twentieth century’s second decade. However, how they viewed the functionality of these safety devices is disputed. Conflicting opinions existed regarding early cab designs as some writers believed that they were a means to improve

⁵⁸¹ “Program Guide for Tractor Safety,” *Farm Safety Review*, November 1963, 4.

⁵⁸² Jack Burke, “Why Wait for Tomorrow?,” *Farm Safety Review*, November/December 1969, 10.

⁵⁸³ Robert D. Schnieder and Robert J. Florell, “Farm Tractor upsets are Mankillers,” *Farm Safety Review*, May/June 1969, 3.

⁵⁸⁴ “AMA Calls for Tractor Protection,” *Farm Safety Review*, September/October 1967, 15.

comfort or to protect the tractor, while some researchers deduced that safety considerations were present throughout the development of tractor cabs. In 1988, Arnold B. Skromme, while presenting a paper on the development of such devices to an audience of fellow agricultural engineers expressed the view that safety was understated. He stated, “It should be noted that none of these early inventors, or none of the several millions of farmers in the US ever suggested that the safety structure be made high enough or strong enough to protect the operator.”⁵⁸⁵ Although Skromme’s confidence in knowing the desires of the nation’s farmers regarding driver protection is overstated, it does appear his point is valid on some level. For instance, in 1923 Henry W. Hanson of Cheney Center, Colorado received a patent for a cab. Hansen stated that the main purpose of his device was, “providing a sun shade and a rain protector for the driver of the tractor.”⁵⁸⁶

Despite these differences of opinion, it is indisputable that by the 1950s, both independent creators and university researchers were developing devices to protect tractor drivers from being harmed in tractor rollovers.⁵⁸⁷ By the 1960s, such important tractor manufacturers as International Harvester and John Deere were also studying the effectiveness of various types of operator protection devices.⁵⁸⁸ In 1967, David H.

⁵⁸⁵ Arnold B. Skromme, “The History of Rollover Protection for Farm Tractors,” 2.

⁵⁸⁶ United States Patent Office, “Top for tractors,” submitted by Henry W. Hanson on November 20, 1922 and received patent on August 21, 1923.

⁵⁸⁷ See United States Patent Office, “Safety Guard for a Tractor Operator,” submitted by Osborne Maybrier on July 28, 1952 received patent on January 3, 1956; United States Patent Office, “Tractor Canopy Guard and Combination,” submitted by Earnest E. Selby on February 10, 1956 and received patent on September 10, 1957; in 1953, researchers at the University of California at Davis designed and tested a roll-over structure for a John Deere tractor, see, Arnold B. Skromme, “The History Of Rollover Protection For Farm Tractors,” 7.

⁵⁸⁸ “International Harvester Tests Protective Frame,” *Farm Safety Review*, March/April 1967, 14; these manufacturers collectively pooled the results of such studies to develop engineering standards for ROPS. For a brief discussion regarding some of the efforts of John Deere researchers, see, David H. Bucher, “A Protective Canopy For the Farm Tractor,” 48 *Agricultural Engineering* (September 1967): 496-499, 506; Arnold B. Skromme indicated that as early as 1959 John Deere designers were working on potential ROPS

Bucher, a prominent member of John Deere's team of product designers, stressed that his company tested ROPS devices. Although all new tractors were not yet being fitted with ROPS, he indicated that they would be made available at a minimum price for the consumer. Bucher stated, "It is sincerely hoped that all tractor manufacturers and persons associated with potential users of protective canopies will make a combined effort to provide and promote voluntary use of safety structures on agricultural vehicles in the interest of decreasing the fatality rates associated with tractors."⁵⁸⁹ Bucher's inclusion of the phrase "voluntary" is crucial in understanding the reasons behind the persistence of the tractor rollover fatality issue. This is the case since throughout the late twentieth century farmers who did not hire outside employees were not required to fit their tractors with such devices.

Americans were not the only ones who were seeking solutions to the tractor overturn problem, the governments of many nations mandated that all new tractors be fitted with overturn protection devices. During the mid-1950s, both Swedish and British engineers were thoroughly engaged in testing various overturn protection concepts. A large number of European governments also passed laws requiring all tractors to be fitted with rollover protective systems.⁵⁹⁰ In 1963, Carlton Zink commented on the regulatory actions of the Swedish governments as well as their more standardized development of such safety devices. He stated that, "In Sweden all new tractors must be equipped with protection for the driver. The National Swedish Testing Institute for Agricultural

devices. For further information regarding activities such as Deere, see, Skromme, "The History of Rollover Protection for Farm Tractors," 15, 17-19.

⁵⁸⁹ Bucher, "A Protective Canopy for the Farm Tractor," 506.

⁵⁹⁰ Carlson, "Frame the Operator for Safety's Sake," 14.

Machinery has developed a procedure for testing protective frames and cabs.”⁵⁹¹ Thus, Northern European farmers generally benefited from the ROPS protection long before their American counterparts. In 1968, E.C. Carlson, a high-ranking engineer for International Harvester contrasted the European experience with that in America which features voluntary compliance regarding manufacturers’ adoption of ROPS. He stated, “Compliance with the recommendation is strictly voluntary insofar as the manufacturer and the purchaser are concerned.”⁵⁹²

Although few farmers and their families received protection from ROPS devices throughout the 1960s, this was not the case for many federal employees and some state workers. For instance, in 1960, state officials in North Dakota responded to the overturn problem by equipping all the state’s tractors with ROPS, which was soon followed by similar actions in other states.⁵⁹³ State policy-makers in other states were taking similar actions. For example, by 1965 most tractor drivers who worked for the state of Illinois benefited from such protection.⁵⁹⁴ Such actions also arose in places where the lumber industry represented an important business. In 1963, Carlton Zink, a John Deere engineer and associate of the ASAE safety committee, stated, “In some states where logging for lumber and pulpwood is important, there are legal requirements for a protective canopy over the top of the tractor and over the driver. Its purpose is two-fold: to prevent falling branches or trees from striking the operator, and to protect him in case of a tractor

⁵⁹¹ Carlton L. Zink, “Anti-Roll Bars: Can They Reduce Tractor Fatalities?,” *Agricultural Engineering* 44 June 1963, 308.

⁵⁹² E.C. Carlson, “Tractor Roll-Over Protection Frames,” *National Safety News*, March 1968, 66.

⁵⁹³ Carlson, “Frame the Operator for Safety’s Sake,” 14.

⁵⁹⁴ Carlson, “Tractor Roll-Over Protection Frames,” 70.

overturn. The governing rules state that the canopy must be capable of supporting the tractor.”⁵⁹⁵

The problem appears to have persisted for at least the next quarter century. In 1995, J.R. Myers and K.A. Snyder, both of whom were prominent safety experts, revealed that as late as the early 1990s, large numbers of farmers were still operating tractors that had not been fitted with ROPS. They stated, “In 1993, over 4.8 million tractors were in use on U.S farms, of which 2.98 million lacked ROPS.” The authors also indicated that large numbers of tractors did not have ROPS and that the reason for this was because older tractors were still being used which had not been manufactured with the safety device. However, they stressed that on average the tractors could be fitted with a ROPS device for \$947, a small amount when considering the emotional and financial cost of a human life.⁵⁹⁶ For international comparison, in 1967, Sverker P.E. Persson, published a piece in *Agricultural Engineering*, which reported, “More than half of all tractors in Sweden now have safety frames or cabs.”⁵⁹⁷ This high figure was achieved due to the fact that new tractors were required to have ROPS and the nation’s leaders also instigated a vigorous retrofitting campaign. Such comparisons highlight the fact that American farm families continued to use tractors without ROPS long after most of their European counterparts were no longer subjected to such risks.

The lack of protection offered to American tractor drivers can be explained by the fact that ROPS use was voluntary throughout the 1960s and that a large-scale retrofitting

⁵⁹⁵ Zink, “Anti- Roll Bars: Can They Reduce Tractor Fatalities?,” 308.

⁵⁹⁶ J.R. Myers and K.A. Snyder, “Roll-over Protective Structure Use and the Cost of Retrofitting Tractors in the United States, 1993,” 185.

⁵⁹⁷ Sverker P.E Persson, “European Experiences with Protective Cabs and Frames,” *Agricultural Engineering* 48 (October 1967): 557, 554.

campaign was never instigated. Many agricultural engineers emphasized the concept that implementing ROPS should be voluntary. In 1966, Merlin Hansen, a prominent ASAE member, stated, “It is hoped that the combined efforts of everyone on a voluntary basis will substantially reduce tractor accident and fatality rates. By voluntarily providing effective protective devices and by intensively publicizing their use, the farm machinery industry can effectively perform a vital humanitarian service.”⁵⁹⁸ In October of 1968, Ernest C. Carlson, a high ranking engineer for the International Harvester Company, also stated, “Compliance with the recommendations is strictly voluntary insofar as the manufacturer and the purchaser are concerned. However, a safety frame designed, fabricated, tested, and mounted on a tractor complying with the recommendations developed by the cooperative industry effort will greatly reduce the fatalities and injuries as the result of tractor roll-over accidents.”⁵⁹⁹ Such a voluntary approach undoubtedly contributed to large numbers of deaths and injuries from tractor upsets.

The preceding narrative reveals that despite the fact that farm safety leaders had initially emphasized cooperation and coordination, a different tone eventually dominated the effort. Such an observation can be confirmed by the controversies surrounding the creation of the NIFS, the arguments stemming from OSHA’s tepid efforts to improve agricultural safety, and the growth of lawsuits stemming from farm equipment accidents. Farm safety specialists’ desire to forge their own organization, control who entered their profession, and market their expertise represented more self-interested than unifying actions. The efforts of OSHA officials to improve farm safety met resistance and thus revealed a suspicious attitude by many Americans regarding mandatory efforts to

⁵⁹⁸ Merlin Hansen, “Reducing Tractor Fatalities,” *Agricultural Engineering* 47 (September 1966): 472.

⁵⁹⁹ Carlson, “Frame the Operator for Safety’s Sake,” 15.

decrease agricultural related accidents. Finally, the expanding number of lawsuits meant that farm equipment manufacturers who neglected safety features could incur severe financial penalties. Despite the fact that members of the agribusiness community, farm safety professionals, and farm families themselves cooperated in funding, initiating, and participating in farm safety efforts showed a significant degree of fragmentation and divisiveness had infected the movement by the late 1960s.

CHAPTER NINE

CONCLUSION

This study reveals the uniqueness of farm families' living and working conditions since those who labored to produce the nation's food supply faced safety challenges that were distinctive from other workers. The fact that the farmstead often functioned both as a home and a workplace is especially uncommon. This meant that the old, the young, and the inexperienced were all exposed to a multitude of hazards in an increasingly complicated occupation. This distinguishing feature of the issue is supported by the many accidents involving children. The reality that farm families were not only exposed to many of the same dangers which urban dwellers experienced, but also a dizzying variety of others related to the agricultural work setting, also confirms their particular vulnerabilities. Furthermore, less conspicuous factors validate the special health risks associated with rural life. For instance, the fact that farm families usually resided farther away from emergency care providers is another example that illustrates the unique safety challenges of the agricultural way of life.

Farm residents also benefited little from federal or state regulatory protections, so educational efforts were especially important in the attempt to reduce the accidents. This was particularly the case since political leaders issued few legislative safeguards during the era. Such law-making measures included limiting the types of work youth could perform on farms and various OSHA standards. However, even when government regulations were enacted, farm families were generally beyond the purview of such actions since the regulations were usually aimed at farm owners who hired employees and not those who depended on family members as a labor source. In addition, farmers

possessed great responsibility regarding the safe use of agricultural chemicals which was represented by the fact that they were not required to have chemical applicator certificates until the early 1970s. Such realities meant that throughout the entire mid-twentieth century, farm safety educational programs represented a crucial component in the effort to improve agricultural safety.

Although farm families have always faced a plethora of dangers, their acquisition of new technologies appears to have added to the potential dangers of living and working on the nation's farmsteads. Innovations such as new kinds of farm equipment, storage equipment, and chemicals created a host of safety challenges for rural residents. Even those technologies such as automobiles and electricity, which were adopted by all Americans, appear to have held special risks for the farming populations. For instance, those living in the countryside often used electricity both in their households and to assist them in their farming operations. Their utilization of the power source for heat and fencing, as well as the increasing presence of electric lines amidst ever-larger equipment all posed exceptional risks. For instance, a farmer's improperly installed heat lamps could easily ignite dry hay, a carelessly installed electric fence exposed individuals the possibility of electrocution, and farm equipment operators might accidentally contact overhead electrical cables. Such hazards were largely unknown to urbanites, further illustrating farm families heightened health risks.

Rural observers had identified many hazards on the farm throughout the early twentieth century; however, it was not until the Second World War that a national farm safety education effort materialized. Political leaders recognized the problem as a waste of human resources at a time when adequate food production represented a crucial element in winning the war. Farm safety boosters also frequently reminded rural residents

of the emotional and financial costs of accidents. Although both governmental and private organizations had devoted little to farm safety educational efforts prior to the war, a cooperative, multi-faceted, and energetic response had fully emerged by the conflict's conclusion. The movement included a diverse group of governmental, non-profit, and business organizations, each fulfilling an important role in a collective effort to decrease accidents. For example, the NSC and the USDA provided administrative leadership on a national level, while 4-H chapters and other entities delivered local educational programming. A varied group including large corporations, small businesses, and other private interests provided the financial support required for farm safety activities.

Although wartime exigencies contributed to the farm safety movement's emergence, other factors help contextualize its development. Agricultural observers and writers expressed the view that farmers' safety issues had changed drastically due to the industrialization of agriculture. Thus, they argued that farm families required educational programs to help them navigate their increasingly complicated environments. In addition, the major organizations involved in the effort had matured greatly. The NSC, USDA, and state extension agencies had continued to gain strength and vitality throughout the early twentieth century. The leaders and employees of these organizations appear to have continually expanded their roles as well as persistently sought ways to market the expertise of their members. Thus, by the 1940s, both an increasing awareness of the problem as well as the existence of an organizational network suited to disseminate the safety message had fully developed. Such trends symbolized the increasing bureaucratization and considerable influence experts had acquired in many areas of American life.

The farm safety movement also exhibited a relatively harmonious and cooperative tone during the 1940s and 1950s. A diverse group of governmental, business, and non-profit organizations worked together in creating an educational effort targeting an impressive variety of rural safety issues. These concerns included the use of agricultural machinery, chemicals, and a variety of other contributory factors in farm injuries and fatalities. The fact that a diverse group of organizations successfully mounted such a cooperative program such as National Farm Safety Week symbolizes the movement's cooperative tone. State farm safety committees' rapid development throughout the nation also demonstrates the accommodating and inclusive atmosphere in the early years. The rural population's enthusiastic participation in farm safety programs and the private sectors' enthusiastic financial support of such efforts provide additional examples of this relatively harmonious environment.

However, this relatively cooperative atmosphere had been greatly altered by the late 1960s and early 1970s. Federal regulatory interventions such as OSHA's relatively timid but nonetheless largely unpopular actions showcased how large segments agricultural community were antagonistic towards governmental intervention. The appearance of the farm safety professional which had begun at the outset of the movement had become fully realized by the early 1960s. The creation of a separate NIFS organization symbolizes how this highly trained group of safety careerists desired to improve their occupations professional reputation. Such efforts appear to have contributed to a general fragmentation the movement which had been relatively unified during the 1940s. The growing numbers of farm accident liability cases reveals how Americans increasingly pointed to manufacturers as being partially to blame for their accidents. The trend also seems to have created divisions amongst agricultural engineers,

farm safety experts, equipment manufacturers, and other groups who had been involved in the effort.

Although it is apparent that the farm safety movement became increasingly characterized by a contentious atmosphere, it is more problematic to ascertain the overall effect safety education had upon reducing farm accidents. Safety activists often measured the success of their efforts by such superficial means as the number of safety committees established, event attendance totals, or the numbers of safety materials distributed. Thus, the fact that safety advocates engaged in few systematic appraisals of their activities does much in explaining this ambiguity. This situation should not come as a surprise since farm safety activists appear to have been sufficiently challenged in attempting to gain a statistical understanding of the numbers, types, and causes of the accidents themselves. In addition, much of the numerical support for educational programs often were anecdotal in nature and did not represent the findings of carefully conceived studies. Nevertheless, safety advocates did occasionally provide state-level data which demonstrated reductions in some kinds of accidents following the enactment safety educational programs.

Although ascertaining the overall effectiveness of such educational programs presented difficulties, other conclusions can be more easily determined. Such findings include the fact that farm safety leaders successfully achieved high levels of participation, developed a diverse range of activities, and expanded their programming throughout the era. Safety advocates successfully gained the participation of thousands of rural Americans in their activities. Youth organizations such as 4-H and FFA were committed to such efforts throughout the era resulting in effectively reaching thousands of individuals with the safety message. Safety leaders also proved to be particularly effective at both identifying farm hazards and responding to such issues by quickly

fashioning safety programs which were uniquely suited to specific areas of risk. This accomplishment is verified by their successful development of programs aimed at reducing accidents with various kinds of agricultural equipment, chemicals, as well as a myriad of electrical devices. Their efforts were also directed at preventing mishaps with livestock, avoiding farm fires, as well as developing efforts meant to avoid recreational hazards. They also utilized a variety of media including print media, radio, and television, in an attempt to improve farm families' health and welfare. Rural safety activists also demonstrated a high degree of pedagogical experimentation throughout the era utilizing full-scale demonstrations, models, and competitive events all in hopes of inspiring people to live more carefully. Such observations demonstrate that farm safety leaders successfully mounted a vibrant safety movement which effectively provided educational experiences for the nation's farm population.

Despite the farm safety movement's accomplishments, the problems persisted. In the 1980s, significant numbers of agricultural engineers, health professionals, and journalists continually to express their view that excessive numbers of people were being killed or injured. In 1988, Kelly J. Donham, a faculty member at the University of Iowa's Institute of Agricultural Medicine and Occupational Medicine, stressed that there was much of left to be done to meet the tremendous challenge of improving agricultural safety. He indicated those government farm agencies, ag-related businesses, and various other farm-related groups needed to devote more resources to what he viewed to be a highly important rural issue. Jim Leach, Republican Congressman from Iowa, echoed Donham's recognition of the seriousness of the problem stating, "Romantically, we think

of agriculture as the finest way of life in the world—unfortunately we know it’s not the safest.”⁶⁰⁰

Those who critiqued farm safety efforts provided convincing evidence regarding the need to place greater priority on families’ well-being. For instance, in 1988, the *Daily Dispatch*, a Moline, Illinois newspaper featured an article by Angella Herrin, a journalist who had investigated the farm safety issue. Herrin wrote, “In 1983, the federal government spent about \$4.34 per U.S. worker for on the job safety programs but only 30 cents per farmer.” Such financial disparities were expressed by other individuals throughout the era. Kelly J. Donham reacted to such evidence by stating, “There is a double standard in terms of lack of programs and resources available to cope with what is most dangerous occupation in the country.” He also added, “Other countries are way ahead of us in dealing with the problem.”⁶⁰¹ In 1989, Sidney M. Wolfe, editor of the *Health Letter*, a publication of The Public Citizen Health Research Group further supported such observations. He stated, “The reality that most farms are family units makes the safety regulations which do exist irrelevant. Congress had forbidden OSHA funds to inspect farms of less than 11 workers: this essentially means inspections for dangerous machinery and practices are forbidden on U.S. Farms. Sadly, OSHA is not using its authority to inspect large farms: in 1987 it inspected a total of 32 large farms—only after a death in each case!”⁶⁰²

⁶⁰⁰ Angella Herrin, “Farming Safety Act Proposed,” *Daily Dispatch*, December 8, 1988, 1.

⁶⁰¹ *Ibid.*, 1.

⁶⁰² Sidney M. Wolfe, “Farm Families: An Endangered Species,” *Health Letter* 5 (March 1989):1; the Public Citizen Health Research Group is a non-profit organization aimed at researching and educating the public about various public health issues.

Furthermore, some agricultural engineers and safety specialists believed that the farm equipment industry could have done more to safeguard farm families by more quickly introducing safety features into their machinery designs. The relatively slow progress regarding ROPS adoption in the United States is particularly illuminating regarding this point. Additionally, seasoned safety experts such as Norval Wardle repeatedly expressed their view that the nation's agricultural manufacturers had not sufficiently infused safety considerations into their equipment designs. In 1990, Arnold B. Skromme revealed that such criticisms had persisted when he spoke on the subject at the ASAE's annual meeting. He revealed that American farm families experienced considerably more deaths and injuries than their European counterparts. He summarized the situation by stating, "An historian uncovers a strange situation in the United States- although this country had led the rest of the World in new inventions, such as the first pickup hay balers and forage choppers, the first all-purpose farm tractor, first vertical silos, the invention of hybrid seed, etc, this country has failed to take a similar leading action to design machines and building to prevent accidents." Skromme's comments symbolize the manner in which the entire agricultural community, not just the farm equipment industry, had often placed more perceptible economic considerations such as an emphasis on production in much greater priority than safety.⁶⁰³

⁶⁰³ Arnold B. Skromme, "A Farm Safety Program Sponsored By Farmers," (paper presented at the annual meeting of The American Society of Agricultural Engineers, Chicago, Illinois, 18-21 December 1990), 1; Skromme's comments echoed the point that farm safety leaders had articulated since the movements very inception. The opinion being that safety had been given a low priority. He also directed his criticisms at the federal government stating, "All the agencies of our government, including the lawmakers themselves, have a policy of pushing the farmer harder and harder to produce more and more, by using larger equipment, buying more land, using more fertilizer and chemicals, increasing the vehicle ground speed... doing everything to reduce the cost of our food, but at the expense of his health and life! Practically all of the research funded by the federal and state governments covers how the farmer can raise more at a lower cost!"

The farm safety movement's history also provides specific insights into the larger transformation of rural life. Although sophisticated technology assisted farmers in increasing their productivity, reducing the drudgery of agricultural work, and bringing modern conveniences into farm homes, such modifications had also fundamentally altered the farm family's living and working environment. The era witnessed the introduction of a host of new types of equipment and chemicals which if used improperly could result in a catastrophic injury or even death. By the mid-twentieth century, rural Americans had recognized the transformation and its relevance for the farm family. In 1955, Melvin Simmons of Jasper, Missouri, FFA chapter, indicated that there was a gulf between the farmer's potentially dangerous environment and the public's idyllic image, stating that "city people consider the farm a place of safety and quietness." By the early 1970s, Americans occupying the highest government offices had also acknowledged how technological innovation possessed consequences regarding safety. During his Presidential Proclamation of Farm Safety Week in 1973, President Richard Nixon stated, "The unfailing supply of food and fiber provided by the nation's largest industry, agriculture, has been the foundation of American prosperity since our country's beginnings. Abundance on the farm has, in turn, been stimulated by constant technological progress. But the blessings of technology sometimes have been mixed, as each advance has also brought a new potential for injury."⁶⁰⁴

The farm safety story also reveals how farmers continued to exert considerable independence due to their occupation's entrepreneurial nature; however, this autonomy made them more vulnerable to accidents than those who labored in other occupations.

⁶⁰⁴ *Transactions-National Safety Congress* (Chicago: National Safety Council, Transactions: 1955) 26; *Farm Safety Review*, May/June 1973, 16.

Farmers' autonomy was also limited in regards to their dependence on outside individuals to improve safety conditions. Farm safety careerists devoted their entire professional lives to investigating the nature of the farm accident problem, proposing technical solutions, and fashioning educational programming. Thus, farmers not only depended on their own judgment regarding proper work practices, but also on the continued work of these professionals. Agricultural engineers, farm safety experts, and extension personnel labored to identify the specific dangers of an increasingly complex and changing rural environment. They funneled their solutions through an organizational network of governmental and private institutions. The farmer's dependence on the expert for safety echoes their reliance on outside groups such as financial institutions for credit, government agencies for farm subsidies, and distant fertilizer companies to maintain the soil fertility. Although agricultural policy-makers had promoted these agents of agricultural change since the opening early decades of the twentieth century, the creation of a farm safety movement required the stimulus of a wartime labor emergency to fully launch an effort to improve safety.

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