FARMING IN DELAWARE | ESTABLISHING THE SUBSTATION | THE CARVEL CENTER

THE *AGRICULTURAL GEM* IN *SUSSEX COUNTY* FOR THE *DIAMOND STATE*

THE **ELBERT N.** AND **ANN V. CARVEL RESEARCH** AND **EDUCATION CENTER**

by Ed Kee

PROGRESS THROUGH **RESEARCH** AND **EXTENSION**

UNIVERSITY OF DELAWARE

George Chaloupka, (standing back left) helping conduct a Feed Microscopy Short Course for poultry feed company staff in 1964. Feed Microscopy was a quality control process for feed manufacturers.

A **HISTORY** OF THE **AGRICULTURAL SUBSTATION** AND THE **CARVEL CENTER**

UNIVERSITY OF DELAWARE

| Ed Kee

PROGRESS THROUGH **RESEARCH** AND **EXTENSION**

Research and Extension
at the
University of Delaware Carvel Center

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FOREWARD

MARK RIEGER
Dean
College of Agriculture
and Natural Resources

Sussex County, Delaware ranks first among 3,142 counties in the United States for farm sales per acre. It is the epicenter of the modern, multi-billion dollar poultry industry. When the Carvel Center was first envisioned in 1941, poultry was already booming but very few could have predicted that Sussex would remain atop the leaderboard in farm sales well into the 21st century. The foresight exhibited by the Delaware General Assembly and committee of 34 who established the "substation" near Georgetown to support the industry is truly visionary, on par with major milestones in agricultural history. We are very fortunate that the state, our industry partners, allied agencies and Delaware farmers continue to support the Carvel Research and Education Center, one of the best in the nation. We could not carry out our Land Grant Mission without it. The work at Carvel complements, but does not duplicate the research, teaching and extension done in Newark, and our presence in Georgetown is vital to the college's goal to provide relevant, impactful programs to the state's #1 industry.

Not withstanding the 450+ acres (including the Warrington Farm) and millions of dollars of physical assets, the Center's people are what make it a great resource. Key contributions from the Carvel family, for whom the center is named, and from the Adams and Warrington families who contributed so much to agriculture in Delaware. Hiram Lasher played a huge role in building excellence in research and outreach in poultry management, which today is performed in a state-of-the-art Biosafety Level 2 facility that bears his name. The Center's leadership, from John Turner to Mark Isaacs, has served the faculty, staff and students extremely well, providing the financial, political and moral support to grow world-class, impactful programs.

Ed Kee has done a masterful job in chronicling the history of the Carvel Center and its major contributions to agriculture and natural resource disciplines. The story told is one of a grass roots effort to provide unbiased, science-based information to assist the growth of Delaware agriculture. It is a fitting tribute to the College of Agriculture and Natural resources as it celebrates its 150th anniversary in the year 2019.

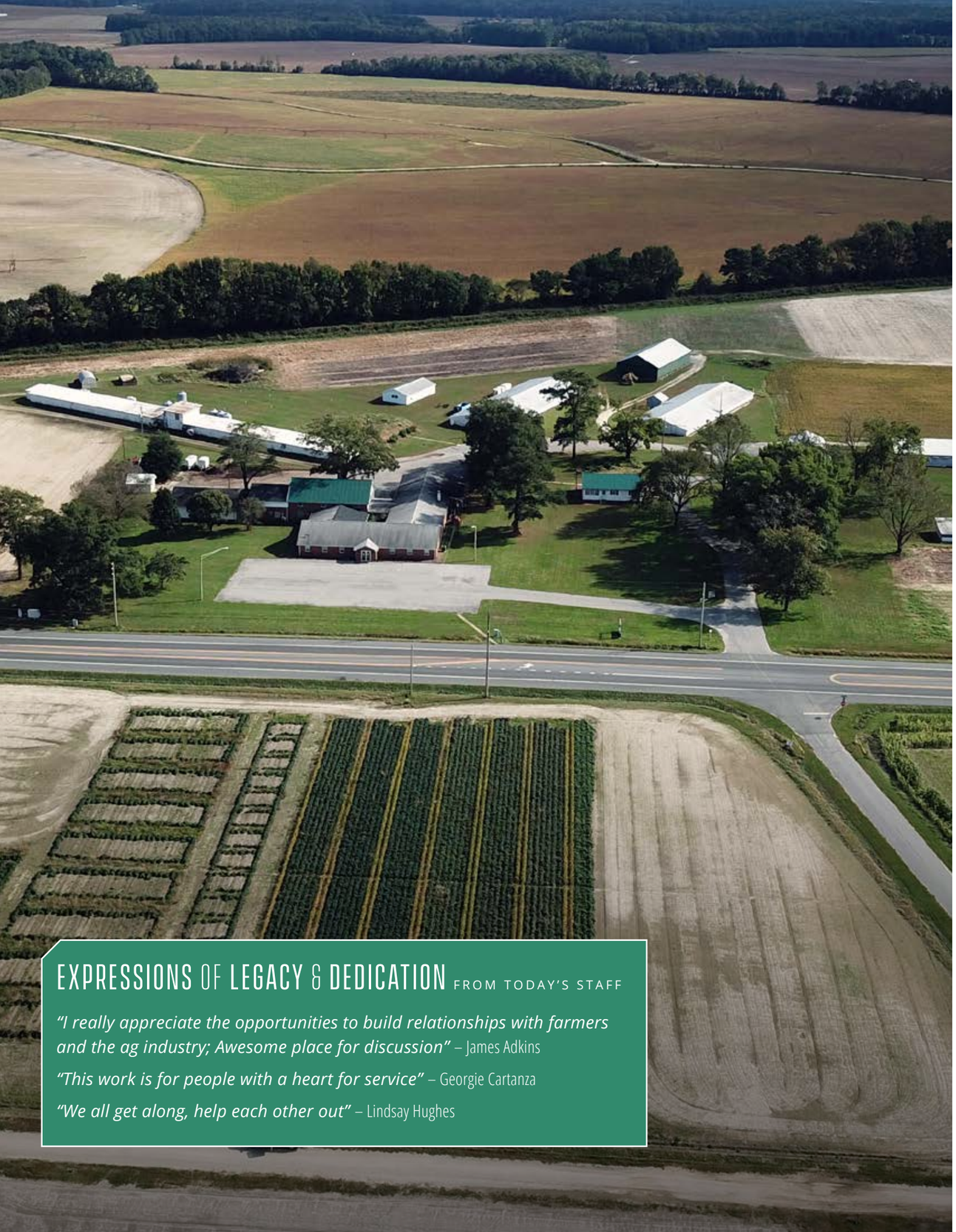
FROM THE **DIRECTOR**

MARK ISAACS
Director
Carvel Research &
Education Center
College of Agriculture
and Natural Resources

Serving as Director of our Elbert N. & Ann V. Carvel Research and Education Center since 1991 has truly been a pleasure and honor. The Carvel Center serves the land grant university mission of research, outreach/extension and teaching. It also serves as the Southern Agricultural Experiment Station for the University of Delaware College of Agriculture and Natural Resources. The Center encompasses the Thurman Adams Jr. Agricultural Research Farm, the Warrington Irrigation Research Farm, Lasher Poultry Diagnostic Laboratory, the Jones Hamilton Environmental Poultry Research House, and is home to Sussex County Cooperative Extension. The very rich history of this experiment station is built on the heritage of tradition, service and visionary insight. Mr. Frank Gordy, our first Director, set the stage of excellence for being the "go-to place" for research and outreach in agriculture, 4-H youth development, family and consumer sciences and community issues. His vision that Sussex County Cooperative Extension staff be located at the experiment station started the legacy of service and outreach that runs strong today at the Carvel Center. Following in Gordy's footsteps, Directors Ed Ralph and George Chaloupka continued the amazing leadership focus on serving the needs of Sussex Countians as well as Delaware and Delmarva citizens.

Today, more than 50 faculty and staff at the Carvel Center work diligently to investigate and identify new challenges in the areas of grain, vegetable, and fruit crop production, precision agriculture technologies, ornamental and garden plants, water, nutrient and pest management, poultry production and disease management, family health and nutrition, and youth development and leadership. To work on these many areas, financial resources in the form of capital and personnel have been critical in moving the Carvel Center forward. Our last three Deans for the College of Agriculture and Natural Resources (Dr. John Nye, Dr. Robin Morgan, and current Dean Dr. Mark Rieger) provided significant support and freedom for the Carvel Center's growth and development. The integral partnerships formed with county, state, industry and private partners paves the way for supporting the path of excellence ahead to meet the challenges of feeding a growing population in an environmentally sustainable manner as well as addressing societal challenges.

Who would have thought that the purchase of 310 acres in Sussex County, Delaware for $7,555 in 1941 would have transformed into one of the most progressive and innovative agricultural experiment stations in the country? Ed Kee has done an excellent job in capturing the rich history and impact of the original substation to today's Carvel Center. It is an exciting time to witness and work closely with the next generation of agricultural leaders and be a part of their development. Our students today are equipped with the knowledge, innovative strategies and commitment to provide food and fiber for the world. Working directly with farmers, allied industries and Delaware citizens, the Carvel Center and its amazing staff are well positioned to meet the challenges ahead with a dedication to agriculture and Delawareans focusing with a service heart.



EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"I really appreciate the opportunities to build relationships with farmers and the ag industry; Awesome place for discussion" – James Adkins

"This work is for people with a heart for service" – Georgie Cartanza

"We all get along, help each other out" – Lindsay Hughes

A SINGULAR PLACE

"In the middle of Sussex County, along Delaware Rt. 9, or the Georgetown-Laurel Highway, stands an extraordinary outpost of the University of Delaware's College of Agriculture and Natural Resources. The Elbert N. and Ann V. Carvel Research and Education Center, originally known as the University's Agricultural Substation, was established in 1941. "Substation" because it is a subset of the original Agricultural Experiment Station still located on the main campus in Newark.

The Agricultural Substation had been re-named the Research and Education Center in 1985. In 2006, the name changed again with the opening of the new Elbert N. and Ann V. Carvel Research & Education Center. This new building, reminiscent of the architecture on the main campus in Newark, replaced the offices and additions of the original facility. The Carvel Center houses new offices, meeting rooms with the latest communication equipment and an Interactive Video Conference Facility that links to the main campus.

Honoring former Governor and Mrs. Carvel, the new building represents a wonderful continuance of the tradition of research, education and service dating back to the establishment of the County Cooperative Extension Service in 1918 and the founding of the then "Substation" in 1941. The Carvel Center, funded with a $2 million gift from the Carvel family and a $4 million appropriation from the State of Delaware along with other individual gifts, is also a statement of the University's commitment to agriculture and the people of Sussex County.

In 2014, the research farm at the Carvel Center was named for Thurman Adams, Jr. in honor of the longtime State Senator from Bridgeville. Adams, an alumnus of the University's School of Agriculture in 1950, was a strong supporter of the facility since its days as the "Substation" and was instrumental in acquiring funding for the new Carvel Center.

The Land Grant University, a uniquely American system of public higher education that provides educational opportunities for youth of modest means, also serves through its research and Cooperative Extension programs. The spirit and intent of the Land Grant mission is profoundly realized at the Carvel Center. The three-legged stool of the Land Grant mission, *Extension*, *Teaching* and *Research*, happens under one roof at the Center. This organizational accomplishment is rare across our nation's land grant system. The combination of research and extension reflects the intent of far-sighted agricultural leaders not only in 1941, but by subsequent leaders as well.

An astounding array of agricultural scientists are housed at the Center, dedicated to their assorted fields of poultry husbandry & health, agronomy, horticulture, weed science, crop production, irrigation science, entomology, and plant pathology. Often, these professionals have a joint appointment with research, extension and even teaching responsibilities. Many, but not all, are Ph.D. level faculty members of the University, others have bachelor's or master's degrees in agriculture and serve as Extension educators, technicians or program assistants with their faculty colleagues. Equally important to fulfilling the mission are the men and women who provide the office and clerical services or do the farm work in support of the myriad of poultry and crop research projects.

Cooperative Extension Specialists, Agents and Program Assistants make huge contributions through their educational outreach responsibilities. Cooperative Extension, founded in 1914 by Congress and signed into law by President Woodrow Wilson, created the nationwide system that expanded the mission of our Land Grant Universities to each county of every state. County Agents, i.e., agents of the University, are dedicated to bringing new knowledge to the people. Extension's original mission focused on agriculture, home and family demonstrations and 4-H and youth programs. In addition to delivering educational programs, these Agents listen to the people they serve and bring those needs to the attention of their faculty colleagues on campus or at the Center, who then often address those needs by providing information or conducting new research.

Housing Research Scientists with Cooperative Extension Agents and Specialists at the same facility in the middle of farm country is the exception rather than the rule. Many have a joint research and extension appointment which further melds the missions of the Land Grant system. The depth and breadth of the subject matter covered by the faculty and staff adds to this novel arrangement at the Carvel Center. Across the United States there are plenty of field research stations, often dedicated to **crops** or **livestock** but rarely both. There are county extension offices in nearly every county of every state, but rarely are they put together at the same facility with the **research** faculty.

It must be said that at Carvel, in the tradition of Cooperative Extension, it's not just agriculture. Extension programs in 4-H & Youth, Family & Consumer Science and related social sciences have been an important component of life in Southern Delaware for generations. These programs have made a difference every day for the people of the county and the state. Whether using traditional methodologies like the individual farm or home visit, or educational group meetings to the web-based learning of today, the University's Cooperative Extension has been relevant and responsive to the needs of the people in all three Delaware counties for over a century.

The undergraduate teaching component of the Land Grant mission also occurs at the Carvel Center with the installation of the Interactive Video Conference Facility in 1999. This linked the Center with the main campus and to certain course offerings with students attending the same class at the same time at both locations.

The response of the people to having an asset like the Carvel Center has been profoundly expressed over the years. People call or email the staff daily with their questions, concerns and suggestions. It is often a close relationship based on several generations of trust, appreciation, confidence and respect that goes both ways. At times, the professionals become confidential sounding boards about some of the most personal things that occur in their client's lives, often going way beyond their professional expertise. Divorce, financial problems, drug use in the family and other very personal subjects are quietly shared by the people with Carvel staff, who in turn, listen and perhaps make suggestions on where to seek medical or professional advice.

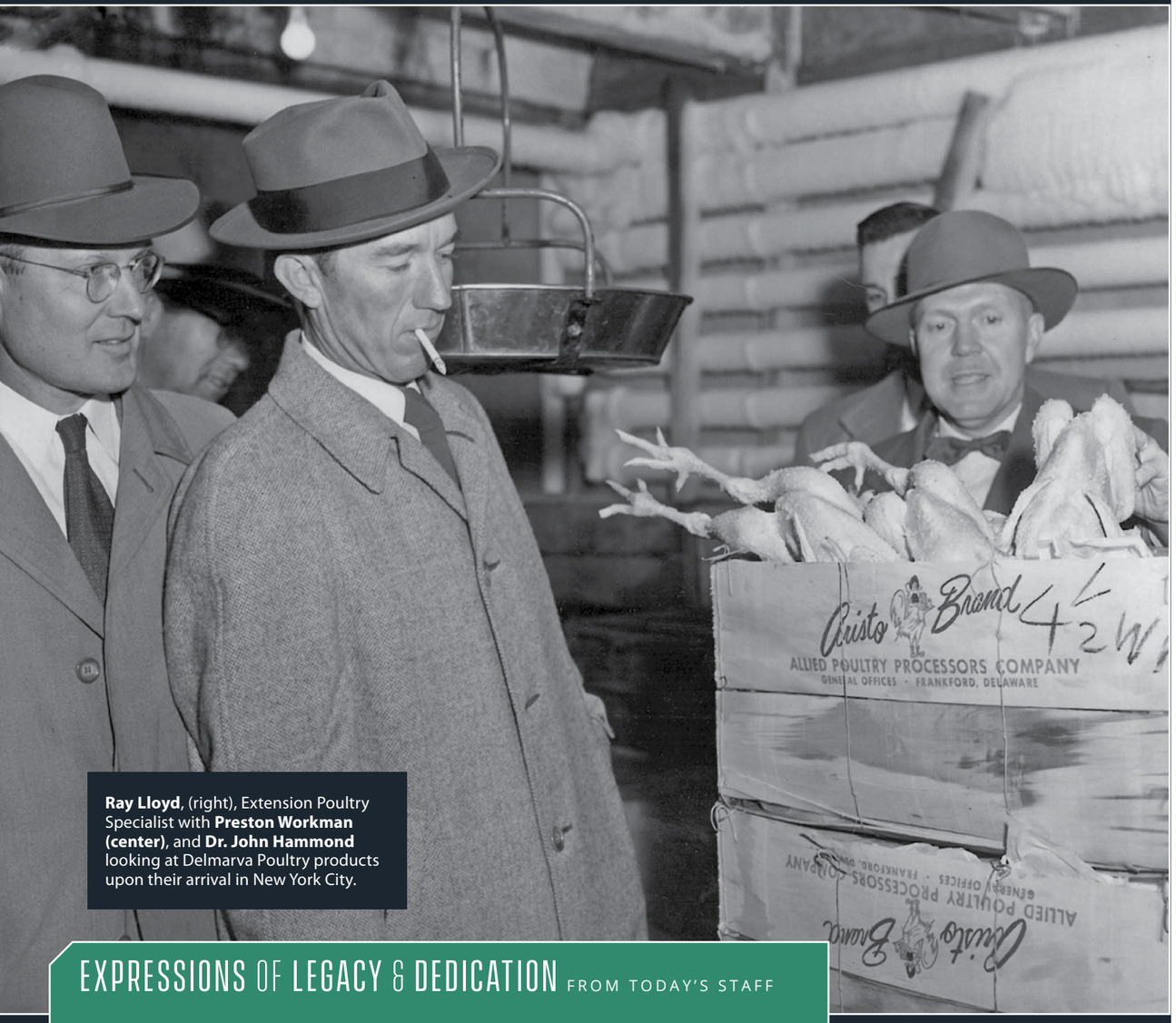
Happily, those conversations of crisis do not dominate the influx of knowledge needs.

It is the symbiotic relationship between the University professionals at the Carvel Center who make their expertise available to the people who need it and can turn that knowledge into progress that has, since the Substation's founding in 1941, made it an institution that is appreciated and respected by the people it serves. The Carvel Center and the College of Agriculture and Natural Resources has been a far-sighted and responsible agent of progress from the horse and buggy era to today.

"When I was young and there might be something wrong on the farm, perhaps the corn didn't look right, or a couple of hogs look like they were off their feed, or anything, Dad would say, call the Substation, they can come out and help us."

- The late State Senator Thurman Adams, Jr.

SUBSTATION OFFICE
The first office for the Substation was built in 1945. The adjacent chicken house for research was built in 1942.



Ray Lloyd, (right), Extension Poultry Specialist with **Preston Workman (center)**, and **Dr. John Hammond** looking at Delmarva Poultry products upon their arrival in New York City.

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"Everything we do here is help our farmers and our communities. Everything we do is to help educate and enrich the communities we live in." – Lisa Collins

"Everyone has always been welcoming to me, even before I was located here." – Dr. Gordon Johnson

"Best part of job was working with growers; helping them, providing the info that helped make a decision that was good for them." – Derby Walker

FARMING IN DELAWARE

> "General farming is still the predominating type of farming carried on in Sussex County, although there are several farms devoted to trucking, producing principally potatoes, sweet potatoes, tomatoes and strawberries. Corn and wheat are the principal farm crops. The production of forage crops, including the different legumes, is also important.

In 1900, 9,687 farms operated in Delaware on 1,066,288 acres. Eighty-four percent of Delaware's total land mass of 1,265,970 acres was in farmland. While fruit and vegetables were the signature crops during the 19th century, corn and wheat were always the staple crops, more widely planted than the more demanding and intense fruit and vegetables. Wheat acreage varied little during the period from 1880 to 1930. Most of the wheat crop was sold for cash, providing critical farm income over the years. Farmers planted field corn, also a staple, on approximately the same acreage each year from 1890 to 1940. However, yields of both crops, wheat and corn, remained the same during these years, averaging 15 and 25 bushels per acre, respectively.

As the twentieth century began, one observer reported, "General farming is still the predominating type of farming carried on in Sussex County, although there are several farms devoted to trucking, producing principally potatoes, sweet potatoes, tomatoes and strawberries. Corn and wheat are the principal farm crops. The production of forage crops, including the different legumes, is also important."

As part of the Atlantic coastal plain, the soils of Sussex tend to be light, sandy and well-drained. They are not as fertile and tend to be more droughty than the soils in northern Kent and New Castle Counties. Ninety-three percent of Sussex County soils are suited for farming, the rest being marsh, wetlands, forest and beach. Nearly 45 percent of the acreage for farming requires some artificial drainage. A similar percentage of land is moderately or severely limited by the light, sandy soils with low available moisture holding capacity.

Sussex County is the southernmost and largest of Delaware's three counties with nearly 49% of Delaware's land mass. In the early 1900s, it was an isolated and insulated place. While the railroad went through the county with several branch lines connecting communities, there were precious few paved roads. Automobiles were just beginning to appear and of course, there was no radio or television.

By 1923, the DuPont Highway reached from Delaware's southern border at Selbyville all the way north to Wilmington. This first ribbon of concrete was critical to the future of Sussex County's agriculture, connecting farmers to urban markets throughout the northeast and beyond. In addition, the telegraph and an expanding telephone system helped the emerging farming and food industry conduct its business with distant markets. Fresh crops like strawberries, apple, peaches, watermelons and cantaloupes were now being shipped by truck. Canneries in just about every town preserved tomatoes, lima beans, sweet corn, peas and more. Canned goods from Sussex County canners were sent across the nation. Sussex County and its agriculture suddenly wasn't so isolated anymore.

The most important linkage between the new highway and agriculture in Sussex County was the role it played in the rise of the broiler chicken industry, the biggest development in the County's economic history. Broilers are meat-type chickens are generally sold when young, between 6 and 9 weeks old. It all began in Sussex County when Mrs. Cecile Steele, of Ocean View, ordered 50 chicks for her spring flock. The Hatchery sent her 500 by mistake, but Mrs. Steele carried on and ended up selling 367 birds 16 weeks later when they weighed two and a half pounds for 62 cents/pound. She started 1,000 chicks in 1924 and sold them for 57 cents/pound. A commercial "broiler" business was born.

By 1928, 500 growers raised an average of 2,000 birds throughout Sussex, but mostly in the southeastern part of the county. Broiler production became a year-round industry, which was itself a new enterprise, no longer limited to just the spring and summer. Now Sussex County farmers were sending broilers to New York, Boston, Philadelphia and other destinations throughout the northeast the year round. Production increased by a million birds a year until 1935, when the rate of increase of production jumped to 24 million birds. By 1941

production reached 48 million birds, a long way from Mrs. Steele's 367 birds just 18 years earlier.

Residents in 1940 rural Delaware, and perhaps especially in Sussex County, still lived in a relatively remote place, but change was happening. Rural residents could tune into a local AM radio station, most of which signed off the air in the evening. Television, just invented and demonstrated at the 1939 World's Fair in New York city, would not be available for at least a decade. Several very good weekly local newspapers were available in town or by subscription and delivered through the Postal Service Rural Free Delivery service. The two statewide daily newspapers reached most towns, but often were not readily available to folks out on the farms. The DuPont Highway connected Delaware farmers with urban markets in the northeast, creating opportunities for interactions with diverse buyers and suppliers in the cities.

Broiler production, the extraordinary new enterprise, was quickly revolutionizing the agricultural economy in Sussex County and its neighboring counties in Maryland and Delaware. In just 18 years, farmer's income from broilers went from zero in 1922 to $21.23 million by 1941. Demand for meat protein during World War II exploded and generated $60.8 million of farm income for Sussex County's farmers in 1945. Indeed, Sussex County has been the leading county in the United States every year since 1940.

Delaware remained a predominantly rural state by 1940. Seventy-one percent of the state's land mass, or 895,507 acres were in farmland and cultivated by 8,994 farmers. Most of the farms and farmers were in Sussex County. 5,671 farmers tilled 402,163 acres of farmland in Sussex. In Kent, Sussex's neighboring county to the north, 2,742 farmers tilled 300,361 acres and in New Castle, the most urbanized county and the smallest county, 1,587 farmers worked 192,983 acres. By 2012, Delaware's 2,451 farmers were tilling 508,652 acres (**Table 1**).

The average size of the farms in 1940 in Kent, New Castle and Sussex Counties was 109.5 acres, 121.6 acres and 86.2 acres, respectively. As a note of interest, the percentage of land in farms dropped from over 70% to just over 40% over the nearly 75 years from 1940 to 2012, while the average size of Delaware's farm increased to 207 acres (**Table 2**).

With the growth of the agricultural industry in Southern Delaware and particularly the rapid growth of the broiler industry in Sussex County, farmers and businessmen in the service, supply or processing side of it all recognized the need for agricultural research conducted locally to best address the problems and challenges they faced. A group of farm and agricultural leaders would soon turn to the University of Delaware for just such a program and facility to expand the Agricultural Experiment Station's mission in Southern Delaware.

Breeds of chickens used in the early days of the industry where primarily dark feathered breeds.

Corn shocks in Sussex County, circa 1940s.

Table 1. *Number of farms, acreage of farms in Delaware and by County, 1930, 1935, 1940 and 2017.*

Year	Delaware		Kent County		New Castle County		Sussex County	
	# FARMS	ACRES	# FARMS	ACRES	# FARMS	ACRES	# FARMS	ACRES
1930	9,707	900,815	2,874	302,006	1,639	207,323	4,994	391,466
1935	10,382	921,251	2,871	293,682	1,839	206,654	5,671	402,715
1940	8,994	895,507	2,742	300,361	1,587	192,983	4,665	402,163
2017	2,302	525,324	822	182,396	361	67,455	1,119	275,473

Table 2. *Percentage of Land in Farms of State and County total acreage; Average size of farms, 1930, 1935, 1940 and 2017.*

Year	Delaware		Kent County		New Castle County		Sussex County	
	Acres Per Farm	% of Land in Farmland	Acres Per Farm	% of Land in Farmland	Acres Per Farm	% of Land in Farmland	Acres Per Farm	% of Land in Farmland
1930	92.8	71.1%	105.1	79.3%	117.7	74.1%	78.4	64.6%
1935	88.7	72.7%	102.3	77.2%	112.8	73.8%	74.2	66.5%
1940	99.6	70.7%	109.5	78.9%	121.6	69.0%	86.2	66.4%
2017	228	41.9%	222	47.9%	187	24.1%	246	45.4%

THE FOUNDATIONAL YEARS

1862

Morrill Act passed by Congress and signed by President Abraham Lincoln establishes the Land Grant University System. The act established a Land Grant college in each state . . . "without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as or related to agriculture and the mechanic arts."

1869

On January 12, 1869 the Trustees of Delaware College approved the acceptance of the Morrill Act, making the College a Land Grant Institution. The Morrill Act was passed by Congress and signed by President Lincoln in 1892.

1887

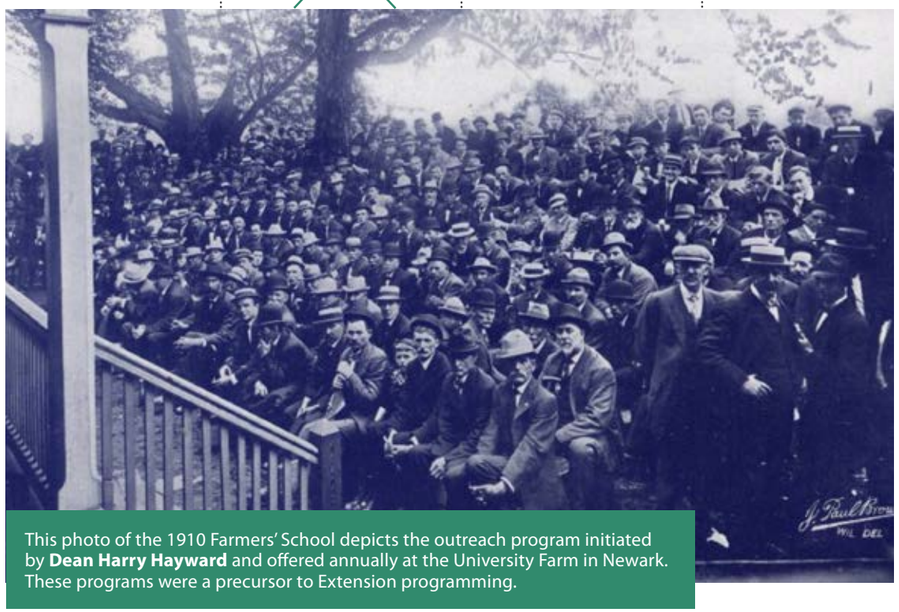
The federal government passed the Hatch Act, which established federal funding for an Agricultural Experiment Station to conduct agricultural research at each Land Grant Institution.

1914

The U.S. Congress passes the Smith-Lever Act. Signed by President Woodrow Wilson. Delaware College implements Extension Programming with the hiring of Extension agents in agriculture and home economics.

1921

Delaware College is re-named the University of Delaware. The Department of Agriculture is re-named the School of Agriculture.



This photo of the 1910 Farmers' School depicts the outreach program initiated by **Dean Harry Hayward** and offered annually at the University Farm in Newark. These programs were a precursor to Extension programming.

DELAWARE COLLEGE AND THE UNIVERSITY OF DELAWARE

The founding of the University of Delaware Agricultural Substation in 1941, is a direct descendant of a visionary Illinois farmer's 1852 dream for higher education in agriculture that eventually resulted in two 19th century pieces of federal legislation that still serve agriculture today. The Morrill Act of 1862 that established the U.S. Land Grant University System. The Hatch Act of 1887 provided funding for agricultural research at each state's land grant institution and continues to this day. Delaware College, re-named the University of Delaware in 1921, benefited greatly from these acts of congress.

In 1852, Baldwin Turner, a professor at Illinois College turned farmer, advocated for Congress to grant public lands to each state for the establishment of industrial universities. Soon, Representative Justin S. Morrill of Vermont introduced a bill in 1857 that would provide grants of public lands to the states to teach subjects related to agriculture and mechanics. Morrill's bill was passed in both the House of Representatives and the Senate in 1859 despite opposition from Southern members but was vetoed by President Buchanan. The emerging tensions between north and south that would explode in Civil War were part of the blocking of the Morrill Act. Buchanan, Southerners and their Democratic allies, felt it was unconstitutional and would enlarge the powers of the federal government at the expense of the states. Southerners did not feel such a program would benefit large plantation holders. They also saw such colleges encouraging small, non-slave holding farmers, with a resultant increase in numbers, could disrupt the balance in Congress between slave and non-slave states.

When Abraham Lincoln became President in 1861, the Southern States left the union. The land-grant college bill was reintroduced in the House by Morrill and in the Senate by Benjamin Wade of Ohio. In 1862, Congress passed, and Lincoln signed three new laws whose purpose was to assist the family farmer – the Morrill Land-Grant College Act, the Homestead Act and the act that established the United States Department of Agriculture.

The Morrill Act granted each state 30,000 acres of federal lands for each of its House and Senate Members. Western states were granted lands within their boundaries, but most states did not have that much unsold public lands. Those states were given script to the public domain in states and territories that had excessed unclaimed public acres. Each state was to use the money from the sale of the land as a trust to endow a college where practical education in agriculture and engineering would be emphasized. However, Delaware's land grant system got off to a unique seven-year late start due to national politics, the Civil War and financial distress at what was then Delaware College.

Originally, states were required to accept the terms of the Morrill Act within two years, but fortunately for Delaware the deadline was extended. Delaware took four years to respond because Delaware Democrats controlled at least one house of the General Assembly and, like their southern brethren in rejecting the original Morrill legislation before the Civil War, were state's rights advocates. In March 1867, Delaware College was designated by the General Assembly as Delaware's Land-Grant University, the trustees of the College did not meet to re-organize until 1869. On January 12, that year, the Trustees accepted the Morrill Act and the funds that came with it.

Delaware College received title to 90,000 acres of land and sold it for 88 ¾ cents/acre, generating $83,000 (fees and commission deducted), which was invested by the State Treasurer in bonds that paid 6%, yielding an annual income of $6,480. This funding was critical to reinvigorating what had evolved into a moribund institution.

The Morrill Act supported agriculture and mechanics (engineering) and engineering drew far more student interest than agriculture. Getting an agricultural curriculum off the ground challenged the faculty and leadership of Delaware for the remainder of the 19th century. The College offered a three-year agricultural curriculum in the 1870s but failed to attract one enrollee. Similar efforts in the 1880s failed to arouse interest. That program, called the Course in Agriculture, was offered but few students enrolled. The first degree in agriculture was awarded in 1893, but the second wasn't awarded until eleven years later.

Soon more federal action would serve as a major stimulus for Delaware College to serve the state's agricultural interests.

On March 2, 1887, Congress passed the Hatch Act, sponsored by Representative William H. Hatch of Missouri and Senator J. Z. George of Mississippi. The Hatch Act provided federal funding to be spent on agricultural research at each Land Grant college, including a new Agricultural Experiment Station at the University of Delaware's main campus in Newark. The Delaware College Board of Trustees had a specially designed two-story brick building erected to house the research of the experiment station at the cost of $21,786. The building still stands, the closest building to Old College, and is still known as Recitation Annex.

Dr. Arthur T. Neale served as Director and his work on Anthrax, the bacterial disease of cattle, sheep, goats and horses correlated the relationship of infected hides imported to Wilmington's leather tanning industry to outbreaks of disease on farms along the tributaries of the Delaware River. As a result, Delaware passed legislation that prevented the importation of hides from countries where cattle anthrax existed.

Other scientists at the Delaware Agricultural Experiment Station during this era worked on vaccines for livestock diseases, fungicide control of fruit diseases and insect control. The station chemist provided the service of analyzing fertilizers to ensure the chemical content was as stated when purchased. A. E. Grantham, using variety trials and fertilizer investigations introduced soybean production to Delaware, but it would not be until the 1940s that the crop got much traction in Delaware.

With the Hatch Act funding a nucleus of agricultural scientists, a tradition of service to Delaware Agricultural by Delaware College was clearly established, even though undergraduate enrollment in the Agriculture Course was non-existent in many years of the late 1900s. The Agricultural Experiment, still in place and functioning very well, is the oldest research unit at the University of Delaware.

In 1906, the Trustees of Delaware College named Harry Hayward Professor of Agriculture and Director of the Agricultural Experiment Station. One year later Hayward accepted even more responsibilities as the Dean of the Agricultural Department, the first Dean of any type in the history of Delaware College. The groundwork Dean Hayward laid out would also enable the future expansion of the Agricultural Experiment Station to Southern Delaware, supplementing the work of the existing Station on the Newark campus.

Hayward identified the greatest need to get the Department moving: funding and a farm for instruction and research. In a speech to an Agricultural Conference made on December 6, 1906, only three months after his arrival, he pointed out that the Delaware General Assembly had not ever made any appropriation for the Agriculture Department, even though agriculture employed 40% of Delaware's population at that time. Meanwhile, over the previous 30 years, The Department of Mechanical Arts (Engineering) was well supported, resulting in a large enrollment and generating graduates eagerly sought for employment. He felt the same result could happen with a well-supported Agriculture Department.

Furthermore, Hayward told his audience, "The Agriculture Department of Delaware College exists only on paper (it has in fact one student). A department originally planned to be of material assistance to the farms of the State, has been allowed to degenerate into a mere name, without weight in the institution itself or influence in the State. A department dead, or so embalmed by indifference that only a might effort of the combined agricultural interests of the State can ever bring it into a useful life."

Hayward made the analogy that ". . . a farm to an Agricultural Department of a College is what a machine shop is to the Department of Mechanical Engineering." He stressed that a farm also enhances the ability of the Agricultural Experiment Station staff to conduct research that serves the needs of Delaware agriculture.

The Delaware General Assembly responded to the need Dean Hayward expressed which was also supported by the State's farming community and the Delaware State Grange. In 1907, they gave Hayward what he needed to reinvigorate the agricultural programs at Delaware College: $20,000 to purchase the 217-acre Wilson farm, just south of Newark. Soon known as the University Farm, it still exists and operates on the south campus of the University. It continues to meet Dean Hayward's vision as a farm for teaching and research. While Hayward's efforts were directed to the establishment of the University Farm in Newark, the results of his work set an important precedent that would set the stage for the establishment of an Agricultural Substation in Southern Delaware 34 years later.

Dean Hayward also recognized that to make the most of a University, it was imperative to spread the word to the state's farmers about the new work at the research farm. As early as 1908, he initiated the Farmer's Schools, attracting farmers from the state and region to the University Farm to see and hear about the latest advances in crop and livestock production. Hayward also secured funds from the Delaware Legislature to support fertilizer demonstrations on farms out in the state. This type of educational outreach initiated by Hayward and his team was a harbinger of the Cooperative Extension Service.

In 1914, Congress passed, and President Woodrow Wilson signed the Smith-Lever Act, establishing a structure for agricultural extension work to be conducted "cooperatively" between the USDA and state agricultural colleges. The Act's stated purpose is the ". . . diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same." Thus, a system was created that brought the university to the people and has touched generations of farmers, families and young people through a wide array of educational programs in agriculture, family & consumer science and 4-H programs for young people.

In Delaware, the first county agricultural agents were Lee H. Cooch in New Castle County, M. O. Pence in Kent and W. C. Pelton in Sussex. This was the first physical presence of Delaware College in Southern Delaware. At first, the USDA encouraged states to form "farm bureaus" to help disseminate their extension efforts and the New Castle County Farm Bureau was formed as a cooperative program with the USDA and Delaware College. In 1918, their first newsletter was published at the Delaware Farm Bureau News. It listed the Delaware Extension Staff, Specialists and County Agents. The county offices were identified as Farm Bureau offices.

Soon, with the local farm bureau joining the National Farm Bureau Federation and entering commercial enterprises ranging from insurance to sell farmers seed, concerns regarding potential conflicts of interest arose. All three cooperators, the USDA, the Land-Grant colleges and the Farm Bureaus agreed the Extension system must be non-biased, independent third-party deliverer of science-based information. Extension became a part of the College of Agriculture in every state.

By 1920, the Delaware newsletter was re-named Delaware Extension News and county extension staff gained insight and developed work priorities through their County Advisory Boards. The Sussex County Extension Office was established in the Sussex County Courthouse in Georgetown. Molloy C. Vaughn was now Sussex County's Agricultural Agent; C. Eva Miller was the Home Demonstration Agent.

With the addition of the University Farm in Newark, undergraduate enrollment began to grow as Hayward had hoped. Hayward became the Dean of the Department, Director of the Agricultural Experiment Station and now, also the Director of Cooperative Extension. This administrative model continues with modification and shared responsibilities to this day.

In 1921, with support of the faculty, the University Trustees changed Delaware College to the University of Delaware. This logical step merged the Woman's College with Delaware

Atlantic City Convention for poultry. (L to R): **Hoke Palmer**, **M. E. Vaughn** (Sussex County Agent), **Ray Motney** (Hatchery), **Byron Pepper** (Hatchery). 1925.

College and provided a broader base for future growth of the institution. What were formerly Departments were re-named Schools. The Agriculture Department became the School of Agriculture with three departments: Agronomy, Horticulture and Animal Husbandry.

Responding to the rapidly growing broiler industry in Sussex County, the University hired Hoke Palmer as the first Extension Poultry Specialist. First among Hoke Palmer's early priorities was to address Salmonella pullorum, a bacterial disease that accounted for as much as 14% of all poultry deaths. The disease is transmitted through the eggs of infected hens; Palmer, working with hatcheries and the State Department of Agriculture, was able to help them increase egg production while reducing the incidence of the disease.

Professor Arthur E. Tomhave, who began as an instructor in Animal Husbandry after receiving his Master's Degree in Animal Husbandry in 1925, would go on to a long career of teaching, research and working with poultry producers for decades. In 1948, Tomhave would play an instrumental role the creation of the national Chicken of Tomorrow contest, first held at what would be the Agricultural Substation. Poultry health, management and husbandry practices, nutrition and feeding practices, and marketing were all issues addressed by the research, teaching and extension professionals during the poultry industry's first twenty years. However, both Palmer and

Tomhave were in Newark. This had to be especially challenging for Palmer to fill his Extension responsibilities in the booming broiler business over 90 miles away in Sussex County.

The growth of the broiler industry, especially during the Great Depression years of the 1930s, was remarkable, especially in the face of a very grim time for Delaware farming. The 1933 gross cash farm income in Delaware averaged just $1,125 per farm, from which both farming and family living expenses had to be paid. In 1933, the broiler industry was an infant with only seven million birds sold with sales of $4 million; however, in just two years, over 24 million broilers would be raised and marketed by Southern Delaware farmers. Delaware and even Sussex County's agriculture was still largely a dairy, cash grain, and general farming operation. Milk from Delaware's farms was selling for only $1.65/cwt. in 1933, $5.60 in 1967 and $18 in 2017. Corn sold for only $0.60 per bushel, soybeans for $1.17 per bushel. Soybeans were only planted on 29,000 acres. 25,000 horses and mules worked on Delaware farms.

The Land Grant University model in Delaware had now taken root. The foundational three pillars of the Land Grant Mission: teaching, research and extension were well established by the 1930s in Delaware. The growth Dean Harry Hayward fostered in enrollment, research, extension and the acquisition of the University Farm did much to create an effective and lasting structure of the University's role in Delaware agriculture. His legacy left an important precedent as farmers and agriculturists in Sussex County would soon express a need for a "Substation" of the University's Agricultural Experiment Station in their part of the State.

STATE SPECIALISTS 1939

(Located in Newark on the Main Campus)

- Pearl McDonald, Nutrition Specialist
- Louise Whitcomb, Home Management Specialist
- H. L. Richardson, Extension Poultryman
- R. C. Stezler, Extension Economist
- J. H. Skinner, Jr. Extension Editor
- C. M. McCaulay, State Boy's Club Agent at Large
- L. A. Stearns, Extension Entomologist – part-time
- J. M. Amos, Assistant Extension Entomologist – part-time
- T. F. Manns, Extension Plant Pathologist – part-time

In 1925, the positions of County Agent Leader and 4-H Club Leader were merged as the State Leader of County Agents. A.D. Cobb functioned in that capacity until 1929 when the title was changed to Assistant Director. Cobb remained in that position.

In 1938, the title of Helen McKlinlay was changed from State Home Demonstration Leader to Assistant Director.

From 1914 to 1939 and beyond the Deans of the School of Agriculture also served as Director of Cooperative Extension and as Director of the Agricultural Experiment Station. See Appendix IV for list of Deans through the years.

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"I always felt I was a part of something much bigger than any individual – we're each part of the tradition of the University, the College of Agriculture, the Substation and then the Carvel Center. Helping people by providing knowledge." – Ed Kee

"When I first came here for my first job interview – it felt like home." – Nancy Mears

"We work as a team, if somebody needs something we pull together. There is a warm, family feeling here." – Tammy Schirmer

"It's special to be a County Ag Agent in my home county, 5 minutes from where I grew up. Having a connection with the farmers is great – they know me and my family and I know them." – Dr. Cory Whaley

Cooperative Extension County Agents and State Specialists 1914-1939

NEW CASTLE COUNTY

COUNTY AGRICULTURAL AGENTS

Lee M. Cooch 1914-1917
M. O. Pence 1917
R.O. Bausman 1917-1928
Ed. Willim, Jr. 1928-1935
G. M. Worrilow ..... 1936 to date

HOME DEMONSTRATION AGENTS

Helen L. Comstock 1918-1919
Kate Henry Daugherty ..... 1928 to date

4-H CLUB AGENTS

Agnes P. Medill 1919-1923
Naomi Pepper 1923
Ed. Willim, Jr. 1925-1928
G. M. Worrilow* 1928-1935
Laura B. Rutherford ..... 1936 to date

**Appointed as Assistant County Agent*

KENT COUNTY

COUNTY AGRICULTURAL AGENTS

M.O. Pence 1914-1916
H. H. Zimmerly 1916-1918
A. D. Cobb 1918-1921
R. E. Wilson ..... 1921 to date

HOME DEMONSTRATION AGENTS

Ethel M. Dole 1917-1918
Hazel Plummer 1918-1919
Helen L. Comstock 1919-1920
Mary Graham 1928-1929
Louise Whitcomb 1930-1938
Hazel H. Darrell ..... 1938 to date

4-H CLUB AGENTS

Helen L. Comstock ..... 1920 to date

SUSSEX COUNTY

COUNTY AGRICULTURAL AGENTS

W. C. Pelton 1914-1917
D. H. Kauffman 1917-1918
M. C. Vaughn 1918-1928
C. R. Snyder ..... 1928 to date
B. V. Carmean (Assistant) ..... 1936 to date

HOME DEMONSTRATION AGENTS

S. Eva Miller 1917-1918
Dorothy Emerson 1919-1920
Laura B. Rutherford 1928-1934
Lucille Zion 1934-1935
Laura B. Rutherford 1935-1936
Marion O. Severance 1936-1937
M. Alice Melendy ..... 1938 to date

4-H CLUB AGENTS

Dorothy Emerson 1921-1923
Anne B. Moore ..... 1923 to date

AN AGRICULTURAL SUBSTATION FOR SUSSEX COUNTY

1941

The Substation is Established


PUBLIC SALE
OF VALUABLE
Farm and Timber Land
The undersigned, Owners of the land herein more fully described, will sell by way of public auction, on
SATURDAY, AUGUST 30, 1941
BERTHA MESSICK,
LILY HARDEN, OWNERS

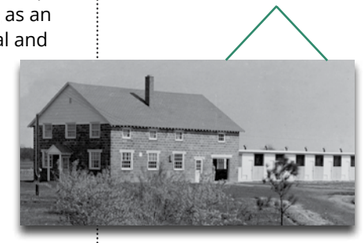
The University purchased the 310-acre farm of John A. Tyndall, five miles west of Georgetown, for $7,555 with funds provided by the Delaware General Assembly to establish a permanent Agricultural Substation as part of the Delaware Agricultural Experiment Station. A committee of 34 farmers and others from Sussex County had expressed the need for the research station for Southern Delaware.

1942

Emmor F. "John" Turner is hired as the Substation Farm Superintendent. Turner retired in 1965. Karl Seeger is hired from the University of Connecticut as the Substation's first poultry research associate. Each were key to getting the Substation up and running as an experimental and research farm. A poultry "Open House" was held for producers to see the first poultry experiment at the Substation.

1945

The cinder block two-story office building was constructed, housing offices and a poultry research laboratory. This block building would be the nucleus of the Substation for 61 years and would have several "wings" connected to accommodate larger research and extension staffs.



The first Field Day opened the farm for producers to visit the field research plots. The experiments on view were all either vegetable or fruit crops. Field Days would not be held annually until 1951.

Despite the economic pressure of the Great Depression, farming and agriculture continued to dominate life and land use in Southern Delaware. Broiler production soared from nine million birds in 1934 to 31 million in 1939. Indeed, as the winds of World War II began to blow across the globe by 1941, agriculture was a dominant economic factor in Delaware, especially in Sussex County. Broiler production would continue its rapid expansion and add greatly to the county and state's cash farm income. By 1941, broiler production was generating over $20 million in cash farm income in Sussex County. (**Tables 3 and 4**).

Farmers, poultrymen and agribusiness concerns in Sussex County had come to respect and rely on University professors, specialists and agents for new information. These dedicated professionals from the School of Agriculture, always intent on serving the agricultural interests of Delaware, conducted research and field demonstrations on farms and plots throughout the state for years, recognizing that experiments at the University Farm in Newark were not always relevant to the soils and conditions downstate. Researchers would work with farm cooperators or even rent plots of ground. However, the sporadic and intermittent nature of these arrangements complicated and impaired those research and demonstration efforts.

AN AGRICULTURAL RESEARCH STATION FOR SOUTHERN DELAWARE

Interest in creating a southern Delaware research farm as part of the Agricultural Experiment Station and the School of Agriculture began as early as 1938. Vegetable and fruit growers, poultry producers and others saw the need and expressed their interests in organizing such a facility. While this initial effort did not immediately gain traction, the need and issues were framed expertly. A position paper, the first connected to the concept of a Substation in Southern Delaware, cited the concentration of agriculture in southern Delaware and the tremendous expansion of the broiler industry in just a little more than a decade.

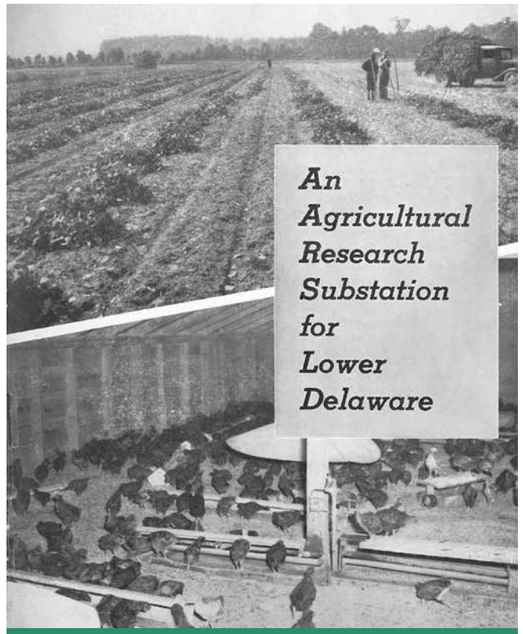
". . . . the fruit, vegetable and broiler industries are more important in the southern part of Delaware than they are in the northern part of Delaware. The Agricultural Experiment Station, located as it is in the extreme northern end of the state, cannot serve these farm enterprises to the best interests of the farmers. The nature of soils, drainage, climatic conditions, prevalence of disease and insect pests, and other environmental factors are different in southern Delaware than those at the University Experimental Farm and, therefore, present problems that should be pursued at the point of origin. Farmers ask many questions of the Station workers or the Agricultural Extension Service through the County Agents that cannot be answered because there is no information available that is applicable to the local conditions."

George Schuster, Dean of the School of Agriculture, wrote in the 1940 Agricultural Experiment Station Annual Report:

Many investigations must of necessity be carried on in the midst of the enterprise concerned if results applicable to the local situation are to be obtained. This has been partially accomplished through cooperation with interested farmers, or by leasing of land. Other investigations, due to their fundamental nature, must be carried on at the Experiment Station where laboratory facilities, greenhouse facilities and facilities for controlled conditions may be available

Building on concepts expressed earlier, a grassroots committee of 34 farmers and agribusinessmen from Sussex County (*see sidebar on page 27*) worked with Dean Schuster, Poultry Professor A.E. Tomhave and Plant Pathology Professor, Dr. Kenneth Kadow to explore the possibilities for an agricultural research farm in Sussex County. They created a proposal that reiterated the need to conduct research under local conditions and emphasized the necessity for the state to be a major factor in funding a new facility.

The new proposal, "An Agricultural Experiment Station for Southern Delaware," acknowledged the earlier one, observing, "many people who are close to the agricultural conditions within the State of Delaware have long seen the need of strengthening the work of the Delaware Agricultural Experiment Station. Poultrymen and truck growers of lower Delaware were the first to become interested. This was a natural, first because they are so far removed from the present station located in the extreme north end of the state; and secondly, because research done at Newark is often not applicable to lower Delaware because of differences in soil



This document made the case for the creation of the Substation. It is the result a committee of 31 farmers and agriculturists working with Dean **George Schuster,** Professors **Kadow** and **Tomhave** in the University's School of Agriculture. **C. C. Murray**, a farmer from Selbyville was the chairman of the committee.

conditions. Other groups have since become interested that a sub-station or a field experimental station for lower Delaware is badly needed."

The authors then defined agricultural research, "Research is a question of try, try, try, try this, try that, all the time keeping accurate records, looking for a new way, a better way." They pointed out research can pursue a well-thought out theory, or trial and error, or a hunch. After all, they observed, this is how Edison and Bell worked; it was how Nylon was invented.

They specified what was needed and how it could be organized. That is, a branch field station of the present experiment station in Newark should be in Southern Delaware. It would require only a slight increase in personnel, who would work on the agricultural problems in the area. Much could be done with the present staff of the Agricultural Experiment Station, who would travel south to conduct the work in conjunction with the local staff. Administratively it could be managed from the existing administration at the School of Agriculture.

They also observed the concept is not new. Other states had off campus research stations. Maine had 2; Massachusetts, 2; New York, 2; New Jersey, 4; Virginia, 8; Georgia, 2; North Carolina, 2; and South Carolina, 5.

Finally, the economic impact of the emerging modern agriculture was stressed along with the State of Delaware's responsibility to support that rapidly expanding industry. Citing the latest numbers, the June 30, 1939 Hatch Act federal funds for agricultural research brought $94,400 to Delaware. The State had met the required match of funds with $21,500, a ratio of 81% federal support and only 19% from state funds. They deemed this a small amount when Delaware's agricultural industry was generating over $40 million in gross farm income. In other states, state funding often equaled or exceeded federal funding.

The Agricultural Committee of the University's Board of Trustees approved the concept and the development of plans and specifications for a Substation to be in Southern Delaware as part of the Agricultural Experiment Station. The Stage was set.

In 1941, the General Assembly passed "An act to provide for the establishment of an agricultural substation for lower Delaware . . ." Governor W. W. Bacon appointed a commission, including Preston Townsend of Selbyville, Harley Hastings of Laurel, and Kenneth Kadow from the University to select a site and make a "Substation" of the Agricultural Experiment Station reality. They investigated 87 sites in Sussex County, identified the John A. Tyndall Farm, five miles west of Georgetown, and on August 30, 1941, purchased the farm at public auction for $7,555. It consisted of 310 acres of land, 120 of which were suitable for horticultural work. They recognized the soil was in a poor state of fertility and the farm needed many building improvements.

Mr. Tyndall had died back in 1918 and the farm was left to the care of tenant farmers. The once handsome buildings and fertile fields had become so rundown by 1941 it was hard to see that this farm had once been prosperous. Tyndall was said to be ahead of his time, experimenting with advances in farming. He grew barley, wheat and vegetables. His peach orchard, which he sprayed ". . . with a home cooked mixture containing sulfur, stored in a huge barrel in which the spray was hand pumped." His strawberry and watermelon patches were well known for their productivity. One report observed, "before his death, Mr. Tyndall was way ahead of his time in his farming and his family was most pleased to have the University of Delaware purchase the farm so that his ideals and dreams could be carried on after so many years of neglect."

Mr. Emmor F. "John" Turner was hired in early 1942 as the Farm Superintendent. Turner came to Sussex County from Illinois and would stay as the Superintendent until his retirement in 1965. His responsibilities over his career included supervising farm labor, keeping daily weather records, managing costs, supervising labor and keeping other records, maintaining buildings, grounds and machinery at the substation. The job of establishing and maintaining field research experiments fell to him as he cooperated with project leaders from the main campus in Newark. One of Turner's first hires was Jack Mason, an African-American who did the field work and was especially respected and appreciated for his dedication to spraying the orchards. Mason woke early to spray before dawn when the wind was calm.

Mr. Turner would raise his family in the brick farm manager's home and became a steadfast man in the Georgetown community and his church. In 1965, he received many tributes from his co-workers, farmers and members of the general Georgetown community.

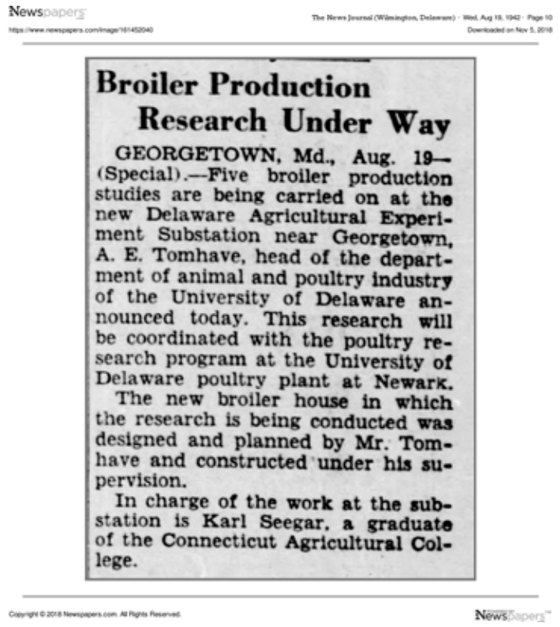
Through these early years, crop research experiments were conducted directly by faculty on the main campus in Newark and assisted by Mr. Turner and the farm staff. Karl Seeger, a young researcher with the University of Connecticut Animal Research Department was hired in 1942 to conduct poultry research at the Substation, often in concert of faculty in Newark and with input from the poultry industry. Seeger's recollections are shared in the adjacent sidebar.

A little over a year into World War II, School of Agriculture faculty members M. M. Daugherty, an Agricultural Economist; T. A. Baker from the Animal Industry Department; E. P. Brasher of the Horticulture Department and Claude Phillips of the Agronomy Department were charged by the State War Production Board with determining the state's potential in filling the increased demand for food during the war. In 1943, they published a treatise, "Wartime Agricultural Capacity of Delaware," pointing out that Delaware because the state's farmers were already growing food crops most needed in wartime. This resulted from, in part, the state's temperate climate, productive soils and proximity to markets.

The team noted that 14,000 acres of tomatoes and 17,000 acres of lima beans grown for canning were already a significant contribution and that 7,000 new victory gardens were in place by 1943. Milk was plentiful from the state's 38,000 cows, averaging 4,500 pounds of milk annually. The broiler industry, its annual production of birds growing from 10,000 in 1925 to 9 million in 1935 to 48 million as the war started in 1941, became a mainstay in the state and national effort to meet the military and domestic demand for animal protein. However, the team identified the wartime shortage of available labor to grow and produce the crops and livestock as a major challenge.

Even with the start of the war, improvements at the newly formed Substation were getting underway. By May 1942, a long-term soil improvement plan was developed to facilitate crop research that addressed the agricultural needs of southern Delaware's agriculture. Apple and peach orchards were established. As 1942 was the first season for crop production research studies, the Experiment Station scientists were off to a fast start, conducting field studies in apple soil management, strawberry fertilization, watermelon variety trials and peach variety trials.

Soybeans, today the state's most widely planted crop, were a new and unknown commodity in Delaware were planted as


Newspapers
https://www.newspapers.com/image/161452040
The News Journal (Wilmington, Delaware) - Wed, Aug 19, 1942 - Page 10
Downloaded on Nov 5, 2018

Broiler Production Research Under Way

GEORGETOWN, Md., Aug. 19—(Special).—Five broiler production studies are being carried on at the new Delaware Agricultural Experiment Substation near Georgetown, A. E. Tomhave, head of the department of animal and poultry industry of the University of Delaware announced today. This research will be coordinated with the poultry research program at the University of Delaware poultry plant at Newark.

The new broiler house in which the research is being conducted was designed and planned by Mr. Tomhave and constructed under his supervision.

In charge of the work at the substation is Karl Seegar, a graduate of the Connecticut Agricultural College.

The News Journal: *Poultry Research to be conducted at the new Ag Experiment Station near Georgetown and the introduction of* **Karl Seeger** *as the supervisor of this work in the August 19, 1942 edition of the Wilmington News-Journal.*

well. Early Delaware Agricultural Experiment Station scientist, A.E. Grantham, had planted some basic studies of soybeans at the University Farm in Newark in the late nineteenth century. It wasn't until the 1930s when Professor A. Alexis Horvath, a Russian refugee who had worked with the crop in Manchuria, established experimental trials in Newark and in Georgetown at the new Substation in its first year of operation.

The grass roots committee had identified several areas of needed broiler research in their report. Broiler management, housing, breeding, feeding and disease control became initial priorities. Plans for a broiler house were developed and poultry scientist Karl Seeger was soon overseeing the broiler research at the Substation.

The first research flocks evaluated floor space, studied litter comparisons (sawdust, shavings, corn cobs and other materials) and ran trials of cracked corn versus mash as a starter feed. Thirteen weeks after the studies were started, 150 broiler producers came to view the results. Opening the farm to producers was consistent with Harry Hayward's example of Farmer Schools conducted 30 years earlier at Newark.

The 1943 Annual Report noted the establishment of a nutrition-disease unit for poultry investigations as well as a facility for studying the feeding and management of laying

THE ORIGINAL SUBSTATION OFFICE
now painted white with the adjacent first poultry research house, circa 1947.

Karl Seeger. The first poultry researcher at the University Substation. Hired in 1942, Seeger made great contributions to the poultry industry and the Chicken of Tomorrow Contest. He moved to California in the 1950s.

flocks. A 13 x 120-foot brooder house was also constructed, under the watch of Mr. Seeger.

In 1945, a two-story cinder block office building was constructed on the southside of Rt. 28. That building would be the hub of the Substation and would have new office wings and a meeting room added over the years. In addition to housing the University staff, it would also serve as the home office for the Delmarva Poultry Industry, Inc. (DPI), the trade association that has represented the broiler industry on Delmarva since the late 1940s. In 2006, the University staff would move to the new Carvel Research & Education Center across the road, however, DPI still operates from the original Substation building.

Educational open houses at the Substation, a combined effort of Ag Experiment Station and Extension Service personnel, proved to be popular with broiler growers who wanted as much information as possible in this relatively new and rapidly expanding enterprise. The intense demand for meat and protein during World War II caused broiler production to explode to new highs; Delaware broiler producers raised 48 million birds at the start of the war in 1941 and produced 73 million birds just four years later in the last year of the war, 1945.

On the disease side of broiler production and research, early studies of sulfa drugs to control Coccidiosis and antibiotics to control Infectious Synovitis were on the list of accomplishments in the 1940s. The early disease and diagnostic work at the Substation in the 1940s and early 1950s was led by scientists from Newark in conjunction with the Georgetown staff. This collaboration between Newark based faculty, Georgetown scientists and the industry established a precedent for poultry disease research that has developed tremendous advances for the state, region, the country and the world.

Early work included evaluating broiler breeds and strains for not only growth rates and yields, but also the quality of the finished meat product. Barred Rocks, New Hampshire and Barred Rock/New Hampshire crosses were popular since the earliest days of commercial broiler production. By the end of World War II, the industry was demanding more of the white-feathered broilers and the primary breeders were crossing the various strains within breeds as they strove to develop faster growing birds with improved meat quality. Workers at the Substation responded by conducting trials under controlled conditions that treated the different strains equally to determine which were the best producers.

While the broiler industry in Delaware and across the nation was expanding, it increasingly demanded science-based information to improve its competitive position. During this expansion, the industry faced decreased demand for

Howard Pierce, Chief Poultry Buyer for the A & P Company weighing birds in the *Chicken of Tomorrow Contest*. Pierce's observations about the need for meatier birds helped initiate the Contest.

broilers. Supply was increasing, demand was decreasing with a resultant drop in price and profitability. Under these conditions, the Chicken of Tomorrow Contest emerged. Under the leadership of Extension Poultryman J. Frank Gordy and Karl Seeger, the University of Delaware Substation housed the first contest in 1948, rearing 16,000 birds from breeders from across the country for evaluation of yield and quality at the end of the contest.

University of Delaware historian, William H. Williams recounts the origins of the Chicken of Tomorrow Contest in his 1998 book, Delmarva's Chicken Industry: 75 Years of Progress.

In November 1944 Howard C. Pierce, national poultry director for A & P Food Stores – then the nation's leading retail poultry distributor – stated, during a speech at a Canadian poultry meeting, that the development of a meatier, broad-breasted chicken would have a very significant impact on the broiler industry.

Pierce's words were picked up by the media, and people across America spoke enthusiastically about the need for a meatier broiler. With the support of A & P, the U.S. Department of Agriculture, and the poultry industry nationwide, the National Chicken of Tomorrow Committee was formed and drew up a three-year program to promote the development, through scientific breeding, of a meatier, broader breasted chicken. In 1946 and 1947, state and regional contests held across the nation awarded cash prizes and established eligibility for the national finals to be held in Georgetown, Delaware, in 1948.

In the spring of 1948, the forty breeders and hatchery men who were eligible for the national contest sent eggs to the Bradley Hatchery in Easton, which produced some sixteen thousand broiler chicks. The birds were then brought to the University of Delaware Substation where the broilers were fed and raised under identical conditions until they were twelve days and two weeks old. Then they were sent to processing plants and their "New York dressed" carcasses were examined by a panel of judges and the winners declared.

Noting the success of the poultry "open houses" dating back to that first year of operation in 1942, it was decided to open the farm to show the agricultural community the work being done during the summer of 1945. There were 20 crop research plots to show as well as the work in the poultry houses (*see sidebar on page 42*) for a listing of the projects). The scientists were proud of what they were doing and anxious to demonstrate their work. That was the first of what became the "Farm and Home Day" headquartered in the grove of oak trees on

the farm. This tradition, always on the second Wednesday of August, became not only an agricultural event, but included programs for 4-Hers and for homemakers. Soon it was a place to see and be seen, especially for politicians and anyone running for public office. Held annually since 1951, Farm & Home Field Day would continue until 2004. Today, the tradition is continued in different formats directed towards events targeted for specific issues and topics through the year.

COOPERATIVE EXTENSION IN SUSSEX COUNTY

While the Substation was being established five miles west of the Sussex County Seat, Georgetown, the Sussex County Cooperative Extension staff worked upstairs in the Georgetown Post Office on the town's Circle. That building is still standing, although expanded as the Sussex County Administration building.

J. Frank Gordy, hired as the Sussex County Agent in 1941 after teaching vocational agriculture in Delaware High Schools for 13 years, was assigned duties as the Extension Poultryman in 1943. His colleague, George M. Worrilow, having risen from County Agent in New Castle County to Extension Dairy Specialist, became the Associate Director of Extension in 1943, under Dean Schuster.

With World War II exploding on the world scene just four months after the purchase of the Tyndall Farm, new priorities emerged, and Frank Gordy was a big part of contributing to the war effort as the Farm Labor Coordinator for Delaware. The U.S. War Production Board appointed Gordy as the State Supervisor of Emergency Farm Labor reporting to George Worrilow, who served as the State Director of the Farm Labor Supply Program. The pair would provide great service to the war effort and to Delaware's agriculture during the national crisis.

Worrilow and Gordy left no stone unturned to find help for Delaware's farmers. School children, Boy Scouts, women's organizations and others volunteered to work on the farms and in the packing plants. Victory gardens were planted up and down the state, including in the City of Wilmington. Vocational agriculture students and their teachers were important and appreciated as they went out to the farms to help. They even arranged for 25 Newfoundlanders to work on Delaware dairy farms.

Gordy's son, J. Frank Gordy, Jr., with his Boy Scout troop, cut asparagus at the age of 13 on a Bridgeville farm. 4-Hers served as air raid wardens and plane spotters. Extension Home Demonstration Agents established community canning centers, canning food for not only themselves, but for others in hospitals and for veterans. The Agents were also very much involved in canned good drives as well as sewing clothing articles for the Red Cross. Labor camps for Bahamians and Jamaicans were established. Over 300 soldiers from Fort Miles volunteered to pick string beans, saving the crop for several farmers and a canning company.

It was German Prisoners of War, who started arriving in Delaware in 1944, that provided some of the greatest challenges for Gordy. Prisoners were interred at Fort DuPont (at Delaware City), but side camps existed at Lewes, Harbeson, Georgetown, Fort Saulsbury (near Milford) and Harrington. He had to balance the daily requests for labor from farmers, poultry processors and vegetable canners, often facing an intractable and pressurized juggling act of the needs of employers. He persevered, and the program was an outstanding success. Gordy and his Extension colleagues across the State reported the placements and savings for 1944 and 1945:

	1944	1945
Number of different farmers assisted	1,735	1,705
Number orders placed by farmers	3,451	2,662
Number different placements	35,635	25,270
Male	25,727	22,250
Female	2,092	911
Youth	4,816	2,109
Number of different individuals placed		
Bahamians and Jamaicans	1,076	1,001
Prisoners of War	1,500	3,000
Intra State (VFW and WLA)	1,533	1,250
Information furnished to Selective Service	1,146	844
Value of Crops Harvested	$6,921,000	$7,369,200

Despite these early challenges, great progress was made as the 1950s approached the University of Delaware Agricultural Substation in Georgetown. In 1966, at the 25th anniversary of the founding of the Substation, University Board of Trustees Chairman, James M. Tunnell reflected on the founding of the Substation. Tunnell, an attorney in Georgetown whose family was highly involved in land acquisition, timbering and farming remembered his first reaction when he heard the University was buying the Tyndall farm, "While I wasn't a farmer, my family had a lot of experience and interest in farming, timber and land. When I heard the University had bought that farm, with its poor drainage and wild shrubs growing on the fields, I thought if the University can make that place work, they must be very good."

George M. Worrilow, former Dean of the College and a Vice-President of the University by 1966 recalled, "I guess we figured that if we started at the bottom with that farm, the only way we could go was uphill!"

By 2018, since the founding in 1941, literally thousands of research projects in a wide array of crops as well as studies in poultry health and husbandry have been conducted. This work has connected to farmers, poultry producers and the ag industry and thereby reflect well on the Georgetown enterprise and the University as a whole. It all began with the sincere interest among the agricultural community in Sussex County, working with their University. Research projects for certain years are posted in Appendix I.

The 34 Members of the Founding Committee for an "Agricultural Experiment Station for Lower Delaware"

EXECUTIVE COMMITTEE

- C. C. Murray, Chairman, Selbyville
- Martin Doordan, Secretary-Treasurer, Bridgeville
- Harley, Hastings, Bethel
- Carlton Draper, Milton
- F. M. Gum, Jr., Frankford
- George L. Shuster, Newark
- Ebe Chandler

BUDGET COMMITTEE

- F.M. Gum, Jr., Frankford
- Levin Bunting, Frankford
- E. A. Yutzi, Millsboro
- Kenneth Kadow, Newark
- A.E. Tomhave, Newark

EDUCATION COMMITTEE

- Harley Hastings, Chairman, Bethel
- H. L. Richardson, Secretary, Newark
- Robert Yearsley, Marshallton
- Wilson Price, Newark,
- J. Danforth Bush, New Castle
- Clarence Jester, Frederica
- William Haas, Dover
- C. Arthur Taylor, Harrington
- Walter Phillips, Harbeson
- Laird Kratz, Greenwood
- Charles Conaway, Greenwood

FINANCE COMMITTEE

- Carlton Draper, Chairman, Milton
- F. M. Gum, Jr., Frankford
- Levi Bunting, Frankford
- George Ellis, Ocean View
- Louder Mitchell, Millsboro
- Hugh Davis, Millsboro
- Roy Steelman, Dagsboro
- Albert Hill, Bethel
- M.D. Yerkes, Laurel
- M. G. King, Laurel
- L. G. Knapp, Lewes
- Clarence Jester, Frederica
- Warren Newton, Bridgeville
- Martin Doordan, Bridgeville
- E. N. Carvel, Laurel

A FARMER'S PERSPECTIVE

Cliff "Bud" Murray, Selbyville *– Bud Murray's grandfather, C. C. Murray was the chairman of Founding Committee for An Agricultural Experiment Station for Lower Delaware. The committee's work led to the purchase of the Tyndall Farm in 1941 and the subsequent establishment of the University's Agricultural Substation.*

Today, Bud and his family continue their farming tradition with grains, seed production and turf production. Bud says, "We always felt it {the Substation/Carvel Center} was the best source of non-biased information. Over the years, the people there have done a great job with poultry and all the crops. It's been really good for the farmers. I don't know how we could live without it.

SCHOOL OF AGRICULTURE - 1944

1944 Agricultural Extension Report (Substation – UD Archives - Sept 27, 2018)

G. L. Schuster, Director
K.W. Baker, Associate Director
G. M. Worrilow, Acting associate Director
J. F. Gordy, State Supervisor, Emergency Farm Labor
Helen V. McKinley, Assistant Director/ Clothing Specialist
Pearl MacDonald, Nutrition Specialist
C. E. McCauley, 4-H Club Agent Supervisor
Louise R. Whitcomb, Home Management Specialist
W. C. Skoglund, Poultry Specialist
J. E. H. Lafferty, Extension Editor
Betty Burch, Acting Extension Editor
Garry A. Miles, Poultry Specialist *(Resigned March 4, 1944)*
J. F. Gordy, Poultry Specialist *(Part time appointed, July 1)*
Harvey L. Chada, Entomology Specialist *(Resigned May 31)*
Paul L. Rice, Entomology Specialist *(Appointed July 1)*
C. E. Phillips, Forage Crop Specialist
E. P. Brasher, Truck Crop Specialist
Florence E. Fader, Secretary

NEW CASTLE COUNTY
UNIVERSITY of DELAWARE
NEWARK

Ralph L. Wilson, Acting Agricultural Agent
Kate Daugherty, Home Demonstration Agent
Laura B. Owens, County Club Agent
Viola Hanby, Acting County Club Agent
Clara D. Skoglund, County Club Agent

KENT COUNTY
POST OFFICE BUILDING, DOVER

Russell E. Wilson, Agricultural Agent
W. E. Tarbell, Assistant County Agent at large
Florence L. Yetter, Home Demonstration Agent
Virginia Ann Tull, 4-H Club Agent

SUSSEX COUNTY
POST OFFICE BUILDING, GEORGETOWN

W. H. Henderson, County Agent
S. M. Sloan, Assistant County Agent
Gertrude Holloway, Home Demonstration Agent
Margaret S. Nelson, County Club Agent
F. S. Cantrell, Emergency War Food Assistant
Jacob Miner, Farm Labor Assistant
David Green, Farm Labor Assistant (June 12 – August 12, 1944)

George Worrilow, Dean of the College of Agriculture, broadcasting from a Farm & Home Field Day in the 1950s. County Agent **Bill Henderson** to his right.

John Turner, (Center), arrived at the newly purchased Agricultural Substation on January 3, 1942. He would serve as farm manager until his retirement in 1965.

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

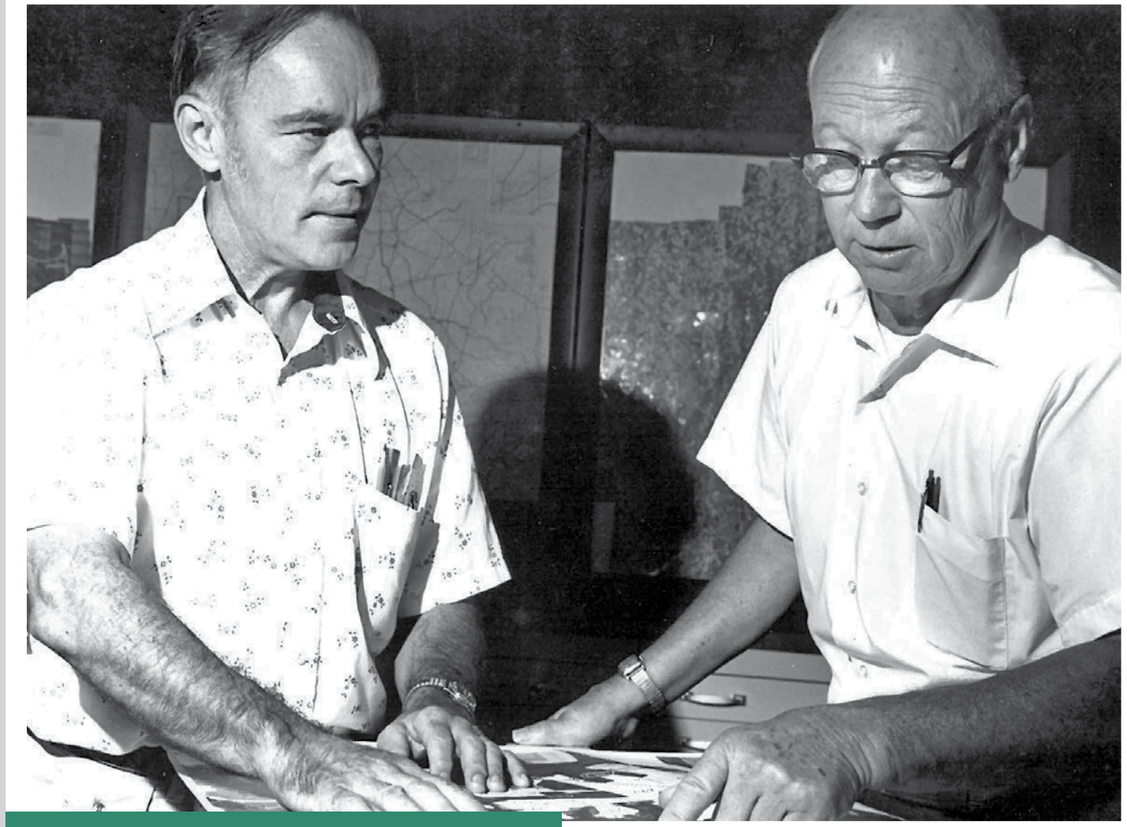
"For me, someone who grew up near here, then went to UD College of Agriculture, it's an awesome place, I have a real sense of place as a Sussex County native and UD alumnus about how it manifested out in the farming community." – Ward Harris

"It's the people I've worked with over the years, you get to know everybody on some level." – Quintin Johnson

"I remember as a young kid coming here in August 1974 – that the people who worked here were extremely dedicated." – Barbara Stephens

"With the knowledge base that's here, the research farm, so much easier to get work done, to get the breadth of knowledge that's just down the hall with my colleagues." – Jarrod Miller

I like helping people also the people I work with. Legacy – I'm very conscious of the reputation and expertise we've had over the years. Want to uphold that tradition. It's a work family." – Tracy Wootten



Bill Henderson, Sussex County Agent (right) working with County USDA Agricultural and Conservation Service Director, **Donald Campbell**. Henderson served as the Sussex County Agent from 1943 to 1978.

Table 3. Cash Farm Income from Livestock & Poultry by Counties and Commodities in 1941 and 1945

Cash Farm Income from Livestock & Poultry by Counties and Commodities in 1941 and 1945								
	State	State	New Castle	New Castle	Kent	Kent	Sussex	Sussex
Livestock & Livestock Products	1941	1945	1941	1945	1941	1945	1941	1945
Cattle & Calves	$765,000	$1,374,000	$296,055	$485,022	$296,055	$583,950	$172,890	$305,028
Hogs	455,000	932,000	118,300	249,776	141,050	267,484	195,650	414,740
Sheep & Lambs	4,000	5,000	1,720	2,240	960	1,105	1,320	1,655
Eggs (Chickens)	2,193,000	3,843,000	438,600	880,047	701,760	1,172,115	1,052,640	1,790,838
Commercial Broilers	21,200,000	65,174,000	212,000	1,042,784	636,000	3,323,874	20,352,000	60,807,342
Chickens	1,204,000	2,565,000	240,800	597,645	409,360	792,585	553,840	1,174,770
Turkeys	458,000	750,000	59,540	91,500	178,620	181,500	219,840	477,000
Other Poultry	138,000	185,000	27,600	62,900	46,920	59,200	63,480	62,900
Dairy Products	3,498,000	5,932,000	1,469,160	2,276,968	1,259,280	2,835,386	769,560	819,646
Wool	5,000	6,000	2,100	2,520	1,300	1,560	1,600	1,920
Other	5,000	48,000	845	8,160	1,635	15,840	2,520	24,000
Total Livestock	$29,925,000	$80,814,000	$2,866,720	$5,699,562	$3,672,940	$9,234,599	$23,385,340	$65,879,839

Table 4. Cash Farm Income from Crops by Counties and Commodities in 1941 and 1945

Cash Farm Income from Crops by Counties and Commodities in 1941 and 1945								
Commodity	State	State	New Castle	New Castle	Kent	Kent	Sussex	Sussex
	1941	1945	1941	1945	1941	1945	1941	1945
Wheat	$1,447,000	$1,212,000	$546,966	$437,532	$685,878	$553,884	$214,156	$220,584
Rye	55,000	202,000	440	2,222	13,640	58,580	40,920	141,198
Corn	532,000	773,000	83,524	108,220	153,748	206,391	294,728	458,389
Oats	1,000	7,000	650	364	260	427	90	6,209
Barley	13,000	25,000	9,997	8,275	2,249	9,450	754	7,257
Hay	100,000	169,000	33,600	85,007	32,600	43,204	33,800	40,729
Soybeans	265,000	587,000	24,645	51,069	73,935	210,146	166,420	325,785
Apples	1,726,000	912,000	107,012	90,288	949,300	380,304	669,688	441,408
Peaches	353,000	682,000	8,119	14,322	192,738	331,452	152,143	336,226
Pears	5,000	3,000	1,435	975	2,315	1,707	1,250	318
Grapes	102,000	52,000	2,856	4,056	87,312	40,508	11,832	7,436
Strawberries	523,000	396,000	5,230	22,176	70,082	118,800	447,688	255,024
Small Fruits	25,000	8,000	400	1,000	2,050	1,000	22,550	6,000
Other Fruits	6,000	1,000	96	120	492	120	5,412	760
Truck Crops	2,479,000	5,561,000	123,950	647,393	495,800	1,175,272	1,859,250	3,738,335
Potatoes	102,000	283,000	19,380	41,035	29,172	61,977	53,488	179,988
Sweet Potato	405,000	601,000	4,050	13,222	60,750	123,806	340,200	463,972
Other	779,000	1,157,000	90,903	138,840	246,563	370,240	441,534	647,920
Total Crops	$8,918,000	$12,631,000	$1,063,253	$1,666,116	$3,098,884	$3,687,328	$4,755,863	$7,277,556
Total Crops & Livestock	$38,843,000	$93,445,000	$3,929,973	$7,365,678	$771,824	$12,921,927	$28,141,203	$73,157,395

Adapted from R. O. Bausman, Cash Farm Income, Delaware Agricultural Experiment Station, Mimeo Circular No. 47, June, 1946. Published in Delaware: A History of the First State. H. Clay Reed, editor. Lewis Historical Publishing Company. New York. 1947

SUBSTATION FIRST YEAR BUDGET

CAPITAL INVESTMENT

CAPITAL INVESTMENT – HORTICULTURE

200 acre farm and buildings	$7,500
Tractor, disc and plows	1,200
2 pair mules	600
Equipment, special	400
Truck	800
Hotbeds, cold frames	250
Renovation and repairs to buildings	500
	$11,250

CAPITAL INVESTMENT – POULTRY

1 broiler house 20'x200', solid foundation, Including stoves	$1,500
1 broiler house 16'x100', solid foundation, Including stoves	700
2 broiler houses 24'x24', solid foundation, Including stoves	500
1 central feed and storage house 20'x30' Including equipment (feed mixer)	1,500
Wiring of poultry houses and feed room	400
Fencing for broiler plant	200
Miscellaneous equipment (materials, waterer, feeders, cages, piping, etc.)	1,000
	$6,100
Total Capital Investment	**$17,350**

OPERATION

OPERATION – POULTRY

Superintendent @ $35/week	$1,820
2 men @ $18 per week	1,872
Additional Labor because of experimental Procedure	1,870
Chicks for 3 turn-overs @ .10	2,400
Feed for 3 turn-ovrs, 13.5# per broiler Or 162 tons @ $50	8,100
Fuel for 3 turn-ovrs, $1 per 100 broilers	250
	$15,437

OPERATION – HORTICULTURE

Supervisor (Technically Trained)	$2,400
2 men @ $18 per week	1,872
Seasonal Labor	500
Seed, fertilizer, gasoline & misc.	1,000
Equipment, replacements	500
	$ 6,272
Total Operation	**$21,709**

ADMINISTRATION & RESEARCH

ADMINISTRATION AND RESEARCH – POULTRY

Technical Man	$2,400
Clerical Help (part-time)	720
Mileage	400
Postage, printing, telephone and misc. supplies	100
	$3,620

ADMINISTRATION AND RESEARCH – HORTICULTURE

Clerical Help	480
Mileage	500
Office furniture and supplies	300
Printing	100
	$ 1,380
Total Administration and Research	**$ 5,000**
Anticipated Income – Poultry	$10,000
Anticipated Income – Horticulture	$ 1,000
Total Anticipated Income	$11,000

SUMMARY

Capital Investment	$17,350
Operation	$21,709
Administration and Research	$5,000
Total Funds to be Appropriated	$44,059
Anticipated Income	$11,000

A FARMER'S JOURNAL

Emmor "Jack" Turner

The first farm manager of the Substation was Emmor "Jack" Turner. Turner came from Illinois, arriving in Georgetown on January 3, 1942. He kept a daily journal from that date to November 9, 1963. He noted planting dates, spraying dates and the major daily events during his tenure. He also noted local events, such as on May 31, 1942, "Lightning killed Linden Barr's team." The author's favorite is December 1, 1942, "Ira came to work drunk for the third and last time."

Turner's Journals were kept in the successive farm manager's file, with only cursory looks over the years, until 2019. Now they are placed in the University's Archives in Newark.

4-H club members from Delmar participated in a scrap metal early in World War II.

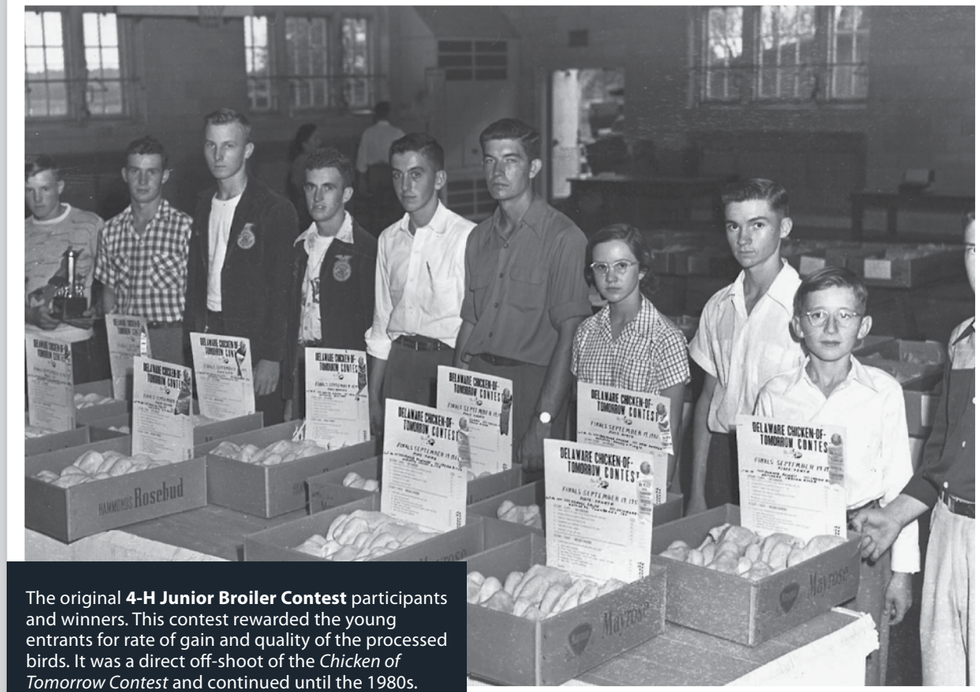
Miss Anna B. Moore, Sussex 4-H Club leader with an early African-American 4-H club at the Trinity School near Bridgeville, 1940. Segregated Schools and Jim Crow traditions in Sussex County existed, but the University of Delaware 4-H programs, although segregated by race, did include the African-American community.

(L to R): **Preston Townsend**, **Governor W.W. Bacon**, **K.J. Kadow**, **Harley Hastings** and the late **Dean G.L. Schuster**. Taken August, 1941 as they toured the John A. Tyndall farm—the site selected for the University's substation.

Chemical weed control is demonstrated in this early substation research.

System of **crop harvesting** widely used in the early days of the substation's development.

Frank Gordy consulting with a Sussex County poultry producer at her new chicken house, 1940s.

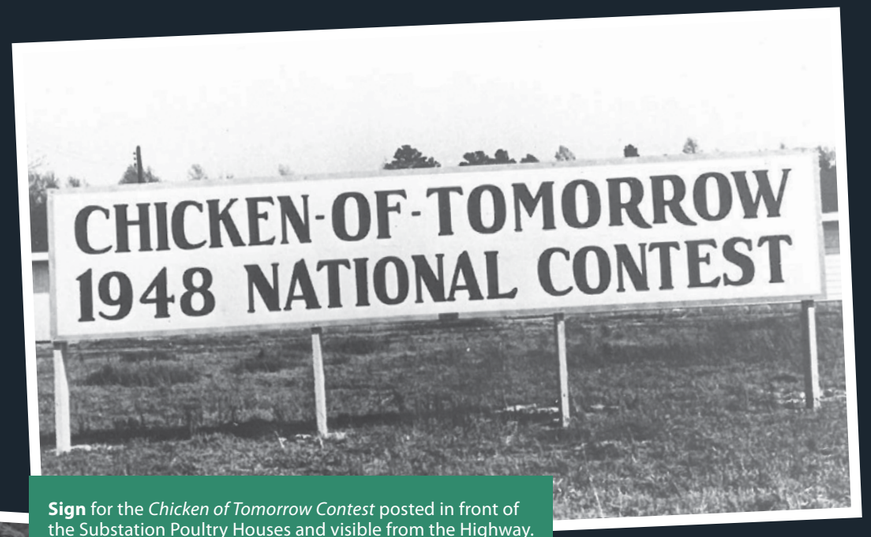


The original **4-H Junior Broiler Contest** participants and winners. This contest rewarded the young entrants for rate of gain and quality of the processed birds. It was a direct off-shoot of the *Chicken of Tomorrow Contest* and continued until the 1980s.

The Tyndall Farm in 1937, four years before the State of Delaware purchased it for the University of Delaware. Rt. 28, now Rt. 9 is the straight road that dissects the photo. The original homestead is on the southside of that road, the first office at the Substation was adjacent to the homestead.

The **original farm house** dating back to the Tyndall family ownership. This photo shows renovations completed in the 1940s and 1950s. The house dates back to the early 1900s and was the Tyndall family residence.

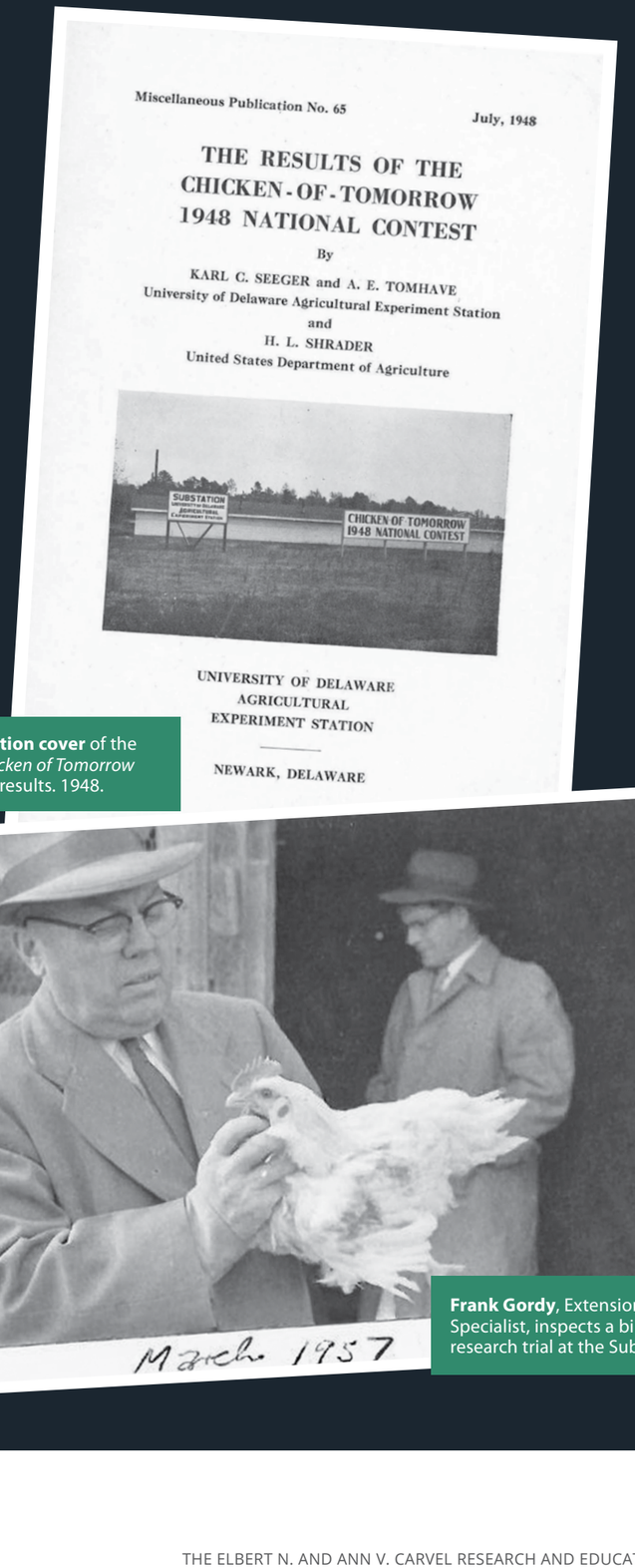
Early sign for the Substation from the early 1950s. It advertises the "Poultry Diagnostic Service in Cooperation with the State Board of Agriculture." That relationship ran from 1951 to 1956, when the University assumed full responsibility for the Diagnostic Laboratory.



Sign for the *Chicken of Tomorrow Contest* posted in front of the Substation Poultry Houses and visible from the Highway.

Filming of the contest occurred at each step of the process to insure fairness and transparency. Local and national media were also invited to record the contest.

Birds, after being weighed, loaded on a truck for delivery and processing at the Birdseye-Snider plant in Pocomoke, Maryland. The birds were 12 weeks and two days old.



Miscellaneous Publication No. 65 July, 1948

THE RESULTS OF THE CHICKEN-OF-TOMORROW 1948 NATIONAL CONTEST

By

KARL C. SEEGER and A. E. TOMHAVE
University of Delaware Agricultural Experiment Station
and
H. L. SHRADER
United States Department of Agriculture

UNIVERSITY OF DELAWARE
AGRICULTURAL
EXPERIMENT STATION

NEWARK, DELAWARE

Publication cover of the first *Chicken of Tomorrow Contest* results. 1948.

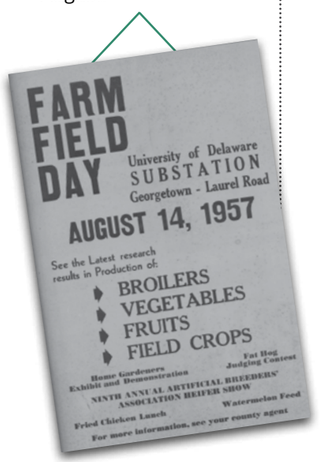
Frank Gordy, Extension Poultry Specialist, inspects a bird from a research trial at the Substation.

EXTENSION & RESEARCH

1951

The Poultry Diagnostic Laboratory was established at the Substation. The laboratory was a branch laboratory of the State Board of Agriculture, who provided a poultry diagnostician. This format continued until 1956.

The first annual Farm and Home Field Day was held in August. Farm and Home Field Day would be held for 54 consecutive years, 1951 through 2004, usually on the second Wednesday of August.



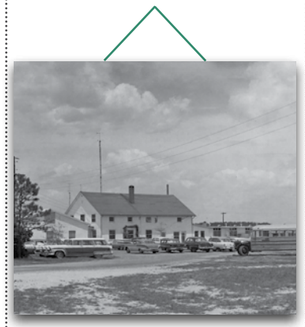
1956

The University Board of Trustees approved the creation of a Substation Division under the direction of the School of Agriculture. Before this change, research projects were administered through academic departments in the School of Agriculture on the main campus in Newark, an inefficient system. J. Frank Gordy was named Substation Director.

An important part of the reorganization was the establishment of the Poultry Diagnostic Laboratory under the management of the Substation and the School of Agriculture. By joint agreement, the State Board of Agriculture no longer had a role in the Laboratory. Dr. Lester M. Greene, D. V. M. was appointed as the Poultry Diagnostician.

1958

The Sussex County Extension Office relocated from the Georgetown Post Office to the newly constructed wing at the Substation. This wing housed a reception area, offices and a meeting room.



1960

Kitchen facilities were added to the Meeting Room. Delmarva Power & Light and the Delaware Electric Cooperative purchased and donated a range/oven, Refrigerator & Freezer, a washer and a dryer. The total value was $2,000.

PULLING TOGETHER: EXTENSION AND RESEARCH

If there is one essential truth about modern farming and food systems, it is that agriculture knows change. This has been especially true since the end of World War II, which marked a new era in which agricultural science and technology led to great progress in our capacity to produce food. Agricultural advances, many resulting from scientific research linked to the war effort were beginning to have real impact on farmers across the country, across Delaware and in Sussex County. These new practices needed to be tested and evaluated to farmers could make the most of them.

New chemistry that controlled insects, plant diseases and weeds were being tested at Land Grant Universities and then tried in the real world out on the farms. Plant breeders and geneticists were developing higher yielding varieties with genetically inherent resistance to diseases. New medications were emerging that controlled or mitigated the impacts of diseases on livestock and poultry. Power and machinery improvements touched all sectors of agriculture. As pumps and aluminum pipe became available and affordable, more land was being irrigated, especially in fruits and vegetables. Larger trucks, particularly those with improved refrigeration capacity, and better highways helped connect farmers with expanding urban and suburban populations across the country.

In 1950, 8,300 farmers tilled 851,000 acres in Delaware. Average corn yields increased to 52 bushels per acre, up from 26 in 1940. Processing tomato yields nearly doubled to 9 tons per acre from 5 tons per acre ten years earlier. Cows were producing 1,000 more pounds of milk per cow in 1950 than in 1940.

Fifty-three percent of the state's corn acreage was in Sussex County in 1950. Seventy percent of all lima beans, the state's biggest processing crop, were grown in Sussex and 90% of the state's watermelon crop was also produced in Sussex. Table 5 illustrates not only the preponderance of Delaware's crop acreage was in Sussex County, but confirms the School of Agriculture's emphasis on field research with fruit and vegetable crops at the Substation was appropriate, including justification for the large orchard plantings established in the Substation's early years.

However, corn and the new crop, soybeans, were part of the field research mix at the Substation. The research was important as the demand for these crops to feed Delmarva's broilers was growing in the 1950s. This growth in demand continues to this day.

The continued expansion of the broiler industry generated the greatest economic impact in Sussex County, the state of Delaware and indeed, the Delmarva Peninsula. Over the twenty-year period from 1950 to 1970 production grew from 81 million broilers raised in 1950; 91 million in 1960; and to 135 million by 1970. The demand for feed incentivized corn and soybean production. That demand began to result in higher prices, at least higher than the corn belt or the Chicago Board of Trade. Farmers planted more acres but were also quick to adopt practices that improved yields and profits. By the late 1960s, they began to plant with minimum or no tillage techniques. Traveling gun irrigation systems were deployed by growers and a few of the first center-pivot systems were installed.

CROP RESEARCH

RESPONDING TO NEW TECHNOLOGIES AND EXPANDING DEMANDS

The Substation, located in the center of the region's agricultural industry, was an ideal spot for tests and trials of pesticides, varieties and new crop management practices. University Researchers and Extension Specialists in the School of Agriculture tested hundreds of pesticides over these years at the Substation. It was exciting to add to the understanding of how new chemistries could be utilized to protect Delaware crops. Farmers needed science-based, unbiased information to help make decisions on the use, response and economic return from increased inputs of fertilizers. 2,4-D, a new herbicide developed by the DuPont Company in 1943 as a plant growth regulator and a war weapon, was patented by the American Chemical Company in 1945 as a herbicide. It controlled broadleaf weeds in corn and other grass crops (wheat, barley, rye) and was having positive impacts on Delaware farms. During the 1950s and 1960s, other herbicides, fungicides and insecticides were being introduced to farmers, who

needed more information on the proper use for the conditions on their farm. The specific rate of application for a herbicide on a silt loan soil in Middletown would be different than on a sandy soil in Laurel. It was not only the farmers who wanted this localized information, but it was critical to the chemical manufacturers as they marketed their materials to farmers.

Dale Wolf, a farm boy from Nebraska, suffered serious combat wounds at Okinawa, came home with a B. S. degree in hand from the University of Nebraska. After a long recovery, he attended Rutgers University for graduate school and became the first Ph.D. in the new discipline of Weed Science. Soon he was working for DuPont in Delaware and interacting with Dean of the School of Agriculture, George M. Worrilow, Elisha Rahn in Horticulture, Claude Phillips and Bill Mitchell in Agronomy and their colleagues in Entomology and Plant Pathology, Louis Stearns and John Hueberger.

Wolf, who would become the director of Agricultural Business for DuPont for nearly 30 years, recalls, "Working with Dean Worrilow and his great team of faculty was critical to DuPont, the industry and the farmers. Their work identified unanticipated problems, solved those problems and found solutions." This type of approach was replicated at Land Grant schools across the country, truly helping usher in a new age of agricultural efficiency.

The first testing in the country of the insecticide toxaphene, which would be used the world over, took place at the Substation. Eptam, a herbicide used on several vegetable crops was first tested in the east at the Substation. It quickly became a standard and used on three-fourths of the 8,600 acres of potatoes then planted by Delaware growers. Lorox, another herbicide, was also evaluated and had use rates tailored from work at the Substation to help it become a national standard in carrots. Lorox would also become a standard herbicide on soybeans.

The fungicides Manzate and Dithane M-22 were tested on a wide range of vegetable crops at the Substation and became standards in plant disease control. Dr. John Hueberger had a three-way appointment in plant pathology. He taught on campus during the semesters, conducted research in his labs at Newark as well as in the fields of the Substation and made weekly extension trips during the crop season to see what was happening out in farmers' fields. His colleagues in Entomology joined him on these survey trips and together they wrote the "Late News", a newsletter mailed every Thursday in season, so farmers and others could receive it on Saturday or Monday at the latest. The tradition of the "Late News" continues to this day, as the Weekly Crop Update.

Plant Breeding efforts from two professors on the Newark campus Dr. Bill Crittendon with soybeans and Mr. Gene Brasher with peppers, tomatoes and cantaloupes were resulting in new varieties, whose strictest evaluations were conducted at the Substation. The Delmar and Bethel soybean varieties were planted by Delaware growers. 20,000 acres of Bethel were planted in1963, for example, increasing gross returns by $100,000 for those farmers that planted the variety. Brasher developed the Delaware Belle pepper, the Delsher tomato and the Stakeless tomato. The advantage of all these varieties were higher yields and improved resistance to plant diseases.

Brasher, Crittendon and others conducted competitive variety trials at the Substation in many crop species, evaluating new varieties for yield, quality and disease resistance from seed companies and public plant breeders alike. Dr. Elisha Rahn and Dr. Vernon Fisher, also from the Newark campus, conducted trials with lima beans. Then and now, lima beans are the state's most widely planted vegetable crop. Grown for processing, Delaware vegetable growers' contract with processing companies for a known price and acreage. The processing company also selects the variety, making it essential that the best varieties are planted. Dr. Fisher, who had served as the Extension Fruit Crops Specialist along with his teaching and research responsibilities, shifted his emphasis to breeding lima bean varieties. The number of fruit produces had declined significantly by the late 1960s, so Fisher, recognizing all the lima bean varieties had been developed in California, turned to breeding lima bean varieties more acclimated to Delaware conditions. This work today has been picked up by Emmalea Ernest, an Extension Vegetable Scientist at the Carvel Center. The goal of all plant breeding programs is to put the best genetics in the hands of the farmer, thereby improving the likelihood of a profitable crop.

	DELAWARE					SUSSEX COUNTY		
CROP	# Farms	Acres	Yield/A	Price	Value	# Farms	Acres	Value
Corn	5,625	131,045	52 bu/A	$1.69/bu	$2.0 million	2,882	69,403	$1.0 million
Soybean	2,557	60,172	14 bu/A	$2.41/bu	$1.2 million	1,606	42,390	$0.9 million
All Vegs.	2,172	38,767	----------	----------	$3.5 million	1,104	24,109	$2.4 million
Lima Beans	529	23,138	0.8 tons	$134/ton	$2.1 million	295	16,263	Not Available
Watermelons	254	1,164	106 cwt.	$1.25/cwt	$185,000	220	1,050	Not Available
Fruit		# Trees					# Trees	
Apples	902	144,000	----------	----------	$680,000	309	70,000	Not Available
Peaches	614	117,470	----------	----------	$220,000	225	67,200	Not Available

Table 5. *Selected Data of Major Crops in Delaware and Sussex County, 1950. U.S. Ag. Census*

At the University of Delaware Substation, a center-pivot system with three wood towers was set up in the late 1960s over fields that are now directly across the road from the new Carvel Center building. This prototype system was difficult for the farm manger to rely on as one tower or another would advance faster or slower than the others, causing it to lose its alignment which could lead it to topple over. However, it often worked well enough and was a harbinger of better things to come, including steel or aluminum towers and systems that did not lose their alignment. It was exciting to have a 1960s prototype of a center-pivot irrigation system at the Substation, looking impressive to drivers going by on Delaware Rt. 28, now Rt. 9.

Feed costs have always been the largest single expense in raising broilers. Agronomists from the University in Newark utilized the Substation to test varieties and evaluate new management practices for corn and soybeans, the two major ingredients in any broiler feed ration. Dr. Bill Mitchell, Extension Agronomist, began his career at Delaware in the early 1950s and would earn the farmers respect and appreciation over the years. His agronomy colleagues Claude Phillips and Richard Cole also conducted trials at the Substation to help improve corn and soybean production to meet the extraordinary demand for feed from the Delmarva poultry industry while also improving profits for the farmers.

POULTRY DIAGNOSTICS AND BROILER PERFORMANCE RESEARCH

While their colleagues in agronomy were working to enhance feed production, poultry scientists at the Substation and in Newark were seriously addressing a wide range of issues and needs inherent in broiler production. Poultry health and disease control was a priority, but so was developing a better understanding of the optimum temperatures and environmental conditions within the chicken house. Studies were also conducted with turkeys as there were farms producing turkeys on a commercial basis. The 1950 Agricultural Census reports 419 farms raised nearly 104,000 turkeys in the state. 119 farms in Sussex County raised over 70,000 turkeys.

In 1951, in partnership with the State Board of Agriculture, a "branch laboratory" of the State Animal Disease Laboratory in Dover was established at the Substation. The State Board of Agriculture was the predecessor of today's Delaware Department of Agriculture. Before the establishment of the Substation Laboratory, a field pathologist was assigned to Sussex County to help growers combat poultry diseases. Serious outbreaks of air-sac infection in flocks throughout the peninsula in the Fall of 1950 led to a conference with the Board of Agriculture, the Delaware Poultry Commission and the Delaware Agricultural Extension Service to discuss strategies to control this disease and others.

It was determined that a fully equipped laboratory with a full-time Veterinarian located in the center of the broiler industry would best serve the broiler industry. The Substation was an obvious choice due to its central location. The University donated the space in the original two-story office building, the Poultry Commission allocated funds for defraying equipment costs and the State Board of Agriculture placed its Poultry Pathologist, Dr. Frank Wills, at the new lab. The primary purpose was not research, but to provide the diagnostic service to growers and the industry. While not for research, the diagnostic findings resulted in a monitoring and surveillance system that identified opportunities and needs for poultry health research. The information gathered from diagnostics stimulated important research at the University that paid great dividends over the decades for the industry.

Five years later, in 1956, A Memorandum of Understanding between the University of Delaware School of Agriculture and the State Board of Agriculture was signed that outlined a new agreement regarding the Poultry Diagnostic Laboratory. The University would now be responsible "to provide diagnostic services for poultry producers and other related services to Delaware poultry producers." The lab would provide periodic updates of diseases encountered to the State Board, but the Poultry Diagnostic Laboratory was now a University operation at the Substation. This was done for efficiencies and expertise, but also to further link the Diagnostic Lab with the growing number of faculty in Newark involved with poultry health research. Dr. Lester M. Greene was appointed to the post of the Poultry Diagnostician.

Dr. Greene had graduated from North Carolina State College in 1926, having majored in poultry husbandry. In 1928 he received his Master of Science Degree in poultry diseases, also at North Caroline State. He worked for commercial firms doing poultry diagnostic work then went to Michigan State University and received his Doctorate in Veterinary Medicine in 1939. Upon his arrival at the University of Delaware Substation, the poultry diagnostic laboratory was opened on Monday to Friday from 8:30 to 4:30 and Saturdays from 8:30 to Noon. The School of Agriculture's report to the University Board of Trustees in December 1956 lauded Dr. Greene's "understanding and vision, and the work has almost doubled since he was first appointed to the post."

Frank D'Armi replaced Karl Seeger as the poultry research associate in the 1950s. Mr. D'Armi conducted a wide range of practical poultry research. An "equipment revolution" was occurring with new designs in feeding and watering equipment systems becoming available. D'Armi tested these systems in the poultry houses at the Substation, generating data, results and experience that could be shared with poultry growers and the professionals at the poultry companies. His work was not just about the equipment; many of the tests included different levels of bird density, or how many birds per square foot and how population levels impacted bird usage and reaction to the new equipment.

George Chaloupka, who would serve at the Substation as poultry research associate, Extension Poultry Specialist and

from 1984 to 1991, as Director of the Substation, recalls, "The broiler houses constructed at the Substation were designed to simulate the latest concepts used by industry or to evaluate new ideas. One idea tested was the performance of a windowless, power-ventilated house as compared to conventional houses containing windows. Although total production costs per pound of broiler produced were less in the windowless houses, industry, primarily because of its marketing philosophy on skin pigmentation, did not adopt this type of housing." However, by the year 2000, windowless houses were the rule rather than the exception, with new technologies, feeding practices and improved strains of breeds fostering the use of the more efficient windowless house. The early work of D'Armi and others gave insights as the new windowless houses gained wide acceptance.

The team of poultry scientists in Newark and Georgetown collaborated on research into the best growing conditions as defined by temperature and ventilation in the poultry. The work of Dr. Paul Sammelwitz on the intersection of growing conditions, high summer temperatures and the chicken's ability to digest feed generated a new understanding of those interacting factors and bird performance.

Dr. Morris Cover, through his own work and through the people he hired and taught, instilled what at the time was a new concept. Basically, it was that specific diseases must be identified and pursued, but the interaction of known pathogens with other known, unknown or lightly regarded organisms was just as important. Also, the concept of cooperative research and education programs to include extensive outreach with the regional poultry trade association, Delmarva Poultry Industry (DPI) was initiated and is still active today. An important individual in the initiation and evolution of this relationship was Frank Gordy, who was Director of The Substation as well as Executive Director of DPI. Mr. Gordy was succeeded in this critical role by Ed Ralph, who further augmented these activities. The positive role of this relationship cannot be understated.

In the early 1960s, research was conducted on a newly discovered disease named for a small town in Sussex County, Gumboro, which became technically referred to as infectious bursal disease (IBD). While this disease ravaged the industry both on Delmarva, as well as the industries around the nation and the world, its true and even more wide spread role in chicken health would be brought to light 13 years later by two young UD graduates who returned to Delaware after completing advanced degree programs at other universities, Dr. Spangler "Buzz" Klopp and Dr. Jack Rosenberger.

Ray Lloyd a native of Cape May County, New Jersey, and a graduate of Rutgers, came to Sussex as the Assistant County Agent in 1953, working with County Agent Bill Henderson, who had arrived in 1943 from Henderson, Maryland with a degree from the University of Maryland. In 1959, Lloyd was named assistant Extension Poultryman, working with Extension Poultryman, J. Frank Gordy. Lloyd became the Extension Poultryman in 1963.

In the early 1960s, growers were becoming interested in converting non-insulated commercial broiler houses to ceiling insulation and even full-insulation. Lloyd and Extension Agricultural Engineer, Ernie Walpole, conducted research at the Substation that highlighted energy cost savings and improved broiler performance in insulated houses.

RESEARCH AND EXTENSION

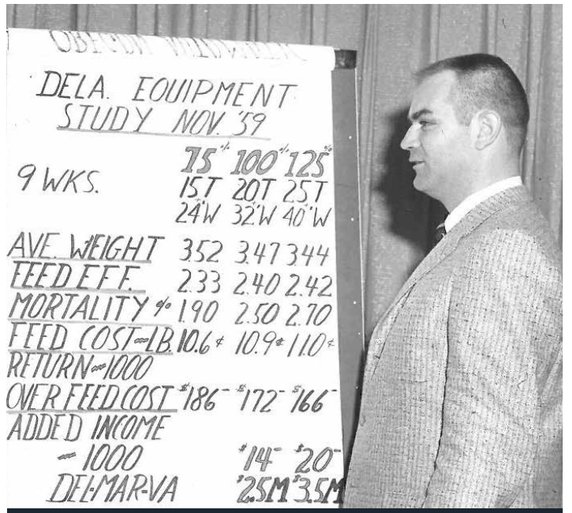
A NEW ORGANIZATIONAL PLAN TO SERVE THE FUTURE

By 1956, with an expanding work load of crop projects on the farm, broiler research in the chicken houses and poultry diagnostic work in the lab, the faculty, staff and Administration of the School of Agriculture saw a need for change in the organizational structure of the Substation. Up until that time, the specific projects were operated through the academic departments in Newark. Crop projects could go through either the Agronomy Department, the Horticulture Department or the Department of Entomology. Poultry projects went through the Animal & Poultry Industry Department. The Farm Superintendent or the Poultry Research Associate would then have to implement the work. Communication and logistical challenges issues naturally arose due to distance and paperwork challenges in an age when the telephone was the quickest form of communication. Even with the phone, often the best one could do was leave a message and hope for a timely reply. Crop project leaders could have their work for the day disrupted when they left Newark in sunny weather, only to be rained out once they got to Georgetown.

Perhaps more important than random disruptions due to weather or communication issues was the overall need for coordinated advanced planning among all parties. In addition, there was a notion in the air that consolidating School of Agriculture research and extension activities in one place could be more efficient and facilitate outreach to all clientele in Sussex, in Sussex and throughout the State.

During 1956, George M. Worrilow, Dean of the School of Agriculture, Frank Gordy and others on the staff developed a plan for the University Board of Trustees to consider. After study, consideration and finding ". . . that the Agricultural Substation at Georgetown could materially aid the Research, Extension and Short Course Programs if we re-designate its place in our organization structure and coordinate and expand in a limited way its functions."

That December the University Trustees approved the formation of a Substation Division in the School of Agriculture. The Trustees also resolved, "That as soon as feasible and as physical facilities become available, the Sussex County Extension staff be housed with the division." The stage was set for the consolidation of research and extension at the Substation.



Frank D'Armi Poultry Research Associate in the 1950s and 1960s. Conducted valuable trials and demonstrations related to a wide range of feed, housing and breed issues.

Frank Gordy was named the Substation Director, reporting to the Dean and Director of the Agricultural Experiment Station in Newark. The new-found autonomy worked. Many bureaucratic processes were streamlined, and research work was better facilitated with partners at the two locations.

Dean Worrilow, who served as not only Dean of the School, but also Director of the Agricultural Experiment Station and Director of the Cooperative Extension Service, turned to his colleague Frank Gordy and together with staff, worked to move the Sussex County Extension staff from the Georgetown Post Office to the Substation. Besides the obvious programmatic linkages, why pay rent when you don't have to at your own facility?

In 1958, the Sussex County extension staff moved into a new wing connected to the 1945 building. A meeting room was added at the same time and connected to both buildings. That meeting room would be significant to the farmers and general citizens of Sussex County as it was the site of literally thousands of educational meetings in agriculture, 4-H and youth, and the family and consumer sciences. It was the site of a tremendous number of educational programs, teachable moments and on occasion, heated but constructive debates on the future of agriculture and its needs.

Ray Lloyd joined Bill Henderson as an Assistant County Agent in 1953. Lloyd would soon become the Extension Poultryman, complementing Frank Gordy's work with the poultry industry. Lloyd worked closely with the research colleagues at the Substation as well faculty on campus in Newark. Great change and modernization were occurring not only in production practices, but in the structure of the industry as companies moved to vertical integration. Lloyd, along with Farm Management Specialist, Willard McAllister, helped companies think through not only management challenges, but also connected the industry with what poultry buyers from the chain stores wanted and needed for their customers.

Sam Gwinn was replaced as the Sussex 4-H Club Agent by James O. Baker, another West Virginian. Baker would lead the Sussex 4-H program until he moved to Newark as the State Director of 4-H. William Pinnel followed then T. Harold Palmer in 1968. Through these decades, a robust system of 4-H clubs thrived across the county and throughout the state. Local adult leaders provided enthusiastic oversight for the clubs. Each club had their programs, projects and activities, often augmented with the expertise of Extension specialists and agents from the agriculture and home economics areas of responsibility. The Camp Barnes experience was a key component of many 4-Hers summer. Showing, judging and competing at the Delaware State Fair was (and still is) a big deal for 4-Hers. Whether a youngster is showing a calf, competing in livestock contests, competing in the public speaking contest, or winning ribbons

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"When one's out, everyone steps up and gets it done. UD here at the Carvel Center is so well-respected out in the community, that's a great thing. I am so proud of where I work and how people feel about the place." – Karen Adams

"I've learned so much from all the people that work here; I felt like it was my farm." – Vic Green

"Most appealing for me is the large extension component with my position. It's kind of nice that other disciplines are integrated." – Dr. Alyssa Koehler

"When I came here, everybody was so helpful. People are glad to share, there is no keeping info from each other." – Kim Lewis

Harvesting Asparagus Trials, circa 1955. **Catherine Hudson**, (left) a long-time seasonal worker who helped with many projects over the years. Opposite of Catherine is **Jack Mason**, a full-time member of the farm staff. The man reading the scale is Farm Manager **Jack Turner**. In this era, the farm staff often collected the harvest data for the project managers.

in photography, baking or any one of hundreds of categories, hundreds of 4-Hers were engaged at the State Fair.

In the 1950s and 1960s, Home Demonstration Clubs continued to be a place where women could meet and learn. In Sussex, many of these clubs dated back to the earliest days of Extension. Frances "Fran" Shoffner served as the County Home Demonstration Agent for nearly three decades through the Fifties, Sixties and early 1970s. From Tennessee originally, with a master's degree in education from Columbia University, Miss Shoffner had taught school at Rehoboth High School before joining Sussex County Extension. Extension programs in this area began to focus on societal and family issues, specifically the balance between work and family as more women entered the workplace. Family safety as it related to automobiles and food preparation became important topics. Demonstrations on new home appliances, such as washing machines and dryers, microwave ovens, freeze-drying and their impact on meal preparation or clothing care.

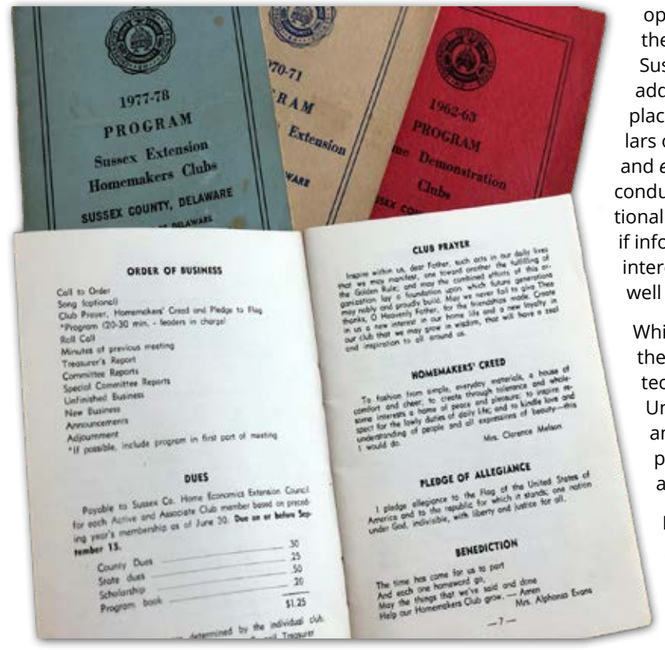
To facilitate the educational mission of the Extension Home Economics program and to support a multitude of events at the Substation, a kitchen facility was installed in 1960 as part of the meeting room. Delaware's two utilities, the Delaware Electric Cooperative and Delmarva Power and Light, donated $2,000 to purchase a new range, refrigerator/freezer, washing machine and a dryer.

In 1962, the Home Demonstration Agent became the Home Economics Agent and the Home Demonstration Club became the Homemakers Club. Agents began to focus on educational programs in cooperation with business and community-based groups. In response to the War on Poverty movement of the 1960s, federally funded Extension programs were created to teach families with young children and limited food resources how to be well-nourished. The Expanded Food and Nutrition Program (EFNEP) created positions in the county as part of Extension programming to help lower income families understand and translate nutrition information into practical hints and recipes to build healthy eating habits. The county EFNEP staff came from the local communities which they served and were mentored by Extension food and nutrition specialists. As many as 8 EFNEP program aides were covering the county by 1970.

A group of remarkable women were pioneers as they provided the clerical assistance in an era with only telephones, mimeograph machines and typewriters. Doris Clendaniel Rogers, Lena Short, Frances Bohn and Peggy Bramble were critical components of the earliest days at the new office.

LOOKING AHEAD TO THE NEXT 30 YEARS

Much had been accomplished since 1941. A "rough piece of land" had been transformed into a viable research farm. The agricultural faculty on the main campus in Newark utilized the Substation for hundreds of crop and poultry research projects in the fields and in the poultry houses. John Turner, the farm manager had been instrumental in all of this. Turner was a true pioneer in creating a research farm and implementing and overseeing the research projects.



The invitation to chicken growers to come to the first-ever open house in 1942, set the stage for what would become the annual Farm & Home Field Day. The re-location of the Sussex County Extension staff to the Substation in 1958 added a new and critically important dimension to the place. The Substation now truly incorporated the three pillars of the Land Grant University mission: *teaching*, *research* and *extension*. True, formal undergraduate teaching was not conducted, but the workshops, demonstrations, and educational meetings provided the atmosphere for highly effective, if informal, teaching. The subjects reflected the needs and interests of farmers and their industry, 4-Hers and youth, as well as those of the county's families and homemakers.

While a whirlwind of societal change swept through the country in the 1960s, ever increasing advances in technology affected the farmer and food industry. At the University of Delaware Agricultural Substation, extension and research efforts helped refine those changes and provided guidance on how best to incorporate those advances.

Indeed, the next decades would welcome a new generation of professionals to the Substation. They would respect and build on the advances of their predecessors and continue the legacy of progress and service. They would continue the legacy of commitment to the people.

A FARMER'S PERSPECTIVE

Ray Vincent, Laurel *– Ray and his family grow watermelons, other vegetables, corn and soybeans. Ray recalls, "When I first graduated from Clemson and came back to the farm, I remember talking to Mark Isaacs. Mark had just completed his bachelor's and master's degrees at Clemson and was working as the Crops Research Associate at the UD Center. He asked me why I chose Ag Economics as a major and not agronomy or horticulture. I told him that's what you guys are for! I knew all the people at the REC Center could help me with the production side, but I needed a strong background in marketing and management."*

Ray continues, "The 4-H program has been very important to my children and my family. On the Ag side, all the agents and specialists have been great. I've been active in the National Watermelon Board lately and it is amazing how Gordon Johnson's name comes up so often and is so well-respected. One result of Gordon's work is trimming vines in the drive row, rather than training them over and out of the drive row. By trimming, we save $40,000 to $50,000 per year in labor costs."

"I ran into a farmer by accident in North Carolina and he knew James Adkins, our irrigation engineer in Delaware. So, the people there are working for agriculture in our state, but they have regional and national reputations. We're fortunate to have that resource so close to us."

An **aerial photograph of the Substation** in 1954. The large orchard plantings of peaches and apples are evident. The original office and broiler houses are on the south side of then Rt. 28, now Rt. 9.

Farm Manager **John Turner** (center) handing over the keys to a new tractor to **Jack Mason** in the early 1960s. Substation Director **Frank Gordy** watches approvingly. Jack Mason was one of the first hires at the Substation. One of his responsibilities was spaying the fruit trees, often at pre-dawn hours to avoid the winds.

FARM FIELD DAY

The first open house occurred in 1942 when the Substation's first poultry scientist, Karl Seeger, invited poultry producers to come and see his research projects. That event occurred in August, just 11 months after the University purchased the unimproved Tyndall Farm. The first Field Day was held in 1945 with the farm opened for all to visit the fruit, vegetable, grain and poultry research trials. Field Day became in annual event in 1951 and became known as Farm & Home Field Day when the Sussex County Extension staff moved from Georgetown to the Substation. Home Maker demonstrations in cooking, sewing and related topics, 4-H demonstrations and the tours of the crop and poultry experiments were all part of the program.

While the event's main purpose was education, the day of the event, always the 2nd Wednesday in August, quickly became a place to see and be seen. That was especially true for anyone running for public office in an election year. The barbecue chicken lunch, with fresh sliced tomatoes became the lunch time tradition in the "Grove," attracting farmers, families, friends, neighbors and officer seekers.

No matter how hot the day was, the magnificent trees in the Grove provided great shade, often coupled with a nice breeze that made for a pleasant event. About 25 trees still stand, some with a life span of 160 to 200 years old. They are a hickory-oak combination of species, a typical Delaware "climax" or forest type – climax meaning the final stage of succession of plant species which would continue to occupy an area if soil or climatic conditions remain unchanged.

Farming changed and the August date used to be a time when farmers had a little break as their crops were mostly "laid by" until harvest. By 2000, with many farmers now managing irrigation, growing more vegetables and tending more chickens, it was difficult for them to get away for Field Day. Attendance dropped and the last Field Day was held in 2004. However, numerous targeted field days and educational meetings continue to be held for specific topics and issues and remain well-attended.

The field day programs from 1945, 1961, 1975 and 2004 are posted in ***Appendix 1***. Those programs reveal the change in emphasis among the University's Research and Extension programs as Delaware's agriculture changed and met new issues and challenges. They reflect the vision and commitment of three generations of agricultural workers associated with the University of Delaware College of Agriculture and the nearly 80 year tradition at the Carvel Center.

Announcing **Field Day** at the Substation on August 14, 1957.


FARM FIELD DAY

University of Delaware
SUBSTATION
Georgetown - Laurel Road

AUGUST 14, 1957

See the Latest research results in Production of:

- BROILERS
- VEGETABLES
- FRUITS
- FIELD CROPS

Home Gardeners Exhibit and Demonstration

Fat Hog Judging Contest

NINTH ANNUAL ARTIFICIAL BREEDERS' ASSOCIATION HEIFER SHOW

Fried Chicken Lunch

Watermelon Feed

For more information, see your county agent

Wagon tour taking farmers and interested folks out to view the research plots on display at Field Day, 1991.

Original substation office built in 1945. Years of subsequent construction of office wings are illustrated above.

SUBSTATION STAFF 1950s & 60s

1958 RESEARCH & EXTENSION STAFF

J. Frank Gordy – Substation Director

Frank D'Armi – Research Associate in Poultry
J. A. Ellegood – Poultry Laboratory Technician
Lester M. Greene – D.V.M., Poultry Pathologist
Raymond W. Lloyd – Associate Extension Poultryman
Edward H. Ralph – Research Associate and Crops Specialist
Emmor "John" F. Turner – Farm Manager

SUSSEX COUNTY EXTENSION STAFF

William H. Henderson – County Agricultural Agent
James O. Baker – County 4-H Agent
M. Frances Shofner – County Home Demonstration Agent

1968 RESEARCH & EXTENSION STAFF

J. Frank Gordy – Extension Poultryman and Substation Director (DPI Director)

George W. Chaloupka – Poultry Research Associate
Edward L. Wisk – Crops Research Associate
James C. Windsor – Farm Manager
Dr. Roy Montgomery – Poultry Pathologist

SUSSEX COUNTY EXTENSION STAFF

Bill Henderson – County Agent
Ed Ralph – Associate County Agent
Ted Palmer – 4H Agent
Fran Shoffner – Home Economics Extension Agent
Ray Lloyd – Extension Poultryman

DELMARVA POULTRY INDUSTRY, INC. (DPI) STAFF

Isabelle Morris – Assistant Exec. Secretary
Mrs. Edith Scott – Administrative Aid
Mrs. Ann Nesbitt – DPI's Home Economist
Mrs. Marguerite Willey – Home Economist (Part-time)
Mr. Ernie Mathews – Special Assistant

1969 SUBSTATION FARM STAFF

Jack Mason – Janitorial and Security
Ethel Mason – Janitorial (part-time)
Howard Wolfe – Crops
Marlin Wolfe – Crops
James Poore – Crops
Ed Betts – Crops
Catherine Hudson – Crops
Laura Brittingham – Poultry
Roy Brittingham – Poultry
Bill Swift – Poultry

Frank Gordy broadcasting live on Delaware's NBC Affiliate.

EMERGING TECHNOLOGIES

1969-71

USDA Regional Poultry Laboratory constructed on the Substation. This lab would be closed in 1994 and eventually become the Lasher Poultry Diagnostic Laboratory.

Edward H. Ralph named Substation Director upon the retirement of J. Frank Gordy.

1977

Swine Research Facility constructed, including a breeding-gestation house, farrowing-nursery house, two wastewater lagoons and an office trailer.

1979

Front office wing was added and connected to the 1958 and 1974 wings. This addition was built by Delmarva Poultry Industry, Inc. It included 6 offices, a reception area and a conference room. The addition cost $66,000.

1983

37 acres of additional crop research land was purchased from Frank and Sandy Dill. The Dill Farm is approximately 2 miles west of the Substation on Rt. 28 (Rt. 9).

1985

The University Board of Trustees re-names the Agricultural Substation to the *University of Delaware Research & Education Center*.

George W. Chaloupka named Substation Director upon the retirement of Edward H. Ralph.

1991-92

In 1991, Mark Isaacs was appointed the interim director of the Research & Education Center upon the retirement of George W. Chaloupka. Isaacs was appointed director in 1992. He went on to earn his Ph.D. from Virginia Tech in 2000.

1994-95

The University had been left the 126 acre farm of long-time Georgetown attorney Everett F. Warrington. Assuming control of the farm in 1994. A center-pivot irrigation system was constructed to conduct crop and irrigation research. The property is administered under the Carvel Center.

1996-97

Swine herd liquidated and Swine research facility closed as a result of an administrative decision to re-direct funding in light of the diminishing swine industry in Delaware.

Lasher Laboratory Dedication. The former USDA Poultry Lab converted to the Poultry Diagnostic Laboratory with significant contributions from Hiram Lasher and his family.

TOWARD A **NEW CENTURY**

The dramatic societal and political changes of the 1960s impacted all Americans at some level. Those changes, coupled with the constant emergence of new technologies on our farms, in our homes, and just about everywhere we went, accentuated the need to better understand social change and the emerging technologies. The opportunity for people to use change to their advantage and improve their lives and that of their families was great. But these opportunities carried the risk of failure or worse. With these monumental shifts crossing our worlds, the mission of the research and extension staffs at the University's College of Agricultural Sciences in Newark and its precious prize in Sussex County, the Agricultural Substation was more important than ever before.

The 1970s were a decade of personnel change at the Substation as the **founding generation** retired, opening opportunity for the College leadership to hire new staff with skill sets that would complement the transformations occurring in farming and in the larger society. New programs and positions were added to help the people understand and adjust to these changes.

Frank Gordy retired in 1971. (*See short biography on page 81*). His long-time Sussex County Extension colleagues, Ray Lloyd and Bill Henderson retired in 1973 and 1978, respectively. Miss Fran Shofner, County Home Demonstration Agent for over 20 years, retired in 1975. In Newark, Dean George Worrilow had finished his University of Delaware career in 1968. He was succeeded by Dr. William McDaniel, who would retire in 1977.

The generation of project leaders and faculty from Newark who conducted significant research at the Substation were also retiring. These men experienced the Great Depression of the 1930s and many served and survived World War II were also retiring. Dr. John Hueberger, Dr. Lewis Kelsey, Professor Claude Phillips, Dr. Vernon Fisher, Dr. Bill Mitchell, and Dr. Dale Bray all retired in the 1970s and 1980s.

In those two decades, a second generation of dedicated Cooperative Extension workers emerged at the Substation. Additionally, a new wave of well-trained and enthusiastic research faculty from the College of Agriculture up in Newark were leading projects at the Substation. This tradition of progress through research and extension would eventually welcome a third generation as the new millennium approached.

Ed Ralph, who had worked at the Substation since 1957 in various research and extension capacities, replaced Frank Gordy as the Substation Director in 1971. For a time, like Gordy before him, Ralph held the Directorship concurrently with the Executive Director position at DPI. Ralph would retire in 1984 from the University and 1986 from DPI. (*See short biography on page 83*).

George Chaloupka followed Ed Ralph as the Substation Director in 1985. Chaloupka grew up on a farm near Milton, studied poultry science at the University of Delaware, graduating in 1954. George taught agriculture and managed the farm at the Sanford School in Hockessin, then moved down to work for O.A. Newton Company. His responsibilities included formulating poultry feeds, overseeing the feed mill and working with Dr. John Hammond, Newton's poultry breeder, to evaluate new lines of poultry breeds. It was a perfect background and training for his next job. In 1965, George replaced Frank D'Armi as the poultry research associate at the Substation. With the retirements of Frank Gordy and Ray Lloyd, George took on Extension poultry specialist responsibilities in 1973. (*See short biography on page 85*).

1985 also brought another change. The University of Delaware's Board of Trustees voted to re-name the Agricultural Substation as The University of Delaware Research and Education Center. The new name was more inclusive and better represented the total scope of work conducted there. Still, many staff and their clients still called it the Substation; some out of habit and some because they honored the legacy of its origins. However, in a short time, the "REC" Center came off the tongues of most people. Another name change was in the now well-established and respected institution's future – twenty years down the road from 1985.

In 1992, Mark Isaacs was appointed as the Center Director, following the retirement of George Chaloupka in 1991. Isaacs, who grew up on his family's farm just five miles from the Research and Education Center, graduated from Sussex Central High School in 1980 and went to Clemson University where he earned his Bachelor Degree in Agronomy & Soils in 1984 and his Master's Degree in Weed Science in 1986. Isaacs would take a one-year sabbatical in 1994 to pursue his Ph.D. in Weed Science from Virginia Tech, which he achieved in 2000. Dr. Isaacs remains as Director today. (*See short biography on page 86*).

George “Bud” Malone,” was hired in 1974 as the Research Associate for Poultry, continuing the tradition that began with Frank Seeger, Frank D’Armi and George Chaloupka. Malone conducted numerous evaluations of new strains of chicken breeds, along with studies on housing environments and potential new sources of litter for the floors of chicken houses. By the late 1980s, Malone saw the next big set of issues that would confront the poultry industry were related to environmental impacts. The emergence of concerns related to poultry manure applications on ground and surface water quality became a major part of Malone’s research and extension work. Similarly, Malone was also a leader in developing strategies that mitigated the impacts of ammonia emissions from poultry houses. Bud’s work in the development of processes related to dead bird disposal, composting and humane euthansia systems for major mortality episodes gained national respect and attention.

Dan Palmer, the son of Hoke Palmer, the University’s first Extension Poultryman back in the 1920s and 1930s, was hired as the Extension Poultry Specialist in 1987, taking Chaloupka’s position who had become the Director of the Research and Education Center. Palmer worked with Malone and his colleagues on a wide range of issues, but perhaps Palmer’s biggest contribution was helping people evaluate the business side of the investment in poultry houses and then, if a person went ahead with it, helping them understand and implement best management practices

The Poultry Diagnostic Laboratory, housed in a modest addition to the original office building, remained an industry leader in poultry diagnostics. Dr. Lester Greene, the first poultry veterinarian and diagnostician had retired and was succeeded by several very capable and well-trained vets, including UD alumnus Dr. Spangler “Buzz” Klopp. Dr. Ed Odor, from Auburn University, arrived in 1984 and served until his retirement in 2002. In 1984, Odor and his team were confronted for the first time with the threat of Avian Influenza, which had been detected in Lancaster County, Pennsylvania. Fortunately, the disease was held at bay, but the incident was a forerunner of threats 20 years in the future.

In 1969, the United States Department of Agriculture agreed with the University to construct a Regional Poultry Laboratory on the western edge of the Substation property. This was exciting news to have a team of USDA scientists come to the area to provide additional poultry research. The research results would benefit the industry and the Lab’s proximity to the industry would engender insights and feedback that would inform the research. Despite this, budget and other logistical considerations caused the USDA to close the Lab in 1994 and turned the Lab over to the University. In 1997, the Poultry Diagnostic Laboratory, still functioning in its outdated and crowded space where it started in 1951, moved into the former USDA building. This was made possible by an outstanding gift from Dr. Hiram Lasher.

In 1948, Lasher, a 1942 graduate of Cornell and a veterinarian who was not a UD graduate or staff member came on the scene to start a long and rewarding interaction with the University of Delaware. He was initially employed by the Delaware Department of Agriculture as a field veterinarian and worked with Delaware farmers on disease issues, most notably Newcastle disease. In 1950 he left DDA and started one of the first, if not the first, USDA licensed business to produce and sell vaccines to the poultry industry. One of the first vaccines he developed was for the dreaded Newcastle disease. Dr. Lasher conducted cooperative projects and interacted with both UD staff and students that lead to vaccines for contagious diseases of chickens. These vaccines included Newcastle, Gumboro, infectious bronchitis, infectious laryngotracheitis and others over time.

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY’S STAFF

“The Lasher Lab is the sentinel lab for the State’s poultry industry.” – Dr. Dan Bautista

“I’ve always been intrigued with all parts of agriculture, since I was a kid. Now I get to work on everybody’s projects, get to suck up every body’s knowledge.” – Brian Hearn

“I like working here because we meet so many different people, we’re all so concerned about what’s going on in agriculture. We have foreign visitors to teach and learn from. We’re always learning – I feel like we’re helping.” – Kathy Phillips

“Extension is the leader behind the first adopters. I always appreciated here is being able to do a research plot on the spur of the moment to address a new problem – do a quick and easy test – always some small patch available to do something. The farm crew is very cooperative.” – Dr. Mark Van Gessel

“My Service at the Substation – it’s been fantastic – what Extension and people at the Substation do to help anybody who asked for help. I tell ‘ya’, I never dreaded coming to work here.” – Jay Windsor

The relationship between Dr. Lasher’s company and the University was mutually beneficial and culminated with the naming of the poultry diagnostic laboratory, at the now named Carvel Research and Education Center in Georgetown, as the Lasher Laboratory. Dr. Lasher’s interaction with the personnel at the diagnostic lab and the faculty on main campus in Newark has been tantamount in the education and mentoring of students as well as serving to elevate research efforts on poultry diseases.

In 1996, Hiram Lasher and his wife Bertha provided $250,000 in memory of their son, Steven, to renovate and update the former USDA Poultry Research Laboratory. Dr. Jack Rosenberger, chair of the Animal and Food Science Department, and Dr. Robin Morgan, a professor in that Department who conducted research on the development and efficacy of vaccines, were instrumental in this acquisition. Morgan would become Dean of the college in 2001 and Provost of the University in 2018. The long-term interaction between Dr. Lasher and the poultry scientists at the University, both at Georgetown and on the main campus in Newark, set the stage for this generous gift. One innovative part of the gift was the establishment of the Interactive Video Conference (ITV) Facility which connected Georgetown to Newark live and in real time. In addition to Lasher and his Sunrise Farm, Inc., his family members, Sandra and W. M. Gordon, Denise H. Lasher and Douglas N. Lasher contributed to the video facility.

Derby Walker was hired as the Assistant County Agent in 1973, beginning a 32 year of dedicated and incredible service to Sussex County’s farmers. Walker, or “Derb”, was the master of providing one-on-one service, visiting farms, troubleshooting fields of all types of crops, and talking to growers on the phone. By the time of his retirement in 2005, Walker had left a legacy of immeasurable economic impact on the farms of Sussex County. (*See short biography on page 91*).

Jay Windsor, a Laurel native who in his freshman year at College studied at Kansas State before transferring to Delaware and graduating with a degree in Agriculture Business Management in 1961. He went to work for Libby, McNeil, Libby, a vegetable processing company in Washington State, Wisconsin and Delaware. He became the Substation Farm Manager in 1969, then the Assistant County Agent in 1971. Jay left Extension for awhile as he started his family greenhouse and flower business, but came back, first on a part-time basis, then full-time as a County Agent from 1986 until his retirement in 2003. Jay’s primary focus was on commercial horticulture and home horticulture, but he handled agronomic and vegetable crop calls to help share that burden with his colleague, Derby Walker. Windsor also served as the interim-Director of the Substation while Mark Isaacs was on sabbatical to pursue his Ph.D. at Virginia Tech. (*See short biography on page 90*).

In 1973, the first Extension Crop Specialist posted at the Substation was Frank Webb. Webb grew up on a farm on the Milford Neck in Kent County, received his Bachelor and master’s degrees in agriculture and Agronomy at the University, was hired as the Assistant Kent County Agricultural Agent in 1969. Recognizing the growing need to evaluate new herbicides and other agronomic practices, Webb was appointed first as an Agronomic Specialist at the Substation and later as a full-time agronomic weed control specialist.

The following year, upon the retirement of long-time Extension horticulturist, Bob Stevens, who was in Newark, Dr. Mike Orzolek was hired and posted in Georgetown as the Extension Vegetable Crops Specialist. Now two Extension crop specialists were working full-time at the Substation. Webb and Orzolek soon were able to hire a technician, who given the job title as Extension Associate. They shared this associate, Gary Johnston, for their programs.

Since the 1960s, Ed Wisk served as the Crops Research Associate, a parallel position to the Poultry Research Associate post. His duties included helping coordinate the field research projects in cooperation with the Farm Manager. Mr. Wisk did not carry an extension appointment, but as Crops Research Associate, he participated in a regional soybean variety evaluation annually. The data generated at the Substation and at cooperating research farms in the region, helped identify new and promising soybean varieties. Wisk had worked previously as a vegetable crops field man for the Libby, McNeil, Libby processing company, experience that helped his colleagues at the Substation.

Dr. Bill Mitchell, the venerable Extension Agronomist and his Extension Associate, Bob Uniatowski, conducted a wide array of agronomic field research and demonstrations. This work was carried out in Newark at the University farm, at the Substation and at numerous farms throughout the state. They conducted variety trials in corn, soybeans, wheat and barley. They conducted herbicide and weed control studies in the same crops. The weed control work quickly became a critical component in working out strategies for the expanding interest among farmers in minimum tillage systems.

What were the challenges that faced the research and extension workers over the second thirty-five years at the Substation and the Research and Education Center? Those challenges reflected change in the business and science of the region’s largest enterprise, poultry production. Equally fluid was the change in technology, management and marketing of the crops that support poultry production as well as in the vegetable and fruit sectors of Delaware’s agriculture. A significant number of farmers were involved in pork production, so a Swine Research Unit was established in the 1970s.

The essence of the agricultural research and extension work was to evaluate new strains of chickens, new variety of crops and new management practices. Then, if they had application for the agriculture of the state, figure out how to help farmers best implement and take advantage of these

practices. It was often applied research that connected with the audience of farmers and agriculturists of Delaware, the region and the country.

Just as meaningful and dynamic were societal changes that led to changes in course of the 4-H and Home Economics program. Those societal changes also brought new educational programs in extension directed to communities and new audiences.

AGRICULTURE RESEARCH AND EXTENSION 1970 TO 2005

The 1970 agricultural landscape in Delaware consisted of 673,895 acres of farmland covering 3,701 farms. Nearly 50% of the farmland was in Sussex County on 334,023 acres covering 1,992 farms. Corn averaged about 75 bushels per acre in both the state and the county. Soybeans averaged 28 bushels/acre across the state and the county. Seventy percent of Delaware's cropland was in corn and soybeans. Fifty percent of the state's farm income came from chickens.

Thirty years later in 2000, 2,600 farms were operating on 560,000 acres across the state; 1,312 farms in Sussex covered 283,503 acres. Corn averaged 162 bushels per acre across the state and in Sussex. Soybeans averaged 43 bushels per acre. The ratio of cropland in corn and soybeans and the farm income derived from chickens remained essentially the same.

Delaware broiler producers raised 135 million birds in 1970. By the year 2000, they produced 247 million birds. The average weight of the birds at slaughter in 1950 was 3.9 lbs.; that was up to 6.6 lbs./bird by 2000. More birds and bigger birds. The expansion of the industry that began in 1923 near Ocean View continued over the 77-year period. During the 30 years between 1970 and 2000, managing the manure from the broilers to mitigate nutrient loading of surface and ground waters became an important part of crop management.

What were the factors that fostered this constant increase in agricultural productivity and efficiency? For example, how did corn yields double over the nearly five decades since 1970? How did poultry feed efficiency improve from four pounds of feed for a pound of meat to less than two today? How and why were these advances implemented by and for Delaware producers?

One way to answer those questions is to review the research projects and demonstrations conducted annually at the Substation. Appendix I lists the projects as presented in the Field Day programs of 1945 (the first one), 1961, 1975, 1991 and the projects on display in 2004 (the last Field Day). They reveal much about the change in importance of certain crops, new systems of production and the appearance of environmental concerns related to agricultural production.

Much of the Substation farm was planted in apple and peach orchards from the 1940s onward. By the early 1970s, all the fruit plantings were gone and replaced with agronomic and vegetable crop projects.

There are six broad categories of advancement affecting Delaware agriculture since 1970. These are science-based technologies that are accepted and implemented only because they offer economic advantage in the form of more income or reduced expense; often, they mitigate negative environmental impacts but do so that fits within the economics of profit.

GENETIC IMPROVEMENT OF CROPS AND POULTRY

- Traditional plant breeding improved yields in many agronomic and vegetable crops.
- Genetically modified corn and soybean varieties with resistance to herbicides and certain insects were widely adopted by the late 1990s. Enhanced yields and better weed management contributed to farmers' improved profits.
- New strains and lines of poultry breeds have improved the rate of gain and the bird's ability to withstand certain infectious diseases.
- Genetically modified or enhanced disease preventative products contribute to better poultry health.
- Traditional plant breeding has improved the production and quality of many vegetable crops, improving yields, disease resistance and providing products that meet changing consumer interests.

FARMERS INVESTMENT IN IRRIGATION

- In 1973, Delaware farmers used irrigation on 21,000 acres, mostly hand-move pipe for vegetable production.
- In 2017, nearly 150,000 acres were irrigated, primarily by center-pivot irrigation systems. This is private investment by the farmers that provided them improved yields and greatly reduced risk from drought.

IMPLEMENTATION OF MINIMUM TILLAGE SYSTEMS OF CROP PRODUCTION

- Since the 1970s, minimum tillage systems have come to be the dominant system in the production of corn, soybeans and small grains.
- Yield improvement, reductions in soil erosion, fuel savings and time savings have driven the use of minimum tillage on almost 100% of the acreage of those crops

ENHANCED NUTRIENT MANAGEMENT

- Global Positioning Systems (GPS) have allowed for more precise applications of fertilizers, based on more precise soil sampling.
- Great Enhancements in poultry manure management have occurred to better manage the manure.
  - High phytase feed for poultry helps chickens better metabolize phosphorus, resulting in less phosphorus excreted in the manure.
  - Farmers are now required to have nutrient management plans in place. Storage and application timings and rates are much more sensitive to environmental issues. The informed timings and rates of manure applications also result in better utilization of the nutrients by the crops and reduces fertilizer expense.

MACHINERY AND EQUIPMENT

- Farm machinery is larger, faster and can cover more acres, leading to cost savings and potential yield improvement by operations being carried out when the timing is best for planting, harvest, pesticide applications or other field functions.
- Poultry House Design, Engineering and Computer Controls
  - Bird performance is improved, energy costs are better managed
  - Disease outbreaks are better avoided by maintaining better environments for bird health
  - Precision technologies that are computer-based and often lined to satellites generate better yields due to precise plant spacing. Yield monitoring in grain combines and other harvesters help make informed decisions for the next crop as well as marketing and grain delivering decisions in season.

INTEGRATED PEST MANAGEMENT FOR CROPS

- Pest control applications that are based on real-time data on pest populations and predictive technologies that utilize weather data and other computer-based programs to predict pest outbreaks have had tremendous positive impacts in pest control and related cost reductions in applications.
- These have evolved from monitoring insect populations with black light traps (still important and used) and correlating weather conditions with certain disease outbreaks by recording daily weather conditions to refinements and enhancements using computer and information technologies.

INFORMATION TECHNOLOGY

- In 1970, one-on-one consultations, the telephone, meetings and mail were the methods of information delivery.
- Today, computers, websites, cell phones, iphones and the myriad of social media put the information out there.
- Information technologies enhanced the receipt of market and price information
- Information technologies allowed producers to reach new markets and more consumers

Influencing the implementation of all these developments has been the vagaries of the business environment driven by the global and domestic economies and their impact on our agricultural economy. The recurring energy crises, The Farm Crisis of the 1980s and the Great Recession of 2008 were great challenges for farmers and the food industry in Delaware and the nation.

Derby Walker, Sussex County Agricultural Agent from 1973 to 2005 observed, "Farming became more like a business, farmers needed to be more business-like. Input costs went high, putting lots of money at risk. We helped this not only with seminars and fact sheets on the big economic or management issues, but primarily providing farmers good information and teaching them skill sets related to the hundreds of day-to-day decisions that involved a lot of money."

To recount for clarity, the farm purchased in 1941 for $7,555 has had three names. From 1941 to 1985, it was the **University of Delaware Agricultural Substation**. From 1985 to 2006, it was the **University of Delaware Research and Education Center**. In 2006, with the construction of the new office and meeting room facility, it was named the **University of Delaware Elbert N. and Ann V. Carvel Research and Education Center (REC)**. The narrative of this era of accomplishment uses the terms Substation and Research and Education Center interchangeably, depending on the timing of the accomplishments.

Since the first years of the Substation, partnerships with many sectors of the larger agricultural community have been critical to finding financial and in-kind support for the field and poultry research. The applied research and extension work conducted by the agricultural project leaders have led the way for farmers to be first adopters of new technologies.

These partnerships were then and remain now as the lifeblood of this work. Often financial support or in-kind offerings of land, labor or supplies are provided. Equally as important are the insights the farmer and other cooperators share with the researchers and Extension specialists. The collaborating partners then receives the third-party, non-biased, professionally conducted research and evaluation. The results of these relationships become public information shared with farmers, the agricultural industry and any interested person.

On the crop side, the work is often done in collaboration with the ag industry – seed companies, pesticide manufacturers, local fertilizer and farm supply companies. Machinery and equipment supplies are often engaged, ranging from creators of new electronic technologies that connect with the satellites, to mammoth processing vegetable harvesting combines and to auto-steer tractors. All of this is linked to the farmers – often farmers provide the seed idea for a project, often they collaborate on their own farms.

On the poultry side, the cooperating partners include the integrator companies, primary breeders and others connected with the genetic improvement of poultry, feed companies and animal health firms. Computer technologies that assist in monitoring and regulating the temperature, humidity and general environment within a poultry house are tested and evaluated. These technologies also facilitate the research on determining how environmental factors impact bird growth and performance.

A research facility for swine opened at the Substation in 1977. The concept, conceived by Dr. Richard Fowler, Extension Livestock Specialist and supported by the Delaware Pork Producers Association, who worked with the Delaware Legislature to provide funding for the facility. The work started with research on farrowing sows and baby pigs. In time, a feeder pig facility was added and later a finishing barn. When Dr. Fowler became the Director of Extension in 1984, first Dr. Ken Kephardt and then Dr. Kevin Cera provided the leadership for the swine facility as Extension Livestock Specialists. Dr. Lesa Griffiths, a Professor in the College's Animal Science Department also led research projects at the Swine Unit. The first swine unit manager was Ralph Lowe, then Dania Warrington with Ward Harris instrumental in the operations from 1986 until it closed in 1996.

The research was primarily focused on nutrition and feeding. Various levels of protein and even flavors were evaluated

to determine what impacted growth, rate of gain and even quality of the meat. One of the most fascinating things was the use of a biopsy tool of which there were only 2 in the world. It was tool from the Netherlands. It could go in a pull out a small sample of the meat between the ribs, the tenderloin to determine if certain feed ingredients could impact the taste and texture of the meat, in this case the tenderloin. In 1987 a gestation house was built and in 1990 a hog finishing building was completed.

By the mid-nineties, Delaware's swine industry was declining while the national industry was changing. Iowa, North Carolina and other parts of the country were providing the nation's pork and it was difficult for Delaware producers to compete. With a smaller local grower base, interest and support waned. The facility closed in 1996.

Ed Kee was named the Extension Vegetable Crops Specialist in 1982. Kee, with a B.S. and M.S. degree from the Plant Science Department, had worked as the farm manager of Nassau Orchards, a 500 fruit and vegetable farm near Lewes. He served as the Kent County Agricultural Agent from 1978 to 1982 and would stay at the Substation/REC Center/Carvel Center until his retirement in 2008. He then worked as the Director of Agriculture for Hanover Foods for one year before being named Delaware's Secretary of Agriculture in 2009 and held that position until 2017.

Kee was able to hire three associates over the years to assist in the field research and in conducting extension programing. Lori Rider was first, then Tracy Wootten and Emmalea Ernest. Wooten is now a Sussex County Horticultural Agent and Ernest is a Research Scientist in vegetable crops with a primary Extension appointment.

In addition to conducting variety trials and management studies, Kee partnered with Dr. Jim Glancey, a Professor in Agricultural Engineering in Newark. Together, a horticulturist and an engineer, worked to improve the harvest efficiency of mechanical harvesters for peas, lima beans and pickling cucumbers. On the horticulturalist side, plant architecture and structure were issues as the plant made initial contact with the machine. Operational and design parameters were the among the engineering issues. This work was conducted with farmers, on their farms and often with insights offered by the harvester manufacturers. This work, like so many of the projects by their colleagues at the Center, put money in the farmer's pockets.

Dr. Mitchell, along with Tom Williams, the Extension Agricultural Engineer and Frank Webb, the Extension Weed Control Specialist were instrumental in the development of conservation tillage systems of corn and soybean production. In the late 1960s and 1970s, no-till and minimum tillage systems where revolutionary. At a Substation Field Day in the early 1970s, over 800 farmers showed up to see the No-till demonstrations and research plots. It soon became clear to farmers that they could save time, energy expense and improved their soil's health with minimum tillage. The University of Delaware trio, along with an effective and accessible group of County Agricultural Agents worked directly with farmers to develop systems that worked in Delaware. Today, these systems are the predominant method in corn and soybean production.

Perhaps the most important contribution in crop production in Delaware since 1970 has been the farmers' investment in irrigation. In 1973, Delaware farmers irrigated 21,000 acres, 3% of the cropland, mostly with hand-moved pipe in vegetable crops. Extension Agent Frank Webb reported in 1969, "Low labor irrigation work is needed desperately for Delaware and neighboring states, because water is the main limiting factor in agricultural production." Mitchell continually stressed the need for irrigation, after years of watching Delaware's corn crop shrivel in the summer droughts that occurred far too often. Mitchell and Webb were prescient; their declaration of need helped lead to a more complete irrigated agriculture in Delaware. Today, Delaware farmers irrigate nearly 150,000 acres, over 31% of the cropland, primarily with center-pivot systems. Commercial vegetable crops require irrigation, but much of the irrigated acreage is in corn and soybeans. The poultry industry's demand for these crops as the major component in chicken feed rations helped stimulate farmer's investment. The strong local demand for corn and soybeans creates a price advantage over midwestern prices. This advantage helped justify farmers' commitment to irrigation. Farmers saw the risk reducing and yield enhancing potential of irrigation systems.

Again, Bill Mitchell and Tom Williams became leaders in helping the agriculture community maximize their investment in irrigation. In 1977, they began "The First State Irrigation Program," collecting soil and tissue samples as well as yield data from over 70 irrigated fields up and down the state. They worked with County Agricultural Agents Derby Walker, in Sussex County, Dave Woodward and Ed Kee in Kent County and Dean Belt in New Castle County. The First State Irrigation Program helped growers understand factors such as water infiltration rates and that connection to water application rates, plant population and fertilizer rates, crop response to irrigation timing along with a host of other decision points. It was landmark work that led to the growth in irrigated farming in Delaware with resultant reduction in risk and improvement in yield.

Joanne Whalen, the Integrated Pest Management Specialist and Bob Mulrooney, the Extension Plant Pathologist conducted numerous studies at the Center and throughout the state in their respective fields. This followed a tradition that dated back to the 1940s through the decades of professors and specialists from the main campus coming south to conduct field research on farms and at the Substation. Among these were Dr. T. F. Manns, Dr. John Hueberger, Dr. Robert Carroll in Plant Pathology and Dr. Louis Stearns, Dr. Donald McCreary and Mark Graustein in Entomology.

Two agronomists arrived in the late 1990s that would play an important role in the formation of Delaware's Nutrient Management program. The expanding poultry industry was generating more manure, thereby requiring new management strategies to better utilize this nutrient resource in order to mitigate nutrient loading to Delaware ground and surface waters. Nitrogen and phosphorus are essential to crop production but over applications can impair water quality.

Dr. Greg Binford, located in Newark, and Dr. Dave Hansen, located at the Research & Education Center, conducted numerous studies at the Center and around the state that generated new information. This data helped formulate better nutrient management strategies. Application rates, timing and placement became better managed by growers, thereby mitigating nutrient loading. They even studied the amount of nutrient leaching that occurred when properly constructed temporary piles of manure were placed in fields just before application. Their work made a tremendous difference. Nutrient loading of nitrogen and phosphorus from agriculture has been reduced by over 40% since 2000.

Dr. Mark VanGessel came on board in 1995 as the new Extension Weed Control Specialist, replacing Frank Webb who had retired. Dr. VanGessel, a native of Grand Rapids, Michigan, came with an impressive pedigree. He graduated from Hope College in 1982, then joined the Peace Corp, and was stationed in Lesotho, a land-locked country adjacent to South Africa. He then pursued a career in agriculture, specifically in Weed Science, obtaining a master's degree from Michigan State in 1986 and his Ph.D. in 1990 from North Carolina State University. He then worked in a Post-Doctorate position at Colorado State University. VanGessel immediately continued the agronomic weed control work that had been historically done by Frank Webb and Bill Mitchell. It was an interesting time because genetically modified crops were beginning to dominate the corn and soybean industry, creating a whole new paradigm in weed control issues. VanGessel also took on weed control in vegetables, a needed development.

Dr. Kate Everts, a plant pathologist, became the first person at the REC Center to hold a joint appointment with the University of Maryland and the University of Delaware. Everts majority appointment is at the Lower Eastern Shore Research Center in Salisbury, Maryland, but also has a formal appointment with the University of Delaware. Drs. Everts and VanGessel are married to each other, thus a happy and productive situation resulted in two excellent scientists and extension workers contributing to agriculture in the state and region. Both have also had national impacts through their professional organizations as well as their work in their fields of discipline.

CHANGE IN OTHER TRADITIONAL EXTENSION PROGRAMS

4-H Programs in Sussex County and the state were changing as well. The traditional local 4-H clubs were still strong and were beginning to incorporate new activities in their programming. While crop production, public speaking, cooking & baking, sewing and photograph were still major components of the 4-H programs, soon safe hunting, vegetable production for low income families, computer science and other new programs became part of the 4-H efforts. Of course, the State Fair was one of the highlights of the 4-H year, along with the weeks at Camp Barnes. Ted Palmer and then Mary Argo were the County 4-H Leaders for many years, from the late 1960s into the 2000s.

In 1978, The Delaware 4-H Foundation was incorporated to raise private funds for 4-H programs and activities. Dr. Sam Gwinn and State 4-H Leader Jim Baker, both former Sussex County 4-H leaders were instrumental in creating the Foundation, which is still very much alive and generates significant funding for support of 4-H programs. The Foundation has also enjoyed great volunteer leadership from the 4-H families as well as the County 4-H leaders of the era. Joy Gooden Sparks in New Castle County, Marion MacDonald in Kent County and Ted Palmer in Sussex County helped spark the Foundation, as well as providing wonderful leadership in developing new programs to interest new generations of 4-Hers.

The three decades from 1960 to 1990 saw significant change in the Extension Family & Consumer Science program. In 1962, the Home Demonstration Agent became the Home Economics Agent and the Home Demonstration Club became the Homemakers Club. Charged with broadening their work beyond club members, Home Economics Agents worked to train club members to take over leadership. This was the beginning of an evolution from the original Demonstration Agent concept to making the program more relevant to more people in a more modern and changing society. No longer could the program expect support if their audience was limited to the historical and largely rural Home Demonstration Clubs.

In 1969, a federal initiative administered by Extension nationally, the Expanded Food and Nutrition Program (EFNEP) was designed to teach families with young children and limited food resources how to be well-nourished. Claudia Holden, EFNEP Agent in Kent County, Cheryl Weatherell, EFNEP Agent in Sussex County, Gwendolyn Colvin, EFNEP Agent in New Castle County trained assistants from the lower socio-economic communities they served by helping translate nutritional information into practical knowledge and recipes, which helped build healthy eating habits. EFNEP Training also stressed how to get the most value for limited food dollars, how to stretch the monthly food budget and the advantage of buying ingredients to prepare meals rather than "oven-ready' meals. The program's emphasis in the 1970s and 1980s on the importance of choosing fruits and vegetables over high-fat, high sugar items was ahead of its time as these issues became a critical factor in the obesity and diabetes epidemic that emerged in the late 1990s.

Partnering with community centers and other agencies in the state, Extension leadership and programing addressed youth substance abuse, a precursor to the Delaware Prevention Network. Family and Consumer agents, specialist and staff

addressed societal issues such as family conflict management, nutrition to reduce heart disease, and balancing work-family issues. By the 1990s, the program, still interacting with its original audiences, had clearly broken new ground in addressing pressing needs of a new and diverse audiences.

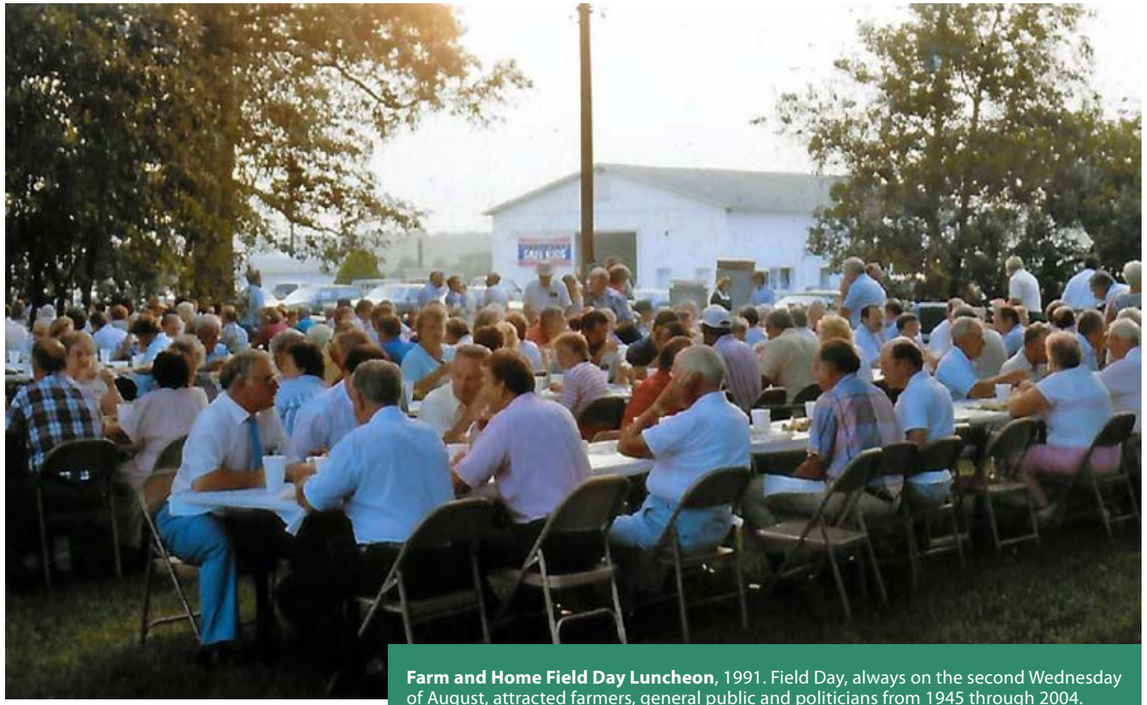
In Extension, the three decades beginning in the 1970s saw the formation of Community Rural Development programs. Dan Kuennan led this mission at the Substation through the 1990s. His work was followed by Bill McGowan.

Extension professionals in Community Rural Development work with rural towns and communities to improve their infrastructure and economic development. Kuennan and McGowan provided significant guidance and assistance as communities improved water and sewer systems, built libraries and firehouses and health care facilities.

SETTING THE STAGE FOR THE FUTURE

By the year 2000, sixty years after the founding of the Substation in 1941, the generation that replaced the first generation of workers at the Substation was retiring or nearing retirement. Yet another generation, a third generation, of researchers, extension workers, administrative staff and the farm staff was emerging to continue the tradition of excellence in research and education.

By 2005 the stage would be set for the biggest addition in the facility's history, the construction of a new office and educational center. This new edifice would be named the University of Delaware Elbert N. and Ann V. Carvel Research and Education Center. In a very real sense, the building of the Carvel Center was made possible by the respect the larger community had for the legacy of work that began in 1941 and was now being continued by a third-generation of workers. That record of service and accomplishment provided ample justification for a former Governor and long-time University Trustee to provide the seed money for the project. That legacy motivated State leaders to recognize that man, Bert Carvel and his wife Ann, by providing the additional funds needed to create a modern 21st century facility.



Farm and Home Field Day Luncheon, 1991. Field Day, always on the second Wednesday of August, attracted farmers, general public and politicians from 1945 through 2004.

A FARMER'S PERSPECTIVE

Keith Carlisle, Greenwood *– Keith and his family grow corn, soybeans, small grains, pickling cucumbers and processing sweet corn. He points out, "The place has added greatly to the viability of agriculture in Sussex County and the State. The County Agents, like Bill Henderson and Derby Walker, have always been very responsive. Often, they would connect us to the Specialists at the Substation for access to more in-depth, specialized information. This has been very important. The Specialists have also been great links for us to agribusinesses and processors."*

"It's not just the specialists from Georgetown, it's also the specialists and researchers from Newark. They have come down and visited our farm, did field work at the Substation. Often we were connected to them by the County Agents."

"There's no doubt the work done by the people and our access to them from Georgetown and Newark have helped farmers avoid financial troubles and even bankruptcy."

DEDICATION TO RESEARCH & EDUCATION

2003

Dedication of the Jones-Hamilton poultry research house; funded by the Jones-Hamilton Company with state, county and local companies.

State of the art research is conducted in the Jones-Hamilton House to address environmental issues related to air quality as impacted by ammonia and particulate emissions. The work brings improvements to the environment surrounding the birds while lessening emission impacts on the outside environment.

2004

The last Farm and Home Field Day is held. It had been held continuously since 1951. Field Days were held, but not annually, in the late 1940s.

2006

THE ELBERT N. & ANN V. CARVEL RESEARCH & EDUCATION CENTER

Dedication of the Elbert N. and Ann V. Carvel Research and Education Center. Construction began in 2004. Funding came from a $2 million gift from Governor and Mrs. Carvel, and a $4 million state appropriation. $1.6 million came from other sources including a $100,000 appropriation from Sussex County, $100,000 in gifts from the local poultry companies, and a $25,000 gift from Ed and Debbie Kee and a $25,000 gift from Mark and Cindy Isaacs. Nearly every person employed at the Center donated to the campaign.

2006

THE ELBERT N. & ANN V. CARVEL **RESEARCH & EDUCATION** CENTER

On May 6, 2006 the Elbert N. and Ann V. Carvel Research and Education Center was dedicated. The construction and opening of this building, magnificent in appearance and extremely functional for all the staff and their programs, was the most significant event since the founding of the University' s first and foremost facility in Sussex County in 1941. Indeed, the $7.6 million investment represented the University' s commitment to Southern Delaware, agriculture and the citizens of the region.

For over six decades, the facility played an integral role in agricultural research and extension programs, 4-H youth development programs, family and consumer science programs and community development. However, its influence and impacts were felt around the state, the region and the nation. Indeed, the poultry diagnostic laboratory (Lasher Lab), the associated research in poultry management and the wide array of agronomic and vegetable crop research impacted audiences around the world.

By the 2000s, the main office facility, originally built in 1945 with the patchwork of wings constructed in 1958, 1974 and 1980 was beginning to deteriorate. As the building aged the heating, ventilation, air conditioning, and wiring and plumbing were inefficient at best. Technological capacity was also very limited which hindered computer uses and other highly sensitive operation and research equipment.

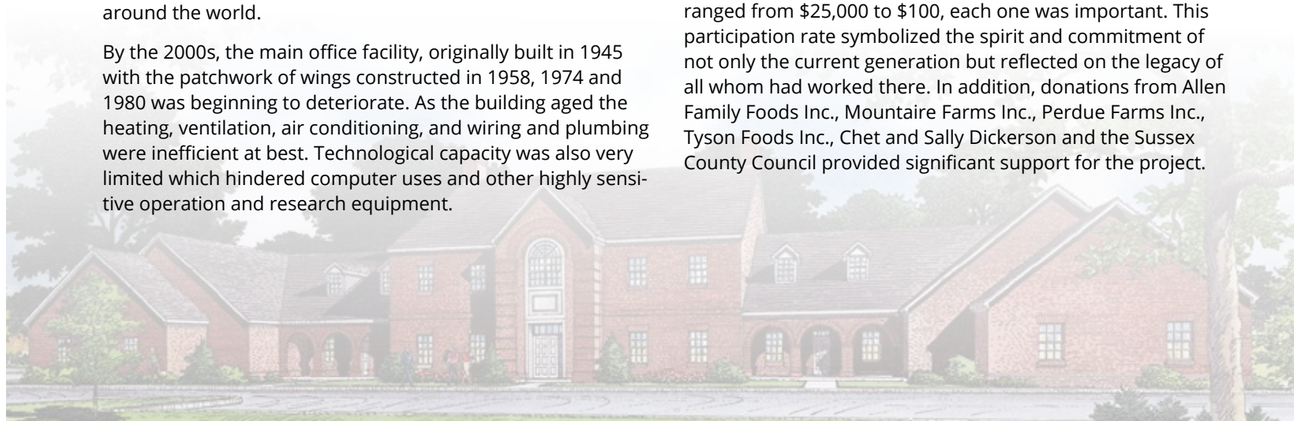
In addition to the infrastructure shortcomings, Cooperative Extension and Research programs were expanding, creating new positions that required more space than was available in the original office building. Clearly, something needed to be done, and just as clearly, the staff and the citizens they served deserved a building that could meet the research and outreach needs for the century ahead.

Dr. Mark Isaacs (Director of the Center since 1992) worked with the University administration to explore the possibilities and develop possible funding scenarios for a new building. Fortunately, Elbert "Bert" Carvel, former Governor of Delaware and long-time trustee of the University and his wife Ann contributed $2 million towards the total of the $7.6 million project to fund the much-needed office, teaching and meeting space.

"Bert" Carvel was respected and admired by many. As the word spread of Carvel's financial commitment to the project, State Senator Thurman Adams Jr., Senator James Vaughn, Senator Bob Venables and then Lieutenant Governor John Carney became very supportive in the project recognizing the importance of agriculture to the state's economy. Furthermore, they understood the role the University and the Georgetown Research and Education Center played in helping farmers and Delaware citizens thrive and prosper. The Senators and University officials felt strongly that Carvel deserved to have the new facility named in his honor. He had been a good governor, a trustee of the University from 1945 to 1985 and his roots in agriculture were strong. In addition, they knew that Carvel had served the people of Delaware admirably for many years.

Senators Adams, Vaughn and Venables met with University President David Roselle and other University officials to ensure the new building at Center was a budget priority within the University construction plans. The University officials agreed with the proposal and the Senators secured $4 million from the State of Delaware Bond Bill for the project. The remaining funds came from federal, County, and industry sources as well as from individual donations.

Many full-time staff members at the Research & Education Center contributed funds to the project. While the donations ranged from $25,000 to $100, each one was important. This participation rate symbolized the spirit and commitment of not only the current generation but reflected on the legacy of all whom had worked there. In addition, donations from Allen Family Foods Inc., Mountaire Farms Inc., Perdue Farms Inc., Tyson Foods Inc., Chet and Sally Dickerson and the Sussex County Council provided significant support for the project.



The new 26,000 square foot building provides modern office space, teaching, research and outreach facilities for the entire research and extension staff. Three meeting rooms with modern audio-visual systems can each comfortably seat over 100 people. Two Conference rooms also exist for smaller meetings, with the most modern named in honor of the Sussex County Council. The Interactive Video Conference (ITV) classroom links to Newark and other locations in the state and was made possible from the Lasher family donation. Undergraduate courses are taught simultaneously in Newark and Georgetown along with meeting capabilities in the ITV room.

In addition, Isaacs was able to work with the Sussex County Council to increase funding for the county extension programs as well as other specific projects. Isaacs and his colleagues at the REC were able to cultivate private sector support for some capital projects and other programmatic support. In the early years the Substation/REC only received enough operational support funds from Newark to keep the facility functional. With the freedom to pursue state funding and other sources, operational and facility funds grew, which in turn brought new equipment, staff, and infrastructure upgrades to enhance all research and extension programs conducted at the facility.

The Poultry Diagnostic Lab, established in the former USDA building as the Lasher Lab in 1997, faced major operational and maintenance challenges that reflected the age of the building. Isaacs, working with then Secretary of Agriculture Ed Kee along worked with members of the Delaware General Assembly and acquired $4 million from the State for the second major renovation. Kee made sure the funding was in the Governor's Budget and then he and Isaacs worked with the legislators, particularly Senator Bob Venables (Chair of the Bond Bill Committee) to ensure the necessary funds made it through the appropriation process. By 2016, the renovation was complete with the installation of the most modern technological equipment available for poultry disease monitoring and testing.

Governor **Bert Carvel**, circa 1962.

WHO WAS BERT CARVEL?

Elbert Nostrand Carvel was born in February 9, 1910 and died on February 6, 2005, three days shy of his 95th birthday. His birth place was his mother's family home in Shelter Island, on Long Island, New York. However, the Carvel family was from Kent Island, on the Eastern Shore of Maryland and that was Carvel's early childhood home. His family moved to Baltimore when he was six and he attended public schools there. He graduated from Baltimore Polytechnical Institute and then attended the University of Baltimore Law School.

In 1928, he met Ann Hall Valliant, from the Eastern Shore of Maryland. They married in 1932 and had three children. Although Carvel held a good job at the Baltimore Gas & Electric Company during the Great Depression, in 1936 the Carvels moved to Laurel, Delaware.

Mrs. Carvel's uncle, William E. Valliant, had started a fertilizer company in 1914. He recalled, "I left a good job in Baltimore and came over here at a low salary because I thought Delaware was a land of opportunity."

Carvel was immediately confronted with a crisis and had to fire the President of the Company and the bookkeeper as there was a shortage of $100,000. He settled the matter, funds were reimbursed over time and he became the General Manager and in 1943 became President of the Valliant Fertilizer Company. The firm had offices in Laurel and Milford, later organizing the Milford branch as a separate company named Milford Fertilizer Company.

As a fertilizer dealer, he had the opportunity to meet a lot of people, which he loved to do because that was his nature and because he had an eye on politics almost as soon as he landed in Delaware. He first gained public attention when he served on a Grand Jury investigating election fraud in the 1940 election.

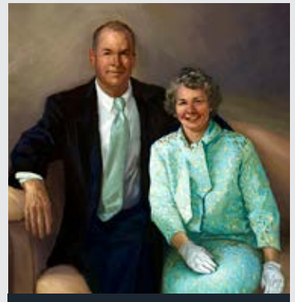
He won the Lieutenant Governor seat in 1944 as a Democrat and served under then re-elected Republican Governor Walter Bacon. In 1948, he ran for Governor and won handily. However, he lost his re-election bid in 1952 to Caleb Boggs, a Kent County Republican. However, Carvel made a comeback, beating multi-millionaire Republican John Rollins in the 1960 race for Governor.

Carvel was the second Democrat to win the Governor race in the twentieth century. He was the first Democrat in the same century to win the Governor election twice. A week after the 1960 election, he appeared on the television show, What's My Line. He said his line was he manufactured fertilizer, eventually acknowledging he was the Governor-elect of Delaware.

He tried to beat the venerable Republican Senator from Millsboro, John J. Williams twice, in 1958 and 1964. He lost both times, saying "He had a halo and a white horse, and that's pretty hard to beat in a Republican state."

Carvel was opposed to capital punishment and worked hard on behalf of civil rights. He was Governor when the first span of the Delaware Memorial Bridge opened in 1951.

Carvel served on the University Board of Trustees from 1945 to 1985. He always maintained his home in Laurel and attended St. Phillips Episcopal Church in Laurel. Governor and Mrs. Carvel had three children, Betty, Edwin and Ann.



A portrait of the **Carvels**, painted by Kelly McConnell Cox, hangs in the dedicated building.

The State Office Building in Wilmington is named for Governor Carvel, as is the cafeteria in the North Laurel Elementary School. Governor Carvel was present for the ground breaking of the University of Delaware Elbert N. and Ann V. Carvel Research and Education Center in 2004. Carvel and his wife both passed before the Center's dedication on May 1, 2006.

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"Great people to work with here; that definitely makes every day better." – Emmalea Ernest

"We're lucky to have Extension specialists, agents and educators on site. They do the research or find the answers and aggressively disseminate the information to our clientele. What we do is respected because of our rapid response." – Dr. Mark Isaacs

Groundbreaking for the Elbert N. and Ann V. Carvel Research and Education Center. (L to R), **Howard Cosgrove**, President of the UD Board of Trustees, Governor **Ruth Ann Minner**, Governor **Bert Carvel** (seated), State Senator **Thurman Adams**, **David P. Roselle**, President of the University of Delaware, **Dr. Robin Morgan**, Dean of the College of Agriculture and Natural Resources.

THE WARRINGTON FARM

Complimenting and supplementing the agricultural extension and research programs on the Thurman Adams, Jr. Research Farm at the Carvel Center is the Warrington Farm. Located 12 miles away near Indian Mission and Hollyville, the Warrington Farm is dedicated to irrigated crop research. A center-pivot irrigation system was installed in 1995 and since then Extension and Research staff at the Carvel Center have put the Warrington Farm to good use as an ideal location for commercial sized irrigated crop studies.

Everett F. Warrington was an attorney in Georgetown who died in 1965 and left his farm to the University of Delaware. Mr. Warrington was born in 1888 on his home farm, grew up there and was a graduate of Georgetown High School in 1903. He graduated from what was then, Delaware College in 1907. In the fall of that year, he went on to Oxford as the Rhodes Scholar from Delaware. He had taken the examination two years earlier, as a sophomore. Woodrow Wilson, the President of Princeton University was on the Rhodes Scholar committee for Delaware at that time. Wilson would be the 28th President of the United States (1913-1921). Warrington was only the second Rhodes Scholar from Delaware.

Warrington spent three years at St. John's College, Oxford and in 1910 earned his Bachelor of Civil Law Degree. In 1912, after being admitted to the New York Bar, he worked for a large liability insurance firm in New York City. His cases ranged from suits asking for hundreds of thousands of dollars in damages to small breach of promise suits. That same year, taking an active interest in Republican politics, he ran unsuccessfully for State Assemblyman from the 10th District in Brooklyn. He was active in New York at least until the early 1930s.

Warrington returned to Delaware, admitted to the State Bar in 1946. His practice in Georgetown was diverse, being involved in civil and criminal cases. He also represented several school boards in Sussex County in the 1950s as school districts coped with federally mandated school desegregation resulting from the 1954 Supreme Court ruling, Brown v. Board of Education. In 1958, he was defeated in the race for Sussex County Recorder of Deeds.

Warrington's roots went deep in Sussex County. His mother, Mary Emily Warrington, born in 1853 in the Indian River district and died at the age of 77 in 1930. Her husband, William A. Warrington, for many years was the mayor of Georgetown and a Justice of the Peace. They had five children, including Everett. Two of his sisters married doctors and moved away. One sister, Elva, became the principal of Rehoboth High School. His only brother, Reverend Ernest W. Warrington, moved to Corvallis, Oregon. Everett made his home at the family farm.

Perhaps it was these deep family roots and his legal work in Sussex County that led him to leave the Warrington family farm to the University of Delaware. But, first, Warrington specified in his will, "I hereby devise my farm at Hollyville and also my marshland on the Rehoboth Bay, both located in Indian River Hundred, Sussex County, Delaware to Elsie Phillips during the term of her natural life". Warrington's will went on, ". . . and if she not be living at the time of my decease or upon the death after my decease I hereby devise the said farm and marshland unto the University of Delaware, Newark, New Castle County, Delaware, for the **use of the agricultural department or extension service of said University, the said farm and marshland to be used so far as possible for the encouragement of individual farm owners in Sussex County, Delaware. (Bold added by the author)**. Miss Phillips rented the farm to a local farmer and received that income, approximately $2,000 per year until her death in 1989 at the age of 87. She worked as a salesperson and buyer at Braun's department store in Georgetown, retiring in 1964. Earlier, she was an operator for Bell Telephone, Georgetown.

At this point, the University wanted to sell the land, turn it into cash and create an endowment in Mr. Warrington's name. Ed Ralph, former director of the Substation and by then serving as Assistant to the President of the University for Sussex County, wrote, "The location of this farm (about 16 miles form the University's Research & Education Center) makes its use for crop research questionable because of the time and expense involved in moving equipment. Also, irrigation is not available on the farm." He went on to propose the creation of the endowment.

The heirs of the Warrington family did not like the idea, feeling strongly that Warrington's intent of serving the interests of the county's agriculture was best served by keeping the farm as a farm dedicated to agricultural research and demonstrations. Georgetown attorney James Griffin defended the family's interests and won a settlement that compelled the University to keep the property as a farm to meet Warrington's intent.

In 1994, Dean of the College of Agricultural Sciences, Dr. John Nye and Director of Extension Dr. Richard Fowler knew the farm was part of their responsibility. After several internal discussions, a meeting was called with some faculty, department chairs and extension specialists to see what could be done. Extension Vegetable Crops Specialist Ed Kee proposed that if a center-pivot irrigation system was installed, commercial sized plots in processing vegetables, using commercial planting and harvesting equipment could be conducted. Large plots replicated real world conditions, enabling researchers to study the interactions of production practices, plant architecture and harvester operations as they impact harvested yield and quality. In addition, the farm could be rotated with agronomic crops to evaluate irrigation management practices.

Dean Nye approved the purchase and installation of a 760' 4 span center-pivot system for $64,000 to cover 55 acres. The farm has 84 acres of tillable ground and 37 acres of woodland. Dr. Jim Glancey, of the Department of BioResource Engineering and Kee went to work in December 1994. The first task was to clear the hedgerow that ran down the middle of the farm in order to install the irrigation system. Borrowing a Caterpillar bulldozer from Richard Y. Johnson & Son, a local construction firm, they made room for the center-pivot. By spring of 1995, the first crops were planted.

Initially, the irrigation system was utilized to support the research on pea, lima bean, sweet corn and pickling cucumber production systems. In 2001 the irrigation system was modified by Extension Irrigation Scientist, James Adkins, to create the first variable rate irrigation (VRI) system in the Mid-Atlantic. This system was dedicated to the research of improved irrigation management techniques that would improve yields and maximize irrigation efficiency.

In 2012, with support from the Natural Resource Conservation Service, Delaware Department of Agriculture and Vincent Farms, an 18 ac., 42 zone subsurface drip irrigation (SDI) research plot was added on the field across the road from the largest Warrington Farm field to explore and refine this "new to the region" technology.

In 2016, Dr. Isaacs approached Steve Risley of the Lindsay Corporation, a manufacturer of center-pivot systems, who working with their local dealer, David Brown, donated a new system with variable rate application capabilities. Today, Adkins and his team use geographic information system (GIS) software to map where and how they want certain research plots irrigated. The primary goal is to evaluate and identify the most effective and efficient water management strategies to enhance crop production and nutrient management.

To plant the crops, Adkins uses a tractor equipped with real-time kinematic steering that can be set up to drive plus or minus an inch one way or the other for each pass so that all the rows on the farm are planted perfectly straight. He then takes that map out of the tractor and uses it with the pivot to determine how the farm plots get irrigated.

"We've got the farm randomized into about 300 individual 60- by 60-foot squares and we categorize the soils based on a range of factors such as electrical connectivity, which is a proxy for soil moisture holding capacity, and clay content. We're categorizing them in such a way that we've got five tiers and we plant each of our treatments in each tier. We want to make sure that 'Treatment One' doesn't always end up in the best soil and make sure it gets into all five tiers," said Adkins.

Each square is irrigated differently, and every morning the researchers collect data from sensors that monitor soil moisture content at 6, 12 and 18 inches. The data comes from watermark sensors that are hardwired to a wireless transmitter that sends data to a tower where 11 machines record all the information.

The researchers look at and record soil moisture values daily and can see how soil moisture values change throughout the day.

Adkins notes, "We're looking at a large volume of data each day. We can tell where the roots of a crop are by looking at the soil moisture values because when the sun comes up, the plant starts using water."

In 1973, there were 21,000 acres of irrigated crops. In 2018, nearly 150,000 acres are irrigated, largely with center pivot systems. Irrigation has become critical to profitability and farmers must balance use of the correct amount of water and fertilizer to produce the best crop yields while mitigating nutrient loading to ground and surface waters.

The steady enhancements to the irrigation research capabilities and the improved drainage system at the Warrington Farm have created a world-class facility to study irrigation and fertigation treatments in soybeans, wheat and corn. In addition, State Representative Harvey Kenton and his colleagues in the State Legislature have provided an irrigation research funding budget line that supports the work at the Warrington Farm and at the Carvel Center.

Certainly, the intent of Mr. Warrington is being met. The support from Dean Nye, the initial work of Jim Glancey and Ed Kee, and the continuing work of James Adkins and his team have met Warrington's goal of providing "encouragement of individual farm owners of Sussex County." Equally certain is the work at the Warrington Farm generates information and knowledge benefitting not only Sussex farmers, but those throughout the State, Delmarva and the nation.

Ed Kee removing the hedgerow in December, 1994 with a borrowed bulldozer.

View of the **Warrington Farm** in 1992. The hedgerow in the center of the field needed to be removed to accommodate the installation of the center pivot system in 1995. Mr. Warrington's original farm stead, long since removed, was near the end of the hedgerow.

2018 view of the **Warrington Farm** with research plots and center pivot well-established.

Irrigation system at the Warrington Farm in 2018. Note different sections of the system are operating to irrigate specific treatments.

SUBSTATION FAMILY DEDICATED TO SERVING THE PEOPLE

2012

The Research and Education Center Farm is dedicated to the late State Senator Thurman Adams, Jr., naming it the Thurman Adams, Jr. Research Farm.

The Delaware Department of Agriculture's Secretary of Agriculture Ed Kee, collaborating with Dr. Jack Gelb, chairperson of the College's Department of Animal and Food Science established with support from the General Assembly and Governor Jack Markell a $500,000 annual line item in the State of Delaware to support the work of the Lasher Poultry Diagnostic Laboratory.

2015

Dedication of the complete renovation of the Lasher Poultry Laboratory, a result from a $4 million appropriation from the State of Delaware initiated by Secretary of Agriculture Ed Kee and Substation Director Dr. Mark Isaacs and supported by Governor Jack Markell and the General Assembly.

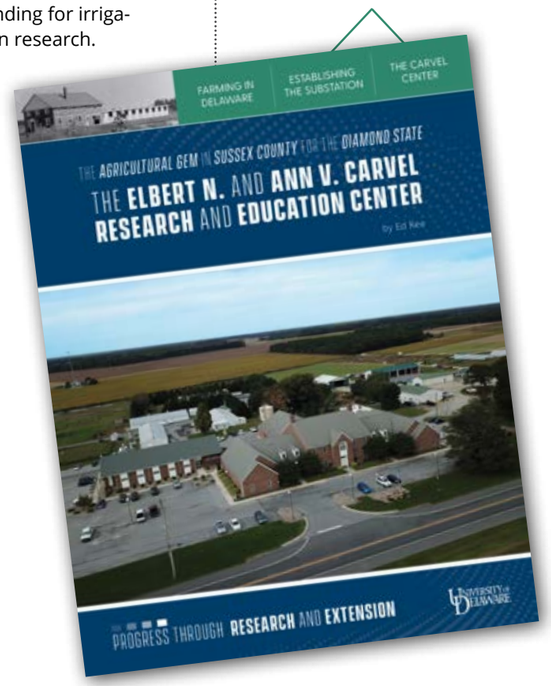
2016

A new center-pivot system replaced the original system constructed in 1995 at the Warrington Farm. The new system cost $75,000 and is equipped with variable rate technology.

State Representative Harvey Kenton led the legislative effort to provide earmarked state funding for irrigation research.

2019

"The Agricultural Gem," this illustrated history of the Carvel Center and its predecessors, The Substation and the Research and Education Center is written by Ed Kee with the help of a host of retirees, Sussex Countians and current Carvel Center staff.



TODAY FOR TOMORROW

Seventy-eight years ago, in 1941, the Delaware General Assembly passed "an act to provide for the establishment of an agricultural substation for lower Delaware" as an annex to the University's experimental farm in Newark. Today, a strong and invaluable center for agricultural research and cooperative extension programs is firmly established. The origin and evolution from the University's Agricultural Substation to the Research & Education Center to the Elbert N. and Ann V. Carvel Research & Education Center is the central story of this narrative. It is a narrative of resources, facilities and programs, but above all it is a narrative of people.

Today in 2019, after nearly 80 years of growth, development and change, it is a time for reflection on the heritage we enjoy today. It is also a time to capture and celebrate where are we now. If we know where we've been and where we are, we'll be better equipped to address our future. This piece of the narrative concentrates on today's people, who are continuing the tradition of excellence at the Center.

AGRICULTURAL RESEARCH & EXTENSION

Dr. Cory Whaley grew up just five minutes from the Carvel Center and went to Seaford High School. He received his bachelor's degree from Clemson University in 1996, his master's degree from the University of Delaware in 2000 and his Ph.D. from Virginia Tech in 2005. Cory joined the Sussex County Extension staff in 2006 as the County Ag Extension Agent. Today he holds that position and serves as the Sussex County Extension Director.

Agronomy and Weed Science are Whaley's specialties and responsibilities. Whaley says, "My goal is to try to develop applied field research to answer local questions. We respond to farmer calls, texts and emails with questions. One big focus is irrigation research. We use the Warrington Farm to investigate water use and crop yield. Fertilizer rates are also part of the irrigation program."

Working with James Adkins, the irrigation specialist at the Center and with Phillip Sylvester, the Kent County Agricultural Agent, they are unlocking some new findings. Farmers depend on getting 250 bushels/acre from irrigated corn. It didn't happen this year, it was a terrible start and we had drought then too much rain.

However, despite the bad year in 2018, Whaley sees irrigated corn yields approaching 280 bushels/acre for producers and at the Warrington Farm. Yet, ten years ago they reached 316 bushels ten years ago at the Warrington Farm, but have not been able to repeat that. Whaley postulates that "Night temperatures are high, causing the plant's respiration processes at night to burn more photosynthate or carbohydrates, which limits yield. Certainly, we don't have the light intensity and perhaps more cloudy days than the Midwest and Far West, which could also limit yields."

Whaley feels they have made real progress in understanding irrigated soybeans, making sure good moisture conditions exist during soybean flowering and the pin and pod-filling stages. In wheat, in collaboration with colleagues from neighboring states, they are investigating the potential of harvesting wheat at higher moisture levels, thus allowing yield enhancing earlier plantings of double-cropped soybeans.

Sharing his thoughts on how farmers are feeling about things, Cory says, "I think they see opportunity and diversity. The new Malting Barley company offers something new for growers. They have diversity opportunities with processing vegetables and in this part of the county, watermelons. Our farmers are in for the long haul and always have in the back of their mind the importance of the poultry industry. If the poultry industry stays competitive, grain farming here has a good future."

Whaley's reflections reflect realities of the region's corn/soybean/poultry relationships that Frank Gordy, Bill Henderson, Derby Walker and all the specialists and agronomists have understood over the last 80 years.

Tracy Wootten grew up on her family's farm right on the Delaware side of the Mason-Dixon line west of Seaford. A Seaford High School graduate, Tracy graduated from the University of Delaware in 1988 and received her master's degree from Delaware in 1995. Wootten's Master's Thesis opened some important insights into the growth, flowering and reproduction of lima beans, Delaware's most widely planted processing vegetable crop.

Tracy was a summer intern in Joann Whalen's Integrated Pest Management Program one summer and then one summer in Ed Kee's Extension Vegetable Crop program. Upon graduation, she was hired as the Extension Associate in the Vegetable Crop

program. In addition to working on the field research projects and vegetable growers' educational meetings, Wooten became responsible for the Weekly Crop Update, a revised version of the old Late News. The Update informs growers and agriculturists of what pests are out there along with timely cultural and production information.

In 2003, upon Jay Windsor's retirement as the Sussex County Agent with commercial and home horticulture responsibilities, Wootten was appointed to the job. A primary program on the home horticulture side is the Master Gardeners program. Wootten says, "Master Gardener volunteers are our way to extend educational programs out to the public. We have 85 volunteers, every two years we train a new class. They have a Speaker's Bureau, run the Gardner's Help Line and hold workshops for the public."

Under Wootten's coordination and leadership, Master Gardner's work with community gardens, veteran's groups, schools, home owner organizations and run an outdoor woodland classroom. A short play was developed for children when they come to the Master Gardener's Garden. "The Misadventures of Peter Rabbit," teaches children about how plants grow, good bugs, bad bugs and related topics. The project won 1st place in a National Master Gardener's program and it's been replicated in 3 states.

Wootten interacts closely with the nursery, commercial greenhouse and landscape industry in Sussex County. Collaborating with their trade organizations to deliver educational meetings. In addition, she is part of the leadership for Annie's Project, a program for women in the farming or agriculture business that addresses issues related to those types of businesses. She is also a leader in the multi-state Women in Agriculture annual program.

Dr. Mark VanGessel has served as the Extension Weed Science Specialist since 1995. Dr. VanGessel's background is recounted in the previous chapter, but he arrived just as glyphosate resistant varieties (Round Up Ready) were gaining almost universal acceptance among farmers. Dr. VanGessel's primary Extension Associate is Quintin Johnson, who grew up on the family farm near Georgetown and completed his bachelor's degree at West Virginia University. Johnson, who has been with VanGessel and his predecessor leads other full-time assistants and a cadre of summer interns. Johnson has presented numerous scientific papers over the years at professional meetings in collaboration with VanGessel and the weed science team.

VanGessel reflects, "Round Up Ready certainly simplified weed control tremendously. We went from tank mixes with several products with advantages and disadvantages to a single product used for burn-down of the cover and the same product for one or two applications to control newly emerging weeds. One consequence is that across the country the adoption of no-tillage strategies increased, although here on Delmarva, no-till was already very much in place." Within two years, over 90% of the corn and soybean acreage nationally was planted to Round Up Ready varieties. VanGessel recalls, "I'll never forget how amazing it was to see the rapid adoption rate. Also, the price dropped from $80/gallon to $26/gallon in just five years."

"Perhaps the big thing about Round Up Ready was the value to the company was in the seed, not the chemical. Patenting the genetics, which prevented farmers from saving seed, changed agriculture. The value in the whole system is with the genetics."

Dr. VanGessel cautions, "Today, however, because of the advent of resistance to glyphosate in several weed species, we're moving back to the tank-mix days, albeit with whole new chemistries."

VanGessel works with vegetable crops as well and has a real interest in studying the potential of weed control from cover crops.

The biggest single weed challenge in the last 5 years has been the movement and spread of Palmer Amaranth. VanGessel observes, "The weed was always in the area, but never a major threat. It can cause serious yield loss in many crops and causes foreign matter contamination during grain harvest. While it's assumed to be resistant to ALS herbicides and glyphosate, it is unknown as to what has made it explode like it has."

Dr. VanGessel says he got "vibes" when he first came on the station. The ability to work at a station in the middle of a significant farming and agriculture industry was very appealing. The farm staff has been very accommodating over the years, and one thing he always appreciated was he could find space to do a quick study to address a problem that has popped up out on the farms.

James Adkins grew up on his family's farm near Parsonsburg, Maryland and graduated with a bachelor's degree in Agricultural Engineering from the University of Maryland in 1999. He joined the Research and Education Staff as an Extension Associate for vegetable harvest mechanization and irrigation in September 1999. Today, he focuses on irrigation as the Irrigation Program Leader. He is also very much involved with precision agriculture applications. Warren Wiley, who works closely with Adkins, provides great technical support of the work at the Warrington Farm.

Much of this work occurs at the Warrington Farm, located 12 miles from the Carvel Center on Rt. 5, south of Harbeson, near Indian Mission. The original center pivot irrigation system that dates to 1995 was replaced in 2012 with a center pivot system with programmable variable rate capabilities. This feature allows for variable rate applications of water that can be replicated precisely over the plots. As Adkins says, "All of this makes the Warrington Farm the 'go to' location for large plot irrigation studies." Indeed, the work has not only caught the attention of Delaware producers, but farmers and researchers from the south and Midwest have reached out to learn about what's going on in Delaware.

Collaborating closely with Dr. Cory Whaley, the Sussex County Ag Agent and Phillip Sylvester, the Kent County Ag Agent, insights have been gained on corn and especially soybeans. (*See Cory Whaley earlier*). In addition, "good answer on wheat irrigation have also been developed."

The work at the Warrington Farm and on 60 farms across Delaware has also confirmed that the practicality of using the Evaporation "checkbook" system of water use is just as effective and perhaps more reliable than soil sensors. Certainly, the cost and required maintenance of sensors does not provide enough return on investment. Information such as this is important to farmers as they look to maximize their investment in irrigation.

Adkins and Wiley have done much to improve the natural drainage at the Warrington Farm, a significant exercise that has implemented and tested some new approaches.

Adkins notes he really values the relationships with farmers, his colleagues and ag professionals from all fields. He says, "I have a lot of respect for colleagues past and present who are all part of building those relationships. It's great fun to bump into farmers and have lunch with them."

Dr. Gordon Johnson was the Kent County Agricultural Agent from 1994 to 2010, when he became the Extension Fruit and Vegetable Specialist. Gordon received his bachelor's degree in 1979 from the University of Maryland, his master's degree from Clemson University and his Ph.D. from the University of Delaware in 2010. He also spent time in the Peace Corps, serving in the Seychelle Islands.

Dr. Johnson does Extension programming for vegetable producers and the allied industries. He also conducts a full load of applied field research each year. In recent years, Gordon has provided a huge service to the state's vegetable and fruit producers as he helped train them to implement the new federal food safety regulations. These regulations were the result of the Food Safety Modernization Act, which requires producers to implement best safety practices as well having a Food Safety Plan for their operation.

He also teaches an undergraduate course in vegetable science on the main campus in Newark. His field research includes variety trials in a wide range of crops, designed to put the best varieties for this region in the hands of the growers. One element of his variety testing program is he does not restrict the trials to the major crops. For example, he sees crops such as broccoli and beets, not usually associated with Delaware, may have potential for local growers with new, better adapted varieties.

He and his colleagues are also interested in climate change issues and implementing practices that mitigate heat and other stresses on vegetable and fruit crop production.

In early 2004, Emmalea Ernst called then Extension Vegetable Crops Specialist Ed Kee and asked if there were any jobs connected to working in the plant species Phaseolus, which are the family of edible beans. Ernst was finishing her master's degree at Michigan State in plant breeding, specifically in a program that focused on the Phaseolus species. A native of Lancaster County, Pennsylvania, she had earned her B.S. Degree at Penn State.

Kee, who had been working with lima beans since the early 1970s, had always wished for someone with plant breeding expertise to develop and test lima varieties adapted to this region. At the time of Ernst's call, Tracy Wootten was shifting from the Vegetable Crops Program to the Sussex County Horticulture Agent position. Emmalea began work in 2004.

Ernst balances a vigorous Extension program with a sophisticated lima bean variety breeding program. That is a unique combination that is well facilitated by the tradition of service and openness over the years at the Center. Her official title is Associate Scientist, Extension. She is pursuing her Ph.D., working on understanding heat stress in lima beans.

She is the weekly editor and assembler of the Weekly Crop Update, which runs from April 1 to September 30. Over 800 email subscribers receive it, a huge increase from the early 1990s when less than 100 received it. Interestingly, today only 7 subscribers receive it by mail, a great indicator of how communication technology has changed things.

Ernst also works with Dr. Johnson on Extension programming, perhaps especially in planning and executing the annual Fruit and Vegetable Growers Meetings in January.

Ernst says, "The major goals of our Lima Bean Breeding Program are to incorporate resistance to the root know nematode, develop heat tolerance in new varieties, and to improve plant architecture to enhance mechanical harvest. We also have made progress in developing new Fordhook lima beans with heat tolerance."

Reflecting on landing in Delaware and finding a place to work in Phaseolus, "As I finished at Michigan State, it seemed like most of the plant breeding opportunities were in the west or overseas. I wanted to stay closer to home, which is the way it worked out. I feel like the work and research I want to do is well-supported here. I can usually figure out a way to get done what I want to do. Sometimes it requires creativity, but that's a good thing."

In 2018, three new Extension Specialists landed at the Carvel Center. These positions had been historically located on the main campus in Townsend Hall. Dean Mark Rieger, Extension Director Dr. Michelle Rodgers and Carvel Center Director, Dr. Mark Isaacs, along with the respective Department Chairs, agreed to place these positions at the Carvel Center.

Farmers and professionals in the associated agricultural supply and service industries are delighted to see this expertise placed in the center of the state's agricultural interests. Dr. Alyssa Koehler, Extension Plant Pathologist came to Delaware from North Carolina. Dr. Koehler earned her B.S. degree in Plant Biology, then moved to Plant Pathology for her master's degree and her Ph.D. All three degrees are from North Carolina State University. Dr. Jarrod Miller, Extension Agronomy Specialist received his B.S. and M.S. Degrees at Virginia Tech and his Ph.D. at the University of Kentucky. Dr. David Owens, Extension Entomologist, earned his B.S. and M.S. Degrees at Virginia Tech and his Ph.D. at the University of Florida.

Within their first year, each is already participating in Extension meetings for farmers, contributing to newsletters and putting together their own research programs and laboratory facilities. These three agricultural specialists trained at World Class Universities are poised to make their contributions to the benefit of Delaware's agriculture and to the benefit of each farmer. Shawn Tingle, a nutrient management and agronomy associate will work with Dr. Miller. Tingle has worked with Extension workers over the years on a wide array of projects related to nutrient management.

The placement of these three specialists pull together a remarkable team of expertise under one roof. In place at the Carvel Center are the five state specialists: (1) Extension Weed Scientist (2) Extension Fruit and Vegetable Specialist, (3) Extension Entomologist, (4) Extension Plant Pathologist and (5) Extension Agronomist. The goal to round out the expertise is to place an Extension Farm Management/Marketing Specialist at the Carvel Center.

Georgia "Georgie" Cartanza was appointed the Extension Poultry Agent in 2016. Ms. Cartanza is a graduate of Delaware State University and came to Extension with tremendous private sector experience with Delmarva poultry companies. She held several positions of responsibility with Perdue Farms and Mountaire Farms. Georgie also owns and operates three poultry houses on her own farm in Dover, Delaware.

Georgie has proven herself already, conducting programs related to ventilation, economic analysis, management to enhance poultry health and just plain answer questions from growers. The last point is especially true for new producers. Cartanza and her colleagues on the main campus, from other states and in the industry are putting more focus on ammonia emissions from poultry houses.

As an Extension Agent for poultry, in many ways she is upholding the traditions of poultry specialists, agents and researchers over the years at the Center. Frank Gordy, Ray Lloyd, Frank D'Armi, George Chaloupka, Bud Malone and Bill Brown all made strong contributions to the industry and helped growers improve their knowledge and skill sets as poultry producers. Perhaps the most important legacy that Cartanza is fulfilling is the total cooperation and outstanding working relationship with the industry.

POULTRY DIAGNOSTIC LABORATORY

Dr. Dan Bautista is the Laboratory Director for the University of Delaware Lasher Poultry Diagnostic Laboratory. The Lab was begun in 1951, initially with shared responsibility with what was then called the State Board of Agriculture, but since 1956 has been solely a part of the University. The 2016 renovation of the Lasher Lab was timely as the workload and demands on the facility and the staff are ever-increasing. In 2018, 10,718 accessions, or samples, were run, up from 3,914 back in 2004. Dr. Bautista received his Doctor of Veterinary Medicine at the University of the Philippines. He also earned a master's degree in poultry medicine from the University of Maryland. He came to the Poultry Diagnostic Laboratory in 2006, after working several years in the Maryland Department of Agriculture Animal Health laboratory in Salisbury, Maryland.

Dr. Bautista says, "Traditionally, the Lasher Lab is the sentinel for poultry diseases for the state. The lab identifies initial signs of trouble and if necessary, the University confirms the disease. If it's serious, like Avian Influenza, The USDA Animal Health Research Center in Ames, Iowa gets involved." He points out, "It's really a three-part program. We identify the symptoms and the diseases, UD scientists confirm and work on characterization and the solutions come from the vaccine industry, who have worked closely with us at the Lasher Lab and our colleagues at the University in Newark."

Vigilance in detecting outbreaks of highly contagious diseases such as Avian influenza is primary. Coccidiosis and infections bronchitis are also major priorities for the Lasher Lab, although the work there can identify many other poultry pathogens that impact live birds. The Lasher Lab staff is also equipped and trained to identify the presence of certain organisms, such as salmonella, that can cause food-borne illnesses.

In addition to diagnostic and surveillance testing, the Lasher Lab staff also participates in research. An example is Gumboro disease, a virus that has been identified for decades, but mutates and adapts, thus creating a need to constantly develop and evaluate new vaccines. This work is typical of the three-part program that includes the Lasher Lab team, poultry health scientists on campus in Newark and the poultry health/vaccine industry.

Bautista reflects on new challenges in poultry health as poultry companies move to Anti Biotic Free production systems out on the farms. Bautista says, "The recent increase in the number of cases tested in our lab is primarily due to the industry moving away from antibiotics to anti-biotic alternatives such as Probiotics, Prebiotics or Essential Oils. As these new products come on the market and are made available for use on poultry, our poultry companies and veterinarians don't have the efficacy data from non-biased, independent testing."

Dr. Bautista enjoys being involved in "applied research project" that can provide good answers quickly to the major stakeholders: the poultry companies, poultry health companies and ultimately, the producers. He notes, "the $4 million renovation in 2016 was a watershed moment. It not only renovated the lab to the highest level, but it signals the University's commitment to the poultry industry."

Kim Allen is the Lasher Laboratory Quality Manager. She has a Bachelor of Science degree in Medical Laboratory Technology from Salisbury State University. Ms. Allen worked in the medical laboratory at the Nanticoke Memorial Hospital for nearly 20 years before joining the Lasher Lab in 2017.

As the Quality Manager, Kim makes sure the diagnostics are run properly, the instruments are working and are calibrated correctly. This involves work in bacteriology, with a special nod towards the importance of the bacterial disease, Salmonella. Many virus organisms threaten the poultry industry, avian influenza being the most notorious, but many others can be serious.

Kim notes, "Each year the number of samples for all types of issues grows. It has more than doubled since 2004 when just under 4,000 samples were analyzed. In 2018, we ran a total of 10,718 accessions or samples. The companies and professionals that have worked with this lab have long-term relationships, they know the quality of our work, they trust us, we're very accessible. We email them immediately with results if they need a special rush."

"Our lab is ahead in technology of many hospitals that deal with human health," says Allen. "We have a great relationship with the Allen Poultry Lab on campus and we also have student interns and graduate students from Delaware and other places. Our lab is open to the public and tours, we get everything from 4-H kids to scientists to governors. It was a big surprise to me how much work goes into making sure the poultry industry is safe. The Lab is a hidden treasure."

Kathy Phillips is the Senior Laboratory Technician/Deputy Laboratory Quality Manager at the Lab. She earned her Associate Degree in poultry technology from Delaware Technical & Community College in Georgetown in 1996. Ms. Phillips has worked at the lab since 1998. She did work part-time at the lab beginning in 1993 while in school and after graduating until she came on full-time.

Her main responsibility is managing and running the Polymer Chain Reaction (PCR) testing equipment, which is the surveillance test for Avian Influenza (AI). The poultry industry requires that every flock be tested for AI. The company representatives bring in an oral swap sample from the chickens a week or two before they are harvested. Phillips says, "Typically, the lab does tests from about 100 farms each week. In a crisis, the lab could run 1000 samples in a day. Our instruments and equipment can run 96 samples at once."

"We also do diagnostic samples for the industry. Mortality is considered high if 3 birds/thousand die within any given day. The company brings a subset of birds from a sick flock, we automatically do an AI test if they are older than 21 days, but we also test for other viruses, infectious bronchitis, LT or a bacterium caused problem. Dr. Bautista autopsies the birds before we test to give us clues for what to test for."

Phillips proudly observes, "Our lab is in better shape than it ever was. We have stayed on the cutting edge."

COOPERATIVE EXTENSION – 4-H & YOUTH

Jill Jackson was named the Sussex County Extension Educator in 4-H in 2013. Ms. Jackson is from Bridgeville and was a 4-H member of the Greenwood Flyers 4-H club. She follows on the footsteps of Mary Argo, longtime Sussex County 4-H Club Leader, who held the position Jill now holds. Today in Sussex there are 25 4-H clubs with about 500 members. She meets monthly with the volunteer leaders to plan programs and help ensure a quality experience for the 4-Hers.

The clubs meet monthly and provides something for everyone. 4-Hers and do projects in wood working, sewing, cooking & baking, photography and more. At the county level, events such as public speaking contests, demonstration contests

EXPRESSIONS OF LEGACY & DEDICATION FROM TODAY'S STAFF

"Our poultry diagnostic laboratory is advanced and up to date. More than hospitals. On the people side, it's an unbelievable team work atmosphere. There is also a family feeling and commitment of respecting your home life." – Kim Allen

"Certain degree of freedom as opposed to main campus. I like the research setting off campus, it puts your research in touch with farmers, the land and stakeholders." – Dr. David Owens

"Working here feels like we're all family. Titles don't matter – there are no power struggles. There are no office politics. We are here more than we are with our families. Yet, whenever there is some sort of crisis, large or small, in our family lives, we're all here to support each other." – Sharon Webb

build confidence and provide experience. Ms. Jackson relates, "School educators tell us they can pick out the kids with 4-H experience, because those kids can stand up and talk with confidence."

The State Fair in July and the Camp Barnes experience is still very important in the 4-H year. The experience at the fair gives the kids an opportunity "to put their good work forward to a larger audience." Jackson smiles, "Every 4-her looks forward to Camp Barnes. We have the program for two weeks, its split up into one-week sessions for the campers. They spend a whole week with their 4-H friends from all over the state. There's something magical about the week."

With Ms. Jackson's comment about the magic of Camp Barnes, those who knew the founder, Sam Gwinn, who started Camp Barnes in the late 1940s, can only smile and know that Sam is proud and happy.

Lindsay Hughes grew up near Woodside and was also an early 4-Her. In fact, she met the boy who she would marry years later in 4-H. Ms. Hughes is the niece of the late Joy Gooden Sparks, former New Castle 4-H leader and State 4-H Program leader. Ms. Sparks remains a legendary figure in 4-H.

Ms. Hughes has been engaged in the 4-H programming in schools since 2006. Currently she directs and coordinates the Botvin Life Skills Program for Elementary and Middle School Students. The Botvin program is a research-validated effective substance abuse program to help prevent the onset of cigarette and tobacco use among Delaware's youth. The program helps increase student's knowledge of the consequences of tobacco and other substance use and abuse. Research demonstrates the use of cigarettes is a gateway drug towards the use of alcohol, marijuana and other drugs. Ms. Hughes not only delivers the programs to students, but trains school teachers to include and teach the program directly to their students.

Ernest Lopez is the State 4-H volunteer coordinator and located at the Carvel Center. His statewide responsibilities are to help volunteers understand their responsibilities and to coordinate their activities.

COOPERATIVE EXTENSION – FAMILY AND CONSUMER SCIENCE

Nancy Mears came to the Sussex County Extension as the Family and Consumer Science educator in 2016 with a strong background in Nutrition, Health and Exercise science. A Seaford native with a degree in Exercise Science from Salisbury State University, Ms. Mears worked for the Laurel and Seaford School District School Lunch and Nutrition Services programs. She had also worked for the Nemours Foundation's Health & Prevention Programs and when she first graduated from college, at the Nanticoke Hospital's Positive Steps Fitness Center, working primarily with cardiac patients' rehabilitation. Ms. Mears also has a master's degree in Nutrition from Mississippi.

Among her major programmatic priorities is bringing a "new culture of health" to the citizens of Sussex County. This includes chronic disease prevention. Recognizing the realities of society in the 21st century, she says, "Just because we teach, doesn't meant we have the ability to make change. We have to not only share knowledge with clientele, which is perhaps our primary responsibility, but we must also reach decision makers because they can help make changes, provide resources to reach more people and set priorities for better health within their spheres of influence."

Ms. Mears' initiatives for better health are reaching schools, adult audiences and the health care communities. Her emphasis on reaching decision makers is part of an inclusive Health Communities for Delaware which brings grass roots input to identify needs.

THE FARM: RESEARCH IN CROPS AND POULTRY

The original purpose, the founding purpose of the Agricultural Substation, was to conduct research that could apply to the needs of the farmers in Southern Delaware. That purpose has been met for nearly 80 years by dedicated professionals. Today's equally dedicated faculty, professionals and staff now at the Carvel Center and the College of Agriculture and Natural Resources will honor that legacy by continuing the original mission.

That mission began with the first person to be hired at the new Agricultural Substation, Emmor "Jack" Turner. Turner drove in from his home in Illinois and arrived on a cold day, January 3, 1942. Since that day, seven men have served as the Farm Manager. Each made their own contributions and provided invaluable support to the project leaders on the crop and poultry side of the operation.

FARM MANAGERS: 1942-2019

1.	Emmor "Jack" Turner	1942 - 1965
2.	Jack Dickerson	1966 - 1969
3.	James "Jay" Windsor	1969 - 1971
4.	Alvin Warner	1971 - 1975
5.	Kenneth Hastings	1976 - 1997
6.	Victor Green	1997 - 2006
7.	Brian Hearn	2006 - Today

In addition to the farm managers, the farm staff provided great service over the decades, often unsung. Catherine Hudson and Jack Mason (*see photo page 46*) made significant and daily contributions to the work in the first five decades. Howard Wolfe from the 1960s to 1990s and Lloyd "Junior" Burke from the 1970s to the 2000s were essential to the operations of the farm. All four were critically important to the completion of thousands of field research plots. Wolfe and Burke had tremendous mechanical and practical farm skills that were invaluable.

Victor "Vic" Green, from Middletown, came to the REC in 1995 as the Crops Research Associate, the liaison between project leaders and farm operations. Two years later he was appointed as the 6th Farm Manager in the history of the Research Farm. Vic says, "I've grown roots here, I lived in the house. I felt it was kind of my farm, at least I tried to treat it that way."

He further recalled," I had not spent much time in Sussex County. I like it immediately, I liked the farmers I met. I always tried to work as hard as the farmers were working."

Green was the farm manager when the first linear irrigation system was installed. "It was an incredible improvement from a labor-saving perspective as compared to hand moved pipe. It was also a great improvement in the quality of the research because the water could be applied evenly."

Today, Vic is an Associate Scientist with responsibility for variety trials in corn, soybeans and wheat not only at the Center but also at locations throughout the state. Farmers eagerly look forward to the trial results as they make decisions for the upcoming year.

Green says, "The Substation people have been a family here. People really make this a wonderful place. I look back fondly at all the people I've worked with – I've learned so much from all of them, the project leaders and the farm guys."

Brian Hearn, proud to be a native of Laurel, started working here as a summer helper on the farm in 1996, working for $4.25/hour with the Crops Research Associate, Vic Green. Brian majored in Horticulture at Delaware Valley College in Doylestown, Pennsylvania. He was their starting fullback for three years, but always came back to work the summers at the Substation. After graduation, Brian worked as a weed science technician from 2001 to 2005. He replaced Vic as the Farm Manager in 2006.

Brian recalls the introduction of auto steer on the tractors. "The first year, it was kind of scary. We were used to doing things a certain way. We were afraid the technology would break down. Well, I can't tell you how awesome the auto steer technology is for us. We can lay out plots from the seat of the cab. Everything is more accurate, and breakdowns were non-existent. Today, we've mapped the whole farm."

Brian met his wife at Del Valley, married 17 years and has two children.

Ward Harris is proud to be a native of Delmar and a graduate of Delmar High School. Despite the rivalry between Delmar and Laurel, he and Brian Hearn are great friends. Ward graduated from the University of Delaware in 1989 with a degree in Ag Education and General Agriculture. He came to work right after college at the Swine Research Unit, working with project leaders Dr. Kevin Cera, who was stationed at the REC, and Dr. Lesa Griffith from the Animal Science Department in Newark.

The Swine Unit had a nursery and feeder pig operation and for several years had a finishing pig operation at the farm of Dickey and Delores Culver near Laurel. Ward would travel to that satellite operation daily. In 1996, the swine unit closed and Ward, demonstrating his good nature and interest in all things at the Center, shifted to the farm, helping with irrigation and the farm work in general.

Ward is the Research Associate for Field Crops, and proudly says, "I'm the Flex Man." Ward must have some sort of official title, but he will only say, and proudly say, "I'm the Flex Man." Reflecting back on the development of irrigation resources over the last 22 years, he recalls, "We moved from hand-move pipe to towable linear systems, to more and better linear systems. Today, we have overhead irrigation on 200 acres and drip irrigation capacity on 25 acres. We now have 5 miles of trenches with one mile of rubber hose sections that connect to the linear systems."

Ward says, "The biggest thing here is the people, such a dynamic and diverse group of good people who accomplished much."

JONES HAMILTON ENVIRONMENTAL POULTRY HOUSE

In the late 1990s and early 2000s, serious concerns regarding the role of nitrogen and phosphorus generated by concentrated livestock feeding operations on surface and ground water quality were emerging on the Delmarva Peninsula. Air emissions of ammonia and particulates were also of increasing concern. One commercial chemical manufacturer had introduced a dry alum product that if applied to the litter in the poultry house could tie up phosphorus.

The Jones Hamilton Company of Walbridge, Ohio, had an alternative product, Sodium Bisulfate, commonly known as PLT (Poultry Litter Treatment) that they felt could help address the issue, perhaps not only with phosphorus, but also with the emerging issues related to ammonia emissions from the poultry house. The company had a small presence on Delmarva with three salespeople, and while considering options of renting a farm or some facility to test and demonstrate their product, had not arrived at a solution.

Dr. Bernie Murphy, a Salisbury, Maryland native and a 1975 graduate of the University of Delaware's College of Agricultural Science, joined Jones Hamilton in 2001. Murphy had worked for Perdue Farms during the summers of his college years; one of his projects was traveling to the USDA Lab adjacent to the Substation (now the Carvel Center) and running sheer pressure tests on chicken breast meat. That Lab was transferred to the University and by 1997 was reopened as the Lasher Poultry Diagnostic Laboratory.

Familiar with the facility and the Delmarva poultry industry, Murphy reached out to Bud Malone, then Extension Poultry Specialist to discuss the possibilities of collaboration at the Carvel Center. The discussion quickly grew to include the poultry team in Newark, the College administration and Carvel Center Director, Dr. Mark Isaacs. Dr. Hong Li, an agricultural engineer embedded in the Animal and Food Science Department in Newark emerged as the research leader for the facility. Stephen Collier, the poultry farm manager at the Carvel Center provides the daily management of the facility, as well as other poultry research projects.

Dr. Murphy and the Jones Hamilton team were looking for a place to understand more about their product, how it worked and what additional benefits could it possibly bring to producers. Murphy recalls, "We were not only trying to position our product, but to generate data and information that could help us inform and provide guidance on its use by the growers."

The Jones Hamilton Environmental Poultry House was constructed in 2003. Jones Hamilton provided $75,000 and Dr. Isaacs appealed to the State of Delaware Legislature's Bond Bill Committee to provide the $75,000 matching funds. In addition, Isaacs' request to the Sussex County Council provided an additional $10,000. Since the original construction, the University of Delaware and Jones Hamilton has invested over $500,000 to upgrade and maintain this state of the art poultry research facility. Matching private sector funding with public sector funds and utilizing the land at the Carvel Center, coupled with the vision of Murphy and his colleagues at the University, resulted in a research and demonstration facility that addresses some of the most critical and perplexing issues facing Delaware and Delmarva's largest agricultural industry, poultry production.

Murphy received his Master's Degree from the University of Arkansas and his Ph.D. from Iowa State University is now the President of Jones Hamilton. He came to value the team at the Carvel Center along with the poultry health and agricultural engineering team in Newark. "I appreciate the staff; I mean the whole staff's recognizing the benefits and need for impartial yet credible information from a non-biased source. I have been most heartened the attitude; everyone just gets along."

He cites two of many significant accomplishments. "PLT was first used only during the brooding state, when chicks were first placed in the house. Work conducted at The Jones Hamilton House at the Carvel Center proved that if PLT is used during the life of the flock, in addition to mitigating environmental impacts from ammonia and phosphorus, the treatment also improves bird growth and performance benefits by mitigating the stress caused by ammonia and certain pathogens."

Murphy also acknowledges Dr. Hong Li's leadership as the main investigator at the Jones Hamilton House. "Hong Li's tremendous capability coupled with all the monitoring data reveals the product reduces ammonia by 23%. In addition, we're conserving nutrients – if nitrogen is not escaping through ammonia, then it's bound up in the litter as Ammonium sulfate, just waiting to be used appropriately as a fertilizer on crops. What's exciting is we're addressing air quality within and outside the house, nutrient loading, bird performance, and related potential negative environmental impacts."

The availability of the Jones Hamilton Environmental Poultry House has enabled Dr. Li and his colleagues to attract over $2 million in research grants. Stephen Collier, as Poultry Farm Manager at the Carvel Center, continues a long tradition of dedicated poultry workers at the Center. The Brittingham family looked after the chickens at the Substation during the 1950s and 1960s. Bill and Lorraine Swift continued the work from the 1970s for nearly thirty years.

The tradition of relevant and responsible work in poultry at the Substation began with Frank Gordy and Karl Seeger back in the 1940s. The Chicken of Tomorrow Contest, continued evaluation of new strains of birds, evaluating new poultry house equipment, researching the relationship of temperature and humidity on bird performance, improved feeding practices and tremendous poultry health surveillance and research have, for nearly 80 years helped lead the way for Delmarva's poultry industry. Today, the Jones Hamilton House continues that tradition of cooperation between the industry and the University resulting in a viable and profitable poultry industry. Stephen is also part of a tradition of poultry house workers. The Brittingham family looked after the chickens in all the houses near the original office in the 1950s and 1960s. Bill and Lorraine Swift did the same for over twenty years into the 1990s. Today, the work is more focused on environmental impact, but just as important.

The purpose of this section, Today for Tomorrow, is two-fold. The first is to acknowledge the dedication and work of all who work at the Carvel Research & Education Center today. Photos of each working group are included on pages 94-95.

The second purpose is to capture what is going on today for the benefit of future workers and other interested people. The story of "Progress through Research and Extension" is also the story of agricultural progress in Delaware and Sussex County. It is my hope, that 50 or 100 copies of this book will be set aside so future workers at the University of Delaware Elbert N. and Ann V. Carvel Research and Education Center will understand the legacy and heritage of research, education and service. It is quite a story.

The Hopkins family at Green Acres Dairy Farm near Lewes host school children for three days in May every year. Cooperative Extension's 4-H program organizes and cooperates with the Hopkins on what as become an annual Happening."

A FARMER'S PERSPECTIVE

***Walt Hopkins, Lewes** – Walt and his family operate a dairy farm and grow crops to support the cows. They also have a great on-farm ice cream store. The Hopkins farm family goes back several generations and Walt remembers his early days in 4-H at the Substation. "Growing up that was the place to be. If you went up in the county 4-H programs, you got to go the Substation – it was exciting to go to the other side of Georgetown," Walt exclaimed. "Over the years, the meeting room in the old building was used for so many meetings – not just University meetings – but we met with the Farm Bureau Young Farmers & Ranchers group and the Farm Bureau would hold their meetings there." Walt came back to the farm after graduating from the University with a degree in Ag Engineering and Army service in Vietnam. He recalls, "Early on, if I needed help, I'd call the Substation. It was also the conduit to the specialists in Newark, especially those who worked with dairy, like George Haenlein."*

Linking back to his advocacy for agriculture and his history with 4-H, Walt and his family host Farm Tours for elementary school children for 3 days in May. "We started it and it grew so fast, we called Extension for help. They came through and today the 4-H team and others from the Center organize it, run it and make it happen. It's a great opportunity for teachers and students to see animals – chickens, pigs, and our cows - and begin to understand a little about farming and where food comes from. We couldn't do it without Extension." Also, Walt fondly remembers his Dad's observation, "Besides, Dad always said a tour is good to get the place cleaned up!"

CENTER DIRECTORS

The first three Directors. **George Chaloupka** is receiving the Sussex County Service Clubs Award for Service to Agriculture with **Ed Ralph** on the left and **Frank Gordy** on the right.

FOUR **DIRECTORS**

GORDY, RALPH, CHALOUPKA, ISAACS

J. FRANKLIN GORDY

THE FIRST DIRECTOR OF THE SUBSTATION

In the spring of 1941, George Schuster, Dean of the School of Agriculture, hired a 35-year-old vocational agriculture teacher to be the Assistant County Agent in Sussex County. J. Franklin Gordy would assume many roles and positions over the next 30 years with the University, ultimately laying down a tone of sincere commitment to the mission of the University of Delaware, the Land Grant Mission and to the people of Sussex County, Delaware and Delmarva. He also set a high aspirational bar of service for future generations of University faculty, Extension workers and everyone who served at the Substation and now the Carvel Center.

Frank Gordy was born in 1906 in Laurel, Delaware. An only child whose Dad worked in Laurel but was not a farmer, Gordy was greatly influenced at Laurel High School by Colonel Tanner, an educator at the school with military background from World War I. Gordy led the "School Brigade" at Laurel High School in his senior year. The program was a type of junior military training for youth. Tanner took a real interest in Gordy, eventually encouraging him to attend the University of Delaware, which he did immediately after graduating from Laurel in 1924.

He graduated from the University of Delaware with a Bachelor of Science Degree in Agriculture in 1928. Gordy then embarked on an interesting progression of vocational agriculture (Vo-ag) teaching positions. In 1928 he was at Seaford High; 1929 saw him at the Ferris School for boys, a reform school in Wilmington, serving as a Vo-ag teacher and Assistant farm manager. He spent 1930 as the office manager for his father-in-law's feed company, J. L. Beauchamp & Co., his only venture into the private sector. The very next year he moved to Greenwood School as the Vo-ag teacher, staying there until 1939. He then moved to Dover High School, teaching there until 1941, at which time he was named the Assistant County Agricultural Agent back in his native Sussex County.

Thinking about why Gordy left teaching for Extension, his son Frank Gordy, Jr. reflected, "Something about the Extension job got him excited about a way to work with more people and serve agriculture." Promoted to County Agent the very next year, 1942, he soon was faced with a very difficult and logistically convoluted challenge as the Supervisor of the Emergency Farm Labor program, a War Department directive to the Cooperative Extension Service in each State. Associate Director of Extension George M. Worrilow in Newark was the Director of the Food Program while Frank Gordy put legs on the project throughout the State.

Gordy and his colleagues attracted school kids, Boy Scouts, foreign workers and eventually German Prisoners of War encamped in Delaware. Bill Henderson, long-time Extension colleague of Gordy's, shared a telling anecdote about Frank Gordy and the challenges of that job. One of the biggest farmers in the county and the state, John S. Isaacs, grew peas and lima beans, milked cows, ran a canning factory, and along with general farm work, also timbered off his holdings. Isaacs, a driven man, would call Gordy multiple times each day with ever changing needs for labor. Gordy, exasperated at times with Isaacs, never let his frustrations show and just dealt with Isaacs and his volatile labor needs.

The next big role for Gordy, having been named Extension Poultryman in 1943 on a part-time basis with his farm labor responsibilities before taking on the poultry responsibilities as a full-time specialist in 1946, was to help the broiler industry adjust to tremendous post-war changes.

"Having lost the military as its primary wartime buyer, facing continued price ceilings for its broilers and pinched by a scarcity of chicken feed, the Peninsula's broiler industry braced for hard times." Gordy, with support from other University researchers and extension personnel, put for the concept that growers must employ better business practices and the industry would be able to compete if growers and processors grew – bigger was better and more efficient. Willard McAllister, Extension Agricultural Economist helped Gordy drive home these management points.

Gordy was an early voice for vertical integration, encouraging poultry companies to provide growers the inputs such as the chicks and feed as part of a contractual arrangement for delivery of the broilers for processing and marketing. This was key to the strategy advocated by McAllister and Gordy to help the industry gain efficiencies in production. To insure quality for buyers, they advocated mandatory inspection of processed chickens and the use of a regional brand, "Delmarvalous Chicken" to gain brand identification for the region's broiler industry.

Gordy recognized competition between companies was a fact of life, indeed, it spurred innovation and progress. However, he also saw that cooperation on industry wide issues such as poultry health challenges, finding improved breeds and

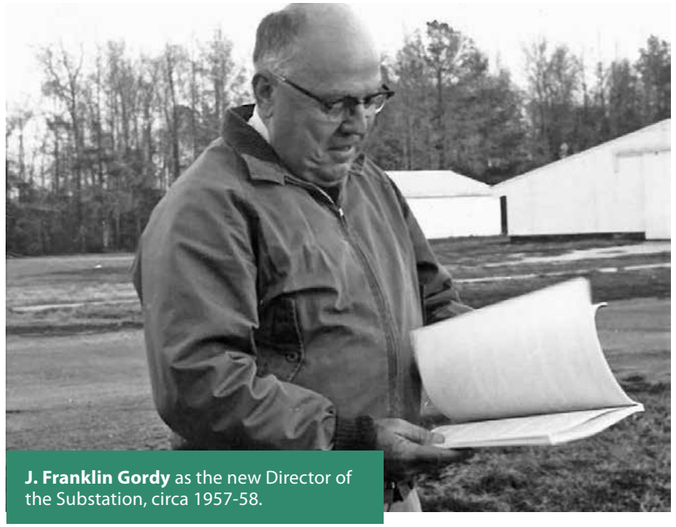
strains of birds put on more meat in less time, and developing a strong reputation for quality in the marketplace would be positive for growers and integrators alike.

Gordy's work enhanced the relationship between growers and the industry with the academic community at the School of Agriculture. Bringing the expertise of established and younger, newly trained faculty alike to the problems at hand, Gordy's leadership led others to address and resolve problems and help the industry meet challenges. That may be his greatest legacy to the poultry industry and the University.

During this era, in-depth studies were conducted on many aspects of broiler production. Experiment Station Bulletins described research on price-feed relationships, the influence of management practices on costs of production, control procedures for coccidiosis, evaluations of brooding systems, feed rations and litter types, and the use of poultry waste as a fertilizer for vegetables and strawberries. This work was accomplished not only by staff at the Substation, but Gordy's ability to identify needs led faculty from not only the Animal and Poultry Industry Department, but from Horticulture, Agronomy and Agricultural Economics to initiate research relevant to the growers and the industry. The Department of Agricultural Engineering was formed in 1967, but that department would investigate energy use, water quality and solar energy by the 1970s.

To fulfill his programmatic goals, Gordy naturally evolved to leadership positions in several local and national poultry-related organizations. He served as the President or Secretary of the Delaware Poultry Improvement Association for 20 years. The Eastern Shore Poultry Exchange near Frankford was a live auction where poultry processors would purchase entire flocks based on a sample of birds brought in cages. Gordy was a director of the Exchange for 17 years. The Delmarva Poultry Industry, Inc., perhaps better known as DPI, started under Gordy's quiet, but effective guiding hand back in 1948. This organization was a direct result of the University's sponsorship and support of the first "Chicken of Tomorrow" national contest. DPI, as its names states, represents the entire Delmarva Peninsula's broiler industry. Connect to all of that was DPI's sponsorship and hosting the National Chicken Cooking Contest annually from 1948 to 1971. To celebrate the Chicken of Tomorrow Contest and the Cooking Contest, Gordy and his colleagues hatched the Delmarva Chicken Festival, which ran from 1948 to 2014.

Although Gordy was probably recognized as DPI's Executive Director, at least informally, since the beginnings in 1948, it was not until 1955 that title was formalized with the University that he would concurrently hold two titles, DPI Executive Director and Extension Poultryman. In 1956, he gave up his Extension Poultryman responsibilities to Ray Lloyd. This freed up Gordy to remain as DPI's leader, but to assume a new role as the first Director of the Substation.



J. Franklin Gordy as the new Director of the Substation, circa 1957-58.

The Substation had been functioning well since its first season of operation in 1942. The field work was initiated and conducted through the academic departments in Newark. As more project leaders started more crop and poultry related field projects at the Substation, logistics, organization and communications often led to confusion and misspent energy. The University Board of Trustees created the Agricultural Substation Division in 1956 and confirmed the School of Agriculture's choice of Gordy as the Director. All of this happened during Dean George M. Worrilow's tenure, who held great respect and affection for Gordy. Worrilow, who also served as the Director of Extension and Director of the Agricultural Experiment Station, along with Gordy, made sure the University Board included a directive to house the Sussex County Extension Office at the Substation as soon as "funding and facilities" can be made available.

This opened the door for the County Extension staff to move to the Substation as a new wing was completed on the west side of the original building in 1958. A meeting room was also connected to the old building and the new wing. This meeting room would be the site of thousands of agricultural, 4-H, and family and home economics meetings for nearly five decades. Important advances not only in agriculture, but also related to issues of a wide range of communities were often first introduced in that meeting room.

Gordy would hold the joint titles of Substation Director and DPI Executive Director from 1956 until his retirement in 1971. Over the years, he was recognized for his professional work, but also for his community service with Kiwanis International, Boy Scouts, his church and with local schools. He was the founder of the Georgetown Parent-Teachers Association (PTA).

He served on numerous boards and committees for State of Delaware agencies as well as the Delaware State Fair Board. In 1960, he represented the Institute of American Poultry Industries and the U.S.D.A. Foreign Agricultural Service at the International Trade Fair in Poznen, Poland. In 1971 he was awarded the George M. Worrilow Award for Outstanding Service to Agriculture by a University of Delaware graduate.

Perhaps the most telling acknowledgments of Frank Gordy's career are comments and reminiscences made over the years. Bill Henderson, long-time County Agent who probably worked with Gordy longer than anyone else recalled to the author, "Frank was a marvel. He could take the most contentious issues in a meeting and get everyone on the same page by the end of the meeting."

Frank Perdue, a poultry industry icon told Gordy's son Frank, Jr. after Gordy Sr.'s passing in 1987, that his Dad "Would come to a meeting and fix whatever was wrong."

Barbara Gordy Stephens (from Laurel but no relation) began as a part-time office helper not long out of school in 1974, three years after Frank Gordy's retirement. She would stay 42 years, as a Secretary and then Administrative Assistant and Business Administrator to the Substation Director. Ms. Stephens has fond memories of "Mr. Gordy" stopping in the Substation Office to say hello, bring candies or other small considerations and his trips to either mushroom country in southern Pennsylvania or oyster country in Chincoteague to bring those products back to the staff, especially as holidays approached. "Barb" recalls, "Mr. Gordy was a gentleman. He was always congenial, his sincerity always showed through. He had great compassion for people. Although his physical stature may not have fit the image of a leader – he was short, robust and unassuming – he was a leader."

Preston Townsend, another poultry industry icon who with his father Senator John G. Townsend, in the 1940s, founded Townsends, Inc., an important and major poultry company for decades, wrote about Frank Gordy, Sr., "He has personally been responsible for much of the growth and development of the broiler industry on Delmarva."

Perhaps summing up the true reasons for Gordy's success, Townsend continued, "Frank Gordy is a leader who does not try to be a leader; he gets behind worthwhile projects, puts the wheels under them and turns over the operation to qualified industry leaders. He is truly a leader of leaders."

Frank Gordy's leadership style, his commitment to helping people move forward and his integrity stimulated and supported the growth of the Delmarva Broiler Industry. He also set the tone and standards of integrity, service and good nature for generations of future extension workers. Today, everyone at the Carvel Center and those who worked at the Substation, have felt and continue to feel the impact of a great man born in 1906, who came to the University nearly 80 years ago in 1941. All of those who knew him must not be surprised at his continuing legacy.

EDWARD H. RALPH

Edward H. Ralph became the Substation Director upon the retirement of the first Director, J. Frank Gordy in 1971. Ed, born in 1933, grew up on his parent's farm just west of Laurel, Delaware, graduating from Laurel High School as the class salutatorian in 1951. He then attended the University of Delaware, graduating with a degree in Horticulture in 1955 and a master's degree in the same major in 1957.

That year, he was hired into the Substation family as the Research Associate and Crops Specialist, a position he held for 3 years. In 1960, he accepted responsibilities in Cooperative Extension at the Substation as the Associate County Agent, working with his fellow County Agent, Bill Henderson, until 1971. He then took on a split appointment as the Substation Director and the Associate Extension Crop Specialist. Three years later, he relinquished his Cooperative Extension assignment to be named the Executive Secretary of Delmarva Poultry Industry, Inc. (DPI) while maintaining his duties as the Substation Director.

Working with the College of Agricultural Sciences administration in Newark, Ralph led two expansions of the Substation Office. A wing parallel and to the east of 1958 wing was built in 1974 and the two were connected by a front wing in 1980. This increased space was necessary primarily because Extension was expanding. Extension Crop Specialists with state-wide responsibilities were located at the Substation for the first time. New federally mandated programs in Extension created the need for even more space. In addition, DPI needed more office space. Ralph played a key role in developing the financial support for these expansions.

Research faculty and Extension specialists were conducting more crop research and demonstration projects at the Substation. Delaware farmers were beginning to invest heavily in center-pivot irrigation systems. Irrigation at the Substation was necessary to not only reflect what was going on commercially, but also to ensure quality field research by removing the often yield killing variable resulting from the lack of rainfall. Ralph understood this and saw to it that more irrigation capacity and irrigation pipe was available during the 1970s and 1980s.

The Dill Farm, a 40 acre farm just two miles west of the Substation came up for sale in the 1980s, and again, Ralph's vision and persuasive skills led the University to acquire this farm, expanding the Substation's capacity to do more field research.

Ed Ralph retired from the University in 1985 as the Substation Director, but maintained his position as the Executive Secretary for one more year, resigning in December, 1986. In 1990, he became the Assistant to the President of the University, located on the Circle in Georgetown, a position created to help with University development and community relations in Southern Delaware. His last official position came in 1993,

Ed Ralph began work at the Substation as a Crops Research Associate in '57 and was the Director from 1974 to 1985.

when he was appointed as Delaware's Deputy Secretary of Agriculture.

Ralph received many awards in recognition of his career accomplishments, beginning with being named "Aggie of the Year" as he completed his studies at the University's School of Agriculture (later the College of Agriculture) in 1955. He received the George M. Worrilow Award for Outstanding Service to Agriculture by a UD alumnus and the Delmarva's Distinguished Citizen Award from the Delmarva Poultry Industry, Inc. The DPI Medal of Achievement Award was re-named by DPI as the Ed Ralph DPI Medal of Achievement Award.

Ed was a member of the Mount Pleasant United Methodist Church and the Broad Creek Grange. He was active in a wide range of agricultural and community organizations throughout his career. After he permanently retired in 1997, Ed was a leader in the expansion of the Laurel Public Library.

Ed's first wife was the former Lanny Richards. They had one child, their son, Alan. Ed's second marriage was to Peggy Bramble in 1983, who worked at the Substation as a secretary and office manager. Ed and Peggy had wonderful years together traveling and enjoying their grandchildren. Ed Ralph passed away in 2008.

Ed Ralph and his wife **Peggy** at Ed's retirement party in 1985. Peggy began her career as a secretary in 1959 and served as the office manager for many years before her retirement, which occurred soon after her husbands.

GEORGE W. CHALOUPKA

George W. Chaloupka was appointed Director of the Research and Education Center in 1985, following the retirement of Edward H. Ralph. George, a native of Sussex County, grew up on his family's farm near Milton, Delaware. The Chaloupka family story is a great American story. His parents were born in Czechoslovakia and emigrated to New York City sometime before World War I, landing in New York City, where they met.

George's father, mother, brother and sister moved to a farm on Cave Neck Road near Milton and raised strawberries. As George says, "Dad found out he could not make enough money for his family raising strawberries, so they went back to New York City to earn enough money to buy another farm.

Soon the Chaloupka's were back on a new farm on Round Pole Bridge Road, also near Milton. Other Czech families settled in the Cave Neck area of Milton. George was born in 1932. They grew corn, soybeans, tomatoes for the cannery. George remembers taking baskets of tomatoes into the cannery in Milton.

Chaloupka graduated from Milton High School in 1950 and was the first in his family to attend college, going to the University of Delaware. George played football there for a short time, but a buddy told him about lacrosse and George became hooked and played intercollegiate lacrosse at Delaware. George graduated with a degree in poultry production in 1954. Upon graduation, he taught agriculture and general science at the Sanford School near Hockessin. He also managed the Sanford School farm during his two years at the school.

He came back to Sussex County in 1956 to work for the O.A. Newton Company in the firm's poultry operations. This was a homecoming of sorts for George and his bride, the former Barbara Dickerson, who attended Milton High with George and pursued her nursing training at the Wilmington Memorial Hospital while George was at Delaware.

O.A. Newton was a poultry integrator at the time and George worked with Dr. John Hammond, who was a poultry pioneer. Hammond was a nutritionist and general authority on broiler production. George formulated feed rations, kept up on quality control operations for the firm. Warren Newton interviewed George and Barbara for the job at the Hotel DuPont in Wilmington.

George joined the University Substation staff in 1965 as the poultry research associate with the primary responsibilities of coordinating the poultry research program. His work included evaluating litter comparison studies, windowless versus conventional broiler housing, cage rearing of broilers and comparison trials between breeds and strains of broilers.

In 1974, George assumed the Extension Poultry position, which became open with the retirement of Ray Lloyd. George was key in developing educational programs for all sectors of the poultry industry – from growers to company and allied industry personnel. These programs were often offered in conjunction with the Delmarva Poultry Industry and covered poultry health, nutrition, management seminars and flock supervisor and grower programs.

As Director, George helped lead the way for improved poultry diagnostic facilities, the construction of a farrow to finish swine operation at the REC Center, and significant additions to the crop irrigation systems. George noted, "I have always received excellent cooperation from industry. Poultry is so important to Delaware and to all the Delmarva peninsula and that cooperation is key to meeting challenges.

Soon after the 50th anniversary celebration held at the 1991 Field Day at the University of Delaware Research and Education Center, George announced his retirement. He looked forward to spending time with Barbara and their children Carlie and Kevin. George lost Barbara in 2011.

George, still very active at the age of 86, stays involved in several community organizations and still travels to Newark to cheer on the University of Delaware Fightin' Blue Hens football team.

George Chaloupka (left), receiving the State FFA young farmer of the year award as a high school senior in 1950 from **Frank Gordy**.

George Chaloupka was a member of the 1948 Milton High School Basketball Team. Several future farmers and agribusiness men were on the team. (Seated, L to R) player #1, Donald Isaacs; #3, George Chaloupka; #4, Harold Betts; #6, Earl Isaacs; #7, Ralph Marvel. (Standing, L to R) player #1, Elmer Smith; #2, Charles West.

DR. MARK A. ISAACS

Mark Isaacs became the Director of the University's Research and Education Center in 1992, after the retirement of George Chaloupka. Mark grew up on his family's farm, working with his father George, producing grain, poultry, swine and operating a standardbred horse enterprise for racing. The farm, near Cokesbury Church, is only 3 miles from the Center.

Isaacs' ancestors in Sussex County go back to at least 1782 and perhaps back to 1738 when John Isaacs bought 106 acres for 40 pounds. It is unclear if that Isaacs was a forebear of the Isaacs family, but Owen Isaacs, born in 1782 is the first confirmed ancestor of Mark Isaacs. Owen lived and farmed on land northwest of Georgetown that would remain in the hands of one Isaacs or another for over 200 years.

Mark Isaacs, at the age of 12, first encountered Cooperative Extension when his father called the County Agricultural Agent, Derby Walker, to come out and diagnose a soybean problem. Derby diagnosed a herbicide issue and Mark was intrigued. Mark recalls, "I was fascinated with how Derby looked at the field and diagnosed the problem."

By the time Mark reached the 10th grade at Sussex Central High School, he knew he wanted to study agriculture. Isaacs remembers, "I knew I wanted to come back home to the family farm, so I wanted to go outside Delaware to see another part of the country." By his senior year, Mark was excelling in football, and decided to attend Clemson University with the hopes of playing football and studying agronomy. He was also interested in learning about crops unfamiliar to any Sussex County farm boy - peanuts, cotton and tobacco.

Isaacs played in a few games in his freshmen year, an accomplishment at a highly-ranked national power. Sadly, during the spring of that first year, a head injury ended his football career. It was a setback, but Mark focused on his studies in agronomy and graduated in 1984.

During his undergraduate days, he became motivated to consider graduate school for two reasons. First, he was really interested in learning more about weed science, an interest that may have been piqued back when he met Derby in that soybean field when he was 12. He was given the opportunity to work with a well-known and respected Weed Scientist, Dr. Ed Murdock as a graduate research assistant. Mark feels that two-year experience, traveling across South Carolina conducting field research studies on diverse crops along with attending grower meetings, prepared him for a career of service in Research and Extension.

Isaacs freely admits he had fallen in love with a beautiful blonde, Cindy, who was two years younger than him. So, if he stayed for graduate school, he could be near Cindy while earning his master's degree. That is exactly what happened. After both graduated in 1986, Cindy with a bachelor's degree and Mark with his Master's, they married in June. They moved to Delaware where Mark began his career at the University of Delaware.

His first position with University of Delaware was as an Extension Assistant Environmental Quality located at the Research & Education Center. It was a fortunate and exciting opportunity to come back to work in agriculture only 3 miles from his home. Mark recalls with a smile, "That job was really about calibrating manure spreaders." It was the time when efforts were really beginning to mitigate negative impacts of manure applications and storage on water quality of Delaware's surface and ground waters. Applying manures accurately at rates that supported the crops but were not excessive was key to the strategy of improving water quality and crop yields.

That position was created with temporary federal funding and within a year the funds were running out. Fortunately, long time Crops Research Associate at the REC, Ed Wisk, was retiring and the job was a natural fit for Isaacs. His responsibility was working with all the crop research project leaders, both from Newark and at the REC. He coordinated and monitored field projects, linking the project leaders' intentions with the farm manager and staff to help ensure the successful implementation and completion of the field projects.

In 1991, soon after the 50th anniversary celebration of the founding of the Substation, held in August at the annual Farm & Home Field Day at the Research and Education Center, George Chaloupka announced his retirement as Director of the REC. Isaacs served as the interim Director for a few months and then was hired as the fourth Director of the Research & Education Center in 1992.

Dr. John Nye was the current Dean of the College of Agricultural Sciences in 1991. As Isaacs took the job as REC Director, he told the Dean that he needed the latitude and support to go out and get the resources to enhance the Center. Dean Nye did indeed grant Mark that freedom and he was able to get new line items in the state budget for programs and projects at the REC. While there had been two lines devoted to work at the REC, now Isaacs was able to work with Delaware's Legislature to enhance them and create more.

Early in Mark's tenure as Director, Dean Nye had told Isaacs that he was the youngest experiment station director in the country and one of the very few that did not have a terminal doctorate degree. Nye encouraged Mark to pursue a Ph.D. and he and Cindy along with their 3-year old son (Gunnar) packed up and went to Virginia Tech in Blacksburg, Virginia in 1995. While on sabbatical from the University of Delaware, Mark worked on understanding the interactions of the ALS herbicide family when mixed in combination with other herbicides for weed management in field crops. He completed two years of course work in his one-year campus stint and returned to Delaware to do two years of field research work at the REC Center and other locations while working full-time in his role as station Director. During the next few years he commuted back and forth to Virginia Tech on the weekends to conduct laboratory research at the Glade Road laboratory on campus. In 2000, Mark was granted his Ph.D. in Plant Physiology/Weed Science.

Three Directors *(L-R)* **Ed Ralph**, **George Chaloupka** and **Mark Isaacs**.

Dr. Henry Wilson, longtime and legendary Weed Scientist at Virginia Tech's Eastern Shore Research station at Painter, Virginia provided a stipend to help support Mark and his family during that year at Blacksburg. In addition, Mark's parents (George and Eva Lynn Isaacs) and grandmother (Leah Isaacs) provided invaluable support during his pursuit of a Ph.D. Dr. Kriton Hatzios, who oversaw Isaacs' laboratory work was also critical to Mark's success. During the time while Mark was away, Jay Windsor, Sussex County Agent took on extra responsibilities as the interim Director along with great assistance from Mrs. Barbara Stephens, the REC office coordinator. Dr. Isaacs is quick to share the credit for his degree with those individuals and others who helped manage activities at the REC during his year at Blacksburg. In addition, Mark will be forever grateful for the support of his wife and of Dean John Nye during that experience.

The original Substation/old REC office, whose core was built in 1945 with three major additions over the years, was also showing its age. As described earlier in the Carvel section, Isaacs played the key role in working with supportive legislators to provide funding for the magnificent new office and conference building. Construction began in 2004 and in 2006 the Elbert N. and Ann V. Carvel Research & Education Center opened. A unique part of the renovation included an interactive video conference (ITV) facility which allowed for teaching opportunities to students in southern Delaware as well as students on the Newark campus. Mark and Ed Kee began teaching courses to students studying agriculture sciences which added a student teaching mission to the Carvel REC.

Under Dr. Isaac's leadership the Lasher Poultry Diagnostic Laboratory went through a state-funded $4 million dollar renovation. As described in the Carvel section *(pages 63-65)*. This capital investment in the new building and the most modern laboratory equipment available makes the Lasher Lab and the Carvel Center a world-class poultry diagnostic facility.

In recent years, Dr. Isaacs' leadership has manifested itself in an intern program for college students. He has used some funding from the University, but also attracted funding from the Sussex County Council, state agencies and the several private allied agricultural industries to provide summer internships focused on work-based learning opportunities for University of Delaware and Delaware Tech students studying agricultural sciences. Some of these internships are based at the Carvel Center, but many are located throughout the state and even, in the case of private sector internships, in other states. Since 2014, 25 internship experiences have resulted from Dr. Isaacs work. Housing is even provided for those interns working at the Center.

The internship experience has its roots going back to the 1970s. Extension Crop Specialists located at the Center used their grants and gifts from private sector research collaborators to fund summer jobs for Ag College students. They would assist in conducting the field research not only at the Center, but on farms throughout the state where cooperating growers facilitated research in their fields. This tradition of University of Delaware researchers and Extension specialists doing on-farm research work goes back to the early 1900s.

In the 27 years since Isaacs assumed the Directorship in 1992, over $32 million of operating and capital improvement funds have been developed at the Center. It is a $4 million operation in terms of annual expenditures including all salaries and operating costs. That is a long way from $44,000 capital and operating budget of the Substation's first year back in 1942.

Dr. Mark Isaacs' legacy of accomplishment has set the stage for future years of productivity and service from the "team" at the Center. He is quick to say that, "The big reason for the success of obtaining new resources and enhanced facilities is because of the history of great work of the people here and all they do to enhance agriculture and the lives of our Delaware citizens. I was able to convey and market that spirit and tradition of accomplishment and service by so many people who had and currently have exemplary careers while working at this campus."

Mark reflects about the why he was attracted to this type of work, "What I like most about my job is I get to work with an amazing team of extension and research individuals here at Carvel as well as from the main campus, all focused on meeting the needs of not only our farmers and allied industries, but all of our stakeholders. I've always been blessed to have been surrounded by very talented and dedicated people."

THREE COUNTY AGENTS

BILL HENDERSON, JAY WINDSOR, AND DERBY WALKER

Webster's Dictionary defines a county agent as "a consultant employed jointly by federal and state governments to provide information about agriculture and home economics." True enough in its most basic form, but that's like saying Babe Ruth played baseball. The Babe was a baseball player, but there was so much more to how he played the game.

Likewise, there is so much more to being a county agent. First, Webster ignores the 4-H component and secondly there is no mention that these positions are part of the Land Grant University system. County Agents are the front door to the University for people from all walks of life. Three long-tenured County Agricultural Agents, Bill Henderson, Jay Windsor and Derby Walker, each served Sussex County for over 30 years, much of that time concurrently. The depth and breadth of their knowledge, experience and the keenness of their judgment served the farmers and citizens of Sussex County in countless ways.

BILL HENDERSON

William H. "Bill" Henderson was the Sussex County Agricultural Agent for 36 years, from 1942 to 1978. During his tenure, Bill earned the respect of the farmers and all other citizens of the county and state because he cared deeply for people. His empathy for people and their needs, coupled with his passion for bringing knowledge to the people, led to a legendary career. Fondly remembered forty years after his retirement, Bill's career of service and education, along with his contemporary colleague, J. Frank Gordy, still sets the bar of excellence for today's Extension workers.

Born in 1912, the youngest of five children, on a small dairy farm near Lisbon, Maryland, west of Baltimore, Henderson earned his Bachelor of Science Degree in Agriculture Education from the University of Maryland in 1936. He taught vocational agriculture for six years in Caroline County, Maryland at high schools in Denton and Greensboro.

Hired in 1942 as the Assistant County Agent for Sussex County after a legendary dinner interview that has become part of the Delaware Extension lore. Frank Gordy, the County Agent met Henderson for dinner at a restaurant in Denton. Gordy ordered shrimp for both. Henderson had never eaten shrimp in his life and didn't know what to do, so he ate shell and all. Gordy noticed this, of course, but didn't say anything, thinking that's just the way Bill ate shrimp.

It turned out that Henderson was the man they wanted, and he accepted the position, starting in July 1942. Nothing was said about the shrimp until a year into the job, when Henderson, finally becoming acquainted with the proper handling of shrimp at the table, asked Gordy about it.

"Frank, when I ate those shrimp shell and all, went home and told my wife Margaret about it, who told me you're supposed to peel the shrimp first, I thought you would never hire a dummy like me."

Gordy replied, "Well, it seemed to me that you must be so hungry that you really needed the job, so here you are."

With Gordy taking on responsibilities as the Extension Poultryman, Henderson was elevated to County Agent just one year later in 1943. He was active in planning the first Delmarva Poultry Festival in 1948 in Georgetown, an event connected to the Chicken of Tomorrow Contest held at the Substation that year. Bill Henderson saw great opportunities to help farmers work as groups to achieve progress. He was instrumental in the formation of poultry, swine and dairy groups and as well as several crop-oriented organizations, such as the Delaware Crop Improvement Association.

Perhaps his most lasting contributions were his role as a constant "guiding hand" and "right arm" of the Sussex County Agricultural Soil Conservation Service and the Soil Conservation District (today known as the Farm Service Agency and the Natural Resource Conservation Agency, respectively). These two agencies of the U.S. Department of Agriculture function at the county level with direction from farmer and landowner committee members. By law, the County Agricultural Agent serves on these committees, often as the secretary.

Henderson saw these opportunities to bring many positives benefits to farmers through the agricultural programs of the federal government. Farm income support, improved soil drainage, other conservation measures were just a few of the programs that improved farms and farmer's livelihood. Bill was justifiably proud of his role and impact through these organizations.

Henderson was also great at bringing University specialists out on the farms. In the early 1950s, a time when over 800 dairy farms operated in Sussex County, he cooperated with the two agronomists from the University in Newark, Claude Phillips and Bill Mitchell, on the Greener Pastures program. The goal was to improve milk production by improving the feed capacity of pastures. This successful state-wide program would be imitated 25 years later with the Delaware Irrigation Program.

Again, Henderson was part of a team with Mitchell, Extension Agricultural Engineer Tom Williams and his fellow county agents in the other counties that worked with farmers to document better irrigation practices and share those practices among the farmers.

For years, Henderson hosted a thrice-weekly 15-minute radio talk show on a Sussex County station. Opening each show with a cheery, "Hello farm and home friends!", Bill used the opportunity to disseminate information, announce agricultural meetings, and provide the latest ideas for farmers to get the most out of their land and machinery.

Henderson used meetings, both formal educational meetings, but also small, local meetings with a few farmers in a farm shop or at the local diner to spread ideas. He was always mailing out newsletters and of course, responding to calls from his farm clients.

Bill Henderson receiving the Delmarva Poultry Industry Medal of Achievement in 1971. Bill served as County Agent for 35 years, from 1943 to 1978.

During the later part of his career, he observed, "It's easy to spread the information because it's hard to keep a good thing secret. The difficult part comes when you try to get the farmers to actually use the idea."

Those who knew Bill will recall that he was the slowest driver in the State of Delaware, rarely exceeding 40 miles/hour on even the most modern highways. He was also a frugal man and a great record keeper. He knew every cent he ever spent on his automobiles and his expenditures in general. This created much good-natured kidding from his friends and colleagues.

A recipient of many awards from local and national organizations, Henderson always shared the credit with his loving and supportive wife, Margaret. She taught math in the Georgetown High School upon their arrival in 1942 and by 1970, their son was a biology teacher in the same school. Community minded, Henderson was a leader in his Kiwanis Club, his church and the United Fund.

Often referred to with tongue in cheek as "Mr. Henderson," he naturally preferred Bill. He remains widely remembered as he was widely known during his lifetime for his unfailing good humor and enthusiasm and for having so many friends around the county and state. When an Extension program or meeting was suggested, Bill jumped on board immediately with great fervor and passion.

At his retirement dinner at the Georgetown High School in 1978, 450 people attended to salute Bill and Margaret, as well as listen to Bill's co-workers and friends share their memories of Bill's unique collaborative style and accomplishments. Bill continued on the Conservation District for many years of his "retirement". Margaret predeceased him in 1992 and Bill passed in August, 2006, at the age of 96.

JAY WINDSOR

Jay Windsor was the Assistant County Agent from 1971 to 1973, working with Bill Henderson who had started as a County Agent back in 1943. Jay left in 1973 left to start his greenhouse and florist business in Laurel and Lewes. He, his wife Janet, daughter and son-in-law made it work. When one of the two County Agricultural Agents unexpectedly resigned in 1984, Jay came on to help on a part-time basis. He liked it so much and did such a great job, he was hired full-time in 1986 and would stay until he retired in 2003.

Jay Windsor began his UD career as the Farm Manager of the Substation and served as County Agent in the 1970s, left to begin his family's greenhouse business, then returned in 1984 and retired in 2003.

Windsor grew up in Laurel and graduated from Laurel High School in 1956. He went off to Kansas State University in Manhattan, Kansas for his freshmen year. Jay admits, "I had a mediocre record at Kansas State and some credits didn't transfer. Sharing this with Frank Gordy, Gordy suggested he go up and talk to Dean George Worrilow. When Jay met Worrilow in Newark, he was asked why he wanted to get in agriculture. Jay said he didn't know, just wanted to go to College. Worrilow responded, "Well, I think you'll fit in here."

Jay transferred to the University of Delaware before his sophomore year, majoring in Agricultural Business Management, graduating in 1961. During his undergraduate years, Jay worked for Ed Ralph at the Substation, helping with the general farm work. Before his senior year, he worked for Dr. Bill Crittendon on a purple soybean project at the Substation. Jay says, "I hoed, hoed some more, and then hoed some more. I was in school when they harvested the beans, but I worked on the data from the project while I was up in Newark."

Upon graduation, Jay worked for Libby, McNeil, Libby as a field man overseeing the farmers who contracted vegetables with the company. He worked in Wisconsin, Washington State and ultimately from the Libby plant in Houston, Delaware.

One day, soon after it became known that Libby's would close its Houston plant, Jay was pulled off the road near Greenwood by Ed Ralph. Ralph at the time, 1969, was a Sussex County Agent. They needed a farm manager at the Substation. Frank Gordy, the Substation Director hired Windsor, who would hold that position until he was hired as the Assistant County Agent in 1971.

Windsor recalls, "The plot work in the field was different back then. There was a lot of variety testing, not just trials, but breeding programs to evaluate new varieties. There wasn't as much chemical or herbicide trials. It was a seven-day-a-week job, especially with the team that took care of the poultry."

Looking back on his years as the Farm Manager and his first stint as a county agent, he has fond memories of the people, including the specialists from Newark.

"Bob Stevens (Extension Horticulturist) was at the top of the list. The Pathologists and Entomologists, Bob Carroll and Frank Boys came down once a week to visit farms and the plots at the Substation. Bill Mitchell (Extension Agronomist) was great to work with."

When Jay came back in 1984, he was hired to serve the commercial horticulture and home horticulture audiences. However, like all County Agents, he covered the waterfront. By this time, partnering with his county agent colleague, Derby Walker, Jay supported Derby by taking calls and questions from all types of farmers.

Jay started a Men's Garden club in Sussex County, about 15 men met monthly to discuss gardening. Soon, the Master Gardener program started in Delaware, coordinated by Dr. Sue Barton, the Extension Ornamental Crops Specialist. Jay was instrumental in starting Master Gardener program in Sussex County. Jay also was a founding member of the Delaware Nurseryman's Association, which he helped establish when he was in the private sector and supported it over the years as an Extension Agent.

Jay, summarizing what he liked about Extension, "I like helping people answer questions. I got to work with so many good people, professors from Newark and the team down here. It's been fantastic what Extension and the people at the "Substation" do to help anybody who asks for help. I tell ya, I never dreaded coming to work."

DERBY WALKER

Derby Walker is descendent from a long line of farmers from the Woodside area in Kent County, the Derby family and the Walker family. S. H. Derby, came down to Delaware from New York in 1878 and purchased his first farm, near Woodside. Derby would become a leader, serving as Master of the Delaware State Grange and on the University of Delaware Board of Trustees. Derby was also active in the Peninsula Horticultural Society, serving as president. He gave presentations legumes, apples, peach yellows, cold storage and tree culture. Mr. Derby worked together with the University's Dean of Agriculture, Harry Hayward, in support of what would become the University Farm on the campus in Newark.

S.H. Derby's daughter Roxie married Arthur Walker. They were Derby Walker's grandparents. Walker came to Delaware as one of Dean Hayward's former students in New York. Their son Samuel Walker, an outstanding fruit and vegetable producer was our Derby's father.

Derby Walker graduated from Caesar Rodney High School in1964, then matriculated to the University, majoring in Horticulture. The Horticulture Department merged with Agronomy and Plant Pathology into the Plant Science Department while Walker was a student. Derby, coming from a fruit production background, took a lot of entomology courses as well. He graduated in 1968 and earned a Master's Degree in 1970, working on weed control strategies in fruit with Dr. Vernon Fisher, the pomology professor and Extension Fruit Crop Specialist. While at the University, he met Janet Lloyd, the daughter of Extension Poultryman at the Substation, Ray Lloyd. They would marry and have two children.

Walker's first job was doing field research for Campbell Soup on their research farms. He then took an Extension position in Adams County, Pennsylvania. His appointment there was 50% 4-H and 50% agriculture. By 1973, it was known that Jay Windsor would be leaving the Sussex County Assistant Agent position. Assistant Extension Director Willard MacAllister and Extension Livestock Specialist Dick Fowler were in Pennsylvania on other business and visited with Derby to talk about coming to Sussex County as the Assistant County Agent.

Derby accepted, a move that brought Janet closer to her parents, who lived in Georgetown. Derby began his Delaware career in December, 1973. His first county agent colleague was Bill Henderson, who had started his career in 1943.

It was also a move that brought a man totally dedicated to serving his county's farmers to the Extension team. In a few years, Derby was promoted to County Agent. He quickly became involved in the Peninsula Horticulture Society, serving as Secretary of the organization his great-grandfather, grandfather and father had served. He did some field research work in pickling cucumbers in cooperation with Vlasic Foods, which had just recently opened a major plant in Millsboro.

Derby Walker served as Sussex County Agricultural Agent from 1973 to 2005. Walker was a master of serving farmers, especially on a one-on-one basis.

Derby's forte was working one-on-one with farmers. Whether talking on the phone, or with a grower stopping by the office, or more likely, out in a grower's field, Derby helped them address a problem or try a better way of doing things.

Derby recalls, "There were no cell phones for my first twenty years. People called the office to ask a question or to ask me to come out to their farm. Once corn started coming up in May, and soybeans in June, it was very busy responding to crop problems. Often it was urgent and time was short to make the proper treatments. Vegetables, especially watermelons also led to a lot of field visits."

It was Derby's willingness to listen, visit and respond with good answers and approaches that earned him the respect of growers and reflected very well on all of Extension and the University. He was trusted, a trust that allowed some farm families that were thinking of getting out of the business to use Derby as a sounding board and as a source of quiet, discreet advice.

Looking back, Derby says, "The best part of the job was working with the farmers. Giving them the information to help make a decision that was good for them." He also developed positive relationships with the local agribusinesses, the people who provided the farmers the tools they needed. Derby's recommendations helped them serve the farmers the best.

In the days before cell phones, texting and emails, Derby remembers the pink "While You Were Out" message slips that would accumulate in the office when he was out visiting farmers during the critical busy season. He'd return the calls as soon as possible because he knew the farmers needed his expertise and was proud and glad to share it.

Derby retired in 2005, but has continued his connection with agriculture and future generations as an instructor at the Georgetown campus of the Delaware Technical and Community College. That's good for him and even better for his students.

FINAL *Thoughts*

The story of the University of Delaware's commitment to agriculture and the people of Southern Delaware is reflected by the sequence of names for the Center. In 1941, the Agricultural Substation was established on 311 acres. By 1985, the expansion of programs in agriculture, 4-H, family & consumer science and community development led to a more inclusive name, the Research and Education Center. In 2006, with the building of the new office to honor the memory of a former governor with strong agricultural ties, the place is now named the Elbert N. and Ann V. Carvel Research and Education Center.

The Carvel Center is really a continuum of people dedicated to education, research and service for the people of Delaware and beyond. This tradition begins with Cooperative Extension's founding in Sussex County in 1918, well-before the purchase of the Tyndall farm for the Substation in 1941. People like Molloy Vaughn, Byard Carmean, Ann B. Moore and Hoke Palmer laid the foundation. Some of these folks were natives of Sussex County and Delaware, some were not. This mix of people from within and without the county and state would continue and add much to the tradition and expertise at the Center.

This continuum of excellence goes forward with a tradition of great county agricultural agents, educators and specialists who have not only delivered the information but have often had to develop and refine new knowledge through applied field research in crops and poultry. Henderson, Lloyd, Windsor, Walker, Wootten and Whaley are part of that progression of county agricultural agents. Specialists like Seeger, D'Armi, Malone, Webb, Kee, and VanGessel supported the Agents, often by understanding the needs of the farmer as identified by the Agents. The Specialists took that input and ran the applied studies to adapt new practices to the best advantage for Delaware farmers.

The original 4-H County Agents and Home Demonstration Agents are now identified as 4-H & Youth Educators and Family & Consumer Science Educators. The change in title reflects new needs of broader audiences. Gwinn, Baker, Palmer, and Argo on the 4-H side and Miller, Shofner and Wilcoxon on the Family & Consumer Science side are a part of the Extension and Carvel Center historical continuum.

The lineage of leadership of Directors since 1956 is a huge part of the success of the institution. First, Frank Gordy set the bar of excellence. It was continued by Ed Ralph, George Chaloupka and Mark Isaacs. All assumed the position of Director only after spending significant years as a county agent or specialist. In many cases, both. This grounding of being close to the people and understanding their needs propagated the spirit of service through the years.

The first farm manager, Jack Turner, was crucial to the setting the stage for productive, insightful and useful field research. Turner arrived in 1942 and his contribution to not only to completing the daily work but developing a systematic approach to handling a wide array of crop and poultry research has held fast to this day.

It is crucial to understand and acknowledge that traditions of the Center are not restricted to those who were posted there. Over the years, University of Delaware supported the mission of the Center. That support led to literally hundreds of faculty, specialists and others from the Newark campus to come to Sussex County to conduct research, support the poultry diagnostic programs, and participate in Extension educational meetings.

This commitment to the people of Delaware is key to the success of the Center's 80 years of operation as the University of Delaware's flagship facility in Southern Delaware. This spirit of service and good will provides the spark that ignites the power of the Land Grant Mission of Teaching, Research and Extension at the University of Delaware's College of Agriculture and Natural Resources Elbert N. and Ann V. Carvel Research & Education Center.

This power goes back further than the enabling legislative acts that are now over 100 years old. At the Carvel Center, this power goes back much further. Everett Warrington was born in 1888, his mother in 1853; he left his farm to the University. Mark Isaacs' family has farming roots in Sussex that go back to at least 1782. Frank Gordy, who set the stage in so many ways, was born in 1906. Bill Henderson, the legendary county agent was born in 1912.

Today, professionals born in the 1990s work at the Carvel Center. Summer interns born in the new millennium, the 2000s, are helping with the mission while they learn through their work. It is not too far of a reach to say that the seeds of the Center's mission were formed as local farmers and families looked for better ways of doing things going back to the 1700s. The eighty-year tradition of service and education is a proud heritage for the next generations to continue and improve.

University Poultry Researchers sharing the results of their work at an early Open House at the new Agricultural Research Substation.

2019 Carvel Center Staff

POULTRY FARM STAFF
Tom Warren and Stephen Collier

SUSSEX EFNEP STAFF (L-R)
Wanda Taylor and Mary Edwards

STATE EXTENSION SPECIALISTS, SCIENTISTS AND AGENTS (L-R)
Mark VanGessel, David Owens, Emmalea Ernest, Gordon Johnson Alyssa Koehler, James Adkins, Jarrod Miller, Georgie Cartanza

CARVEL ADMINISTRATIVE TEAM
(Seated L-R)
Tammy Schirmer, Sharon Webb, Michele Walfred

(Standing)
Karen Adams, Marvin Duffy, Lisa Collins, Mark Isaacs, Sara Eastwick, Kim Lewis, Cathy VanSciver

COUNTY EXTENSION AGENTS
(Seated L-R) Lindsay Hughes, Nancy Mears, Jill Jackson

(Standing L-R)
Ernie Lopez, Kaleb Scott, Cory Whaley, Tracy Wootten

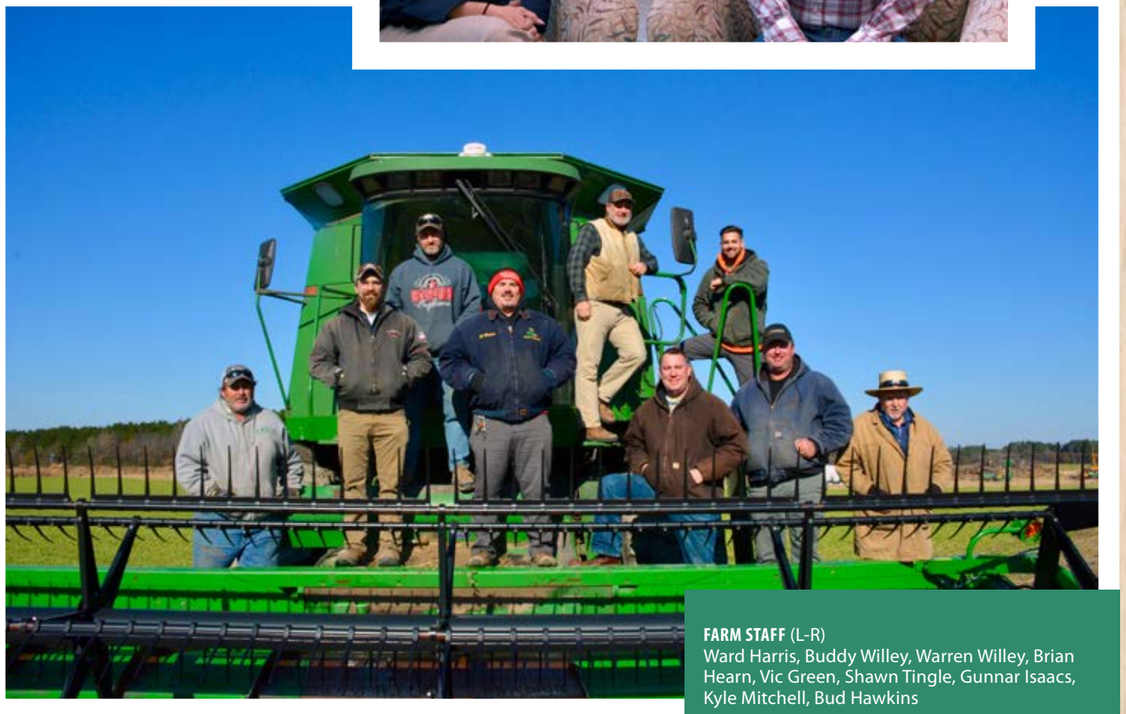
2019 Carvel Center Staff

LASHER LAB STAFF (Front L-R)
Kathy Phillips, Kim Allen, Luanne Sullivan, Billie Jean Wright (Back row), Colby Smith, Dan Bautista, Lisa Collins

FACILITY STAFF (L-R)
Bo Waller,
Mary Anne Wheatley,
Bill Lewis

WEED SCIENCE TEAM
(Seated L-R)
Barbara Scott, Kurt Vollmer

(Standing)
Quintin Johnson,
Claudio Rubione



FARM STAFF (L-R)
Ward Harris, Buddy Willey, Warren Willey, Brian Hearn, Vic Green, Shawn Tingle, Gunnar Isaacs, Kyle Mitchell, Bud Hawkins

APPENDIX I CROP AND POULTRY PROJECTS WITH PROJECT LEADERS ON SELECTED FIELD DAYS - 1945, 1961, 1975, 2004

1945

FIRST FIELD DAY - AUGUST 15

Horticulture and Agronomy Field Day
(Assembled at the Grove 2pm)

RESEARCH WORK IN PROGRESS

Vegetables

Cantaloupe variety testing (11 varieties)
Watermelon variety testing (16)
Sweet potato variety testing (6 wilt resistant varieties)
Early tomato variety testing (6 varieties)
Glass plant protector study with watermelons and cantaloupes
Methods of apply tomato fertilizer
Plowing vs. discing
Utilization of poultry manure in the production of tomatoes cantaloupes and watermelons
Dept of seeding cantaloupes
Fall production of cauliflower, broccoli and cabbage

Tree Fruits

Apple variety testing (56 varieties)
Peach variety testing (32 varieties)
Soil management studies with apples
Soil management studies with peaches

Small Fruits

Utilization of chicken manure in the production of strawberries
Strawberry variety testing
Blueberry variety testing

Field Crops

Hybrid corn varieties (25 varieties)
Yellow soybean varieties (30 varieties)
Trials of milo, kaffir and sweet sudan grass
Results of winter oats and barley trials

Commercial growers, seedsmen, canners, men in colleges and experiment stations and others interested are invited. Station staff members will be present to explain the research in progress and to report results.
– George Schuster

1961

FARM FIELD DAY - AUGUST 2

EXPERIMENTS

Apples

Apple Nutrition ..... V. J. Fisher
Oil-fungicide Compatibility & New Insecticides for Apple Pests .. V. J. Fisher
Apple Varieties (28 Varieties) ..... V. J. Fisher
Color Sports of Apples ..... V. J. Fisher

Asparagus

Direct-seeded Asparagus ..... D. J. Fieldhouse, E. P. Brasher
Asparagus Nutrition, Spacing & Nutrition ..... E. P. Brasher, D. J. Fieldhouse
Asparagus Beetle Control ..... W. A. Connell

Beets

Deepest Red Beet ..... E. P. Brasher
Blackberry
Variety Trial ..... V. J. Fisher

Cantaloupe

Cantaloupe Marketing Trials ..... R. S. Boyce, R. F. Stevens, W. T. McAllister, E. H. Ralph
Increasing the Sweetness of Cantaloupe with Saccharin ..... E. P. Brasher, R. S Boyce
Cantaloupe Mulches ..... R. S. Boyce, D. J. Fieldhouse
Cantaloupe Variety Trials ..... E. P. Brasher
Weed Control in Cantaloupes ..... C. F. Culver, E. M. Rahn
Cantaloupe Breeding Stocks ..... E. P. Brasher

Corn

Field Corn Investigations ..... D. L. Mathews, R. H. Cole
Corn Demonstration ..... W. H. Henderson, E. H. Ralph, W. H. Mitchell

Cucumber

Weed Control in Cucumbers ..... C. F. Culver, E. M. Rahn
Cucumber Variety Trial for Resistance to scab and downy mildew ..... D. F. Crossan, E. M. Rahn

Legumes and Grasses

Control of Pathogens Causing Diseases of Legumes and Grasses ..... H. W. Crittendon

Lima Beans

Lima Bean Variety Trial ..... E. M. Rahn

Nutgrass

Eradication of Nutgrass ..... E. M. Rahn, C. R. Hamilton

Ornamentals

Nutrition of Woody Ornamentals ..... C. W. Dunham

Peach

Peach Variety Trial (64 Varieties) ..... V. J. Fisher

Peppers

Harvesting Green vs. Red Peppers ..... E. P. Brasher, N. F. Warrington
Time of Harvesting Red Peppers ..... E. P. Brasher, N. F. Warrington
Time of Direct-seeding Peppers ..... E. P. Brasher, N. F. Warrington
Time of Transplanting Peppers ..... E. P. Brasher, N. F. Warrington
Weed Control in Direct-seeded Tomatoes and Peppers ..... R. B. Seely, E. M. Rahn
Defloration of Peppers ..... N. F. Warrington, E. M. Rahn
Pepper Drought Resistance ..... D. J. Fieldhouse, C. F. Culver
Pepper Spacing and Irrigation ..... D. J. Fieldhouse, N. Warrington
Control of Pepper Bacterial Spot by Fertility and Foliar Sprays ..... D. J. Fieldhouse, D. F. Crossan
Weed Control in Peppers ..... R. B. Seely, E. M. Rahn
Pepper Variety Trials ..... E. P. Brasher, N. F. Warrington

Potato

Cost and Returns of Potato Pest Control ..... R. S. Boyce, R. F. Stevens, E. H. Ralph
Size and Shape of Potato Seed pieces ..... E. P. Brasher
Potato Hormone Studies ..... E. P. Brasher, Henry Kuratle
Potato Variety Trials ..... E. P. Brasher
Insecticides for Potato Control ..... D. F. Bray

Poultry

Drug Screening ..... L. M. Greene, J. A. Ellegood
A Study of Feed Additives in Broiler Feeds ..... Frank D'Armi
Chopped Pine Bark as a Litter Material for Broilers ..... Frank D'Armi
Poultry Diagnostic Laboratory ..... L. M. Greene, J. A. Ellegood
Control of Chronic Respiratory Diseases ..... M. S. Cover, W. C. Krauss, W. J. Benton
Influence of Sanitation and Antibiotics on Poultry Health ..... M. S. Cover, W. C. Krauss, W. J. Benton
A Comparison of 5 Litter Materials both as New and Used Litter ..... Frank D'Armi
The Effectiveness of Feed Removal in Reducing Summer Heat Losses in Broilers ..... P. H. Sammelwitz

Seaweed

Norweign Seaweed (Kelp) Study ..... R. S. Boyce, E. M. Rahn

Snap Beans

Snap Bean Variety Trial ..... E. M. Rahn
Irrigation and Nitrogen on Snap Beans ..... D. J. Fieldhouse, C. F. Culver

Sorghum

Variety Trial ..... W. H. Mitchell, R. H. Cole

Soybeans

Planter Applications of Lime and Fertilizer for Soybeans ..... R. S. Boyce, E. H. Ralph
Soybean Observations ..... R. S. Boyce, E. H. Ralph
Breeding and Development of Soybeans Resistant to Plant Pathogens ..... H. W. Crittendon
Soybean Chemical Weed Control ..... R. H. Cole, C. D. Kesler
Soybean Variety Testing ..... R. H. Cole, H. W. Crittendon, C. D. Kesler
Soybean Fertilization ..... R. H. Cole, C. E. Phillips, C. D. Kesler
Lime and Fertilizer on Soybeans ..... R. S. Boyce, E. H. Ralph
Spider Mites on Soybeans ..... W. A. Connell

Strawberries

Strawberry Varieties and Planting Systems Study ..... V. J. Fisher
Strawberry Varieties and Phosphate Side-dressing Study ..... V. J. Fisher
Strawberry Variety Demonstration ..... R. S. Boyce, R. F. Stevens E. H. Ralph

Strip Tillage

Evaluation of Strip Tillage Process Method of Minimum Tillage ..... E. N. Scarborough, L. J. Cotnoir

Squash

Weed Control in Squash ..... C. F. Culver, E. M. Rahn

Tomato

Tomato Breeding Stocks (42 Breeding lines) ..... E. P. Brasher
Direct-seeding vs. Transplanting of Tomatoes ..... E. P. Brasher
Time of Harvesting Tomatoes ..... E. P. Brasher
Tomato Variety Trials ..... E. P. Brasher
Weed Control in Direct-seeded Tomatoes and Peppers ..... R. B. Seely, E. M. Rahn
Weed Control in Tomatoes ..... R. B. Seely, E. M. Rahn

Watermelons

Watermelon Demonstration with Mulches, Hot Caps ..... R. S. Boyce, R. F. Stevens
Weed Control in Watermelons ..... C. F. Culver, E. M. Rahn

Other activities:

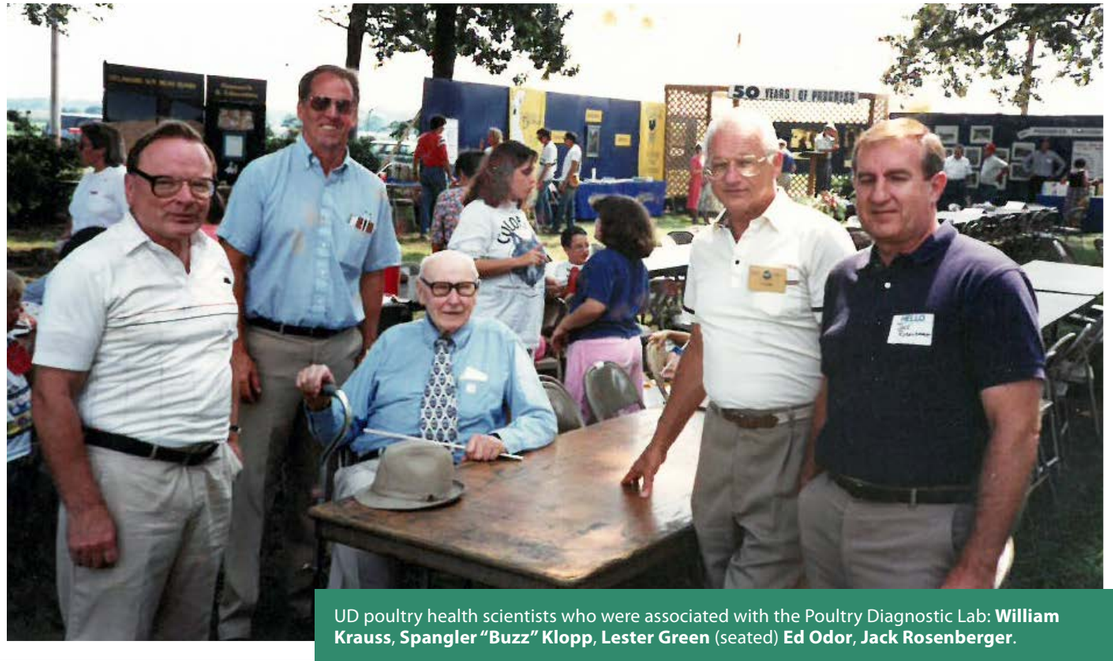
- Centennial Farm Machinery
- First Aid
- Home Freezing
- Civil Defense
- Centennial Pageant
- Chicken Product Showcase
- Quality Broiler Production

GREAT MOMENTS FROM THE PAST

Sussex County 4-H Banquet, 1940.

UD retirees from Newark and Georgetown celebrating the 50th Anniversary of The Research & Education Center.

Early Field Day tour of the Poultry House.



UD poultry health scientists who were associated with the Poultry Diagnostic Lab: **William Krauss**, **Spangler "Buzz" Klopp**, **Lester Green** (seated) **Ed Odor**, **Jack Rosenberger**.

1975

Plant and Soil Investigations

Field Trials of Resistant Soybean Varieties ..... R. W. Rust, H. W. Crittendon
Outdoor Cut Flower Production ..... P.P. Burbutis, C. W. Dunham, P. A. Cimino
Trials of Perennials for Summer Cut Flowers .....C. W. Dunham, D. Walker
Field-Grown and Container-Grown Hino Crimson Azaleas ..... C. W. Dunham, D. Walker
Soybean Disease Monitoring Program ..... R. B. Carroll, E. L. Wisk
Control of Pests Associated with Subsurface Irrigation Lines..... W. H. Mitchell, R. Uniatowski
Air Pollution Control in Watermelon and Cantaloupes .....D. J. Fieldhouse
Subsurface Irrigation and Soil Modification for Corn .....W. H. Mitchell, M. R. Teel
Production on Sassafras Sandy Loam..... R. Uniatowski
Air Pollution Control in White Potatoes ..... D. J. Fieldhouse
Micro-nutrient Fertilization of Corn..... L. J. Cotnoir
Grain Production Systems (No-Till vs. Primary Tillage)..... T. H. Williams
Tomato Variety Trial .....M. D. Orzolek, E. L. Wisk, R. B. Carroll
Treatment of Pepper Seed to Increase Germination..... M. D. Orzolek
Direct Seeding Study of Processing Peppers ..... M. D. Orzolek, E. L. Wisk
Pepper Variety Trial ..... M. D. Orzolek, E. L. Wisk R. B. Carroll
Watermelon Variety Trial ..... M. D. Orzolek, E. L. Wisk R. B. Carroll
Muskmelon Variety Trial ..... M. D. Orzolek, E. L. Wisk R. B. Carroll
Influence of Moisture Stress on Carrot Production ..... M. D. Orzolek, E. L. Wisk, R. B. Carroll
Plant Population Study of Peppers..... M. D. Orzolek, E. L. Wisk
Direct Seeding Study of Processing Tomatoes ..... M. D. Orzolek, E. L. Wisk
Cover Crops for No-Till Corn Production..... W. H. Mitchell, R. Uniatowski
No-Tillage Planter Accessory Evaluation.....T. H. Williams, N. E. Collins
Growth and Yield of Corn As Affected by Poultry Manure On Coastal Plain Soils.....W. C. Liebhardt, A. H. Warner
Soybean Tillage Systems..... T. H. Williams
Weed Control in Field Corn with Preemergence Herbicides..... W. H. Mitchell, R. Uniatowski
Weed Control in Field Corn with PrePlant Incorporated Herbicides..... W. H. Mitchell, R. Uniatowski
Preemergence Weed Control in Soybeans..... W. H. Mitchell, R. Uniatowski
Preplant Incorporated Weed Control in Soybeans.....W. H. Mitchell, R. Uniatowski
Cover Crops and Herbicide Combinations for No-Tillage Corn ..... W. H. Mitchell, R. Uniatowski
Optimum Corn Production System (Tillage/Nitrogen Fertilization) ..... T. H. Williams
Field Test of Selected Herbicides for Weed Control in Soybeans..... W. H. Mitchell, R. Uniatowski
Preplant Incorporated Weed Control in Soybeans.....W. H. Mitchell, R. Uniatowski
Preplant Weed Control in Soybeans on Soil with Variable Organic Matter ..... W. H. Mitchell, R. Uniatowski
Biological Control of European Corn Borer..... G. W. Angalet (USDA Beneficial Insect Lab, Newark)
No-Till Corn Herbicides.....F. J. Webb
Nutsedge Control in No-Till Corn.....L. R. Hawf, B. J. Farwell, J. Hsu
Delayed Incorporation of Sutan and Formulations for Weed..... W. H. Mitchell, R. Uniatowski

Control in Field Corn

Weed Control in Soybeans with Post Emergent Herbicides ..... B. Hughes, W. H. Mitchell, R. Uniatowski
Weed Control in Field Corn with PrePlant Incorporated Herbicides..... W. H. Mitchell, R. Uniatowski
Weed Control in Field Corn with Preemergence Herbicides..... W. H. Mitchell, R. Uniatowski
Evaluation of Soil Systemic Insecticides and Nematodes for Soybeans..... F. J. Webb, F. Boys, R. B. Carroll
Yield Response in Soybeans with Different Seed Inoculation Materials ..... L. V. Svec, F. J. Webb
Effect of Potassium and Calcium on the Severity of the Gray Moldy..... H. W. Crittendon, L. V. Svec

Seed Disease of Soybeans

Development of Soybean Varieties with Multiple Resistance..... H. W. Crittendon
Development of Soybeans with High Protein Content in Seeds..... H. W. Crittendon
Early Generation Testing of Soybeans .....H. W. Crittendon
Development of Soybeans Resistant to Fungi Causing Disease of Pods and Seeds .....H. W. Crittendon
Breeding and Development of Disease Resistant Vegetable Soybeans .....H. W. Crittendon
Soil Modification with Poultry Manure and Solid Waste.....W. H. Mitchell, R. Uniatowski
Soybean Yield and Disease Incidence with Potassium Fertilization..... L. V. Svec, A. K. Andrews, H. W. Crittendon
Improvement of Drought Tolerance in Field Corn ..... S. L. Sullivan
Nitrogen Sources and Tillage Systems for Field Corn Production..... W. H. Mitchell, R. Uniatowski
Competition of Corn and Nutsedge .....L. R. Hawf, B. J. Farwell, J. Hsu
Effects of Canopy Control on the Growth and Fruiting of Holly .....D. Frey
Fungicides for Belly Rot Control on Pickles .....R. B. Carroll, D. Walker, M. D. Orzolek
Evaluation of Herbicides on Lima Beans – Preemergence.....L. R. Hawf, J. Hsu, B. J. Farwell
Evaluation of Herbicides on Lima Beans – PPI .....L. R. Hawf, J. Hsu, B. J. Farwell
Evaluation of Experimental Herbicides on Corn – PPI ..... L. R. Hawf, J. Hsu, B. J. Farwell
Evaluation of Experimental Herbicides on Corn – Preemergence ..... L. R. Hawf, B. J. Farwell, J. Hsu
Evaluation of Experimental Herbicides on Soybeans – PPI..... L. R. Hawf, B. J. Farwell, J. Hsu
Evaluation of Experimental Herbicides on Soybeans – Preemergence..... L. R. Hawf, B. J. Farwell, J. Hsu
Residual Effects of Poultry Manure Applications on Corn Yields..... L. J. Cotnoir
Corn Borer Control in No-Till Corn ..... L. P. Kelsey
Effect of Poultry Manure on Water Quality ...W. C. Liebhardt, A. H. Warner
Short Season Corn Hybrids for No-Till After Small Grains ..... W. C. Liebhardt, A. H. Warner
Regional Soybean Variety Tests.....E. L. Wisk
Mineral Balance as Influenced by Lime and Potash Applications ..... W. C. Liebhardt, L. V. Svec, M. R. Teel
Corn Yield as Affected by Lime Type, Lime Rate and Boron ..... M. R. Teel, W. C. Liebhardt, L. V. Svec
Soybean Varieties and Spacing.....E. L. Wisk
Soybean Variety Productivity: Photosynthetic Capacity, Metabolic Activity and Yield.....L. V. Svec, E. L. Wisk
Soybean Varieties and Spacing (Double Crop).....E. L. Wisk
Sunflower Variety Test ..... W. H. Mitchell, B. Hughes
Lima Bean Variety Test .....V. J. Fisher, E. L. Wisk
Corn Hybrids Irrigation Test..... W. H. Mitchell, R. Uniatowski
Preemergence Weed Control in Soybeans..... W. H. Mitchell, R. Uniatowski
Effect of Fungicides on Performance of Selected Soybean Varieties.... R. B. Carroll, E. L. Wisk, H. W. Crittendon
Trap Crop for Mexican Bean Beetle in Soybeans ..... R. W. Rust
No-Till Production of Potatoes and Tomatoes (USDA Project) ..... D. L. Mitchell, O.L. Bennett
Small Grain Variety Trials.....F. J. Webb
Herbicide Test for Small Grains .....F. J. Webb
Seed Treatments for Small Grains..... R. B. Carroll, F. J. Webb
Nitrogen Rates for Small Grains .....F. J. Webb
Effect of Fungicide Sprays on Small Grain Disease Control ..... R. B. Carroll, F. J. Webb
No-Till Demonstration..... F. J. Webb, T. H. Williams, James H. Baxter, Jr.

2004

LAST FIELD DAY

The last UD Farm and Home Field Day was held on August 11, 2004.

FARM & HOME FIELD DAY

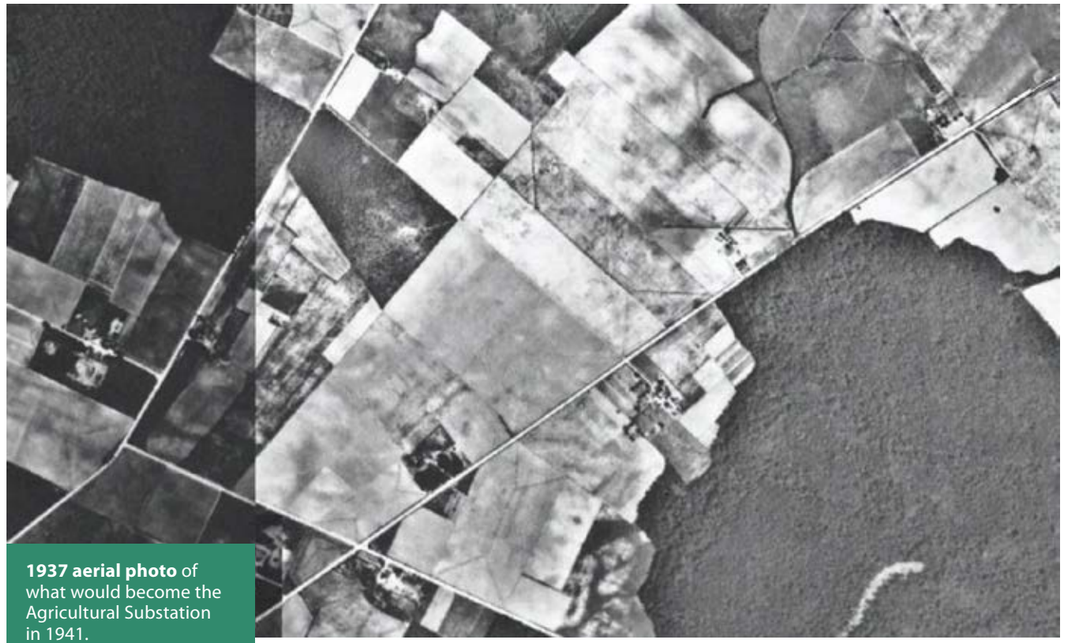
Agronomic and Vegetable Field Tours

- Irrigation and Nitrogen Management for Seedless Watermelons
  - Ian McCann, Extension Irrigation Specialist
  - James Adkins, Extension Associate, BioResources Engineering
  - Tracy Wootten, Horticulture Agent, Sussex County
  - Ed Kee, Extension Vegetable Specialist
- Round Up Ready and Traditional Soybean Blends – Reducing Production Costs
  - Richard Taylor, Extension Agronomist, University of Delaware
  - Robert Kratochvil, Extension Agronomist, University of Maryland
  - Maria Labreveux, Agronomist, Delaware State University
  - Bob Uniatowski, Associate Scientist, University of Delaware
- Chestnuts: Alternative Tree Crop for Delaware
  - Gordon Johnson, Extension Agent, Kent County, University of Delaware
- Agritourism and Entertainment Farming Opportunities for Delaware
  - Gordono Johnson, Extension Agent, Kent County, University of Delaware
- Corn Breeding and Commercial Corn Hybrid Trials
  - Jim Hawk, Professor, Department of Plant & Soil Science, University of Delaware
  - Tecle Weldekidan, Associate Scientist, Department of Plant & Soil Science, University of Delaware
  - Travis Frey, Graduate Student, Department of Plant & Soil Science, University of Delaware
  - Kelvin Grant, Ph.D. Candidate, Cornell University

Other activities:

- Sussex County Master Gardener Demonstrations
- Sick Plant Clinic
- Weed Identification Area
- 4-H Farm Animal Display
- Sussex County Safe Kids Day

APPENDIX II AERIAL IMAGES OF THE CENTER 1937, 1961, 1992, 2005



1937 aerial photo of what would become the Agricultural Substation in 1941.

1961 aerial photo with large fruit tree plantings. Primarily apples, with some peaches, the orchards were used for variety testing as well as insect, disease and weed control studies.

1992 aerial photo showing the research plots and the original office complex with adjacent poultry houses. The USDA Poultry Lab is in the lower left, north of the main road, Rt. 9. The fruit trees no longer exist.

2005 aerial photo showing the new Elbert N. and Ann V. Carvel Research and Education Center, adjacent to the farm buildings.

APPENDIX III

CHRONOLOGY OF BUILDINGS

FARM BUILDINGS, OFFICE BUILDINGS, DWELLINGS	DATE	COST
Original Substation Office (2 Story Cement Block)		
West Wing for Extension and Research Staff & Attached Meeting Room	1945	$ 25,096.70
East Wing for Extension and Research Staff	1958	Unknown
Front Wing connecting East and West Wings for Extension Staff; includes a Reception area and small Conference Room	1974 1980	" $ 66,000
Elbert N. & Ann V. Carvel Research & Education Center	2006	$ 7.6 million
Poultry House # 1	1942	$ 6,513.30
Poultry House # NE-8	1947	$ 2,700.00
Poultry House # 2	1956	$ 6,400.00
Poultry House # 3	1958	$ 7,273.65
Poultry House # 4	1958	$ 7,166.50
Poultry House # 5	1963	$ 3,871.70
Poultry House # 6	1964	$ 3,871.70
Farm Shop & Machine Shed – Frame with Aluminum Siding	1945	$ 3,315.60
Packing House, Office and Laboratory – Cement Block	1951	$ 4,794.70
Granary – Pole Type with Aluminum Siding	1962	$ 1,754.00
Farm Manager's House	1947	$ 2,232.45
Dwelling # 2 – Original Frame Farm House – demolished – replaced by Poultry Flock Supervisor Home – Converted to Conference Center	1900	unknown
Dwelling # 3 – Frame, Asbestos Siding	1945*	$ 1,102.75
Dwelling # 4 – Frame, Asbestos Siding	1945	$ 1.456.55
Dwelling # 5 – Frame, Asbestos Siding	1945	$ 1,500.80
Dwelling # 6 – Frame, Asbestos Siding	1945*	$ 1,303.15

**- These were Civilian Conservation Corp Huts moved to the University Substation and remodeled into dwellings. This dates them back to the 1930s.*

APPENDIX IV

NOTICE OF NON-DISCRIMINATION, EQUAL OPPORTUNITY AND AFFIRMATIVE ACTION

The University of Delaware does not discriminate on the basis of race, color, national origin, sex, disability, religion, age, veteran status, gender identity or expression, or sexual orientation in its employment, educational programs and activities, and admissions as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware prohibits sexual harassment, including sexual violence. Inquiries or complaints may be addressed to:

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Newark, DE 19716
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(302) 831-4643

OR contact the U.S. Department of Education - Office for Civil Rights
(https://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm)

SOURCES AND PHOTO CREDITS

- Archives and Records Management, University of Delaware
- Board Minutes
- The University of Delaware: A History, John Munroe
- Progress through Research Annual Summaries
- Various CANR/Substation/Extension/Carvel Publications
- Photo Services, University of Delaware
- Delaware Public Archives, Delaware Agriculture Museum
- The Carvel Research and Education Center, University of Delaware

ACKNOWLEDGMENTS

ED KEE went to his first Farm & Home Field Day in 1971 and was immediately captivated by the mission of agricultural extension and field research. He has three degrees from the University of Delaware: a Bachelor of Science in Agriculture, 1973; a Masters of Science in Plant & Soil Science, 1975; and a Master of Arts in Liberal Studies, 1996.

Ed was the Farm Manager of Nassau Orchards from 1975 to 1978. He joined the University of Delaware Cooperative Extension Service as the Kent County Agricultural Extension Agent from 1978 to 1982. He was then posted as the Extension Vegetable Crops Specialist from 1982 to 2008, located at the Agricultural Substation. Ed served as Delaware's Secretary of Agriculture from 2009 to 2017.

It is an honor and a great pleasure to write the history of a place that has meant so much to so many people, including me. *Halsey Knapp*, a farmer near Lewes took me to my first field day. *Alvin Warner*, the farm manager when I was doing field studies at the Substation as part of my master's degree demonstrated the power of cooperation in doing research. *Dr. Vernon Fisher*, my graduate studies advisor, saw the Substation as a tremendous asset and an important part of the Land Grant Mission. *Dr. Sam Gwinn*, Director of Cooperative Extension from 1962 to 1984 hired me as the County Agent and then moved me to the Substation as the State Vegetable Specialist. I knew I was at home immediately. Those four individuals represent my early linkage to the Center. I am so thankful for the series of decisions and circumstances that led me to what was to be the Carvel Center.

The opportunity to write *"The Agricultural Gem in Sussex County for the Diamond State"* arose from a conversation with *Dr. Mark Isaacs*, Director of the Carvel Center. After authoring "Cultivating a Legacy", a history of the University of Delaware College of Agriculture and Natural Resources, writing about the Agricultural Substation, the Research and Education Center and now the Carvel Center seemed like a natural. I truly appreciate for the opportunity – thank you Mark.

Having original materials to work with is crucial to a project like this. *Barbara Gordy Stephens*, who worked for forty-six years at the Center did a great service in collecting, organizing and finding a safe, secure place for documents, photos, memos, retirement party programs and much more. Her care and diligence with these resources helped make this project work.

Thank you to *Dr. Mark Rieger*, Dean of the College, for not only his support of the project, but for his great work of bringing the College back to a place dedicated to all three components of the Land Grant University – teaching, research and education. Dean Rieger has been a beacon of common sense, fairness and enthusiasm.

Carrie Qualls' skills as a graphic designer brings this book to life and makes it accessible to the reader. Carrie has been a great partner in presenting the story of first the College through "*Cultivating A Legacy"* and now, *"The Agricultural Gem in Sussex County for the Diamond State."*

Thank you, *J. Frank Gordy, Jr.*, who brought to light so much about his father and about the early years of the Substation, including insights about the first farm manager, *Emmor "Jack" Turner*.

Jay Windsor and *Derby Walker* both provided much background and understanding of the role of County Agents over the years. Now retired, besides being so informative, they were fun to interview.

All the current staff were eager to share what their work was about. Twenty-five members of the current Carvel Center staff were interviewed and articulated very clearly what they do, why they do it and how they do it. This is compiled in the *"Today for Tomorrow"* section in order to provide future readers a sense of what went on here in the 2010s. They are in no particular order as all were equally important to the narrative: *Cory Whaley*, *Tracy Wootten*, *Mark VanGessel*, *James Adkins*, *Karen Adams*, *Sharon Webb*, *Gordon Johnson*, *Emmalea Ernest*, *Alyssa Koehler*, *Kim Lewis*, *Jarrod Miller*, *Tammy Schirmer*, *David Owens*, *Georgie Cartanza*, *Dan Bautista*, *Kim Allen*, *Kathy Phillips*, *Jill Jackson*, *Lindsay Hughes*, *Nancy Mears*, *Vic Green*, *Ward Harris*, *Brian Hearn*, *Lisa Collins* and *Stephen Collier*. Thanks to *Michelle Walfred* for photographs of the current Carvel Center team, as well as several historical photos from the Center's photograph collection. *George Chaloupka*, also retired and a great interviewee, provided photographs, decades of experiences and was a terrific reviewer of who's who in the photographs.

Finally, thank you to the farmers who shared their views about the role the Center has played over the years. *Keith Carlisle*, *Cliff Murray*, *Ray Vincent* and *Walter Hopkins* represent families that have interacted with Center staff over three generations.

– June, 2019

CARVEL RESEARCH AND EDUCATION CENTER

HOME to SUSSEX COUNTY COOPERATIVE EXTENSION

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